Chapter 7: 2D/3D

In the previous chapter I have discussed the basic characteristics of avatarial embodiment, and how avatar-based games are different from instruments, system simulators, hypermedia and role playing games. Avatarial embodiment is premised on a combination of prosthetic tangibility and fictional re-positioning, and it turns the game space into a gameworld.

In this chapter I will look at how avatar-based 3D differs from avatar-based 2D, and what this means for the notion of miniatureness. The emphasis will not be on the characteristics of three-dimensional graphics as such, but on the particular type of re-positioning that is made possible by the navigable point of view. This includes considering the major types of avatarial configurations that we find in 3D computer games, as well as the role and status of different kinds of hardware interfaces. My aim is not to debate if three-dimensional game spaces are better or richer than two-dimensional game spaces, but to point out some of the central differences in how they structure fictional participation. With the introduction of the 3D avatar, new kinds of spaces and experiences are opened up, while others are closed down or marginalised.

The extended avatar

Mario's world in *Donkey Kong* is a two-dimensional world, and a boxed-in world; what goes on in the world is what goes on within the frame of the screen. As an avatar, Mario extends our reach into, and inhabits, a flat world. If we say that this world is not really flat, similar to how the world of classical Disney films is not literally meant to be flat, this would be correct only in a metaphorical sense; as soon as we start doing something, through Mario, the metaphor breaks down, and we discover that the actual fictional world *is* flat. Part of the attraction of Mario's world, which we get to embody through the avatarial relation, is precisely its lack of the third dimension, its playable flatness.

The flat world of *Donkey Kong* is not a universe into which we are invited to project ourselves or jump into. On the contrary, the world is a framed surface, and this surface belongs squarely to the here-and-now of the actual playing space. 2D

game fictions do not alter the spatial relationship between me as a player and my environments any more than a Monopoly board or a pinball machine does. There is a fictional world, but this world is constituted by my relation to a flat surface in front of me, and contained within my actual space, as any other delimited sub-space would be (a desk, a whiteboard). Within my actual playing space, the boxed-in world of *Donkey Kong* relates to my body as a playable object. The cybernetic feedback loop between me and this framed sub-space demands my total attention and maximum effort, and is therefore potentially captivating. To the extent that I manage to conquer the machine, and allows the machine to conquer me, so that we together get into a seamless flow of focussed interaction, the relationship could best be described as some sort of trance, as hypnosis.

The world of the 2D avatar, therefore, is comparable to the 'world' of the instrument, as described by David Sudnow in *Pilgrim of the Microworld*. The instrument, considered as an ideal type of play, has no avatar, no entry point for fictional participation. In *Breakout* as well as in *Pac-Man*, because of their relatively weak avatarial extensions (the latter admittedly stronger than the former), the player is playing *with* rather than within the microworld of the game. Playing with (and against) the cybernetic instrument is in a certain sense a system-oriented activity, only it is not system-oriented in the same way that you would play *SimCity*. When challenging the instrument, your primary aim as a player is to incorporate and embody a pattern, or a dance, if you will. This process of appropriation, whether in old-school twitch games or in contemporary rhythm-action games, is focussed around your *own* body rather than a vicarious one.

While the avatar in *Donkey Kong*, like any avatar, does offer you a vicarious body through which your perception is altered or re-wired, the avatar itself does not incarnate a perceiving body-subject. As a perceptual prosthesis, it re-orients, but never re-*positions* the body-subject of the player. Through the mediation of Mario we are to a certain extent encouraged to re-centre, to imagine ourselves as a subject within the world of the game, but this imagining is based on the mere extension and displacement of our locus of agency, via a puppet, to which any fictional subjectivity must be ascribed through mental simulation. In a phenomenological sense, the meaningful actions that we perform when playing with (or through) Mario are performed from outside the space that Mario inhabits. It is from this outside position we are able to see and hear what we are doing, looking onto the magic surface in front of us. Consequently, we cannot act *as* Mario other than through our imaginative re-positioning, through which it is possible for us to pretend that the 'I' that acts is a different one from the 'I' that perceives. Through mental simulation, we can disregard our own perceptual subject-position, and pretend that the miniature is not a miniature. This suspension of disbelief is produced through imaginative *projection*, riding on the back of the prosthetic agency that the avatarial puppet affords.

However, as we know, because computer games absorb us in a flow of meaningful action, there will usually not be much (or any) room for this kind of make-believe. Under normal circumstances, the game space will demand that we relate to it as a miniature; we will not be inclined, for example, to explain our failure to jump a barrel by referring to the fact that Mario was turned the other way and could not see it coming; this response is of course possible, but it is not the kind of fictional participation that 2D avatars encourage. Mario is our proxy, our privileged plaything and extender of agency into a miniature world, and it is this remote relationship that grounds our participation with a fictional world. I will suggest that Mario is an objective or *extended* avatar – an avatar that we relate to, in a phenomenological sense, as an object among other objects.

The subjective avatar

In contrast, the 3D avatar, I want to suggest, is also a *subjective* avatar. The subjective avatar appropriates a navigable point of view as an apparatus of prosthetic perception, giving the player not just an extended fictional body, but also a re-centred perceptual subject-position.

The introduction of three-dimensional spaces in computer games during the early- and mid-nineties, and the significance of the navigable point of view, has so far not been much analysed in the field of computer game studies. One notable exception is Martti Lahti's article *As We Become Machines: Corporealized Pleasures in Video Games* (2003), which emphasises how the 'prosthetic vision' of 3D computer games has changed how players relate to computer game worlds. Lahti's conceptualisation of the player-avatar relationship is very different from the approach of Juul, Newman or Salen & Zimmerman; his concern is with the *corporeality* of player participation rather than with the functional or narrative significance (or lack of significance) of the avatar within the game structure. "Much of the development of video games", he argues, "has been driven by a desire for a corporeal immersion with technology, a will to envelop the player in technology and the environment of the game space" (Lahti 2003:159). Drawing on Erkki Huhtamo's analysis of the motion simulator capsule, which I will return to in chapter 8, Lahti observes how the screen itself has come to take the role as a prosthetic extension of the capacities of our body:

> Thus, video game history is characterized by a significant shift in perspective relations between the player and the field of play, from the vertical omniscience of the God's-eye-view, through a ground-level, third-person perspective along the horizontal axis, to a fully subjective perspective where character and player are unified into a first-person movement through the virtual space. One effect of

> this unification is the creation of a stronger experiential homology between the fictional world of the game and the real world, where virtual space begins to seem continuous with the player's space rather than sharply delimited by the frame of the monitor as I have been arguing. Our sense of movement and relation to the screen has thus similarly changed. 3-D games (for example *Doom* or *Quake*) brought with them a sense of limitless space opening behind the screen. (Lahti 2003:161)

I will follow up Lahti's perspective, although with a shift of emphasis from corporeality to avatarhood, drawing on the notion of avatarial embodiment that I have outlined in the previous chapters. The navigable point of view establishes a perceptual simulation of continuous space; it makes us believe that we act through or into the screen, and that our own body moves within the simulated environment. This sense of continuity and self-movement is the central difference between the 2D and 3D avatar.

In phenomenological terms, whereas any perceptual extension does reorganise or 'rewire' our bodily space so that we start perceiving our environment differently, the 3D avatarial prosthesis also 'superimposes' a vicarious body onto the body-subject itself, setting up not just a different, but an *alternate* bodily space. This new primary space, as Lahti observes, is premised on an 'experiential homology' – a continuity between the space of the actual body-subject and the screen-projected space of the simulated body-subject. As in photography, cinema and perspectival painting, the frame of the screen can be perceptually related to as a transparent window rather than as the framed surface of a moving image. In the next chapter, I will return to the question of how the game-based and avatar-based variant of this particular visual regime compares to perspectival images in other media. What I want to address here is what this transparency means to the computer game avatar, and the various ways in which the relationship between transparent subjectivity and objective embodiment can be configured.

The primary aim of the subjective avatar is not, as Lahti seems to suggest, to unify player and character – which would be specific to the first-person perspective – but more generally to unify perception and action. The prosthetic point of view gives the player a simulated body-subject rather than an extended proxy or magic hand; it simulates (some important aspect of) the player's own natural perception. In a phenomenological sense, unlike Mario in *Donkey Kong* (or the paddle in *Breakout*), the navigable point of view is not merely an object among other objects. In his analysis of natural perception, Merleau-Ponty's emphasises the non-objective (or transcendental) status of the moving body-subject:

> I observe external objects with my body, I handle them, examine them, walk round them, but my body itself is a thing which I do not observe: in order to be able to

> do so, I should need the use of a second body which itself would be unobservable. (Merleau-Ponty 2002[1962]:104)

The prosthetic point of view simulates this moving body-subject, and it forces us to perceive and act from a vicarious point of view. At the same time, for this prosthesis to become a vicarious *body*, it also needs to present itself extensionally, as that which we can relate to as an object among other objects in the fictional world (as when, in natural perception, we are studying our own hand, for example). An *avatarial* point of view, in other words, is more than merely a navigable or a prosthetic point of view; it implies some kind of objective presence in the simulated environment. Any subjective avatar includes, in one way or another, an objective presence, an extended avatar.

The subjective avatar of computer games simulates self-motion[64], and it simulates our body's dual nature as both body-subject and objective body. Unlike a purely objective avatar, the subjective avatar can never be, in Merleau-Ponty's words, 'completely constituted' as an object, in so far that it is "that by which there are objects" (Merleau-Ponty 2002[1962]:105). Subjective avatars simulate natural embodiment in the sense that they unify perception and action. When the player appropriates the prosthetic point of view, moving and perceiving come together in one vicarious body. The avatarial point of view navigates the world, looking (and listening) for opportunities and dangers, investigating objects, peeking around corners, scanning the horizon. Vicarious action follows from vicarious perception, and vice versa; the 'I' that acts is the 'I' that perceives. In contrast, while the extended avatar in *Donkey Kong* does offer the player a vicarious subject-position, it does not enable the player to perceptually inhabit a screen-mediated synthetic world.

It must be emphasised that the avatarial point of view is not dependent on a first-person perspective. In computer games, the relationship between prosthetic perception and the extended avatar may be articulated or configured in a number of ways. In most cases, the point is not to simulate the 'configuration' of our real bodies, but to simulate the configuration of *some kind of* body – some kind of vicarious embodiment that resonates with the dual nature of our natural body in a fairly stable and predictable (and hence playable) fashion. In *Super Mario 64* (Nintendo 1996) and *Tomb Raider (Core Design 1996)*, which are early and genre-defining games of the 3D action adventure, the navigable point of view works most of the time as a computer-controlled 'follow-cam' that keeps the extended avatar

64 This aspect of visual simulation is referred to, in more technical terms, as *vection*. See Chapter 8 for more on this concept. For an explanation of the concept of vection, see Prothero (1998). Prothero's study is mainly concerned with the relationship between vection and motion sickness or 'simulator sickness' in simulated 3D environments.

in view. It is as if the camera and the extended avatar are hooked up to each other with an invisible string, and the player is pulling the camera along via the extended avatar. At the same time, the player also has the opportunity to control the point of view directly in an alternate 'look around' mode. In neither case can the camera be detached from its umbilical connection to the extended avatar. We may call this a *dual-locus* or 'nunchako' configuration of the avatar. The dual-locus avatar allows the prosthetic point of view to be controlled either directly or indirectly, via the extended avatar. Following Merleau-Ponty, we could say that the camera takes the role of the 'second body which would itself be unobservable'. This body receives its objective presence mainly from the extended avatar, who carries most of the burden, as it were, of objective embodiment. The competent player pulls (or pushes) the tangible 'second body' along, via the direct control of Mario, who is, in a sense, wearing his eyes on a string.

Acknowledging the role of the avatarial camera in computer games implies that the fictional status of screen overlays – menu interfaces, health bars, weapons and inventory information, mission indicators, maps, and so on – does not need to be seen as a potential limitation or a challenge to fictional participation and subjective re-centring. An avatarial point of view will always have a minimal objective extension or presence within the world that it mediates – even when it is not integrated or 'corporealized' as a first-person perspective, and even if we consider it independently of its 'hookup' to and extended avatar like Mario or Lara Croft; it moves in space the way objects do (it does not cut through time and space like a film camera), and it has a minimum of solidity (it cannot move through windows, for example). Information and interface overlays or 'HUDs' (Heads Up Display), or any other signs (blood spills, raindrops) that draw attention to the screen itself as surface and action-space rather than as merely a transparent view, serve to confirm and articulate the objective presence of the avatarial point of view.

In light of Walton's theory of fictional participation, *any* 3D navigable point of view would have the potential to realise this objective status, because any fictionally transparent 'window' is always going to have, as a matter of fictional truth, a reverse side, as it were, a *fictional screen* that faces towards fictional space just like the actual screen faces towards actual space. In computer games, unlike in conventional narrative cinema, this fictional screen is indirectly recognised through the objective status of the avatarial point of view. When, for example, in the third-person adventure *Kameo: Elements of Power* (Rare 2005), the screen gets visibly splattered with green troll blood, this does not challenge any fourth wall or 'transgress' any boundaries of fictional space, because the avatarial point of view was never banned from the fictional world in the first place. Similarly, drawing attention to the surface of the screen through information overlays does not in itself challenge or undermine the constitution of the 3D avatar and the avatar's gameworld.

The notion of the subjective avatar is to a certain extent a matter of degree, and is not exclusive to three-dimensional spaces. Two-dimensional environments may also provide a travelling, fluent and indirectly controllable frame of view, even if the angle of perspective is fixed. This does provide a minimum sense of subjective positioning and subjective self-motion in relation to a simulated environment. The earliest variant is the side-scrolling space shooter, pioneered by the arcade classic *Defender* (Williams 1980), although the simplicity and relative emptiness of the environment (as well as the suspended weightlessness of the avatar) makes the simulation of horizontal movement ambiguous. In comparison, the side-scrolling frame of view in *Super Mario Bros.* (Nintendo 2004[1985]) is more unambiguously scrolling across a landscape, and this subjective horizontal movement gives a sense of travel and adventure that is lacking in the earlier *Donkey Kong* or *Mario Bros.* (Nintendo 1983). In *Super Mario Bros.*, the world is no longer framed or boxed-in as in a traditional arcade game, but extends beyond the boundaries of a navigable frame of view; Mario goes travelling, across a scrolling panorama[65].

The top-down variant of the navigable frame of view, as found *The Legend of Zelda: A Link to the Past* (Nintendo 2003[1991]), the third game in the *Legend of Zelda* series, goes one step further towards a subjective player-avatar relationship in computer games. *A Link to the Past* allows the player to actually navigate the frame of view rather than just pushing or 'scrolling' it on a predetermined track as in *Super Mario Bros.* and similar platform adventures. The player explores the world in different directions through navigating, as it were, a proto-version of the 3D 'nunchako' avatar[66].

65 *Super Mario Bros* did not pioneer the side-scrolling platforming format. This was introduced by the 'Tarzan-game' *Pitfall!* for the Atari 2600 in 1982. Moreover, the side-scrolling frame of view in *Super Mario Bros.* has a significant limitation which reduces the possibilities of exploration and adventure: the frame cannot move backwards.

66 The scrolling top-down frame of view is also a standard format in 2D action shooters and racing games, although, as with *Defender*, these are much more ambiguous (and less adventurous) with respect to movement or travel. The navigable frame of view in *A Link to the Past* must also be distinguished from the static frame of view in the first game in the series, *The Legend of Zelda*, which is more similar to the traditional grid-structured screen transitions that we find in avatar-based games from *Adventure* (Warren Robinett 1980) to *Prince of Persia* (Brøderbund Software 1990). The difference these games *The Legend of Zelda* is that the latter switches from one screen to the next in a kind of 'wipe' transition, which creates a stronger continuity between the screens. *Metroid* (Nintendo 2005[1986]) – Nintendo's third genre-defining action adventure besides *Super Mario Bros.* and *The Legend of Zelda* – combines grid-structured screen transitions with a sideways scrolling frame of view within (or across) each screen. *Zelda II: The Adventure of Link* (Nintendo 2004[1987]) strayed from the Zelda series' top-down formula, with action and combat sections taking place in a side-scrolling platformer format. The *Legend of Zelda* series went 3D with *The Legend of Zelda: Ocarina of Time* (Nintendo 1998).

With the navigable frame of view we can, in a limited sense, in Merleau-Ponty's terminology, "observe external objects with my body" by visually scanning or panning the environment in different directions via the extended avatar. Still, the world that is constituted in this way is two-dimensional; the more we move and act, the more securely do we establish the world as flat, as a 'world map'. 2D navigable frame of view does not attempt to simulate the re-location of the body-subject, and does not establish spatial continuity between play-space and fictional space.

The *isometric* perspective, as found in role-playing games like *Baldur's Gate* (Bioware 1998) or *Planescape: Torment* (Black Isles Studios 1999), as well as in real-time strategy titles like the *Warcraft* series (Blizzard 1994), goes one step further towards a fully subjective point of view. The navigable isometric point of view reveals a three-dimensional topography, while keeping a withdrawn and fixed-angle birds-eye perspective that is perfect for tactical and strategic play. Isometric environments also require less processing power than navigable 3D. However, because the player can not use the frame of view to navigate three-dimensional space (nothing can ever be 'behind' the frame of view), the potential spatial continuity between the player's space and the projected space is blocked. Instead the player relates to the simulated environment as some sort of (topographic) map, a semi-miniature that will always be perceptually positioned as a sub-space in front of the player.

In *Tomb Raider* or *GoldenEye 007* (Rare 1997), through the visual simulation of movement through continuous space, the 3D avatar captures the player's body in a way that can not be imagined otherwise; ultimately, the unbalance between simulated bodily space and actual bodily space may make the player sick. For most players, only first-person perspective avatars (First Person Shooters as well as others) do actually have the potential to induce motion sickness. This is due to the avatar's extra narrow field of vision, combined with the flexibility and speed with which the player is required to navigate the point of view. In principle, third-person games carry the same potential, as do any games or other 3D-applications with a navigable camera. However, the 'follow-cam' of the dual-locus configuration is usually too withdrawn and too slow to be able to create any noticeable physical effects in the player.

The avatarial configuration

In avatar-based 3D, the relationship between the player, the subjective point of view and the objective avatar can be configured in different ways. The first-person avatar, as established by pioneers like *Ultima Underworld*, *Wolfenstein 3D* (id Software 1992) and *Doom*, is characterised by a strong *integration* between the

objective and the subjective dimension; the navigable point of view is controlled directly, and the visible objective avatar is mounted onto the frame of vision as a pair of hands or a weapon. The properties that provide the prosthetic camera with an objective presence within the gameworld are integrated with the subjective avatar's primary capacity to move, perceive and navigate. Whereas any avatarial point of view would have a basic material solidity within the simulated environment (which a purely prosthetic point of view does not need to have), the integrated body of the first-person avatar puts flesh and bone, as it were, on this minimal objectivity. The first-person avatar has a particular weight, it has a set of properties and capabilities that make the avatar and the gameworld playable – moving, jumping, crouching, shooting, taking damage, triggering mechanisms and so on – and it is recognised as an agent in the fictional world in the same way as an extended avatar would be. In other words, the first-person point of view retains the full presence of objective avatarhood within itself. It also locks the player into a focussed tunnel vision that is optimised for precise shooting action, gives a strong sense of speed and disorientation, and encourages a persistent awareness of threat. This 'camera-body' is highly integrated, highly restrictive and radically situated.

The 'over the shoulder' point of view in games like *Max Payne* (Remedy 2001) or *Hitman 2: Silent Assassin* (IO Interactive 2002) presents a looser variant of the integrated first-person configuration. This configuration detaches the extended avatar from the camera, as a playable character or avatar-character, but keeps the camera behind the extended avatar at all times, always moving and turning together with it in a fixed relationship. In physical terms, it is as if the camera is attached to the neck of the character, not on a flexible string but directly on a sturdy pole. This configuration works well for fast shooter action, as the player will always be targeting enemies from a point of view directly behind the extended avatar. The semi first-person point of view is not all that different from a standard First Person Shooter configuration. It keeps the camera pulled back to give more overview, to give room for a more elaborate extended avatar, and to give some room for character description during play[67]. This character still works very much like an extended gun, even if the actual gun itself does not have the same dominating objective presence as it has in an FPS. In the FPS, the gun, and not least the

67 The close similarity between a semi-FPS setup and a standard FPS means that swapping between the two alternatives during play is relatively frictionless. In *Hitman 2: Silent Assassin* (IO Interactive 2002), the player can change to full first-person at any time, and even play the ent ire game in (a relatively clunky and inefficient) FPS mode.

sound of the gun, is indeed the central playable character in the game, always loud and spectacularly in-your-face[68].

A full dual-locus configuration, as found in *ICO* (SCEI 2002) or *Prince of Persia: Sands of Time* (Ubisoft Montreal Studios 2003), unlike the semi first-person configuration, allows the player to move the camera 360 degrees around the extended avatar. In between the semi first-person and full dual-locus alternatives there a number of possible configurations that give various degrees of flexibility to the camera-character relationship. The original *Tomb Raider*, notably, is relatively restricted in how the player is allowed to control the camera; its avatarial configuration is actually closer to the semi-FPS setup than it is to the 360 degree camera that we find in later games like *ICO*.

Prosthetic perception in the action adventure was not 'liberated' until the current generation of consoles (PS2, Xbox, Gamecube), which has implemented as standard a second analogue stick that can be dedicated to camera control in dual-locus configurations. This flexible dual-locus/dual-stick configuration gives a better visual grasp of the capabilities and appearances of the extended avatar. If we compare *Tomb Raider* to *PoP: The Sands of Time*, the latter is arguably more similar to a 2D configuration in the way it combines visual overview with a strong emphasis on the characteristics of the extended avatar. This new flexibility is to a certain extent a 'return to form' that makes the world of the avatar somewhat less immediate and less claustrophobic – and, we could add, somewhat more miniature. The player's perception is still captured by the prosthetic point of view, but this 'body' is no longer tied as closely to the extended avatar as in *Tomb Raider*.

It should be noted that a strong emphasis on the extended avatar does not necessarily imply that the avatarial configuration emphasises fast action or acrobatics. *ICO* is strongly focussed around the characteristics and behaviours of the extended avatars, but these avatars are primarily geared towards relatively slow-paced physical navigation and environmental puzzle solving rather than fast-paced combat[69]. The distinct expressiveness of Ico and Yorda does not come from spectacular movements or exaggerated characterization, but from subtle

68 It is fundamentally ambiguous, I would argue, whether, in a semi-FPS configuration, the player controls the extended avatar directly or indirectly. In a physical analogy, we could say that the objective avatar in *Max Payne*, rather than being mounted directly on the camera as in an FPS, is instead being pushed along the ground by the navigable camera, which is under direct control by the player but which is being 'dragged down', as it were, by the avatar-character. This 'reversed' perceptual interpretation is impossible to do if the camera is relatively independent from the extended avatar.

69 *ICO* has one central avatar, but the player can also form a kind of 'associative avatarhood' with the second character, princess Yorda, through leading her by the hand, pulling her up ledges and so on. Also, after completing the game, two players can play co-operatively, the second player controlling Yorda.

nuances in character animation, particularly in the way they interact with each other.

As noted in the introduction to this chapter, the specific significance of the 3D avatar does not follow automatically from the implementation of three-dimensional game spaces; it is not 3D as such that matters, but 3D-generated forms of embodiment. Through the avatarial configuration, it is possible to make three-dimensional spaces playable while downplaying or almost abandoning the role of the avatarial point of view. In games that encourage multi-player co-operative play without resorting to a split-screen solution, the relative distance and 'neutrality' of point of view is an absolute necessity; with a standard avatarial camera, players would be given very little space to play, uncomfortably locked together like Siamese twins. *Lego Star Wars* (Traveler's Tales 2005), which is optimised for co-operative single-screen play, also illustrates on a more general level the possibilities that emerge from de-emphasising the role of the avatarial camera. Players move in three dimensions, but the computer-controlled point of view is kept pulled back all the time, mostly following the extended avatars through a kind of sideways 'tracking' rather than chasing them along the depth axis while the action is going on. This kind of mildly subjective (or co-operatively subjective) point of view resembles the sidescrolling frame of view of 2D action adventures as well as the isometric perspective of party-based role-playing games. The pulled-back approach constitutes a less exclusive and less imposing – and in one sense more playable – subject-positioning than what you find in other 3D action adventures. The semi-3D navigable camera also gives more room to play out the various expressions and capabilities of the (highly malleable and destructible) environments and extended avatars of the *Lego Star Wars* universe.

Relative independence

Dual-locus configurations imply a relative independence between the subjective and the objective dimension of the avatar, and a relative independence between action and perception. The player does act and perceive through the navigable camera, but in addition the player can also act through the extended avatar in relative independence from the actions of the prosthetic camera. In this respect, the 3D extended avatar is similar to the 2D avatar. Relative independence allows for a vicarious body that is less rigid, more malleable and more complex in its capabilities and appearances than the integrated avatar. Dual-locus configurations do not provide the same thrill (or anxiety) of focussed tunnel vision, and are less able to facilitate fast and precise aiming, but they open up for a broader variety of interactions and challenges. The player is given more overview, and has more alternatives in how to interact with the environment through the extended avatar,

typically in acrobatic ways, as illustrated by *Super Mario 64* and other platform-adventure games. For example, in *Super Mario 64*, Mario is able to climb a tree or a pole, get up in a handstand at the top, and go directly into a tall spectacular jump. First-person avatars, in contrast, give relatively little room for acrobatics, as this would easily produce intolerable – and unplayable – disorientation and vertigo for the player.

Relative independence also means that the properties of humanoid or otherwise animated extended avatars are given more attention and significance also as *characters* that the player controls, and whom the player may identify with in various ways. Quite often, as for example in *Jet Force Gemini* (Rare 1999), variations and differentiations in the capabilities and limitations of the extended avatar are expressed as different playable characters; Juno, Vela and Lupus (boy, girl and their dog) are different variants of the same avatarial relationship, each offering a unique ability that allows the player to perform different actions and reach different areas in the game. A similar kind of differentiation and variation could of course also have been implemented through a first-person avatar, but then the characters' unique appearances and personalities could not have become a part of the avatarial relationship in the same way. One of the strengths of extended avatars like Mario, Link or Ico is that during play, they can more easily draw attention to character – and by implication, to story – than what merely a pair of waving hands or the barrel of a gun can do. The objective appearances and behaviours of the avatar as a character are particularly accentuated in full dual-locus and dual-stick configurations, where the player can move the camera 360 degrees around the extended avatar. At the same time, as noted above, sometimes the barrel of a gun may be the central 'character' than the player wants to focus on.

The first-person configuration is more radically prosthetic than the dual-locus configuration; on one hand, it allows faster, more fine-tuned and more flexible control of the avatarial camera than what is possible with the more unwieldy 'nunchako' setup; on the other hand, it has no relative independence in relation to the player – no relative freedom to act on its own accord, no freedom to compromise, undermine or loosen up the avatarial relationship.

Dual-locus avatars are more flexible in this respect. This flexibility applies to the extended avatar as well as to the avatarial point of view, both in relation to each other and in relation to the player. The avatarial camera retains the prosthetic relationship to the player, while the extended avatar can move and act in relative independence from the player's actions. In *Beyond Good & Evil* and *The Legend of Zelda: Ocarina of Time* (Nintendo 1998) for example, Jade or Link jump automatically when they are close to an edge; this is something the player quickly gets used to (and which may be a welcome alternative to common convention), as there is generally a relative independence or 'slack' between the player's and the extended avatar's actions anyway. This space for independent action also gives more oppor-

tunities for the development of character, because it allows for more elaborate and extended sequences of movement and posture, which may be triggered by a single press of a button. With a first-person avatar, however, similar forms of 'automatic' or independent action – which may include, for example, jumping forwards or sideways, climbing ladders or even walking up to another character to engage in conversation – would neither escape nor loosen up the avatarial relationship, and nor would it be able to convey anything about character; in a first-person configuration, there is only one, unified avatarial prosthesis. If this starts moving on its own accord, it simply means that the avatar, and the player, is *being moved*, is being taken for a ride.

I will return to this 'ride' aspect of the navigable camera in chapter 8. The main point here is that the first-person avatar does not acknowledge any relative independence between action and perception; with first person avatars, it is either full avatarial integrity, or no avatarial relationship at all, take it or leave it. The dual-locus avatar, on the other hand, has more flexibility not just in terms of how the extended avatar is able 'roam' within the parameters of the avatarial relationship as a whole, but also in terms of how the *camera* is able to act independently, even in directly unpredictable and unreliable ways. When not controlled directly by the player, the camera does not merely follow the extended avatar passively, in a fixed relationship, but is operated by the computer in a more or less intelligent fashion, with an aim to present the extended avatar and the environment from angles that is adequate for the task at hand. In *Super Mario 64*, this camera, when set to its most independent modus, is even given a personified 'camera operator' within the diegetic world of the game, the 'Lakitu brothers', who are, presumably, broadcasting Mario's adventure as some sort of televised contest.

The relatively independent behaviours of intelligent 'Lakitu' cameras loosen up the integrity of the avatar, potentially challenging the distinction between on one hand the avatarial point of view, which is prosthetic and has an objective presence, and on the other hand a *filmic* camera, which moves and cuts through space on its own accord, and which does not have any extensional body in game space. In *Super Mario 64*, *Prince of Persia: Sands of Time* and similar variants of the dual-locus configuration, the semi-independent camera keeps the umbilical string to the extended avatar intact, does not move in disembodied jumps or cuts, and avoids (at least ideally) unpredictable or obstructive behaviour[70]. The survival horror genre, however, is a notable exception to the general rule of predictability and control in avatarial configurations. The genre-defining *Alone in the Dark* (Infogrames 1992)

70 An exception to the rule of fluency (although not to the rule of consistency and predictability), in *Super Mario 64*, is when the extended avatar is moving through doors. In these cases, the camera does not follow in a continuous movements, but instead fades out and fades in again at the other side of the door.

and *Resident Evil* (Capcom 1996) combine a 3D extended avatar with pre-defined camera positions, with the camera cutting from one position to the next as the player moves along. Whereas this configuration frames the action from a filmic angle of view, it also makes it noticeably harder to control the extended avatar, and gives the player a perceptual 'prosthesis' that is suitably restrictive and unreliable, in keeping with the horror atmosphere and the generally disempowering imperative of the genre. Rather than aiming to provide the player with optimal (and fluent) perceptual control, the independent and rigid behaviour of the camera aims instead to obstruct, challenge and destabilise the player-avatar relationship.

To conclude, we may see the highly independent point of view in *Resident Evil*, which moves with the extended avatar in filmic cuts rather than as a tangible and coherent prosthetic extension, as the extreme dual-locus variant of 3D avatar, and the uncompromising integrity of the first-person avatar as the extreme variant at the other end of the spectrum. As generic types, they represent different ideals and principles for avatarial embodiment in three-dimensional gameworlds.

3D Sound space

Martti Lahti's concept of 'prosthetic vision', while drawing attention to the avatarial significance of the navigable point of view in computer games, leaves out the role of sound in prosthetic perception. Through the modelling of three-dimensional sound environments, the alternate space of the subjective avatar is defined in terms of navigable *hearing* as well as navigable vision; the subjective avatar has ears as well as eyes. Game designer Stephan Schütze explains:

> Three-dimensional (3D) sounds in computer games are sounds that are placed within the virtual world and a 3D audio engine governs their output. The 3D engine calculates how the sound will be heard in relation to the virtual listener. In most cases the listener position will be attached to the game camera. As the camera moves around the game world, the 3D engine outputs what the camera would hear in that location. Thus, as the player is viewing the game world through the game camera, they hear the world in a manner equivalent to real-world expectations. (Schütze 2003:173)

These 'real-world expectations' are based in our bodies' natural integration of seeing and hearing. Consequently, in games of the dual-locus configuration, it is

the navigable point of view that should be wearing the ears, as it were, not the extended avatar, as is also the case in most contemporary action adventures[71].

Moreover, the fact that sound environments can be navigable in themselves makes it possible to leave out any screen-based visual representation altogether, and still have a playable three-dimensional game environment, as has been demonstrated by the so-called 'audio games' that have been developed especially with visually impaired players in mind[72]. The same logic, however, works also the other way around; screen-based 3D environments do not require sound to be navigable and playable.

Nor do navigable soundscapes, as long as they are integrated with a visual 3D environment, need to actually *distribute* directional sound in physical space through stereo or surround sound devices (the latter which is usually referred to as 'positional sound'). Via the screen-based 3D avatar, the player can experience an environment of sound objects purely in terms of the sound's characteristics and amplitude, as this simulates distance, reverberation, absorptions and occlusions relative to the player's position. It is possible, in other words, to navigate a screen-based soundscape in mono, even if it would be harder to tell exactly which directions the sounds were coming from (a problem that sometimes also occurs, we could add, in real life situations). Distributed or positional sound obviously adds a new dimension to tactical play, and it may enrich the experience of being immersed in a soundscape, but spatially distributed output is not essential to the simulation of inhabiting a sound environment through an avatar.

What positional sound does, however, is exploiting and consolidating the integrity of alternate bodily space; as players, we instinctively accept that sounds from a screen-projected universe are emitting from beyond the screen. It would be much harder to accept distributed off-screen sound in for example *Pac-Man* (Midway 1980); it would at least be a very different (and possibly interesting) type of experience. The genre that definitely makes most use of positional sound is the First Person Shooter, with its slightly paranoid and restlessly narrow field of vision. The discrepancy between visual and auditory perceptual scope adds an

71 Partly due to time constraints, I have not been able to find any example in which a dual-locus avatarial setup places the listening position on the extended avatar rather than on the camera. However, such a consistent split between hearing and seeing would provide an interesting case of dual-locus subjective perception. We could imagine this strategy being chosen for reasons of diegetic consistency – the idea being that the player should be able to listen through the *character* rather than through the subjective point of view – but on the other hand it would definitely be less realistic in the sense that it goes against the integrity of natural perception, as well as against, I would argue, the principle of the subjective avatar as a mode of fictional participation.

72 For more information on audio games, including a list of downloadable games, see http://www.audiogames.net/.

important tactical element, and it solidifies the autonomy of the action-space. More generally, simulated sound environments are central to the establishing of a sense of threat and horror; the first-person avatar, constantly facing potential destruction from any direction, has tunnel vision but not tunnel hearing.

Continuous interfaces

On video games consoles, control pads with analogue sticks established their dominance after being introduced by the Nintendo 64 console in 1996. The 360 degree continuous movement enabled by the analogue stick provided a precision and fluidity that was lacking from the digital 8-directional (or 4-directional) digital pad, and this advantage proved to be much more significant in 3D space than in 2D space. The analogue stick not only expanded the range and subtlety of possible action in three-dimensional environments, but it also responded more adequately to the spatial continuity of the new perceptual regime. When acting into continuous space, an avatarial connection that is only capable of mediating movement in discrete directions and increments becomes an unnecessary restriction, and it also forces a layer of abstraction onto the player's embodied participation in the game space[73].

On today's consoles, the dual-stick configuration of Sony's 'DualShock' controllers, which were first launched in 1997 and later adopted as a standard also by its competitors, adds to the 3D avatar an extra dimension of realistic agency by separating locomotion from looking and turning. This configuration mirrors the keyboard-and-mouse interface that was introduced by *Quake* (id Software 1996) and which has become the configuration of choice on PC-based shooters. In first-person configurations, the left analogue stick (or keyboard) controls the avatar's locomotion, whereas the right stick (or mouse) controls the avatar's movement around its own axis (looking and turning). In dual-locus avatarial configurations, the right stick (or mouse) is typically used for controlling the camera, whereas the left stick (or keyboard) controls the extended avatar. Operated in combination, the dual-stick or mouselook setup offers to the habituated player a flexible, intuitive and reasonably precise control of motion and perception in three-dimensional simulated environments.

73 Because Sony initially provided the Playstation with d-pad control input only, *Tomb Raider* follows precisely this somewhat alienating logic of abstract movement, for better or for worse. Although mostly abandoned after the introduction of analogue stick controllers, abstract movement in three-dimensional space has not entirely disappeared from contemporary games – as exemplified by, notably, the avant-garde arcade-adventure game *Killer 7* (Capcom 2005a).

As explained in chapter 6, the avatarial prosthesis does not require mimetic gestures as part of the physical interface. Any kind of consistent movement can be integrated or 'absorbed' by the avatar, and incorporated by the player as second nature. At the same time, the continuity of alternative bodily space, unlike the miniature sub-space of the 2D avatar, also opens up a possibility for *continuous interfaces*, according to which we are able to act intuitively through the screen as a transparent window, based on pre-established perceptual habit. Classical continuous interfaces would be the lightgun, the steering wheel or the flight stick. Contemporary variants may rely on various kinds of motion-sensing (or tilt-sensing) equipment, which is a technology that will come built into the hardware interface of the upcoming Nintendo Wii.

From the point of view of fictional participation, continuous hardware interfaces imply that mimetic gestures become part of the simulation. Continuous interfaces are in this sense also fictionalised interfaces. However, continuous physical interactions are not to be confused with *gestural simulations*, or gestural games of make-believe, as described in chapter 4; they are not independent mimetic gestures that would in some way be in dialogue with the events on the screen, but are integral to model-based make-believe, integral to the acting into a screen-projected simulated environment.

Continuous interaction is accommodated by the 3D avatar, which is premised on the simulation of continuous space. However, as pointed out in chapter 6, mimetic gestures must either be limited to a *metonymic* function – as exemplified by the shoulder or 'trigger' buttons on modern controller pads, which in a limited sense may give the player the feel of handling a handgun – or they must be otherwise strictly limited and disciplined in the service of the screen-projected vicarious body. Continuous interfaces in avatar-based games can therefore not be directly compared to the continuous interfaces of Virtual Reality installations. In avatar-based play, continuous interaction is not a way of projecting oneself directly into a simulated world, but is filtered through and subordinated to the demands of the avatarial prosthesis; continuous interaction goes in the service of the avatar, not the other way around. The dominant imperative is vicarious embodiment, not virtual embodiment. In other words: it is not just the player who must incorporate the hardware interface as a prosthesis – whether supported by pre-established habit or not – but also the avatar who must accommodate a particular set of pre-established habits, incorporating the continuous physical actions that the player performs.

Mimetic gestures that are *not* subordinated to the avatar may be seen as either irrelevant, or as establishing separate channel for continuous fictional participation independently of the avatar, VR-style. – Or, as the third alternative, they may be meaningful as part of a gestural game of make-believe, which is a

practice of imitation, performed in dialogue with the model-based simulation of the gameworld.

Through the spatial continuity that they establish, 3D avatars have the capacity to provoke irrelevant, yet intuitive physical actions and responses, as many will have observed either in their own play or by observing others; players 'steer' in racing games by twisting and turning the controller pad itself, or they instinctively lean over to peak around corners in First Person Shooters. These perceptually irrelevant and in this sense 'misunderstood' actions and reactions testify to the *illusion* of 3D navigable spaces; players react to the continuity that is established by the navigable point of view, which tricks the player into responding as if there was no actual physical interface, and if there was no avatarial relation.

Martti Lahti reads this phenomenon as a general characteristic of the corporealized 'cybernetic loop' between the player and the computer, and as a symptom of the desire to blur the distinction between player and avatar (Lahti 2003:163). However, while this interpretation does address the unique nature of avatar-based 3D as distinct from two-dimensional game spaces, it fails to distinguish, I would argue, between corporeal immersion on a general level – which would be a 'delirium of virtual mobility'[74] that applies equally whether we are actually in control of our vicarious body or not, and whether we are playing a game or not – and the more specific principle of avatarial embodiment. Misunderstood continuous interaction, I will suggest, is a mark of what we may call an *immature* avatarial relationship. This is a perceptually continuous and tangible relationship in which the player has yet not been (or does not want to be) properly trained and disciplined, has not yet incorporated the vicarious body as second nature, and has therefore not yet adequately 'de-learned' the inclinations of pre-established bodily habit. The competent player, on the other hand, intuitively channels every action and every movement through the avatar, rather than attempting to throw himself or herself directly into screen-mediated space. The competent player, disciplined by the avatar, does not respond to the illusion[75].

Through various types of motion-sensing or motion-detecting technology, continuous interaction into three-dimensional simulated spaces does not need the principle of the avatar. Bypassing or downplaying the avatar gives more freedom to incorporate continuous interaction independently of avatarial constraints and demands; it allows more space for mimetic gestures that are

74 Lahti 2003:163

75 This does not mean, of course, that competent players cannot engage in various forms of gestural simulation while they play. However, competent players do not misunderstand in terms of how they should be able to act into the screen-projected simulated environment. A competent FPS player, for example, is not going to involuntarily lean over to peek around corners, or attempt to physically duck a bullet.

interesting and fun in themselves, and which may also be more easily accessible. The motion-capturing *EyeToy* technology for the Playstation 2 avoids the restrictions of avatar-based play by projecting an image of the player's own body on the screen. With the introduction of the Nintendo Wii console we will see a greater variety of continuous interfaces that bypass or challenge the principle of the avatar, as well as probably also new ways of attempting to incorporate metonymic gestures into high-investment avatarial relationships.

Gestural make-believe may emerge from the particular dynamics of a given playing situation, but it will also be, we must presume, aided and encouraged by immature and physically laborious avatarial relationships. Gestural make-believe is about playing along, engaging in mimetic dialogue with what goes on in projected space; when playing GTAIII with friends, for example, we may adopt a suitably gangsta' style of talking, along with the appropriate bodily postures. In some cases, this kind of dialogue is also embedded in or encouraged by the hardware interface itself, as would be the case with the Resident Evil 4 'Chainsaw Controller' for the Gamecube, which is shaped like a (blood-stained) chainsaw but which functions just like a regular Gamecube controller[76]. In contrast, handling the steering wheel in a racing game like *Gran Turismo* (Polyphony Digital 1998) does not encourage gestural make-believe (unless very immaturely performed), because it is integral to the perceptual interaction of play; the player's driving is no more an act of 'imitation' or 'dialogue' than the player's looking and hearing within the game space.

Finally, 2D interfaces may also have a gestural fictional significance, in so far as they require physical actions that also simulate something independently from the how they are acting onto the surface of the screen. A classical example of a fictionalised interface in 2D gaming can be found in the popular top-down arcade racing game *Super Sprint (Atari Games 1986)*, which was fully equipped with steering wheel, gearstick and pedals. This interface adds a new dimension of fictional participation, a gestural simulation that acts in dialogue with the flat fictional world that the avatar inhabits.

Mouselook

As the example of the shoulder 'triggers' on console pads illustrates, metonymic interfaces are a matter of degree, and in some cases a matter of interpretation. The contemporary console interface, I would argue, has a stronger continuous resonance with the 3D avatar than the dominant PC-based interface. In games of the

76 For an illustrative image of the RE4 Chainsaw Controller, see http://www.eurogamer.net/article.php?article_id=57928 [accessed 15 April 2006].

action adventure category, the analogue sticks are hardly superior to the keyboard and mouse interface in terms of precision and functionality – depending, to a certain extent, on whether we are talking about first-person or dual-locus avatars – but they structure our physical interaction in a way that is more continuous (or at least less discontinuous) with simulated subjective space. The mouse interface is more 'continuous', we could say, with two-dimensional space, and is therefore perfect for on-screen action; the mouse translates our movements on a physical surface into movements on the screen surface, in a 'mystical transformation', in Sudnow's terminology. In the 'mouselook' interface that was (somewhat hesitatingly) established with *Quake*, this transformation from surface onto surface is de-learned and re-incorporated into looking and turning in three dimensions. In other words: a physical interface that is discontinuous and counterintuitive in terms of pre-established habit nevertheless becomes second nature, via the principle of the avatar.

Still, I would argue that there will always be in the mouse-based interface a remnant, or a memory, as it were, of surface action, of point and click, and that it therefore retains an ambiguity in terms of perceptual interaction[77]. This is especially the case in First Person Shooters like *Quake*, where fluent and precise movement across the surface of the image enables a faster and more efficient avatarial relationship. At the same time, high-powered 'surface action' also reflects, to a certain extent, a relative independence from avatarial constraints; via the mouse-controlled point of view, centred in the crosshairs on the screen, the competent player can turn 180 degrees in an instant, and aim anywhere with pixel perfection in a split second, almost without friction, as if the avatar had no objective presence within in the simulated environment. A thumb-operated analogue stick, in contrast, is not the natural or optimal choice for navigating crosshairs or a cursor on a framed surface (– as any mouse-less laptop user can verify), and is therefore considerably less ambiguous with respect to the construction of space. With the right-hand analogue stick, the player actually has to 'travel' the distance of a 180 degree turn, with the limitations on speed and accuracy that embodied presence can be expected to produce. The player's inefficient actions via the right-hand stick are therefore not so much hooked up to the crosshairs directly as to the simulated vicarious body of the avatar, a body which in the case of shooters is centred around the presence of the navigable gun. We could say that, whereas the

77 A far less moderate variant of such surface-oriented physical action would be, quite simply, a direct touch-screen interface, which would arguably be a paradox if applied to avatar-based 3D environments.

PC player pulls the gun around with the crosshairs, the console player pushes the crosshairs around with the gun[78].

Rumble

As a standard element of the contemporary avatarial hardware interface, the significance of tactile 'force-feedback' vibration technology should also be acknowledged. The idea of force feedback, introduced by Nintendo in 1997 as a an accessory 'rumble pak' that fitted into the socket on the N64 controller[79], is to give the player an extra sense of tangibility and physicality through vibrations that are synchronised with events on the screen. These (usually short) bursts of vibration give tactile response to the player's hands when the avatar is subjected to rough contact or damage, when the gun is being fired, when the floor under the avatar's feet is vibrating and so on. This possibility to give physical feedback is most successfully exploited in racing games and shooters, as a way to accentuate and enhance the aggressive physicality of the avatar (the gun, the vehicle). Tactile feedback does not *create* the sense of tangibility, but is rather implied by it and confirms it; or as Martti Lahti observes, "[Tactile feedback] literalizes the implied bodily sensations conveyed through visual and sonic effects" (Lahti 2003:162).

This is why a highly unsophisticated and generic 'rumble' sensation works just fine, in spite of its indiscriminating simplicity; the perceptual significance of each rumble is defined by the simulated action or event as a perceptually meaningful whole, not by the distinct quality or shape of the vibration itself[80]. In particular, the rumble function responds naturally to the presence of imposing *sounds* in the simulated environment; the generic vibration of the controller pad simulates the

78 According to the same logic, the *inverted* mouse interface would have to be placed somewhere in between the gun-directed analogue stick and the crosshairs-directed (non-inverted) mouse. Playing inverted keeps the speed and accuracy of surface navigation, while still establishing a continuous relationship to the avatar by simulating the leaning forward to look down, and leaning backward to look up. This parameter of physical simulation would of course also apply to the analogue stick interface. Moreover, I would argue, in both interfaces, the continuity implied by the inverted axis (pulling up, pressing down) has more significance with longer guns – in other words: the non-inverted axis may qualify as continuous when shooting with a pistol, but takes on a flavour of surface action when operating, say, the barrel of a tank.

79 Immersion introduced their 'force feedback' technology for PC controller pads shortly prior to Nintendo's launch of the 'rumble pak', but it was definitely the latter that made the bigger impact on the market.

80 That said, for the purpose of first-person shooting, some variants and instances of force-feedback may admittedly appear more dissatisfyingly 'woollen' than others.

sound waves' physical impact through continuous space. This close perceptual relationship between sound vibration and tactile vibration is key to the distinctive feel of force feedback in First Person Shooters.

The perceptual role of tactile feedback in the FPS is premised on the 3D avatar's simulated continuity of bodily space; it plays on and consolidates the integrity of the simulated body-subject. In the FPS as well as in racing games, integrity and continuity is accentuated by tunnel vision and fast movement along the depth axis. Tactile feedback is therefore easily appropriated by the player as second nature and therefore invisible and not paid attention to; once you get used to rumble, something feels wrong when it is taken away; the controller pad feels dead in your hands[81].

We may of course also imagine a 'rumble' function being implemented in 2D environments, for example in arcade shooters like *Robotron: 2084* (Williams 1982), but the general rule as stated above would still apply: tactile feedback consolidates or 'literalises' a sense of tangibility that is already there. In 2D environments, this tangibility constitutes a flat microworld, coming alive in front of the player on a magically framed surface. 2D force feedback, in other words, would further consolidate the flatness and the miniatureness of the gameworld.

The 3D avatar defined

In the following I will conclude by summing up the specific characteristics of the 3D avatar, as these are rooted in the more general principles of the computer avatar that I have outlined in chapter 6.

The 3D avatar the is a particular type of avatar, a *subjective* avatar, which mediates fictional embodiment in a more radical sense than the purely extended avatar of 2D gameworlds. Through the appropriation of the navigable point of view as an apparatus of prosthetic vision, hearing and movement, the 3D avatar rejects the miniatureness and flatness of the framed surface, and mediates embodied

81 At the moment of writing, Sony has announced that the new PS3 controller will not include any force-feedback functionality at all, instead replacing it with a tilt controller function. This is a significant departure, I would argue, in hardware interface conventions for console games. It remains to be seen whether this is actually going to be a success, or if Sony will be forced to produce a second version of the controller pad that re-introduces the force feedback. In light of the general argument that I am making in this chapter, the lack of force feedback may not be a dramatic loss, but it will affect the experience in a negative way – in particular in racing games and shooters, in which players have gotten used to (although not necessarily paying much attention to) continuous tactile feedback. My guess is, therefore, that the PS3 console, in these two commercially important genres, will loose out to its competitors as far as multi-platform titles are concerned, unless the force-feedback is re-introduced.

interaction through continuous space. This prosthetic continuity unifies perception and action, and constructs a vicarious body that reflects the dual nature of the body as both subject and object in the world that it inhabits. This simulated body-subject, which situates us perceptually and objectively within the gameworld, is the central prop in avatar-based 3D as a fictional form.

In contrast, the 2D extended avatar mediates embodied interaction into a miniature world; it is a puppet, a magic hand, which relies on mental simulation in order to mediate for the player a fictional subject-position. This act of mental re-centring is disconnected from how the player perceives and acts in the game space, and hence does not help the player to actually play the game.

In avatar-based 3D, the interdependencies between the avatarial point of view, the extended avatar and the player can be configured in a number of ways, from the maximum integrity of the first-person avatar in *GoldenEye 007* to the full dual-locus and dual-control avatar in *ICO*. Whereas the first-person avatar is radically situated and radically prosthetic, the dual-locus avatar allows a varying degree of relative independency between player, the extended avatar and the intelligent follow-cam. This makes avatarial embodiment looser and more flexible, and lends itself better to the elaboration of character and story during play.

The navigable (or scrollable) frame of view that can be found in 2D games like *Super Mario Bros.* or *The Legend of Zelda: A Link to the Past*, and the isometric perspective of *Diablo*, can be seen as a proto-forms of the dual-locus configuration; even if they lack the perceptual continuity that negates the miniature, their dynamic point of view still provides a degree of unity between action and perception, between the 'I' that travels and the 'I' that perceives.

Unlike miniature spaces, the spatial continuity of the 3D prosthesis invites physical interaction through continuous hardware interfaces. For the same reason, whereas miniature surfaces encourage direct touch, the 3D navigable point of view strongly discourages it[82]. At the same time, because avatarial embodiment is about *vicarious* interaction rather than continuous interaction, avatar-based play is counterintuitive with respect to the spatial continuity of prosthetic vision; in a mature avatarial relationship, any mimetic gestures must be rigidly disciplined by and incorporated into the body of the avatar. Undisciplined continuous interaction, unless simply rendered irrelevant, will either set up a space for alternative continuous interaction – undermining or bypassing the avatar – or it may take on a new significance as part of a gestural simulation, which is performed in dialogue with what goes on in the gameworld. Fictionalised interfaces in 2D

82 In this respect, it could also be argued that lightguns, though a seemingly perfect example of a continuous and 'realistic' 3D interface, are actually highly ambiguous in their relationship to the projected world of the avatar, as they operate – albeit indirectly – *on* the screen rather than through it, much like a touch-screen interface.

games, because miniature worlds do not establish spatial continuity, are by definition gestural and dialogical rather than continuous.

The modelling of three-dimensional sound objects and soundscapes contributes to the constitution of the vicarious body of the avatar; it integrates prosthetic vision and prosthetic hearing, and gives the avatar ears as well as eyes. In addition, the 3D avatar is also often given a certain degree of tactile perception through the implementation of force-feedback technology in the hardware interface, which confirms and consolidates the tangibility of the gameworld. Because tactile perception is channelled through and integrated with the perceptual apparatus of the avatar, mostly any unspecific rumble will do.

The currently dominant console controller interface, the dual analogue stick gamepad, is primarily tailored to avatar-based play in three-dimensional environments; it allows for precise, flexible and sustained avatarial control while also being able to incorporate a certain degree of metonymic continuity as well as certain degree of tactile feedback. The PC-based mouse interface, on the other hand, which is more general-purpose, creates an interesting ambiguity with respect to the integrity of avatarial space (although in a moderate sense), not because it is non-continuous or arbitrary, but because it is continuous in relation to two-dimensional surfaces.

Self-contained fictions

The perceptual continuity of the 3D avatar appropriates play space in a way that the two-dimensional playable surface does not. When we play, whereas 2D worlds are being subsumed as a framed sub-space or a micro-space within the space of play, the 3D avatar does not recognise any space for fictional participation outside the projected world that it inhabits, and it does not recognise actions and responses (voluntary or involuntary) that do not act into projected space. This means that play space is subordinated to the integrity of the gameworld as a self-contained and playable 'work world'. As argued in chapter 5, the principle of the work world is not compatible with the *automaton* as a model for fictional participation; when the world of the avatar is all there is, the player is given no position from which to engage in make-believe dialogue with the animated machine.

Playing *Super Mario 64* or *Half-Life* (Valve 1998), therefore, is all about discipline, about getting a grip on yourself; you learn to filter and extract your playful mastery and self-expression through the regime of the avatar. The stronger the perceptual simulation, and the stronger the avatarial discipline, the less space there is for off-screen fictional participation. In this sense, the 3D avatar is more restrictive than the 2D avatar. The world of the radically subjective avatar is, we might say, tangible yet untouchable.

At the same time, *Lego Star Wars* illustrates that 3D action adventures may still choose to de-emphasise the avatarial point of view, emphasising instead a more detached playability that approaches the miniatureness of 2D game spaces. This semi-2D approach also implies that the separation between the avatar's gameworld and actual play space is far less rigid and more permeable, not just as a matter of 'immature' avatarial relationships, but as a result of the avatarial configuration itself, which almost allows you to touch the screen.

Finally, I want to add that the uncompromising integrity and restrictive embodiment of the 3D avatar also carries with it a built-in sense of threat and anxiety that framed miniature worlds cannot produce. As Chaim Gingold points out, the stable and authoritative 'fourth wall' that separates the miniature from the actual world provides the player with absolute control and absolute comfort; the miniature garden is not a threatening place. It is confined in a snow globe, behind the screen. A horror version of *The Sims*, for example, would not be very horrifying, merely amusing; nor are there any chances of involuntary perceptual reactions, motion-sickness or other vertiginous pleasures. Microworlds are 'miniature, malleable and safe' (Gingold 2003:26). The world of the 3D avatar is different, although some avatarial configurations are safer than others. Strong perceptual re-orientation attacks the boundary between simulated world and corporeal reality. This co-opting of bodily space encourages a certain kind of seriousness, and accentuates the persistent threat of hostile environments.