biofeedback game prototype in which the player is connected to a physical space's functionalities (Walz et al. 2005). At the same time, research in entertainment media and game design can benefit from ludicly-inclined architects who conceptualize programs geared toward, for example, mobility, place-making, future learning, or problem simulation, regardless of whether the programs are executed virtually, physically, or in hybrid situations, using high or low technology.

PLAYSPACE

Playing is a special type of human activity – an anthropological constant. In order to think about the nature of play, we must clarify beforehand that there is, of course, a difference between the terms play and games, although languages such as French or German do not differentiate between the two. In German, there is only one noun, Spiel, which is used when speaking of both game and play, and one verb, spielen, meaning both to play and to play a game. Our discussion of play in this book is based on the assumption that play is the foundation of a game, and that neither can exist without the other.

We look at games and play as human practices in space, and in doing so, initially examine play in the context of architecture. What are the parameters of play? To what practices does play give rise? How do we design the space of play, and how does play relate to games? What are, in total, the dimensions of a conceptual playspace?

In this section, we outline the dimensions of this conceptual playspace in order to move closer towards answering these questions. The approaches applied vary and include theories and findings from a variety of fields so that throughout the course of the examination, we develop our own definition of play by way of the following subsections:

- **Play as ambiguous category: The ideologization of the term play is discussed, on the one hand following up on a prevalent academic discussion initiated by Sutton-Smith (1997), and on the other hand underlining that play is subject to contextual and rhetorical uses all across the sciences.**
- **Play as subjective experience: Without the player, there is no play in space, and when designing (game)play, participatory design methods are crucial to creating an enjoyable ludic activity (Fullerton 2008). This subsection elaborates on both these assertions.**
- **Play as modality: Beyond the subjective experience, play takes place either in a physical, imaginary, virtual, or hybrid setting. A model inspired by Bartle (2004) is introduced that organizes these aspects of playspace.**
- **Play as rhythmical kinesis: In this subsection, we develop an architecturally-framed definition of play. Towards this end, we briefly consider notions of movement and rhythm in architecture before examining dance as movement because it allows us to speak of both a spatial and a playful activity. Eventually, with the help of Game Studies pioneer Buytendijk (1933), we propose looking at play as a particular kind of rhythmic movement that can be physical or virtual and that connects the player with the play-environment and a play-other. This way of looking at play allows us to think and speak of it in terms of space and architecture.**
- **Play as enjoyment: Against the backdrop of our kineticist model of play, we reflect on and cross-compare pedagogical, anthropological, and game design taxonomies of play stimuli and player types (e.g. Fritz 2004), deriving an extended model of play pleasure. In addition, we review representative aspects of play enjoyment, including absorption and perceived difficulty.**
- **Play as designed phenomenon: We discuss, representatively, how given physical environments are perceived to be play-suitable and feature positive valence (Hendricks 2001).**
- **Play and games – games and play: We elaborate on the interrelation of play and games in order to bridge to the following section, in which we scrutinize both the formal nature and spatiality of games.**

Taken as a whole, this section prepares us to identify and review existing concepts of space and spatiality with regard to games. In this context, games are understood as formalized systems of play.

1. The Ambiguity Dimension

In the past, the phenomenon of play has been investigated by many scholars from a wide variety of fields. In Homo Ludens, cultural anthropologist Johan Huizinga argues that human culture itself bears the character of play, suggesting that play is not only of

prime importance to, but also a necessary condition for, enculturalization (1939/1971). With regard to the design of the built environment, we read Le Corbusier's oft-cited claim from Vers une Architecture that "Architecture is the masterly, correct and magnificent play of volumes brought together in light" (Le Corbusier 1928/2008:102), establishing "stirring relationships" (1928/2008:194). Reflecting on the information age, William J. Mitchell plays on Le Corbusier's belief in progress, stating: "Architecture is no longer simply the play of masses in light. It now embraces the play of digital information in space" (Mitchell 1999:41).

But what is play? Developmental psychology, for example, has long concluded that for human children, play involves imaginary situations mandatory for learning and child development (Vygotsky 1978:93). Indeed, Piaget (1951) found that play is important for deep learning, which has led contemporary educational learning theorists to claim that, generally speaking, "players are also learners" (Becker 2007:24), even more so when playing well-designed games that are capable of creating intrinsic motivation in the player (2007:25).

In order to better understand play, let us take a step back and consider the words of game design scholars Salen and Zimmerman who point out that many "studies of play focus on identifying the function or purpose of play. The implicit assumption is that play serves a larger purpose for the individual psyche, the social unit, the classroom, the species, and so on" (2004:309). This finding – that play is best explained by demonstrating that it defers to another concept – can be fine-tuned against the backdrop of an already classic study by Brian Sutton-Smith based on "overwhelming evidence that the meaning of games is, in part, a function of the ideas of those who think about them" (Avedon 1971:438). In The Ambiguity of Play (1997), the social science of play pioneer and professor of education dissects the varied, rhetorical uses of play across disciplines and purposes. Play, Sutton-Smith argues, is an ambiguous term. It is used in different contexts with different underpinnings, often shadowing activities and describing them imprecisely and vaguely, thereby persuading the audience to think of the process or activity ambiguously. Thus play cannot be explained by defining the way it functions, but by identifying those who use it as a means to convey a certain communicative strategy (1997:3).

An architectural theorist, for example, is likely to bring architectural meaning to the study of games and play and naturally, will want to define and possibly explain playing in terms of space. In his excellent meta-study, Sutton-Smith goes even further, claiming that "practically anything can become an agency for some kind of play" (Sutton-Smith 1997:6). To support this argument, Sutton-Smith lists activities that are said to represent forms of play or experiences of play, ranging from private to very public:

- **mind or subjective play;**
- **solitary play;**
- **playful behaviors;**
- **informal social play;**
- **vicarious audience play;**
- **performance play;**
- **celebrations and festivals;**
- **contests, i.e. games and sports;**
- **risky or deep play (ibid.).**

Based on Sutton-Smith, we could presume that there is no such thing as a biological nature of play, since a given rhetoric of play only serves as a communication strategy – that is, a means to an end. The Ambiguity of Play reminds us that whenever someone uses the term play, we should pay careful attention to the context in which the term is used.

2. The Player Dimension

In addition to the ambiguity of play discussed in the past subsection, the playspace we describe here always embodies a player and, by extension, subjectivity. Without a player, there is no play; and even more importantly, subjectivity in play has a particularly important role. Let us briefly investigate this role in the context of both design methods and empirical findings in human-computer interaction.

2.1. The Diversity of Players and Player-Centric Design

On the one hand, we can derive this special role of the player from the diversity of players: there are infant, preschool, childhood, adolescent, and adult players, all of

whom play somewhat differently. There are male and female players. There are gamblers, gamesters, sports, and sports players, and there are playboys and play-girls, playfellows, playful people, playgoers, playwrights, playmakers, and playmates (Sutton-Smith 1997:5f.).

The diversity of players is obvious in less designed and more subjective play experiences, and the audience plays an even more important role in designed play as well as in games. In game design, and in particular in the design of digital games, player-centrism is just one of many approaches – like, for example, market-driven or technology-driven approaches – favored because it usually produces the most enjoyable experiences (Adams and Rollings 2006). A player-centric approach understands and designs ludic activities from the point of view of the player. Fullerton underlines that playtesting – a design method in player-centered design – "is the single most important activity a designer engages in (...). Play testing is something the designer performs throughout the entire design process to gain an insight into how players experience the game" (2008:196).

Whether conducted quantitatively with the help of questionnaires or game-play log files or qualitatively with the help of video taping, narrative interviews, or participant observation and field diaries, playtesting helps to improve a designed ludic activity. In addition to creating a game experience that entertains, a designer of a ludic product must understand, as thoroughly as possible, the player's expectations, motives, and needs. Another duty of the player-centric game designer is to comprehend the player's background, mindset, and desires and to empathize with the player by imagining what it will feel like to experience the game, cf. Adams and Rollings (2006:38).

In an article about pervasive game design, this author has listed a number of questions that illuminate core challenges in considering the player dimension of playspace at the beginning of a project, even before a design idea has come into being:

- Who is the player? What is the typical player's background? How would you describe the player – as a competitor, a contemplator, a strategist, a socializer, etc.? What kind of medial and technological expertise does the player bring to the game?
- What are the player's primary and secondary activities before, during, and after the expected game situation? What are the player's motives for being where he or she is and doing what he or she does outside of the game? How will the game change this?
- What are potential concerns the player may have with regards to playing? What is the player's "gameness," including allotted time, budget, theatricality, and constraints?
- (When) Does the player have company?
- Where is the player, and how does he or she move about? At what pace? What is the activity space of the player in his or her current location? (Walz 2007:106).

Two historical roots of player-centrism in digital games will be briefly outlined in the next two sections. Understanding these roots is a prerequisite to reflecting on the role of participatory design in architecturally-framed play, as we will see in the last subsection of the player dimension discussion.

2.2. Human-Centered Design and Situated Action

The concept of player-centered design emerged in conjunction with the concept of a "user-centered" approach to design (Norman and Draper 1986). Today, user-centered design is commonly referred to as a human-centered design approach and appears frequently in interactive system design. Both human-computer interaction experts and game designers have long recognized that human-computer interfaces and interactions should be designed iteratively (Buxton and Sniderman 1980; Nielsen 1993; Gould and Lewis 1985; Adams and Rollings 2006; Fullerton 2008) because the requirements for an interactive system cannot be completely specified at the beginning of the lifecycle (Dix et al. 1998). Instead, designs need to be prototyped and tested by actual participants or players so that any false assumptions or unforeseen problems will be revealed. These problems can then be corrected in the next iteration of the prototype, which should then again be tested to ensure that the problems are truly resolved.

The player-centric and human-centered approach are complemented by the concept of "situated action." Together, they have shown empirically that we can only understand human action as the result of a social situation and thus through the subjectiveness of the experience of that situation. This applies to human-machine communication as well. In her book Plans and Situated Action (Suchman 1987), Lucy Suchman develops a

human-computer interaction theory that takes into account results from cognitive science research and Suchman's own experimental work – including, for example, her studies of and designs for Xerox machine interfaces. In the book, Suchman rejects the view that action is pre-planned and argues instead that plans for acting towards a situation can be seen as resources. Suchman shows that people act not prescriptively, but according to social and material contexts – that in fact, their actions are entirely influenced by their situational contexts. Behavior can thus be described as "situated action." Machines, then, are not just "things," but rather co-creators of this situatedness (1987:55ff.). Building on Suchman, Reeves and Nass (1996) conducted empirical experiments that popularized the notion that people treat computers, television, and other media as if they were "real" people and "real" environments, taking for granted that which a given medium conveys. In other words, the notion that media have become indistinguishable from real life:

Media are treated politely, they can invade our body space, they can have personalities that match our own, they can be a teammate, and they can elicit gender stereotypes. Media can evoke emotional responses, demand attention, threaten us, influence memories, and change ideas of what is natural. Media are full participants in our social and natural world (Reeves and Nass 1996:251).

Stanford University researcher BJ Fogg – who studied under Nass and Reeves – has taken this kind of research even further. In the context of researching and developing persuasive technologies, Fogg more precisely categorizes how people respond to virtually all computing products: "Interactive technologies can operate in three basic ways: as tools, as media, and as social actors" (Fogg 2003:22).

Both Suchman, Reeves and Nass, and Fogg have empirically demonstrated that to a given audience, a medium or communicative properties of this medium are not perceived, say, on a physical-virtual continuum ("More virtual" – "Less virtual"), but rather in a straightforward situated fashion. In addition, all three parties recommend that designers take these phenomena into account during their design processes.

2.3. Conclusion: The Player in Architecture

The player is central to designing an enjoyable ludic activity. The player is also central to understanding the role of play outside of a particular situation. The player dimension of an architecturally-framed notion of play underlines the humanity of play and challenges architects' thinking about play to include participatory design methods into their repertoire.

Beginning in the 1920s, when increasing urbanization of Western society spawned the systematic research and development of modern design, modernists like Theo van Doesborg of the Dutch art and architecture group De Stijl began calling for a system of art and design based on rationality and objectivity (cf. Cross 2007:41), and architect Le Corbusier proposed that a house is an objectively-designed "machine for living" (ibid.). Cross: "[In De Stijl and Le Corbusier's philosophies], and throughout much of the Modernist Movement, we see a desire to produce works of art and design based on objectivity and rationality; that is: on the values of science" (ibid.).

Yet, this spirit of merely rationalizing the player is slowly changing. Since the 1970s, several approaches have demonstrated how architecture and urbanism can profit from participatory design thereby creating a new kind of proximity between people and the built environment. Recent examples include:

- **The Kaisersrot[7] research and software developed at the ETH Zurich, which integrates the computer as a "consensus-machine" that generates and optimizes design solutions for both individual buildings and large-scale urban design, processing stakeholder wish lists so that an equilibrial state is reached (Lehnerer 2007).**
- **When used for participatory city planning, "scenario games" in the spirit of Buckminster Fuller's World Game can contribute to successful placemaking as well as increase awareness for environmental hazards (Bunschoten 2007).**
- **Rule-based, participatory urban planning implies "a partial loss of authorship" for architects and urban planners, but gives individuals more freedom to choose and influence sites (Christiaanse and Lehnerer 2007:373).**

As the built environment becomes increasingly computationally equipped, the player dimension of playspace will become more and more important for architectural design. Designers should always be aware that they never design the actual player experience, only the framework wherein that experience will take place.

3. The Modality Dimension

As a human activity, the act of playing is naturally subjective. Even in the virtual world of God of War (Sony Computer Entertainment 2005), the player "is" the player-avatar Kratos, though really, he or she is only being represented by a graphical and animated figure. Peter Vorderer has summed up this duality of subjective representation, finding that games – and video games in particular – synthesize entertainment media and toys, placing the player in the role of witness on the one hand, and the role of participant on the other (Vorderer 2000:30f.).

Although we introduced player-centrism as a guiding design and analytical principle in the last section, it is still necessary to differentiate player-centrism into several modalities of playspace representation. This becomes particularly important when we consider the advent of pervasive games, which ubiquitously superimpose physical space with interactable computer-generated interfaces and content.

Inspired by virtual-world design pioneer Richard Bartle (2004), we assume the following modalities:

- **Physical: Players, spaces, and objects that are material.**
- **Imaginary: That which is not material.**
- **Virtual: That which is not material but has the form or effect of that which is material.**

From this model, we can deduce that "Virtual worlds are places where the imaginary meets the real" (Bartle 2004:1). Virtual worlds are implemented by a computer – or a network of computers – "that simulates an environment" (Bartle 2004:1). In our reading, this notion of virtuality includes Web phenomena such as Websites. Pervasive – or, interchangeably, ubiquitous games – pervade virtuality so that play activities are (permanently) superimposed on the physical world. As a result, a new modality emerges, which we propose to describe as follows:

- **Hybrid: That which is not material but has the form or effect of that which is material mixed with that which is material to the extent that one can no longer be separated from the other without losing its form or intended or emerging effect.**

Using these modalities, we can say that a player plays in a physical, imaginary, virtual, or hybrid modality and thereby encapsulate the modality dimension of playspace. From the subjective perspective of the player, though, modality will not matter much as long as the player experience remains playful and unbroken.

4. The Kinetic Dimension

The context in which we will discuss play in this subsection is that of movement; the goal is to show how play, movement, and rhythm interrelate and, based on this demonstration, to formulate a working definition. As mentioned above, this approach also attempts to demonstrate how play and architecture share the properties of movement and rhythm at their core. In order to do so, we will now discuss notions of movement and rhythm in architecture, after which we will take a look at an exemplary notion of movement and rhythm in a field closely related to play – that is, dance – so that finally we can discuss at length the function of movement and rhythm in play itself.

4.1. Notions of Movement and Rhythm in Architectural Theory

By thinking of play in terms of movement and rhythm, we attempt to think of play architecturally as a rhythmic activity tied to and enabled by space and objects in space and itself a producer of space. We hypothesize that implicitly or explicitly, movement and rhythm appear across design ideologies in architectural theory and practice, can be considered to lie at the core of designing a built environment, and serve as a pre-condition for spatiality. In the following section, examples from contemporary and often conflicting architectural theories and practices will prove the truth of this hypothesis. These examples illustrate different ways that we can think about and define movement and rhythm.

In the Chartre d'Athènes directed at future architecture and urban planning students, Le Corbusier explains that "Architecture is volume and movement" (Le Corbusier 1962:28). In other words, we wander through architecture, and this modality of movement determines how architecture is experienced. Movement places the visitor into positions and involves him or her in processes, guides views, enforces velocity, and presents or conceals parts of the whole. The way we move through a designed

environment is responsible for our expectations of that environment. Thanks to material and immaterial emphases and the ordering of interior and exterior space, movement affects, shocks, or surprises us, reveals secrets, and, most importantly, asks us to actively participate in a space intellectually, physically, and relationally. Le Corbusier believed in dead architectures and living ones; the latter, he argued, present an interlinking of events – rhythms, i.e. pauses and tempi of space and light – that the visitor experiences. The result is that the visitor is affected by the space and interacts with it (1962:29f.).

Fröbe (2004) finds that the described promenade architecturale is the central element in Le Corbusier's architectural and urban designs, programming rhythm into the relationship between user and architecture – a play of volumes-in-light for the user, but also with the user. From Marxist and Situationist-related philosopher Henri Lefebvre (1991), we have learned to consider this enacted relationship between a human being and an architecture as more than a rhythmical program of movements without social or political connotation that assumed a universal human being void of ideology. Instead of treating space as a mere aesthetical category, Lefebvre proposes that there are different levels of space, ranging from crude, natural, "abstract space" to "social space," the latter brought forth by the interaction between humans and their surrounding
space (1991:26).

Lefebvre suggests a tripartite constitution of this (fundamentally social) spatiality: the perceived material "spatial practice," the conceived "representation of space," and the "lived" spatiality of the representation itself, called "representational space" (1991:38f.). Lefebvre envisions to evaluate spatial practices with the help of "rhythm analysis" (1991:205), and to experiment with spatial practices rhythmically using the spheres of music and dance. Consequentially, Lefebvre suggests the creation of a "rhythmanalysis" (sic!) discipline (Lefebvre 1996:219ff.), in which the city is analyzed through, for example, the rhythms created by bodies and their movements, daily sleep cycles, gestures, traffic, exchanges, sounds, sudden events such as accidents, festivities, moods, seasons, weather, light and darkness, colors, smells, the present-absent, tides, and waves.

In a fabulous application of Lefebvrian theory to the ludic-landscapist realm of skateboarding, Borden (2001) investigates the movements of gyrating, gliding, rotating, miming, performing, declaiming, climbing, descending, and traversing as a particular "skateboarding-architecture" produced by and between skateboarder and skateboarding terrain. Citing Lefebvre, Borden concludes: "Like music and dance, skateboarding creates 'repetitions and redundancies of rhythms' and 'symmetries and asymmetries' irreducible to analytic thought" (2001:113). To Borden, the interaction enacted by and between skateboarders and their terrain allows us to think of architecture "not as a thing but a flow" (Borden 2001:9).

Borden thereby suggests that the physical concepts of movement and rhythm relate to the psychological concept of "flow" (Csíkszentmihályi 1975), which many consider to be at the core of gameplay situations capable of absorbing players (Chen 2007). Csíkszentmihályi's understanding of flow includes activities designed to make optimal and, most importantly, enjoyable experiences easier to achieve. Flow-inducing activities such as ritual, play, dance, or art facilitate concentration and involvement by way of controllable rules, skill learning, attached goals, and feedback (Csíkszentmihályi 1991:72) – the type of flow that results, we see, is more related to formalized, game-like activities than to playful activities. We will later return to the concept of flow in order to detail how flow is typically induced. Whereas the psychological state of flow is attached to a kind of deep absorption, architectural flow is based on the assumption that a certain type of architecture can cause a rhythmic to-and-fro flow, which need not necessarily result in a psychological flow state. The psychological flow concept is thus not the only way to think about the relationship between player and play-other, particularly not in the context of more lightweight, less formalized play activities.

Writing from a far more functionalistic and, like Le Corbusier's, aesthetisizing standpoint, urban planning theorist Kevin Lynch (1960) concerns himself with the look of cities and the way they present themselves to their dwellers as coherent, visible, and clear – in total, as beautiful and highly "imageable." Lynch suggests that certain large-scale design elements can heighten the city's legibility and facilitate, for example, orientation. In Lynch's view, the more easily a city can be read, the more beautiful it is. Lynch's suggested design elements for achieving this "imageability" include clear, coherent, and visible "paths" (e.g. streets, canals, railroads), "edges" (walls, shores), "districts," "nodes" (squares, street corner hangouts), and "landmarks" (points of reference such as towers and domes) (Lynch 1960:46ff.). This choice of elements

reflects Lynch's belief that fundamentally, "a city is sensed in motion" (Lynch 1960:107).

In a later work about the semantics of the city, What time is this Place?, Lynch (1972) investigates humans' innate conception of time and how it relates to change and reoccurring events – i.e. naturally-generated rhythms such as sunrise and sunset as well as artificial city rhythms in an ever-changing urban landscape caused, for example, by catastrophe, building activities, or demolishing. Lynch finds that time and change create our sense of being alive, and that it is therefore crucial for time and change to be represented meaningfully in the urban landscape. Beyond the timely order created by watches, the rhythm of change must be celebrated and carefully planned – in prototyping environments, for example. Lynch's core idea is thus the "architect of time" who enhances the legibility of time in the city by, for example, visibly layering materials from different eras, planning vegetation in the city, designing shadows that passersby can watch move, or publicly displaying image and film stock that documents change (1972:248ff.).

In keeping with this metaphor of city rhythm, Rem Koolhaas – another, more contemporary European architect (and opponent of Le Corbusier) – glorifies tempo and movement (Trüby 2003), but neither as means to create a relationship between a space and a user nor as means to achieve a Genius Loci, a holistic, site-specific, unique architectural characteristic. Rather, Koolhaas sees tempo and movement as expressions of globalization that assure constant change and the promise of (or excuse for) generic architectures without predefined programs (Koolhaas 2003). For Koolhaas and his concept of the Generic City, it is not only the rhythm of spatial impressions that defines architecture, but also the rapid rhythm of change that dictates how an urbanity should be designed so that it can accommodate both that change itself and the movements causing it.

We can compare Koolhaas' Hollywood-coulisse of the Generic City with Constant's idealistic New Babylon, a Situationist and radical draft for a future city freed from utilitarian labor in an oncoming ludic age: "Completely covered, artificially climatized and lit, and raised high above the ground on huge columns. Inhabitants are given access to powerful, ambience-creating resources to construct their own spaces whenever and wherever they desire. Light, acoustics, color, ventilation, texture, temperature, and moisture are infinitely variable. Movable floors, partitions, ramps, ladders, bridges, and stairs are used to construct veritable labyrinths of the most heterogeneous forms in which desires continuously interact" (Lootsma 2007). In the urban game New Babylon, the city's very structure is subject to change and movement, and the Homo Ludens constantly adventures through this large-scale, inconsistent playground, always on the move.

One current and intriguing example of this vision of mobilizing architectural construction is architect David Fisher's proposal for the Dynamic Towers, two high rise buildings – one in Dubai, the other in Moscow – made up of voice-controlled levels that self-rotate on a horizontal axis so that the building becomes its own power plant and a kind of housing toy: "When human and spatial form(s) relationships become interactive, Architecture comes alive" (Naos 2000).

The architects and urban planners, theorists and practitioners cited above are motivated by contradictory design philosophies, but all acknowledge the key role of movement and rhythm in architecture and urban design – whether they understand these as the movement of the user in relation to the built environment, the movement of chance, or the habitual movement of structural play.

We ourselves can clearly see how the consequences of the mobile age have rubbed off on architectural vocabulary – just think of airports, railways, the Autobahn, motels, car-friendly city planning and zoning, modular furniture, etc. Today, movement – or, metaphorically speaking, liquefaction[8] – also impacts the architectural design process and building service and maintenance. The CAAD group at the ETH Zurich, for example, develops strategies and tools to overcome the container-space "dictate" by way of a total computerization and liquefaction of the architectural development and operation chain. Design drafts for buildings are programmed to achieve "individuality through movement" (Hovestadt 2006:78); CNC machines are employed to "print" pavilions; and networked, programmable structures and functions not only solve spatial composition problems, but also allow for emergent and adaptable (we can say: rhythmical) systems in architecture in building services, for example.

The natures of movement and rhythm interrelate, as can be seen from the above examples, drawn from the fields of architecture and urban planning. They can occur

relationally, aesthetically, topologically, navigationally, socially – in total: strategically. Yet although these philosophies are distinguishable as design rhetorics, we are proposing that all are implicitly or explicitly based on the following intrinsic assumptions:

Architectural Movement

Architectural movement is a relocation process of one or more subjects, objects, or spaces in space over time.

Architectural Rhythm

Architectural rhythm is the variation of measured movements in space over time.

We have now outlined and defined how movement and rhythm are considered in architectural thinking and design, but before we examine notions of movement and rhythm in the study of play in greater detail, we will make a little excursion into a bridging field that embodies, at a fundamental level, both movement and rhythm (see Lefebvre and Borden) and play: that is, dance.

4.2. Notions of Movement and Rhythm in Dance Notation

Play can become a kind of dance. In fact, Huizinga (1987) argues that dance is a particular and particularly perfect form of play: both phenomena are identical in nature. Because this is the case, and because, Huizinga believes, when we mention play, we somewhat imply dance, he neglects to explore the topic at greater depth (Huizinga 1987:181). This is an unfortunate decision on the part of the pioneering game scholar, since a proper understanding of dance would certainly shed light onto the nature of play. Caillois, another giant of game studies, goes a little further, subsuming dance as a kind of play and holding that dancing represents a form of disorderly movement that causes pleasure (and giddiness) and that falls under the greater heading ilinx, play and games based on the pursuit of vertigo (Caillois 2001:25). More clearly than Huizinga, Caillois points at that which constitutes dance: movement. But what is our understanding of movement and rhythm in the study of dance and in and of themselves?

Perhaps the most representative and movement-focused research approach is that of Kinetography Laban or Labanotation, a movement notation system similar to music notation that "indicate[s] the accurate rhythm of movement" (Hutchinson 1977:3). It is particularly intended for the field of dance and generally aims to analyze and "record objectively the changes in the angles of the limbs, the paths in space, and the flow of energy [as well as] movement motivation and the subtle expression and quality" (1977:4).

Labanotation – originally called Schrifttanz, i.e. scribe dance – is named after one of the founders of European Modern Dance and community dancing, the dancer, choreographer, and theoretician Rudolf Laban (1879-1958). Laban developed this visual recording system in the 1920s, distilling basic movements from existing movement sequences and translating these movements into a family of icons. Labanotation holds that movement is the result of the release of energy through a muscular response to an inner or outer stimulus that produces a visible result in time and space. Note that Laban's notation does not record the initial stimulus or the exact muscular response; instead, the change produced by muscular action is recorded. This also includes resulting changes such as the placement of limbs in space-time, body shape, or inner body tensions that accompany the initial change. Dance is thus understood as a language of expressive gestures. One way to notate movement using Labanotation is the Structural Form, which records the body and its parts, space (i.e. direction, level, distance, and degree of motion), time (i.e. meter and duration) and dynamics (i.e. quality or texture – like, for example, strong, heavy, elastic, accented, or emphasized).

Note how Laban's system assumes that the purpose of any action may be to relate to one's own body, another person, an object, or a space (or part of space). The notion of rhythm, eventually, is linked to translating a basic recurrent beat or rhythmic pattern

in music into physical action (1977:16). What does this mean in the context of play?

Because computing technologies allow for the framing and constructing of motion, in real-time digital games, not only does the player prescribe the movements of the player-avatar (or, more generally speaking, the movements of the player-representation), but at the same time, the software program triggers player movements, detecting collision and scrutinizing whether or not the notational instructions are carried out in an orderly fashion. Reflecting on Labanotation, Pias argues that in this context, we can think of gameplay as a kind of dance (2002:34). Based on Pias, but also on Laban, we can propose a more general and more dialectical way to look at play through the lens of dance. First, a stimulus – which can be a solo event, a beat, or a rhythmic pattern – provides the player with something to respond to or with which to synchronize; in response to this stimulus, the player enacts a movement. This movement (or rhythm) places the player in a novel relation to another player, an object, or a space, possibly triggering a response.

Recently, Laban's system has inspired other notational attempts. For example, in her German language doctoral dissertation, Gesche Joost (2006:65ff.) presents a visual notation system as an alternative analysis and information visualization method for a rhetorically oriented film analysis, intended to serve both as a tool and a language that transcends the composition of an opus. A notational system similar to that of Laban or Joost that would allow for the recording and even designing of play or gameplay has not yet been fully conceived, but will be an important topic in future game design research.

Analyzing the relationship between bodily actions and the corresponding responses from technology in two Sony Eyetoy games for the Sony PlayStation 2, Loke et al. (2007) have applied, among other movement-interaction frameworks, the Structural Form in Labanotation according to Hutchinson and other specialists in the field. Their contribution draws on the increasingly phenomenological philosophy in interaction design that all human actions, including cognitive acts, represent embodied action and that the bodily experience of movement is a way to access the world and objects in the world (2007:692). This stance of a "lived space," of course, can be traced back to Lefebvre.

The analysis of the two games – a martial arts game and a musical beat mimicking game – operationalized gameplay into four basic actions: (a) selection (a wave gesture movement); (b) striking a moving object against a fixed target (a reach or flick movement); (c) striking a fixed target (a slashing or punching movement); and (d) striking a moving target (a slashing, punching, slapping, or swatting movement). The authors found that the existing notation did not allow researchers to capture the "lived movement as performed through interaction with the Eyetoy interface" (Loke et al. 2007:700). Therefore, the authors extended the Structural Form to include interface aspects, differentiating body parts into Hands, Arms, Upper Body, Legs, and Support for the movement transcription. This extension makes it possible to transcribe gameplay performance in reference to what Labanotation classifies as a "Dab" effort – a movement light in weight, direct in space, and sudden in time. For example, game events are represented alongside the body staff: a circle represents a flying CD that emerges from the center of the screen moving towards the upper right corner of the screen. In particular with regard to pervasive games that increasingly involve physical body movements, Loke et al. demonstrate how to use Labanotation as an analysis tool and potential game design tool.

Given our human ability to move and to both react to and create rhythm, the discussion of play as movement that follows will certainly resonate.

4.3. Notions of Movement and Rhythm in the Investigation of Play

In his time, German idealist philosopher Georg Wilhelm Friedrich Hegel, who was born in Stuttgart in 1770 and who studied – together with Schelling and Hölderlin – theology in Tübingen, developed a radically new form of logic: dialectic. Dialectic thinking embodies a speculative Denkbewegung – in English, a thinking movement. This movement begins when one thinks about something that exists. Then, from the starting point, a difference or "other" emerges. The movement eventually manages to overcome this difference, thereby producing new knowledge and a new starting point. Hegel's dialectic thus not only posits how opposites unite, but also attempts to explain the constitutive movement and process of all things, material and immaterial – of existence itself (Ludwig 1997). Hegel, we could say, is not only the philosopher of movement who interprets perfectly designed thinking in terms of movement and, conversely, moving in terms of thinking; rather, he is also the philosopher whose dialectical moving describes

a kind of play – that is, a speculation between thesis and antithesis that culminates in the (temporary) fusion through movement of the two initial opposites in a moment of concrete universality (Mitscherling 1992).

Such a philosophical investigation of play-movement could be criticized as either too esoteric or too speculative (though given Hegel's understanding of speculative philosophy, this would not so much be criticism as praise). Sutton-Smith would maybe dedicate a chapter to Hegel called, "Rhetorics of Idealism." Hegel's identification of the special relationship between play and movement, however, only guided later thinking, helping to pave the path towards a seminal and phenomenological work dedicated to the study of games, play, and movement: F. J. J. Buytendijk's Het spel van mensch en dier als openbaring van levensdriften (1932), published in German as Wesen und Sinn des Spieles (Buytendijk 1933). In the following paragraphs, the German language version is used to describe Buytendijk's concepts.

This theoretical work by the Dutch comparative psychological anthropologist presents a structural interpretation of children's and animal's play. Offering many behavioral examples, Buytendijk analyzes how both play and games dialectically transcend the opposition between player and play-other, which can take the form of another player, a plaything, or the environment. Note that this form of dialectical argumentation links Buytendijk to Hegel, although the former does not reference the latter. Buytendijk himself, though, is referenced by Johan Huinzga in the opening pages of Homo Ludens (Huizinga 1971:10).

There, Huizinga criticizes Buytendijk for explaining play as a seconding vehicle that serves a biological purpose, arguing that this kind of theory fails to investigate the holistic nature of play and games, what and how they are, and what they mean to the player (1971:12). Given Huizinga's general stance, this is certainly a valid judgment: Huizinga proposes that play and games interrelate with human culture, that they are, fundamentally, the base and factor of culture, finding their expression in myths and rituals, law and order, traffic, handicraft and art, poetry, scholarship, and science (1971:13). Perhaps it is because of Huizinga's unfavorable review – and the wide influence of Homo Ludens – that Buytendijk's work appears to have never been properly translated into English and is seldom, if ever, cited by researchers.

The impression Huizinga gives us of Buytendijk is, however, to some extent misleading. Buytendijk does indeed ask: "What is play? What are games? And why do we play?" (Buytendijk 1933:9ff.). And in the foreword to the German translation of his work, Kurt Lewin, a leading modern pioneer of social psychology, underlines the work's breadth of perspective; "weltmännisch," Lewin calls it (Lewin 1933:8), in English, "urbane," arguing that it attempts to explicate the general lineaments of play and games. Of course, Huizinga is right about Buytendijk's biologistical argument, which mainly attempts to illustrate how play and games span human (child and adult) and animal behavior, connecting the two, and how play and games can be interpreted psychologically and anthropologically as expressions of life drives in both humans and animals. Huizinga dismisses this framework as common knowledge (Huizinga 1971:11). But like Huizinga, Buytendijk understands "man as player" from childhood to adulthood, always seeking to understand play as passively expecting or actively seeking luck in life (see a late article by Buytendijk that appeared in the architectural magazine Deutsches Architektenblatt, in which he examines the meaning of play and games (Buytendijk 1995)). Yet, for Buytendijk, the "primitive" play and the rule-based game both pursue fictional, "as-if" purposes (Buytendijk 1933:159).

That Kurt Lewin wrote the foreword to the German translation of Buytendijk's book is not a coincidence; before we proceed with a presentation of Buytendijk's work, we must first make a small digression to introduce Lewin's relevant ideas and briefly trace the history of their reception. This will allow us to better appreciate the impact of Buytendijk's theory of play and games and the concept of movement therein.

4.4. Excursus: Movement by Valence and Affordance

Kurt Lewin's early work – the portion on which we will concentrate – is concerned with the stimulative nature of objects and environments in relation to a subject. In the 1930s, Lewin tried to develop a formal, non-mathematical heuristic for psychology. The foundations for this language were presented in English in his book Principles of Topological Psychology (Lewin 1936), the first in a series of works dedicated to explaining the situational behavior of a person in terms of the forces (or vectors) acting on him or her. Five years earlier, however – that is, two years before Buytendijk published Wesen und Sinn des Spiels in German – Lewin had already published (in German) several major ideas inspired by his experiments with children, cf. Lewin

(1931/1982).

Lewin's central idea from this time is best paraphrased (and best known) as Lewin's Formula, a highly influential principle in perception and design-oriented areas of the social sciences:

$B=f(P,E)$

where Behavior is a function of the Person and the Environment. Basically, Lewin's formula is an approach to explaining the attractiveness of spaces or objects for motivating behavior in an individual. Lewin's formula builds on the assumption that any given situation models a "force field" in which forces – functional possibilities caused by people, objects, or spaces – act upon an individual from different directions and with different intensities while, at the same time, the individual acts back. To describe a single defining force in such situations, Lewin introduced the term "Aufforderungscharakter," or "stimulative nature," usually referred to simply as "valence."

Valence addresses the phenomenon that properties of objects or environments are either positively or negatively motivating actions and that thereby, objects – including toys, the topic of Lewin's research at the time – and environments trigger movement and determine the direction of behavior in any individual (Lewin 1931/1982:177). The valence of objects and environments can be attractive or repulsive to a person, thereby determining situational movement – for example, reaching for a toy or climbing onto something (ibid.). On a larger scale, valence also causes locomotion from region to region within a field or from one field to another. In all cases, valence adheres to an individual's wants and condition. To describe the sum of force fields in a person's life, Lewin later introduced the term "hodological space." This space can be expressed in the form of a psychologically defined topology in which paths and vectors between fields represent not the shortest paths, but the paths of least resistance (Lewin 1982:66f.).

Note that the concept of the stimulative nature of objects and environments was also the inspiration for Gibson's "theory of affordances" (Gibson 1977), which we mention here to demonstrate the historical evolution from Lewin to today. Yet in this work, we will focus more on Lewin's valence theory.

Using the neologism "affordance," Gibson explains that physical objects and environments have latent and objectively measurable "action possibilities" that allow and animate – i.e. "afford" – an agent to perform an action. Affordances, then, can be thought of as natural relationships between an agent and the world. Action possibilities, then, depend on the agent's ability to recognize these affordances and carry them out. Note that Gibson's reading of allowance implies that an object or an environment can become actionable in virtually every way the agent wants it to and is capable of making it. For example, a soccer ball can be rolled or kicked, but also sat on or used for something less obvious. This plethora of possible relationships between agent and object or environment underlines that in Gibson's reading, an affordance need not
be visible.

This kind of natural, objective, and visually-based possibility of interactions between an agent and an object's or an environment's gestalt, surfaces, colors, layout, or textures differs from a second, widely popular approach to the principle of affordance. Norman (1990), in a designerly publication, limits action possibilities to an affordance that is easily discoverable by an individual. Such an affordance "suggests" an activity and, according to Norman, can thus be considered "good" design.

The difference between these two understandings of affordance, although not explicitly stated, can be seen in the Affordance entry in the Universal Principles of Design. There, Lidwell/Holden/Butler (2003:20) offer the example of round wheels being more conducive to rolling than square ones and of a door handle affording pulling in that it suggests the act of pulling, by the way of form factor, position on the door etc. Whereas in product design, the designer works with physical objects such as door handles that can have both actionable possibilities and perceived affordances, in screen-based design, designers needs to make sure that "clicking on [the] object is a meaningful, useful action, with a known outcome" (Norman 1999:40).

In addition to the principle of perceivable affordance, as exemplified with the door handle, further design principles for so called "user-centered design" (a term coined by Norman 1990) include the following:

- **providing a good conceptual model for the participant, featuring a consistent**

presentation of operations and results and a consistent system image geared towards the goal of assuring understandability and coherence of design;
- making things visible;
- designing good mappings so that the individual can determine the relationship between actions and results;
- providing feedback for the participant concerning the results of actions (Norman 1990:52ff.).

Norman's work has become a major textbook in the disciplines of human-computer interaction as well as in interaction, graphical, and industrial design. His concept of discoverable affordance has, in other words, become commonplace and well-loved for the way it stresses understanding the participant's goals, plans, values, beliefs, prior experiences, and embeddedness as a kind of ecology that can assist in motivating an agent to interact with an object or an environment (Gibson 1979).

In his philosophical quest to discover a way to create the ideal of an experienced serendipitous space for each individual through dwelling, Otto Bollnow (1963) demonstrates Lewin's importance for architectural building. Bollnow extends Lewin's hodological space, which focuses on paths, with the concept of an activity space experienced by the individual via walking paths, a totality of nodes, and, ultimately, human hands that enable the individual to hold on to and grab objects in space (1963:202ff.). This activity space, Bollnow reasons, requires "leeway,"[9] (1963:210ff.) which designers must grant – for only when they do, and man settles in a space to truly dwell in it, trusting both in the building and in the greater context, can "true living" be achieved (1963:310).

This brief digression demonstrates how Lewin's legacy can be traced not only in psychological disciplines, but also in the context of mediated interactions and in architectural theory. It also provides a rough-and-ready preparation for better understanding the relationship of games and space and the impact of Buytendijk's concepts, some of which we consider cardinal for the study and the design of games. Time and again, we will refer to Lewin and the stimulative nature of objects and environments discussed above. And now, we will end our digression and proceed to introduce Buytendijk's ideas.

4.5. Play as Movement and Putty between Player, Object, and Environment

Based on extensive observation of both children and adults as well as young animals, Buytendijk infers that all play and all games are executed through movements. These movements, he further contends, represent not only a means to an end, but also a substantial component of the ludic activity and as such, can be both "real" and "virtual" (Buytendijk 1933:62).

To illustrate this, Buytendijk discusses the game of chess, which seems to be void of physical, or "real" body movement, and instead features "virtual" movements (1933:63f.). This view roughly coincides with the definition presented at the beginning of this book, which, in accordance with Bartle (2004), defined the "real" as that which is, the "imaginary" as that which is not, and the "virtual" as that which is not real, yet has the effect or form of something that is real. According to Buytendijk, the movement of the chess figure is not actually a physical movement of the body, although it could be argued that moving one's arm, hand, and fingers does, in fact, constitute physical movements. But for Buytendijk, the movement in chess is symbolic and, in being symbolic, virtual: the chess pieces symbolize a real king, a real queen, a real battlefield, etc. Although chess is a board game and, as such, not implemented by a computer, it is nonetheless a virtual game that simulates an environment.

In order for play and/or a game to take place, there must be movement. This movement has its roots in Bewegungsdrang – in English, an urge for movement (roughly, motor activity) – composed of two related phenomena: liking to move and needing to move' (1933:67). Buytendijk identifies qualities of these movements, the most important of which follow:

- All play is play with something or someone, and togetherness takes place through movement (1933:44). Without an entity to play with (including oneself), there is no movement and no play.
- The dynamic of all play is created through the balanced alternation between tension and termination (Lösung, or solution) (1933:122).
- The dynamic of play has its roots in surprise – that is, the "wayward variety" (1933:115) of the entity against or with whom the player plays. Play means not only that a person plays with something, but also that something plays with that person (1933:117).

- **In order for play to take place (through movement), there must be repetitive Hin und Her, to-and-fro, between player and play-other (1933:70). The nature of play, then, is rhythmic. That is: play comprises ordered measurable movements between player and plaything. This to-and-fro can take place, for example, within the player; or between a chess player and chess figure; or between a soccer player and soccer ball; or between lovers. Qualities of movement include, for example, intensity, pace, proportion, and pattern, taking place during the amplitude between tension and termination (1933:particularly pages 62ff. and 114ff.). In consideration of our earlier discussion about movement and rhythm in architecture and dance, we can state, then, that play and dance are related by rhythm, and that through rhythm, interaction unfolds, like a dance between two entities. Buytendijk himself considers dance to relate to play in that both feature rhythmic movements, but argues that dance, like swinging and oscillating, is far more rhythmically explicit in the way that its tension and termination are organized (1933:120).**
- **Play occurs through an internal drive that seeks deliverance and/or is triggered by allurements in the play-other (1933:100) – that is, "juvenile dynamics" (Buytendijk 1933:114ff.). The desire for environmental and object attachment (1933:146) explains why play takes place in the first place. Rule-based play consolidates play-movements so that games become more ordered – become, so to speak, "adulted" play (1933:151f.).**
- **Every type of play requires some kind of playing field, and many types of play entail play rules (1933:118).**
- **The playing field defines the outer borders of the dynamic to-and-fro of play and constrains the movements spatio-temporally (1933:118f.). Note how this concept of the playing field mirrors the concept of the magic circle put forth by Salen and Zimmerman (2004), who borrowed the term from Huizinga (1971) and adjusted it to their needs of their argument.**
- **Play rules are the virtual inner borders of the to-and-fro that define what cannot happen during play (as opposed to defining what has to happen) (Buytendijk 1933:119).**

Even if we do not accept the basis of Buytendijk's argument because it seems all too biologistical, and even if many of his assertions are tied to the study of child and animal play, following the communicative strategy of a "progress rhetoric" (Sutton-Smith1997:42), the qualities of play he lists, taken by themselves, are inspiring and contribute significantly to the contemporary (English-language) discourse in game studies and game design, which has always overlooked Buytendijk, the "other" Dutch pioneer.

Bearing Buytendijk in mind, as well as our discussion of movement and rhythm in architecture and dance notation, we can think of play as an activity tied to movement in which we react to rhythm and strive to act rhythmically. This notion is quite similar to the argument that regardless of whether interacting with toy, puzzle, or game, a player strives to recognize and master patterns because "Once we see a pattern, we delight in tracing it and in seeing it reoccur" (Koster 2005:27). If Koster is correct in saying that "Fun in games arises out of mastery. It arises out of comprehension. It is the act of solving puzzles that makes games fun. In other words, with games, learning is the drug" (Koster 2005:40), then we can elaborate on Buytendijk's work and say that playing is a fictional practice.

4.6. A Kineticist Definition of Play

Let us reconsider the widely cited definition that "play is free movement within a more rigid structure" (Salen and Zimmerman 2004:304) now that we have examined Buytendijk's observations and discussed movement and rhythm in the preceding subsections. Is the definition valid for our attempt to present an architecturally framed definition of play? We propose an alternative view, for which we borrow some of Buytendikj's concepts, sans biologism and drive argumentation. From Lewin, we borrow the idea of valence. And from architecture and dance notation, we borrow the understanding that movement always implies a relation to a particular space, and that in play, it is subject to a possible rhythmization.

To prepare for our definition, we will first discuss the special role of movement in the context of play, following which we will discuss the formal nature of play rhythm.

4.6.1. Play-Movement

In order to strictly differentiate the term "movement" from the concept of "play-movement," we will henceforth refer to the latter as "kinesis", derived from the Greek "", meaning movement or motion. Let us look briefly at two alternative uses of the

term.

In physics, objects – such as a soccer ball that has been kicked – have extra energy when in motion. This type of energy is called kinetic energy. It is a physical quantity and a function of velocity co-located with the object; it depends both on the inner nature of the object and the relationship between object and so-called inertial frame of reference. Our soccer ball, in other words, is subject to gravity, and when kicked, kinetic energy changes the gravitational field of the ball. In cell biology, the term kinesis denotes the non-directional movement or the illusion of directed movement of a cell or an organism in response to a stimulus like, for example, temperature or humidity; it can also denote a change of activity in that cell or that organism.

In play and the study of play as proposed herein, kinesis refers to all movements, physical or virtual, that a player enacts to relate to a play-other, i.e. another player, a play object, or a play space. Without a play-other, there is no kinesis, and without kinesis, there is no play relationship. At its core, kinesis is a spatial activity because all play-movements imply space. And as opposed to a mere movement, a play-movement is always an attempt to relate to someone or something else. Kinesis thus comprises, for example, pointing, flicking, grabbing, holding, clicking, dragging, pulling, pushing, punching, constructing, maneuvering, walking, running, jumping, stretching, sneaking, ducking, climbing, rotating, aiming, kicking, hitting, combating, assisting, and cooperating, as well as more verbal movements such as trading, bidding, bluffing, negotiating, and, always, imagining.

Unlike creative media such as books or films, digital environments represent space that we can move through: "The computer's spatial quality is created by the interactive process of navigation" (Murray 1997:80). We believe that movement is indeed a central feature of play as a human practice in space that makes it possible to think of play and digital environments such as computer games as being constituted through relational movements.

4.6.2. Play Rhythm

Play rhythm can come into existence via kinetic interactions between player and play-other. In certain cases, the player adjusts to an outer rhythm. Note that the concept of play rhythm differs from the concept of valence. Valence describes positive or negative stimuli. A rhythm describes the process of to-and-fro kinesis between player and play-other.

In our earlier discussion of movement and rhythm we proposed to detail general rhythm types from the point of view of the player. Play rhythmic types, then, indicate how the play rhythm comes about formally, not motivationally. Play rhythmic types express the general play rhythmic relationship between a player and a play-other. We can divide this relationship into the following types:

- **Self-created rhythm: A player creates a sequence of measured movements over time (for example, whistling).**
- **Co-created rhythm: Together with another person, an object, or a space, a player jointly creates measured movements over time (for example, finger wrestling, playing the piano, playing ball).**
- **Extrinsic rhythm: A player, an object, or a space creates or exhibits measured movements over time (for example, a beat, a pumping, an opening/closing, a landscape for skateboarding).**

Play rhythm types are not mutually exclusive and can intermix during play, when, for example, an extrinsic rhythm becomes the basis for co-created play rhythm. Extrinsic rhythms in particular can be either proposed (the player volunteers to adjust movements to a sequence of measured movements) or imposed (the player is forced to adjust movements to a sequence of measured movements). For example, in the videogame Rock Band (2007), the player is forced to adjust movements to a sequence of measured movements imposed by the bundled play-object of the console, controller, and display. The difference between proposed and imposed play can be traced in the ways that game rules tightly structure kinesis, creating predetermined gameplay (so called "hard rails") or non-linear gameplay. Jenkins and Squire describe how in the 3D platforming game Rayman 2 (1999), caverns, bridges, tunnels, paths, and ledges have been designed as "narrative rationales for various constraints on our movement" (Jenkins and Squire (2002:69), imposing the rhythm of spatial exploration. In the case of imposed play rhythms, the tension and termination amplitude will tend to match the waveform of the play rhythm.

Kinetic to-and-fro and play rhythm can emerge in player-player interactions, like the

jump interaction between two of the author's students from Tsinghua University's Academy for Art and Design in Beijing, who demonstrate a childhood activity during a pervasive game design workshop. See Figure 3.

Play rhythm can also emerge from kinesis between an individual and an environment. In the SimCity series (since 1989), for example, the player, like a child sitting cross-legged in a sandbox, is either "attempting to build a city like the one on the [game] box or actively destroying a successful town with one of the game's built-in disasters" (Thomas 2007b:211). Alternatively, play rhythm can emerge from kinesis between the player and an object. This is the case in all toy-play, and in the way children learn to interact with the world by playing (see Oerter (1999)).

Play rhythm in games can also emerge from interactions between space and space. Consider, for example, the Nintendo GameCube and Nintendo DS game Animal Crossing (2002), in which "the gameworld is synched to the console calendar and clock so that events in the game occur simultaneously with events in the real world, including major holidays, weather, seasons and the transition between night and day" (Kelley 2007a:180). Physical toy objects such as Sony's robotic dog Aizo react to the player's kinesis of stroking, but also interacts with its environs in that, for example, it perfectly navigates alongside house walls, never walking into them.

Eventually, play dynamic is created from the way that play rhythm relates to the amplitude of tension and termination. In the Rock Band predecessor game Guitar Hero (2005), the player must tap buttons on a guitar-neck-like controller along to the rhythm of a song represented by dots on "guitar string" lanes. Playing a song thus becomes paying attention to the play rhythm. In this case, the external play rhythm matches the tension and termination amplitude between the buttons, the tension and termination amplitude defined by the song length, and, finally, the smaller (amplitudinal) portions of the song, such as verse, chorus, and bridge parts.

In a first-person shooter, eliminating a rapidly approaching enemy bot requires play-rhythmically firing bullets, understanding the play-rhythmic movements of the bot, and many other kinetic factors, but differs from the overall tension and termination amplitude created by the bot. The overall spawning frequency of bots as well as their distribution in relation to the spatial layout of the game map, however, creates a play rhythm closer to the tension and termination amplitude.

The kinetic processes described above explain how play rhythms are formed. Let us now look at how these formations can be organized alongside the concepts of player, space, and object. If we take space to mean any type of medium, there is a correlation between this three tier model of player-space-object and human-computer interaction research that empirically investigates how people use or respond to virtually any computing product: "Interactive technologies can operate in three basic ways: as tools, as media, and as social actors" (Fogg 2003:22). Fogg's research is a continuation of the widespread notion that people treat computers like real people, real places, and real objects (Reeves and Nass 1996). Reversing the quotation, we can assert that tool, media, and social actor are the fundamental categories into which we can classify play rhythm.

Such an elementary first-order scheme for play rhythm agency has been organized in Table 1. Note that the arrows express the kinesis between player and play-other: The arrows visualize kinesis, which in turn output kinesis from the play-other. For the purposes of this table, player A plays by herself or himself, engaging, for example, in an intellectual play activity. Meanwhile, player B plays with herself or himself or with an object or space. The table, in other words, understands spectatorship as a play pleasure.

	Player A	Player B	Space	Object
Player A	Player A Player A	Player A Player B	Player A Space	Player A Object
Player B	Player B Player A	Player B Player B	Player B Space	Player B Object
Space	Space Player A	Space Player B	Space Space	Space Object
Object	Object Player A	Object Player A	Object Space	Object Object

Table 1

An elementary first-order scheme for play rhythm agency.

Our concept of play rhythm relates to the notion of interactivity in games and play. Sellers (2006), for example, describes interactivity in the context of soft- and hardware:

A computer program (or any other device) can be said to be interactive if it: presents state information to the user, enables the user to take action indirectly related to that state, changes state based on the user's action, and displays that new state. (2006:13).

From a less computer-centric, more ludic perspective, Salen and Zimmerman argue that play implies interactivity in that playing is interacting: when someone plays with someone or something, he or she inherently interacts with that other person or thing[10] (Salen and Zimmerman 2004:58). Based on this assertion, we propose looking at interactivity in play as the potential for a play rhythm.

Our first-order play rhythm matrix can be extended into n-order play rhythms matrices. For example, in order to interact with an object, another object may be needed. Figure 4 shows a dear colleague at an arcade, playing a high-striker attraction called King of the Hammer, teaming up with a giant plastic mallet object to strike King of Hammer's rubber padded lever object. This situation can serve as an example of second order interactivity.

Let us abstract the concept of a second-order play rhythm (which we can then also use to represent any n-order play rhythm) so that we can work with it in design processes. Consider a hypothetical case in which a player plays with an object through another player: i.e. Player Player Object. This could be the case in, say, a role-playing multi-player game in which player 1, called Tinuviel, asks player 2, Ragnar, to please pick up a healing potion on her behalf because Tinuviel's inventory is overfilled. To render our notation more exact, we would need the following:

S = Space

P = Player

O = Object

p = physical

v = virtual

= kinesis

where

S1 (p) P1 (p) O1 (p) S (v) P1 (v) P2 (v) O2 (p) P2 (p) O2 (p) S (v) P2 (v) O3 (v).

Read aloud, this sequence expresses that over time in a physical space 1 (a living room), a physical player 1 (seated on a comfortable couch), who is situated in the virtual world of a game (World of Warcraft), uses a physical computer system (a notebook on the lap) to ask a player avatar played by player 2, who sits at his office desk on the other side of the planet, to please consider picking up the healing potion over there as a favor, which, after some consideration, player 2 eventually does. With games that increasingly cross media and are played in both computer-simulated and physical spaces, such a notation can be helpful to describe interaction sequences for both design specification and project documentation purposes.

In this book, this notation serves as a rough sketch and as an example for the many possibilities we have for recording play rhythm over time. Much more thorough future research must be conducted to further develop these ideas.

4.6.3. Play Defined

In conclusion, we propose the following human-centric definition of play, which we will use for building on our prior discussion throughout the remainder of this book.

Play

Play has four dimensions:

- **Whether physical or virtual, play is grounded in and executed through movement: The nature of play is kinetic.**
- **Kinesis bridges a player with one or more players, play-objects, and/or play-environments (or combination thereof) that feature some kind of valence and, in their own ways, play back.**
- **This dialectical to-and-fro creates and/or adjusts to a play rhythm, which relates to alternations between tension and termination: From both, a play dynamic emerges.**
- **Play takes place on a play-ground and simultaneously defines that play-ground (i.e. by defining its boundaries in space and time).**

Our kineticist and play rhythmic model differs significantly from Salen and Zimmerman's model of free play within a more rigid structure. The model that has been developed here

- **explicitly differentiates between physical and virtual types of movement, thereby making it possible to analyze both mediated play and physical play within one framework and from one starting point – namely, motion;**
- **underlines the relationship of player and play-other (e.g. another player, an object, an environment, or a combination thereof);**
- **helps us to understand how that with which the player plays has properties that make it more attractive or less attractive to play with;**
- **expresses the rhythmical nature of play dynamics;**
- **ties the activity of play to a playing-field, giving it space and time;**
- **enables, from the very core of ludic activity, a discourse about play and games in relation to an architectural design understanding.**

4.7. Summary: Kinetic Playspace

In our definition, kinesis defines the real or virtual movement that is embodied and co-located with play. Based on this definition of play, and loosely referring to Lewin's special form of hodological space, we can conclude that every play situation creates a lived kineticist space over time. This kind of time-based space is created by the sum of tos-and-fros between all play elements. If one accepts the condition that "Architecture is the art of moving through space" (Naos 2000), one could even argue that such a kineticist space sculpts a kind of architectural play-frame; at the very least, one can visualize this first and fundamental conceptual dimension of playspace.

We can imagine a number of images that allow us a glimpse at how to capture kinesis, although none of them were produced with the concept of kinesis in mind. Rosemary Fiore has done a number of these long exposure shots of classic arcade games, taping one second of gameplay per frame; in one of her art pieces, we see the kinetic space co-created by the player and the game system of Tempest (Atari 1980). To illustrate how the spatial layout of a game such as Asteroids (Atari 1979) changes during the course of a level, Jesper Juul contributed similar long exposure shots to Space Time Play, cf. Juul (2007:34), see Figure 5. Finally, Figure 6 portraits golfer Natalie Gulbis and the path of her golf swing displayed in a long exposure shot; this image, of course, only visualizes the proximate kinesis of the golf player and golf club, leaving out the golf course and the golf ball's trajectory.

5. The Enjoyment Dimension

The terms "fun" "pleasure," and "enjoyment" are similar in meaning, are often used interchangeably, and appear frequently in conversations about play. In a semantic study comparing their meanings, Blythe and Hassenzahl (2003) find that enjoyment is a context-specific and superordinate term. We therefore use this term in our section's title, in an effort to emphasize the enjoyment dimension of our conceptual playspace. Blythe and Hassenzahl further note that fun is culturally and experientially connotated as a form of distraction, whereas pleasure is connotated in terms of absorption. Nevertheless, the body of research we are using to investigate play uses pleasure as an agreed-on term not only to describe absorption, but also to describe more lightweight attractions. Therefore, we use pleasure throughout this book to imply both fun and "deeper" kinds of enjoyment.

On the basis of the kinetic model of play proposed in the preceding section, we can now pose certain questions that will aid our discussion of the enjoyment dimension: What types of play pleasures can we distinguish? And how can these distinctions help us?

By differentiating among types of play, we can investigate how player and play-other relate – that is, how kinesis can be further operationalized. We do this because we assume that particular play types oblige the player's motivational expectations in a specific fashion[11] (Fritz 2004, on the basis of Lewin's valence and force field theory); that, in other words, understanding play types lets designers please certain player types through design and thereby create suitable playspaces and gamespaces. Towards this design purpose, a number of relevant models are introduced and cross-compared, and a play pleasure model is developed and related to the kineticist argument.

To round up the discussion, other aspects of the enjoyment dimension are highlighted. Three questions are briefly discussed:

- What role does technology have in play enjoyment?
- What types of emotions are triggered by playing?
- How do players become deeply absorbed in a play dynamic; what makes playing enjoyable over time?

All three questions contribute to an architectural framing of play. The first question points out that play often embodies or is created with the help of some kind of technology. The second question underlines the fact that play is an activity that causes types of enjoyment. And the third question reminds us that in order for play sessions to take place over time and truly absorb players, certain requirements must be met.

5.1. Caillois' Play Typology

In his seminal work Man, Play, and Games, Caillois (1962) put forward an oft-cited model of four fundamental play categories that builds directly on Huizinga's Homo Ludens and attempts to understand play culturally and as a phenomenon that exists both "in and out of games", as Salen and Zimmerman (2004:82) put it. In the book, Caillois divides ludic activities into agôn, games of competition, alea, games of chance, mimicry, games of simulation and role-play, and ilinx, games of vertigo and rapture. Caillois combines the four categories with a conceptual pair that helps to differentiate between wild, freestyle, improvisational play, which Caillois calls paida, and ludus, or rule-bound, formalized play (1962:27). Table 2 reproduces Caillois' classification of play and games in a simplified fashion, with some examples taken from Man, Play, and Games for each cell in the grid.

	AGÔN (Competition)	ALEA (Chance)	MIMICRY (Simulation)	ILINX (Vertigo)
PAIDA	Unregulated sports	Counting out rhymes	Children's initiations, masks	Children whirling, horseback riding
LUDUS	Sports, chess, billiards	Betting, roulette, lotteries	Theater and spectacles	Skiing, mountain climbing

Table 2

Simplified classification of play and games after Caillois (1962).

According to Caillois, agôn – which comes from the Greek word , meaning competition – is the domain of play into which activities such as racing and wrestling, but also chess, football, and sports in general fall – i.e. competitive play and games, featuring elements such as combat, confrontation, rivalry, contest, or dueling. All games of agôn share the feature that players playing them seek to demonstrate their superiority in specified areas (1962:14).

Alea, from the Latin word for dice, is used to characterize any play that is subject to chance. In games such as betting, roulette, and lotteries, as opposed to games of agôn, "winning is the result of fate rather than triumphing over an adversary." Less structured alea activities include, for example, counting-out rhymes (1962:17).

Mimicry describes games and play activities of imaginary milieus and illusory characterizations, in which the player "makes believe or makes others believe that he is someone other than himself. He forgets, disguises, or temporarily sheds his personality in order to feign another" (1962:19). Typical mimicry activities include putting on masks, or staging theater plays.

Lastly, ilinx, is used to describe play whose aim is to achieve vertigo, i.e. games "which consist of an attempt to momentarily destroy the stability of perception and inflict a kind of voluptuous panic upon an otherwise ludic mind. In all cases, it is a question of surrendering to a kind of spasm, seizure, or shock which destroys reality with sovereign brisqueness" (Caillois 1962:23). Ilinx, then, is meant for games or activities that alter one's perception like, for example, dancing or skiing.

5.2. Caillois' Model and Kinesis

Taking into consideration our general play definition and the concept of kinesis, we can trace particular types of kinesis in all of Caillois' categories:

- **Agonal kinesis includes, for example, athletic movements. Play dynamic is created by the to-and-fro between e.g. a running athlete and a tartan track as well as between competing athletes who watch their moving opponents;**
- **Alea kinesis includes the virtual movements of chance, the movement fate imposes on players, and the to-and-fro between chance results, probabilities, and the player's risk-taking;**
- **Mimicry kinesis includes theatrical movements to stage an illusory character, virtual movement to convert something into make-believe, and the to-and-fro between character(s) and audience that creates a make-believe situation;**
- **Ilinx kinesis includes movements that cause vertigo in the player (such as descending a ski slope), movements made by the player in order to experience vertigo (such as spinning), and the to-and-fro dynamic between, for example, the skier and the steep mountain.**

As can be seen, Caillois' categorizations can be framed by the concept of kinesis. In turn, the concept of kinesis fits into and in fact fills out Caillois' four categories. Caillois thus provides a useful foundation for distinguishing play types. And yet, from a designerly point of view, the connection between play, player, and play-other can be further specified. In the succeeding subsection, we will take a look at how.

5.3. Contemporary Models of Play Stimuli and Player Types Cross-Compared

In this subsection, a number of models of play and interrelated player types are presented that both are based on and go beyond Caillois. These models are cross-compared, resulting in a new model, which is then set into relation with the concept of kinesis.

Jürgen Fritz, whose works have never been translated from German into English, has conducted decade-long empirical research into both non-mediated and mediated play and games, using qualitative methods such as player interviewing and playability observations. Based on this research, Fritz has extended and further differentiated Caillois' model of agôn, alea, mimicry, and ilinx in an effort to understand why players play. For this purpose, Fritz introduces an empirically based theory, which holds that play and game situations should be seen as "play constructs" combining, in varying intensities, eleven important sources of stimulus. These play constructs, Fritz suggests, can be described as "Reizkonfigurationen" – in English, "stimulus configurations" (SCs), or combinations of stimuli found in the play construct that oblige "the player's motivational expectations in a specific fashion" (Fritz 2004:47). Stimulus configurations can be found in fellow players, in objects, or in spaces (2004:45ff.). Playing, then, is a means of pleasing expectations; and play stimuli can also rouse play.

Fritz' dialectical theory resembles and also corresponds to Buytendijk's play dynamic without referring to it. Buytendijk's to-and-fro conforms with the Fritzian bonding between stimulus configuration and the player's motivational expectation. At the same time, Fritz' argumentation bears striking similarity to Lewin's concept of the positive and negative stimulative nature of object or environmental properties, which was introduced earlier to demonstrate the similarity of Buytendijk's thinking with the development of major design principles in human-computer interaction and general interaction design. In fact, Fritz (2004) mentions Lewin once, on page 171, but only in the context of cultural forces that define how a player experiences play and games. Fritz's model extends Caillois' and merges it with Lewin's, with Buytendijk, metaphorically speaking, standing by.

Fritz's eleven stimuli are described below; Caillois is referenced when appropriate. These stimuli can also be read with the kinetic model in mind: try and imagine what types of play-movement the individual stimuli imply.

- **Contesting: Fritz suggests placing sports games such as soccer into this category,**

which Caillois referred to as agôn. First-person shooter games also fall into this category, particularly multiplayer game maps.

- **Risk-taking: This type of play stimulus embodies courage or adventure.**
- **Leaving it to chance: Caillois calls this play type alea, but Fritz assigns it its own category.**
- **Amusing: The play situation caters to the player's humor and provides entertainment with, for example, the help of comedy elements.**
- **Pursuing vertigo: Caillois calls this ilinx; one example of which is riding a roller coaster.**
- **Meditating: With the help of biofeedback sensors and meditation exercises, games such as the meditation game The Journey to Wild Divine (Wild Divine Project 2003), measure player generated psycho-physiological output such as heart beat frequency and skin conductivity as a means of training relaxation.**
- **Collecting: This stimulus centers on completing and/or systematizing a collection.**
- **Role-playing: Caillois calls this category mimicry.**
- **Savoring: Fritz means aesthetic and sensual experiences triggered by atmospheres; this category also includes gazing at landscapes and performance situations.**
- **Creating: According to Fritz, the source of this stimulus is the possibility of "transcending oneself"[12] (Fritz 2004, S. 46); in other words, a player can generate, construct, and design.**
- **Problem-solving: A play situation contains a puzzle, a mental challenge, or something to unravel.**

Fritz's play stimuli can be compared to the four basic player types that Richard Bartle, designer of the first multiuser dungeon (MUD), has suggested: achievers, explorers, socializers, and killers. In a study, Bartle (1996) found that players often have a primary play style and will only switch styles if it suits them. Whereas achievers want to overcome obstacles and accumulate rewards, explorers want to discover and understand the gameworld and its mechanics, while socializers want to interact with other players and possibly role-play and, finally, killers want to cause distress to other players or the system. In a Website experiment entitled "playce," conceptualized and launched by the author as an online portfolio in October 2006 at http://spw.playbe.com, Bartle's four basic player types were translated into four miniature arcade games. The playce website is a place to play – hence the name, which combines the words "play" and "place." At the same time, the name is also a play on words. The name of the author's company is "playbe," making playce the natural progression if one follows the western alphabet.

Figure 7 shows a screenshot of the Website's main menu, with stills of the four mini games. There, the visitor can explore projects the author has been involved with during the past years. The visitor can either navigate the playce with a classic navigation / menu bar (on the bottom of the screen) or choose one of the four play modes on the left side of the screen to access the design spaces for which the author has created projects, such as CD-ROM, World Wide Web, or TV series in development. Each game's mechanic caters to a certain type of player while simultaneously serving as a way to navigate the playce Website. In other words, one browses the site by playing, a procedure which could be called, for example, "navigaming" or "playvigating." Once the visitor has carried out a mechanic successfully (e.g. killed, achieved, explored, socialized), she will be taken to her selection. Mind that the visitor can interrupt a play dynamic by moving the mouse from the left side of the screen, where the play action takes place, to the content zone on the right side. The Website combines game and interaction design with media experimentation, all the while posing the question of how play types may serve as interfaces to content, or, put another way, how typical application processes can be made more accessible through the use of game-like interfaces. More generally speaking, the Website is one example of how mini games and play types can be used to serve purposes beyond mere entertainment.

The author did not draw on any explicit navigational inspiration for the Website in the World Wide Web. The Website's interaction metaphor, however, was certainly inspired by a research project carried out in 2001 by Dennis Chao from the University of New Mexico[13]. In the project, Chao modified the popular first-person shooter video game Doom (1993) so that it could be used as an interface to an operating system administration task. The mod, called PSDoom, displays representations of UNIX processes instead of letting the system administrator use standard text-mode UNIX tools to view and manipulate these processes. For example, the system administrator turns into a player who shoots at processes – i.e. "bloodthirsty mutants" – so that eliminating the mutants "kills" the UNIX process. In another example, just hitting a mutant in the game would lower the process priority.

The playce Website takes the idea of using a game-like interface for a certain application task into the realm of the World Wide Web, applying it to the everyday task of navigating – that is, seeking and choosing menu items and content on a Website. In toto, Bartle's player types have been an inspiring model for the playce Website, which has translated the types into navigational patterns.

Another way of differentiating among player types was suggested by Fullerton (2008:92) in reference to a three-part TV series by Kennard, Brown, and The Institute of Play (2000), which addressed player types and pleasures of play by assuming the perspective of the player. Fullerton mentions that her list – which has been fully reproduced here as it appears in her book Game Design Workshop – is not exhaustive, and that some of the player types have not been equally addressed by digital games, leaving many new areas of play open for designers (Fullerton 2008:93):

- **The Competitor: Plays to best other players, regardless of the game**
- **The Explorer: Curious about the world, loves to go adventuring; seeks outside boundaries – physical or mental**
- **The Collector: Acquires items, trophies, or knowledge; likes to create sets, organize history, etc.**
- **The Achiever: Plays for varying levels of achievement; ladders and levels incentivize the achiever**
- **The Joker: Doesn't take the game seriously – plays for the fun of playing; there's a potential for jokers to annoy serious players, but on the other hand, jokers can make the game more social than competitive**
- **The Artist: Driven by creativity, creation, design**
- **The Director: Loves to be in charge, direct the play**
- **The Storyteller: Loves to create or live in worlds of fantasy and imagination**
- **The Performer: Loves to put on a show for others**
- **The Craftsman: Wants to build, craft, engineer, or puzzle things out (2008:92)**

As can be seen, Fullteron's categorization is similar to both Bartle's and Fritz's; Fullerton herself even mentions this similarity to Bartle (ibid.) and explicitly builds on Caillois, whom she discusses in a preceding section. These overlaps make possible a cross-comparison of player types and pleasures, which the author has visualized in Table 3. The table sets the aforementioned categorizations into relation with one another, using Fritz's model as an anchor. At the same time, the table combines Fritz's list with other play and player types derived from both Bartle and Fullerton, as well as new pleasure types, which are written in bold italics. Note that like Fullerton's model, this classification is not exhaustive, but rather represents a listing of major types. There are unlimited ways to ambiguate human activity as play activity; see also our discussion of the ambiguity of play earlier in this section.

Some explanation is needed concerning the play pleasures introduced here:

- **Adventuring: Like Bartle's explorer, who wants to discover and comprehend the workings of the gameworld, The Explorer in Fullerton's**

Caillois (1962)	Fritz (2004)	Bartle (1996)	Fullerton (2008)
Agôn	Contesting	Killer	The Competitor
	Risk-taking		
Alea	Leaving it to chance		
Mimicry	Role-playing	Socializer	The Performer
	Amusing		The Joker
	Meditating		
	Collecting		The Collector

Ilinx	**Pursuing vertigo**		
	Savoring		
	Creating		**The Artist** **The Craftsman**
	Problem-solving		
	Adventuring	**Explorer**	**The Explorer**
	Achieving	**Achiever**	**The Achiever**
	Directing		**The Director**
	Storytelling		**The Storyteller**

Table 3

A cross comparison of player types. Newly identified stimuli in the spirit of Fritz (2004) have been italicized. Note that The Craftsman and The Artist as a person who enjoys producing something new have been joined in this table, since their common goal is to create; however, certain elements of the craftsman (who "wants to puzzle things out") can also be found in the problem-solving category suggested by Fritz.

- **listing loves to adventure. This leads us to assume that there is a play pleasure of adventuring.**
- **Achieving: Players who are motivated by incentives and who play to achieve are driven by the play pleasure of achieving.**
- **Directing, storytelling: These play pleasures are those not covered by the other categorizations, but they are mentioned by Fullerton. It seems appropriate to consider narrative and steering pleasures in the context of play as well.**

We are only slightly anticipating our discussion of the nature of games when we mention here that our list of play pleasures illustrates the emergence of (digital) game genres. Genres reflect re-occurring combinations of play stimuli. In action games, for example, we find contesting and achieving; in adventure games, exploration and storytelling; and in role-playing games, role-playing or directing.

But let us forget about games for a moment and return to our current subject, play. We will now conclude this subsection by relating the pleasures of play to the principle of kinesis.

5.4. Play Pleasure Spaces

Caillois (1962) suggested four fundamental categories for each free-form and rule-bound play; Bartle (1996) examined four basic player types; Fullerton (2008) listed player types with dominating play preferences; and Fritz (2004) proposed a play stimulus model that we extended in the previous section by complementing it with the stimuli missing from the work of the other authors mentioned here.

From our definition of play as a kind of movement that bridges player and play-other and affords space, it follows that each type of play must embody some kind of play-movement, i.e. kinesis. Table 4 shows a listing of representative kinetic types that correspond to our play pleasures. When enacted during play, they create distinguishable play pleasure spaces, which are listed in the right column.

Play stimulus	**Exemplary type of kinesis**	**Play pleasure space**
		Contest

Contesting	**Any movement aiming to outmatch, e.g. hitting or racing.**	**Contest space**
Risk-taking	**Movements with limited predictability (i.e. movements whose results are hard to foresee).**	**Risk-taking space**
Leaving it to chance	**Movement is only to some extent controlled by participant; instead, play-movement is imposed, cf. to the earlier discussion on rhythm in dance notation.**	**Chance space**
Role-playing	**Make-believe movements with an assumed self executed, against a backdrop, before the background of an ordinary self, and the condition of knowing the differences between both selves.**	**Role-playing space**
Amusing	**Laughing14.**	**Amusement space**
Meditating	**Virtual movements of focusing mind and body.**	**Meditation space**
Collecting	**Point to point movement.**	**Collection space**
Pursuing vertigo	**Spinning or sloping, for example.**	**Vertigo space**
Savoring	**Moving the eyeballs; being moved.**	**Savoring space**
Creating	**Movements needed for originating.**	**Creation space**
Problem-solving	**Movements that break something down into smaller problems; brainstorming movements; simplification movements.**	**Problem-solving space**
Adventuring	**Exploring and boundary seeking.**	**Adventure space**
Achieving	**Leveling up.**	**Achievement space**
Directing	**Steering and controlling.**	**Direction space**
Storytelling	**Conveying events orally, or otherwise.**	**Story space**

Table 4

A listing of representative kinetic types that correspond to our play pleasures.[14]

5.5. Interimsic Summary: Play Pleasures

So far in this subsection, we have determined play pleasure types that cater to the motivational expectations of the player. These pleasure types are the fundamental building blocks for designing play, and they also represent a second dimension of

playspace, underlining the feelings of fun commonly associated with play. Whether experienced individually or in combination, play pleasures and their associated kinesis types are important triggers in the emergence of a given playspace. We have collected these play pleasure spaces in Table 4.

Other factors also help define the enjoyment dimension. Three of these will be discussed in the remainder of this subsection:

- **The enjoyment of technology.**
- **Enjoyable emotions caused by playing.**
- **The enjoyment of absorption (in the sense of immersion).**

5.6. Pleasures of Technology

In the introductory countdown section of this treatise, we demonstrated that today, the increasingly digital nature of games coincides with the ubiquitization of digital technologies. Later, in the preceding section, we outlined play as a human, kinetic practice in space. But naturally, we must also consider the role of (computing) technology in the enjoyment of play; that is, consider pleasures induced via technology. Here, we will focus on several representative aspects of this relationship between player
and technology:

- **The pleasure of the collective unconscious: Technologized play as a way to digitally recycle myths.**
- **The pleasure of toy-medium: Technologized play affording activity possibility and necessity.**
- **The pleasure of enabling technologies that allow for "enchanting" novelty.**
- **The pleasure of exploiting the affinity between computers and games.**

The pleasure of the collective unconscious. Is J.C. Hertz correct when she writes that "Videogames are where technology melts into the occult. This is a place where missile launchers and mojo are both legitimate weapons. All the old monsters, harpies, dragons, and divinities are excavated from their mythological sediment, sampled, looped, remixed, crossfaded, and digitally recycled" (Hertz 1997)? Of course, Hertz is referring to Jungian psychology (though without directly mentioning it), which holds that there is a kind of psychic inheritance, a collective unconscious, which consists of so-called archetypes or mythological images. Jung's archetype of the shadow, for example, comprises those monsters and dragons about which Hertz writes. The shadow is an archetype of instinct and irrationality and is therefore innocent because it knows no morals. The shadow archetype first seems to represent the dark side of our lives. But in fact, it allows us to live out and store that which we cannot admit in everyday life. The shadow can be both evil – think of Dr. Jekyll's Mr. Hyde – or a source of creativity. Unsurprisingly, Jung's shadow typically appears in dreams and visions as the ego's opponent (bear in mind that Jung was writing before the advent of the age of personal computers and videogames) (Jung 1990). In this reading, technologized play – and, indeed, play in general – is seen as an ego's unconscious counterpart.

The pleasure of toy-medium. The book Funology. From Usability to Enjoyment (Blythe et al. 2004) considers enjoyment from a human-computer interaction perspective and discusses how technologies can cause, support, or lead to enjoyment. In this line of thought, media psychologist Klimmt (2001) considers the stimulative nature of computer game software, finding that interactive entertainment can be considered a synthesis of medium and toy, which, generally speaking, affords the player action possibilities as well as action necessities. Though Klimmt does not investigate the enjoyment that computer hardware or technological form can provide, we would argue that the product design of the hardware also caters to the player's motivational expectation, e.g. in that its form factor affords to hold it in a certain fashion. Learning from product designers, human-computer interaction designers conduct empirical research on how to create emotional reactions with their products, seeking to satisfy, to please, or to appeal (Hassenzahl 2004:41).

Whether explained with the help of Jungian psychology or gestalt psychology, which is most interested in how we relate to objects and environments during play, it is noteworthy that "most of the technology now used in videogames had its origins in military research. When you trace back the patents, it's virtually impossible to find an arcade or console component that evolved in the absence of a Defense Department grant" (Hertz 1997:129).

The pleasure of enabling technologies and the affinity between computers and games. The intimate relationship between games and technology is not the result of military

funding alone. Two examples of a computer-game "coupling" serve to highlight this relationship:

- **Enabling coupling: Technologies drive game development and vice versa. A new technology can enable the development of a new type of gameplay or gameplay element, which can then afford pleasure to its users. This is particularly true for the not yet consolidated, growing field of pervasive computing, which gives rise to new innovations in sensing, locating, or networking almost every day. For example, traditional gamepad-based input for video games has been revolutionized, and not just for an audience of hardcore gamers; the primary controller for the Nintendo Wii video game console, the Wiimote (short for Wii Remote), can be thought of as a pervasive computing technology. The Wiimote is a three-axis, rotational position, motion-sensing device designed for one-handed wireless (i.e. remote control-style) use. The major technologies used to achieve this form of human-computer interaction are:**
- **Bluetooth, which enables communication between Wiimote and console;**
- **an accelerometer and an image sensor built into the Wiimote;**
- **a Sensor Bar, a second component wired to the console and placed on top of the TV display to enable visual feedback. The sensor bar emits infrared light detected by the Wiimote's image sensor, thereby allowing for accurate positioning and pointing (Wisniowski 2006).**

In addition to its input capability, the Wiimote features audio and rumble output capabilities, which enhance controller-based immersion, as well as some memory storage. Although the elements themselves have been around for a while, merging and combining them with well-designed hardware, software, and a gameplay situation involving the player, the player's physical context, and other factors have served to create technological enchantment.

- **Reciprocity coupling: The most substantial type of relationship between game (as formalized play) and computing technology is a reciprocal one. Juul argues that there is "a basic affinity between games and computers" (Juul 2005:5) in that computers are particularly fit for processing formal play. Wark goes even further, arguing that "all games are digital. Without exception. (...) From the start, games were proto-computers" (Wark 2007:79). The affinity between games and technology affects the way we look at technology: if a formal play situation is perceived positively, then the technology it represents will be perceived positively too. In other words, enjoyment of software influences enjoyment of hardware and vice versa.**

5.7. Play-Actuated Emotions

One of the most convincing empirically derived categorizations of the types of fun players experience in games has been suggested by Nicole Lazzaro and her player experience research company XEODesign. Lazzaro and XEODesign focused on what players enjoy most about their experiences of play and how games inspire emotion without using story elements (Lazzaro 2004). Although this book is primarily dedicated to games, we are inserting this subsection here to illustrate that play has a positive effect on players and that this effect is not just the result of play stimuli.

Using qualitative data including video recordings of players playing, player questionnaires, and verbal and non-verbal emotional cues during play, 30 adult players were observed for 90-120 minutes while they played at their regular play locations. A total of 15 friends and family members of the participants remained nearby during the observation sessions and were interviewed. Players played a wide range of popular, commercially available and professionally produced video and computer games. This meant that the play they experienced was framed by a defined situation not only in terms of playing locale (i.e. living room, console, and virtual gameworld), but also in terms of game rules, input / output possibilities, etc. This kind of well-defined – that is, well-designed – situation is entirely different from the play we have been discussing up until now. Fritz et al. have been trying to come up with a system that allows for a general classification of play, whereas Lazzaro works with commercial products designed to entertain. Still, we are looking at her findings because they allow us to bridge key types of play with experiences of pleasure caused by systematized playing.

Lazzaro's data material was grouped using affinity analysis methods, leading to four key assumptions about player behaviors as well as about processes facilitating or inhibiting enjoyment (2004:2):

- **Hard fun: Creates emotion by structuring experience around the pursuit of a goal. Typical players enjoy overcoming challenges, solving puzzles, and strategizing,**

often aiming for "fiero," or personal triumph.

- **Easy fun: Inspires emotion that results from the sheer enjoyment of playing and of being immersed in the play activity. Typical players enjoy intrigue, exploration, and adventuring as well as unusual situations.**
- **Serious fun or Altered states: Creates emotion through player-internal sensations triggered by the experience of playing, such as excitement, relief, or simply a respite from the everyday.**
- **People fun: Creates emotions such as amusement or schadenfreude via social experiences such as competition, collaboration, or bonding (2004:4ff).**

Returning again to our play pleasure types, we see that some of them fit into the above model, which seeks to categorize players based on the way they experience pleasure. Lazzaro's model, in other words, complements our play pleasure types. Future research could attempt to merge both models with the help of empirical findings.

5.8. The Pleasure of Immersion

The psychological concept of "flow," which was introduced by psychologist Mihaly Csikszentmihalyi (1975, 1990), attempts to explain how a person can become deeply and delightfully absorbed in an activity and thereby sense true pleasure. As discussed earlier, the concept is vaguely echoed in Iain Borden's analysis of the lived skateboarding architecture, which holds that architecture, when enacted by and between a skateboarder and his or her terrain, is "not a thing but a flow" (Borden 2001:9).

Czikszentmihalyi observed that people can reach an enjoyable state of mind in which they are maximally productive only if the challenges they must overcome are not too easy. If the challenges are too easy, people tend to become bored; if the challenges are too hard, people become apprehensive. Czikszentmihalyi found that an experience of flow is accompanied by the following[15]:

1. **Clear goals, i.e. one's expectations are attainable and the rules of the situation are discernible.**
2. **Concentration and focus, so that no other activity interrupts the immersion.**
3. **A loss of feeling of self-consciousness.**
4. **Distorted sense of time: one's experience of time is altered.**
5. **Direct and immediate feedback, so that one can adjust behavior according to apparent successes or failures.**
6. **Balance between ability level and challenge.**
7. **A sense of personal control over the situation or activity.**
8. **The activity is intrinsically rewarding, i.e. actions become effortless.**
9. **People become absorbed in the activity – action and awareness merge.**

(Csikszentmihalyi 1975:72)

Csikszentmihalyi's notion of flow is an oft-cited, almost common denominator for managing difficulty in play and game situations. In order to maximize player enjoyment, and in order to enable players to enter into a state of peak productivity, game designers seek to balance anxiety and boredom, often dynamically over time. Adams and Rollings (2006:376ff.) suggest that this can be achieved by adjusting the perceived difficulty of the game by programming the intrinsic skill required by a challenge, the stress of time pressure, the amount of power the game gives to the player to overcome a challenge (e.g. the avatar's resistance to damage), and the player's in-game progress and gathered experience in dealing with challenges and interface.

The model of flow, and particularly the way Adams and Rollings adapt it (though only for the particular case of formalized, complex play), underlines the fact that a playspace can come about not only in terms of movement, rhythmic relation, positive valence, and caused emotions, but also in terms of perceived difficulty, shaping tension, and termination amplitudes.

6. The Culture and Context Dimension

So far, we have noted that play – or even a play rhythm – occurs if an expectation is met or an emotion is roused by a play-other, which can be another player, an object, or a space. We have categorized play and categorized pleasures resulting from play, and we have also discussed how enjoyment of play is subject to difficulty level and that enjoyable play results in distinguishable emotions. But what role does the context of the play-other play in the enjoyment of play, and more generally, the existence of play

at all?

To answer this question, play-ground designer Barbara Hendricks assists us. In a (landscape) architectural approach to designing playgrounds, Hendricks (2001) points out that play for children should be designed from a "child's eye" view of the world. She writes:

Good design for children's outdoor play is possible – but it means challenging many of the prevailing adult ideas about outdoor landscapes. Designers find it difficult to talk or write about their plans and expectations in terms of children's behaviour at play. They are trained to work with and think about physical structures and facilities rather than about the behaviour of the user of these spaces. Professional designers often see their role as educating the "unsophisticated" public.

When we look at the kind of places children choose to play in when it is possible to choose, these places tend to have an appearance of being forgotten or vacated by adults. They look somewhat unkempt. They may be places that have just grown up with little or no help from a landscape designer. Children seem to like places that look un-designed. That children choose these places is not to suggest that children prefer environments with a lower quality of material or that they have a preference for nature. Children also love to play in garbage dumps if they are allowed to do so. What they like is the non-predictability of these non-designed landscapes (Hendricks 2001:90f.).

Hendrick's finding reminds us not only of the importance of player-centric design and of how predictability can influence the child – and adult – player.[16] Hendricks also underlines how an environment pleases a player's motivational expectation through a phenomenon, which we will subsume under the general heading designedness of valence. Given our identification of three distinct play-others – another player, a play-object, and a play environment – we can now address the following three questions:

- **How does the designedness of another player affect play via, for example, acquired patterns of thought, behavior, or taste, which are expressed, for example, in habitual use of language, dress codes, etc.?**
- **How does the designedness of an object affect play?**
- **How does the designedness of an environment affect play?**

The three questions are formulated to provide the designer-reader with a kind of checklist. But for the sake of the argument's flow and as a result of our concentration on the conceptual play-space, we will here focus only on the last question.

One way to frame the designedness of a given space with regards to its attractiveness as a play-ground is to identify design properties. These properties interplay with the concept of valence in that they set the stage for valence possibility. In the case of environments, these properties can be, for example, aligned on a continuum of opposites. Continua for the designedness of an environment include:

Natural - Designed.

Pre-existing - Purpose-built.

Vegetated - Unvegetated.

Deserted - Crowded.

Accessible - Inaccessible.

Silent - Performed.

Odorless - Scented.

Daylighted - Artificially lighted.

Naturally shaded - Artificially shaded.

Unkempt - Maintained.

Inhabited - Abandoned.

Empty - Filled.

Sparse - Dense.

Loose - Firm.

Unsheltered - Sheltered.

Unlined - Lined.

Unmarked - Marked.

Disproportioned - Proportioned.

Uncomposed - Composed.

Unstructured - Structured.

Rural - Urban.

Private - Public.

Outdoor - Indoor.

Dangerous - Safe.

Physical - Virtual.

Note that these continua are non-exclusive; that means that a rural environment can be quite composed – think of plow furrows and how they draw patterns into the ground. Also, note that this exemplary list of continua is not exhaustive, and that there is no point trying to prove non-empirically how any of these pairs of opposites work as an attraction or repulsion factor in play situations. Yet designers need to consider these opposites when designing for play and also to consider potential conflicts, especially when working with pre-existing environments.

For example, a pre-existing physical urban environment that is maintained and inhabited will be used according to certain programs. A European pedestrian city core, for example, is typically home to several public plazas, several flat green spaces, often with fountains, several broad, often tree-lined streets with seating possibilities, and numerous restaurants, stores, and public as well as company buildings alongside them. Such an environment affords certain activities such as, respectively, meeting and gathering, relaxing and gazing, leisurely walking, standing, and gazing, lunching/dining, shopping, and going to work. From a play-ground perspective, a green flat lawn also affords "running, games, throwing balls, a place to build up something, a place to lay in the sun, a place to talk with friends" (Hendricks 2001:93).[17]

The inherent play stimuli of the green space conflict with the aspects of its regular, city core program. No wonder that in urbanized areas, play has been confined to dedicated, controllable playgrounds (see for example the DIN EN 1176 / 1177 standards, which regulate the construction, safety testing, and maintenance of playground surfacing and equipment in most EU countries[18]). In fact, in Germany, larger housing projects must be planned to include a playground facility. In the inventory of "play-grounds" introduced later in this work, children's playgrounds are discussed in more detail.

Most importantly, the designedness of an environment – or an object or another player – is not only a question of design culture, but also of how the potential playground is embedded into a certain culture of norms, values, and other more everyday behavioral scripts. In that, the designedness dimension of our play-space also reminds us of the cultural dimension of play – of how a space is always embedded into contexts.

7. Conclusion: Playspace

In the preceding section, we developed a new theoretical model of play that is architecturally framed, psychologically based, and formulated along dimensions of a conceptual playspace.

We highlighted the ambiguous nature of play as well as the special role of the player; then, we investigated how play has its roots in and is executed through movement by and between player and play-other, creating play rhythm, and that play always has boundaries in time and space. In addition, we derived the notion of movement and rhythm from the fields of architecture and urban planning as well as from dance research and from the pioneering work of F. J. J. Buytendijk (1933).

We then developed play pleasure types by way of a cross-comparison of classical and current play pleasure and player type models. We thereby illustrated that play not only caters to the player's motivational expectations, but that it also interrelates with the

technology through which it is presented. Eventually, we examined how play actuates emotions and discussed the fact that the enjoyment of play depends on the activity's degree of difficulty and on the designedness of the play-other. In the latter discussion, we looked at exemplary factors that define the context and culture, i.e. designedness of potential "play-grounds."

On the basis of this new model of playspace, we can now move on to frame games architecturally, thereby approximating a conceptual gamespace.

GAMESPACE

Games and play are interrelated phenomena. Salen and Zimmerman, for example, argue that games are a subset of play in that they formalize play, on the one hand, and on the other hand, that play is an essential game component (Salen and Zimmerman 2004:303). Without one or more players, there is no play; and without playing, the formal system of a game is not set in motion, but sits idling. This reciprocity is complemented by the concept of "meaningful play": in games, players can participate with "designed choices and procedures" (2004:60), and these programmed choices are made explicit to the player, like following the rules of a board game or using a game controller to move an avatar. Player choices result in game system outcomes, and the relationships between actions and outcomes are specified by rules. In digital games, these rules "are buried in layers of program code and are often difficult to identify" (2004:148). From these action, outcome units, interactive meaning, and, in turn, meaningful play
arise (2004:63).

Other research further complicates the peculiar relationship between play and games.

Game theorist Jesper Juul, for example, holds that games contextualize play actions, and that in games, rules facilitate actions by differentiating between potential moves and game occurrences (2005:18f.). Raph Koster, lead designer of the massive multiplayer role playing game Ultima Online, suggests that playing a game implies pattern recognition, and that playing a certain kind of game involves recognizing and learning to master a particular kind of pattern (Koster 2005:36). In a likewise pattern-based approach to game design research, researchers Björk and Holopainen write that "playing a game can be described as making changes in quantitative game states, where each specific state is a collection of all values of all game elements and the relationships between them" (Björk and Holopainen 2005:8). Rules, in this reading, limit the actions a player can take while playing as well as limiting the game's boundaries, thereby governing how game components are instantiated in the game (2005:15). Furthermore, players perform actions in a game through varying modes of play, which are associated with goals, achievements, and other game components.

For example, in the game Pac-Man (1980), the player can play either in a single- or two-player mode. The player moves the ever-moving Pac-Man up, down, left, or right to change direction, or until a wall is hit; on a higher action level, the player avoids ghosts, eats pills, and hunts ghosts after eating power pills. Direct interaction gameplay and cut scenes after loss of a life offer alternating modes of play (2005:28f.).

Maybe it is precisely because the relationship between play and games is quite staggering that there are so many definitions of games, each with its own shortcomings and strengths, as Björk and Holopainen note. They themselves refrain to define games and instead offer an entire game design pattern systematics and all its implicit assumptions (Björk and Holopainen 2005:8).

What is the solution to this jungle of definitions? To add another definition? How can we architecturally approximate games?

From our model, we see that the conceptual game-play relationship builds on how the kineticist relationships between player and play-other are regulated and limited and how valence triggers play. Salen and Zimmerman's aforementioned model of meaningful choice somewhat resembles our concept. In our discussion, though, we have accentuated the notion of space:

- We have derived our definition of play from movement in space and the way that the player plays with a play-other (which can be a space).
- We have shown that the concept of play rhythm is spatial at heart in that it builds on measured movements over time.
- We have demonstrated that fundamentally, play-as-movement affords a space where play takes place over time.

Taking this architecturally framed notion of play as a starting point, the following