
UN-DE-FOCUSED : VARIATIONS OF ATTENTION IN PLAYER ACTION IN VIDEO GAMES

PEDRO CARDOSO

ID+ / Faculty of Fine Arts, University of Porto
Portugal

pcardoso@fba.up.pt

MIGUEL CARVALHAIS

ID+ / Faculty of Fine Arts, University of Porto
Portugal

miguel@carvalhais.org

Keywords: Actuation, Attention, Focus, Frame, Time,
Video Games

A video game player manages her attention according to the strategies developed and the challenges unveiled by the game system. The player does this to the best of her capabilities, developing different activities and performing alternative actions and actuations that may or may not be suggested or even imposed by the system.

This paper proposes four dimensions concerning player attention – time span, sensorial scope, frame, and actuation automation –, each being capable of expressing three alternative states – focused, defocused, unfocused –, and through which the game system manipulates the player's affective state.

The variations that can be obtained by calculating all possible combinations, regarding these dimensions and their states, not only influence the affective states of the player, but also specify alternative characteristics regarding the nature of human interaction with the system, transpiring different gameplay dynamics.



1. INTRODUCTION

In this paper we focus on the phenomena related with the attention span of the player. We explore four dimensions whose different states affect her attention. We are not interested in quantitatively measure her attention, but in finding alternative states that the player manages during gameplay.

The player's mood and affective state may influence her attention. Negative affective states make the player anxious, and thus focused on repetitive operations and on developing similar ideas.

Indeed, the problem is not to overdo it: too much anxiety produces a phenomenon known as "tunnel vision," where the people become so focused they fail to see otherwise obvious alternatives. (...) "Fire", yells someone in the theater. Immediately everyone stampedes toward the exits. What they do at the exit door? Push. If the door doesn't open, they push harder. But why if the door opens inward and must be pulled, not pushed? Highly anxious, highly focused people are very unlikely to think of pulling. (Norman 2004, 28)

Positive affective states induce the player in a relaxed disposition, making her receptive to novel ideas, to improvisation, to adaptation, and attentive to the overall scenario.

These affective states can be manipulated by the system, in order to contribute to an increasing expressive and meaningful gameplay experience.

We propose the existence of four dimensions – time span, sensorial scope, frame, and actuation automation – that incorporate three alternative states – focused, defocused, unfocused.

2. DIMENSIONS OF FOCUS

2.1. TIME SPAN

Players' actions and actuations are developed throughout specific temporal durations, the limits of which are often imposed by the game system, either to determine player's successes and failures or simply to enforce a given gameplay speed or rhythm. These limits also stress the player, testing their ability to keep on playing the game. This dimension is related with the *time span* granted to the

player to perform a given action or set of actions. We propose the existence of three classes of time spans – *short*, *long*, and *none* – that promote alternative types of gameplay. It is important to notice that these time spans are not to be calculated in absolute measurements, as they are relative to the temporal demands of the activities that the player develops.

2.1.1. SHORT TIME SPAN (FOCUSED)

Short time spans promote fast-paced action and quick decision-making. They enforce the player to act without a careful thought-out plan. We may say that they instigate reaction; to quickly act in response of a stimulus. In these cases, the options presented to the player are usually limited, and sometimes they are even summarily described or explicitly shown to the player.

Quick time events (QTE)¹ are a common trait in contemporary video games. These usually happen during cinematic interludes or cutscenes, in which players perform given activities when prompted, traditionally pressing specific combinations of buttons on the game controller within very limited time spans. From the classic *Shenmue* (1999), to the button-mashing-action of *God of War* (2005) and *Metal Gear Rising* (2013), to the tense scenarios populated by zombies in *Resident Evil 4* (2005), and to more cinematic narratives of *Fahrenheit* (2005), *Heavy Rain* (2010), and *Beyond: Two Souls* (2013), these events call the player to action in moments that could otherwise be of mere cinematic contemplation, promoting a sort of hybridization between cinema and gaming.

In *The Walking Dead* (2012) the player is constantly prompted to choose between multiple possible options, or courses of action, in very limited time spans. If the player delays the choice, the system then chooses on her behalf. The player not only has to read and interpret all of the possible choices, as also to mentally simulate their outcomes in order to establish a fitting decision. *The Walking Dead* constantly challenges the player into making moral choices much quicker than they would otherwise like to, raising a sense of urgency that proliferates throughout the game.

In *Octagon: A Minimal Arcade Game with Maximum Challenge* (2013) the player's avatar advances automatically through the game world, while the player is responsible for avoiding gaps and other hazards that

¹ Quick time events derive from the gameplay style introduced by games like *Dragon's Lair* (1983), in which the player had, at specific or key moments, to press the correct button in order to keep on playing.

appear along the way, by moving it to the left or to the right. These options are very limited, but allied to the short time spans that the player has to act they seem very fitting to a focused performance.

The same is true for *Super Hexagon* (2012). The player controls a triangle that is only able to rotate – clockwise or anticlockwise – around a hexagon centered in the screen. A seemingly unending series of hexagons are also displayed centered in the screen, progressively shrinking towards the center entrapping the player's avatar. These are missing at least one side, leaving the shape incomplete and open. As the player's avatar cannot touch them, the player is forced to very quickly escape through those openings. In fact, the game quickly became known for its extreme difficulty, so that each turn can last mere seconds. (Aziz 2012; Rigney 2012; Rose 2012; Smith 2012; Totilo 2012)

We can see the same happening in *Tetris* (1984) where the player has a limited amount of time to stack the bricks that descend automatically. From this perspective, this game further stresses the player when she is short on vertical space, as vertical space equals available play time.

2.1.2. LONG TIME SPAN (DEFOCUSED)

When the player is granted a *long time span* to act, not only she has time to actuate carefully but also to plan her actions. She has time to explore the game world, although a limited time. This careful exploration consists in the realization of a plan the player puts in motion in order to achieve her objectives.

In *Worms* (1995) each player has about one minute to plan and take action against the enemy, choosing from a wide variety of weapons.

In *Pikmin 3* (2013), while in the single player campaign, the player has about fifteen minutes per turn, at the end of which she mandatorily has to retreat to their spaceships with as many 'pikmin'² under her command as possible. Due to this, the player is encouraged to plan her turn in order to collect fruit (an item that she needs for daily consumption, in other words, for every turn) and to progress in the game, exploring its world.

Max Payne (2001), a third-person shooter, became famous for the *bullet time* mode, that consisted in slowing down time without affecting the player's aim, increasing the chances of hitting more targets and more accurately.

² Creatures that follow the player's instructions, having specific and diverse traits, and through which she acts on transforms the game world.

This illustrates pretty well how a short time span may be stretched to a long time span, offering the player enough time to plan her actions.

In *Super Mario Bros.* (1985) there is a time limit that the player has to abide by, otherwise Mario – the playable character – immediately dies, restarting the level or even the game altogether. But the time span feels long enough to provide a careful exploration of the game world. When the counter reaches the last hundred seconds the ‘hurry up’ theme plays indicating the urgency to reach the end of the level. At this time, what could be once classified as a *long* time span becomes a *short* time span – depending on the location of Mario and if the player is familiar with the level, of course.

2.1.3. NO TIME SPAN (UNFOCUSED)

When the player’s actions are not constrained by any time span, she is free to relaxedly explore the game world. Even if in the game’s storyline the world is close to an end, the player still has all the time she wants to engage in whatever captures her interest. This is one of the main traits of open-world games, promoting exploration in richly detailed and diverse game worlds.

In *The Elder Scrolls V: Skyrim* (2011) the player is able to explore the game world as she sees fit. The game even permits the player to undertake quests and to face foes of uneven resilience and strength, considering the current status of her playable character. It is up to the player, it is her choice. As a consequence, the experience of *Skyrim* results in a fragmented and non-linear narrative, essentially based on the exploration of its game world. “Actually, the player may spend much more time exploring optional content than on the main storyline or quest – trying to achieve closure.” (Cardoso and Carvalhais 2013b) And the player may even never reach the conclusion of that main storyline, abandoning the game after spending hundreds of hours exploring the game world.

Such may also be the case of the *Grand Theft Auto* series that have been progressively offering a wider variety of activities that the player may engage in. And it is also true in more experimental games such as *The Endless Forest* (2005) where “[t]here are no goals to achieve or rules to follow.” The player just needs to explore “the forest and see what happens.”³

³ From the webpage of the game, from the official Tale of Tales website, at <http://tale-of-tales.com/TheEndlessForest/>. Accessed on 2014-01-19.

In *Mass Effect* (2007), *Fallout 3* (2008) and *Deus Ex: Human Revolution* (2011), for example, the player doesn't have a limiting time span in which she has to make choices during conversations with other characters. Not only the player is able to ponder on the direction that the conversation is taking, as she may also explore the ramifications of the script, in opposition to the quick decision making previously described in *The Walking Dead*.

And, in *Super Hot* (2013) time only advances when the player moves, so that every action can be the result of careful ponderation.

2.2. SENSORIAL SCOPE

Visual feedback is an essential component in most video games. It is mostly through image that players inspect the game world, and advancements in technical capabilities of digital systems regarding visual representation are in constant development.

This dimension relates to how much of the game world the player sees in the same image, restricting the amount of visual events she may witness. What is within the field of view is potentially perceivable by the player and all that lays outside is hidden – a sort of backstage area where the game's actors⁴ are spawned, respawned, and dismissed as they become irrelevant to the present moment in the game. For example, in *Super Mario Bros.* (1985) the player cannot backtrack.

In some video games this scope changes along the traversal. This ability may be granted to the player or automatically managed by the system, or even both, enforcing, supporting or changing the current play strategy.

In *Ibb & Obb* (2013) and in *Brothers: A Tale of Two Sons* (2013) the player is able to moderately control the field of view of the game world by moving apart both playable characters within a given limit. In *Locoroco* (2006), *Limbo* (2010), and *Badland* (2013) the game system regulates the field of view automatically as the player traverses the game world, allowing her to be more or less aware of her surroundings, promoting an increased focus on the vicinity of her playable characters or on more distant locations.

But, as audiovisual artefacts, video games convey information to players through image and sound. So, in a similar way that the player is be able to observe the game world, she may be also capable of inspecting it through

⁴ Game elements that may or may not act autonomously and that the player may or may not control and/or manipulate while playing.

sound. And, depending on the hardware, haptic feedback may also play a role here. In future studies this will be further developed.

2.2.1. NARROW (FOCUSED)

A *narrow sensorial scope* focuses the player on fewer game elements. It forces the player to be attentive to the events that occur in the immediate surroundings of her avatar or the actors she controls/manipulates. It forces the player to focus on the immediate present time, promoting quick reaction to external stimuli, as it conditions the amount of time available between the perception of an eventual threat and the time that that threat will actually get concretized. *Dead Space* (2008) is practically experienced like this due to its poorly lightened environments through which the player fearfully traverses.

2.2.2. WIDE (DEFOCUSED)

A *wide sensorial scope* allows the player to see beyond their immediate surroundings. By being able to witness more events, she may be capable of anticipating behaviours, increasing her capabilities to take action based on those simulations. While on a narrow sensorial scope the player is forced to react almost instinctively, with a wide sensorial scope she is granted some leeway between planning and actuating. Games like *The Sims* (2000) and *Starcraft II: Wings of Liberty* (2010) are good examples.

2.2.3. TOTAL (UNFOCUSED)

A *total sensorial scope* may be described as a fixed self-contained window that displays the whole playable game world or field of play. There are no hidden playable sites or areas. Some game actors may inhabit or be spawned or respawned outside that frame, but that is not a part of the play field, and if the player is able to travel there and stops seeing her avatar or the actor she controls, this dimension stops being applied to sight as the player starts to further focus on other senses, such as hearing or touch. *Pong* (1972), *Asteroids* (1979), *Tetris* (1984) may serve as examples here.

2.3. FRAME

We refer to *frame* to define the windows through which the player witnesses the game world and the events that it encloses. Frames can be *fixed* – increasing a sense of

entrapment or confinement – or *scrollable* – allowing the player to travel to a currently hidden part of the world, immediately hiding another, promoting exploration.

Although it is easier to describe this in visual terms – and we use some in the following descriptions –, this dimension may also regard non-visual phenomena – such as haptics and audio – but, so far, in the context of video games, they haven't been so widely explored.

2.3.1. SINGLE (FOCUSED)

When a video game features a *single* frame, the player's visual attention is undivided and focused on it. She may be wondering what is happening in the unobservable parts of game world, but they shouldn't affect gameplay as these 'areas' are not part of the play field.

There are many video games that can serve as an example here, as *Pong* (1972), *Asteroids* (1979), or *Super Mario Bros.* (1985).

2.3.2. NON-SIMULTANEOUS (DEFOCUSED)

In this case, the player is able to inspect the game world through multiple frames, but these can only be displayed alternately, one at a time. Actors in undisplayed frames may get their activities suspended, may be waiting for instructions, or may be engaged in automated actions. The player is thus in a state of permanent concern about what is currently happening in undisplayed parts of the game world. Thus, the player is not entirely focused on the task at hand, as she has to constantly keep in mind all the other ongoing activities that she is not actually witnessing.

In *Beyond: Two Souls* (2013) the player may alternately control two characters. When she is controlling Aiden (a sort of spirit/ghost), Jodie (the other playable character) is sometimes set in a sort of suspension, as if in a state of deep concentration. The same happens in *The Legend of Zelda: The Wind Waker* (2003), when the player uses a *Hyoï Pear* (an item that, when used, attracts seagulls) she gives up the control of Link (the main playable character) to control a seagull – useful to scouting and reach otherwise inaccessible locations. While this happens, Link seems to be set in a state of deep concentration – to control the seagull – vulnerable to enemy attacks.

In *Pikmin 3* (2013) the player controls three teams of variable sizes, being able to interchange between them

while they are performing diverse tasks. While one team is engaged in one sort of activity the others are accomplishing other tasks in real time. And in *Thomas Was Alone* (2012) the player may, at any time, interchange control between several ‘geometric’ characters that possess specific traits that the player must take advantage of in order to successfully traverse the game world.

2.3.3. SIMULTANEOUS (UNFOCUSED)

Here, all frames are simultaneously displayed. The player is thus able to witness several events that may occur in different parts of the game world at the same time, or the same events from alternative perspectives. The player is free from the cognitive strain of simulating undisplayed events, but her attention is seriously divided as all of those activities are simultaneously displayed for her to witness.

Games like *The Legend of Zelda: Phantom Hourglass* (2007) or *The Legend of Zelda: Spirit Tracks* (2009) for the Nintendo DS, and *Assassins Creed III* (2012) and *The Legend of Zelda: The Wind Waker HD* (2013) for the WiiU take advantage of a system that uses two screens.⁵ In these games the screens display alternative information: one exhibits the diegetic part of the game world, while the other usually shows non-diegetic components of the game (Galloway 2006), such as maps or menus for configuring the game and/or the characters.

But this is also possible without physical screens, with different frames in the same screen accomplishing the same goal. In *Fahrenheit* (2005), Lucas (one of the playable characters) had just woken up in a café’s bathroom covered in blood, on top of a corpse, with a knife on his hand, and without an exact recollection of what happened. After leaving the café, the screen is splitted in two: one side displays the actions of a police officer located inside the café, an event that culminates with him discovering the body in the bathroom; the other shows Lucas controlled by the player, that has to find a way to abandon the area and escape.⁶

In the course of the game, plenty of moments like this happen. For example, shortly after, as a result of recently fleeing a murder scene, Lucas’s home gets filled with incriminating evidence. The police appears and knocks on his door. This is a rather tense moment, as within a limited time span the player tries to cover all the evi-

⁵ The DS is a portable video game console that has two embedded screens. The WiiU is a home video game console – that needs to be connected to a TV screen – that features a remote controller with one embedded screen.

⁶ This event can be seen at <http://youtu.be/Tzz5VY1p-3o?t=7m37s>.

dence before answering, in order to not raise any suspicions, while constantly monitoring the police officer's behaviour.⁷

But we may go even further. The attention that is given to specific elements in the Heads-Up Display (HUD) may accomplish the same feat. For example, in *Metal Gear Solid* (1998) in the top right corner of the screen there is a map that displays enemies' positions, their field of view and the terrain. As a result the player often has to distribute her attention between the map and the 3D world to be able to traverse the terrain successfully, unnoticed by enemies.

But simpler elements of the HUD may also play an important role here. Lets just consider the attention that the player needs give to the health bar in games like *Street Fighter* (1987) or *Tekken* (1994).

2.4. ACTUATION AUTOMATION

Controls can be *shared* between actors, allowing the player to move two or entire hordes of actors in one move or actuation, managing them as one big collective element, and insuring that the actors are not lost or in jeopardy. Games like *Locoroco* (2006), *Badland* (2013), *Duet Game* (2013), *The Wonderful 101* (2013), and *Super Mario 3D World*⁸ (2013) are good examples where the player controls multiple actors in this manner.

Dedicated controls allow the player to manipulate each actor individually. As a consequence, the player may experience some difficulty in controlling several actors simultaneously with dedicated controls, as she tries to divide her attention to the best of her capabilities between all the relevant events in which those actors are involved. In *Brothers: A Tale of Two Sons* (2013) the player controls two characters through the game world, solving puzzles that often require their cooperation. The controls for each character are mapped at opposite sides of the game controller, forcing the player to use one hand to control one character and the other to control the remaining one.

Ibb & Obb (2013) follows the same premise, but unlike *Brothers: A Tale of Two Sons* it is aimed at two players. Although the methods for controlling the characters are very simple – using the analog sticks on the game controller to run and jump –, it is very difficult to synchronize their different actuations when playing alone, although improvement is possible with practice.

⁷ This event can be seen at http://youtu.be/BhoAlhtU_sA?t=7m13s.

⁸ This is witnessable when the player uses the 'double cherry' item, that creates a clone of the player's avatar.

The main difference between these two video games is that *Brothers: A Tale of Two Sons* is tailored for only one player and that means that the limits of the player's attention span were carefully pondered. Sometimes the player just needs to control each character alternately – as when they are climbing a wall with a rope that is attached to both. But, it is when she is forced to control both simultaneously that the different states we propose for this dimension become more evident.

2.4.1. AUTOMATED (FOCUSED)

Here the player is involved in repetitive actions, whose actuations can be trained, incorporated, patternized and thus transformed into automated processes. (Cardoso and Carvalhais 2013a) After that, player is focused on excelling at their execution, grasping their patterns and optimizing their performance. “The ultimate goal is to turn it into a routine. Frankly, my impression is that the brain doesn't particularly want to deal with it again” (Koster 2005, 32) so that she can focus on something else while keeping that operation going.

An example in *Brothers: A Tale of Two Sons* occurs when both characters are pulling levers at the same time, using the same or similar control schemes.

2.4.2. MIXED (DEFOCUSED)

In many of the cooperative gameplay strategies involving simultaneous control of both characters in *Brothers: A Tale of Two Sons*, the player usually executes two very different types of actuation: one is an automated actuation – which is learned, incorporated and its procedures are automatized; and the other is a non-automated actuation – which will be explained next. What is of importance here is that the player's focus is divided between these two types of actuation. Something that is rendered possible because an automated actuation can be kept ongoing without being constantly monitored, which leaves room for the player to focus on the remaining character as well.

Another example can be found in *Brothers: A Tale of Two Sons* when one of the characters is continuously manipulating a sort of lever while the other has to move through the set, being attentive to whatever lurks in its path.

2.4.3. NON-AUTOMATED (UNFOCUSED)

In many games, you are asked to find “secrets” or to explore an area completely. This teaches many interesting things, such as considering a problem from all angles, making sure that you should make sure you have all the information before you make a decision, and thoroughness is often better than speed. Not to denigrate training by rote and reflex, but this is a much better and interesting set of skills to teach, and one that is more widely applicable to the modern world. (Koster 2005, 76)

In opposition to automated actuations, non-automated ones involve the player in constant improvisation and adaptation to the events in progress. Here actions are not repetitive, nor their actuations can be necessarily trained. They consist of a different stage of learning: the moment of surprise, of discovery. They are born of the necessity of exploring the game world. And this unpredictability requires the player to constantly monitor the events they are involved in.

Continuing with *Brothers: A Tale of Two Sons*, when both characters are traveling through the game world, the player is engaged in two simultaneous non-automated actuations, as she needs to be attentive not only to the directions they both take but also to the lurking dangers in their way. This seems a very simple task when controlling one character, but when multiplied by two it can sometimes become pretty daunting.

3. UN-DE-FOCUSED

Considering the mentioned dimensions, we were able to formulate three general states regarding player focus: focused, defocused, and unfocused. These states are, as mentioned, generalized concepts, but they serve as a starting point to explore the multiple possibilities that are obtained by combining all of the presented dimensions in all of these three states: 82 in total.

3.1. FOCUSED

A player is *focused* when engaged in activities that require attention to the immediate and present time, to the displayed and perceptible game world, developing single-minded activities and patternized actuations and actions. The focused player is stressed into actuating in short time spans and within a narrow sensorial scope, perceiving the game world through a single frame.

A focused player is driven into monotasking, focusing on one task or activity at a time, and on repetitive and patternized actions. A player that is focused is a player that is fully concentrated on the event at hand, ignoring all that may surround her.

In essence, we know how vividly we see some aspects of our world, but we are completely unaware of those aspects of our world that fall outside of that current focus of attention. Our vivid visual experience masks a striking mental blindness – we assume that visually distinctive or unusual objects will draw our attention, but in reality they often go completely unnoticed. (Chabris 2010)

3.2. DEFOCUSED

A *defocused* player is engaged in activities that require both attention to the immediate time and to the near future, planning and putting those plans into practice. A player that is defocused is granted enough time to plan her actions, possesses a wide sensorial scope, inspects the game world through multiple frames but focusing on one at a time, and is engaged in realizing non-automated actuations while keeping a part of her attention span dedicated to the realization of certain automated actuations.

A defocused player always has her attention span divided between what is happening and what is to happen, between what is seen and unseen, between performing and planning; and is always tracking some side activities. The defocused player suffers the cognitive strain of multitasking, but focusing on one task at a time.

3.3. UNFOCUSED

[A] mind adrift lets our creative juices flow. While our minds wander we become better at anything that depends on a flash of insight, from coming up with imaginative wordplay to inventions and original thinking. (Goleman 2013)

An *unfocused* player is engaged in activities that don't have a temporal limit to be met. Is a player that is relaxed, with a sensorial scope that engulfs the totality of the playable game world, accessing multiple frames simultaneously, witnessing multiple ongoing events at different places. The unfocused player is engaged in real-

izing non-automated actuations, involved in improvisation and adaptation in order to keep on playing while developing this state.

An unfocused player suffers the cognitive strain of multitasking, constantly distracted by the persistent and simultaneous calls to attention of the multiple tasks and ongoing activities on the game world.

[T]he experience of cognitive strain, whatever its source, tends to mobilize System 2, shifting people's approach to problems from a casual intuitive mode to a more engaged and analytic mode. (Kahneman 2011, 65)

4. CONCLUSIONS AND FUTURE STUDIES

In the future we will focus on exploring all the variations that can be obtained by combining these dimensions regarding their different states, in a total of 82 types. Their exploration will allow us not only to map different gameplay styles, but may also permit the discovery of new and untested ones. With this in consideration, the necessity for the production of prototypes seems now even more evident.

Furthermore, we believe we will be able to obtain even more variations if we take into consideration the specificities between the different human modalities of perception. Sight has been a favored sense in the context of video games – something that has been definitively suggested by the increasing investment in graphics in the development of game engines. Despite this fact, when it comes to the experience of the player, sound and haptics may also play a very relevant role. So, all of the variations previously described can be dramatically increased if we discriminate different senses that contribute to the experience.

Other dimensions may eventually emerge through the course of time, further increasing all variations, but these 82 will already greatly grant us enough material to focus on.

ACKNOWLEDGMENTS

This work is funded by FEDER through the Operational Competitiveness Programme – COMPETE – and by national funds through the Foundation for Science and Technology – FCT – in the scope of project PEst-C/EAT/UI4057/2011 (FCOMP-01-0124-FEDER-D22700).

CITED WORKS

Assassins Creed III, Ubisoft Montreal, 2012.
Asteroids, Atari Inc., 1979.
Badland, Frogmind, 2013.
Beyond: Two Souls, Quantic Dream, 2013.
Brothers: A Tale of Two Sons, Starbreeze Studios, 2013.
Dead Space, EA Redwood Shores, 2008.
Deus Ex: Human Revolution, Eidos Montreal, 2011.
Dragon's Lair, Advanced Microcomputer Systems, 1983.
Duet Game, Kumobius, 2013.
Fahrenheit, Quantic Dream, 2005.
Fallout 3, Bethesda Game Studios, 2008.
God of War, SCE Studios Santa Monica, 2005.
Heavy Rain, Quantic Dream, 2010.
Ibb & Obb, Sparpweed Games, 2013.
LocoRoco, Japan Studio, 2006.
Limbo, Playdead, 2010.
Mass Effect, BioWare, 2007.
Max Payne, Remedy Entertainment, Rockstar Toronto, 2001.
Metal Gear Rising: Revengeance, Platinum Games, 2013.
Metal Gear Solid, Konami Computer Entertainment Japan, 1998.
Octagon: A Minimal Arcade Game with Maximum Challenge, Lukas Korba, 2013.
Pikmin 3, Nintendo EAD Group No. 4, Monolith Soft, 2013.
Pong, Atari Inc., 1972.
Resident Evil 4, Capcom, 2005.
Shenmue, Sega, 1999 (JP), 2000.
Starcraft II: Wings of Liberty, Blizzard Entertainment, 2010.
Street Fighter, Capcom, 1987.
Super Hexagon, Terry Cavanagh, 2012.
Super Hot, Piotr Iwanicki, 2013 (demo).
Super Mario 3D World, Nintendo EAD, 2013.
Super Mario Bros., Nintendo Creative Department, 1985.
Tekken, Namco, 1994.
Tetris, Alexey Pajitnov, 1984.
The Elder Scrolls V: Skyrim, Bethesda Game Studios, 2011.
The Endless Forest, Tale of Tales, 2005.
The Legend of Zelda: Phantom Hourglass, Nintendo EAD, 2007.
The Legend of Zelda: Spirit Tracks, Nintendo EAD, 2009.
The Legend of Zelda: The Wind Waker, Nintendo EAD, 2002 (JP), 2003.
The Legend of Zelda: The Wind Waker HD, Nintendo EAD, 2013.
The Sims, Maxis, 2000.
The Walking Dead, Telltale Games, 2012.
The Wonderful 101, Platinum Games, 2013.
Thomas Was Alone, Mike Bithell, 2012.
Worms, Team 17, 1995.

REFERENCES

- Aziz, Hamza.** 2012. "Review: Super Hexagon – Your brain will vomit rainbows". Destructoid. At <http://www.destructoid.com/review-super-hexagon-234664.phtml>. Retrieved on 2014/01/19.
- Cardoso, Pedro, and Miguel Carvalhais.** 2013a. "Between Thinking and Actuation in Video Games." xCoAx: Computation Communication Aesthetics and X, Bergamo, Italy. At <http://2013.xcoax.org/pdf/xcoax2013-cardoso.pdf>. Retrieved on 2014/01/19.
- . 2013b. "Breaking the Game: The traversal of the emergent narrative in video games." *CITAR Journal: Journal of Science and Technology of the Arts* 5 (1). At <http://artes.ucp.pt/citarj/article/view/87>. Retrieved on 2014/01/19.
- Chabris, Christopher, and Daniel Simons.** 2010. *The Invisible Gorilla: And other ways our intuitions deceive us*. New York: Crown.
- Galloway, Alexander R.** 2006. *Gaming: Essays On Algorithmic Culture*. vol.18, *Electronic Mediations*. Minneapolis: University of Minnesota Press.
- Goleman, Daniel.** 2013. *Focus: The Hidden Driver of Excellence*: Harper.
- Kahneman, Daniel.** 2011. *Thinking, Fast and Slow*. London: Penguin Group.
- Koster, Raph.** 2005. *A Theory of Fun for Game Design*. Scottsdale, AZ: Paraglyph Press.
- Norman, Donald A.** 2004. *Emotional Design: Why we love (or hate) everyday things*. New York: Basic Books.
- Rigney, Ryan.** 2012. "King of Hexagon: A Game Creator's Furious Fight to Keep His Own High Score". *Wired, Gamelife*. At <http://www.wired.com/gamelife/2012/09/super-hexagon/>. Retrieved on 2014/01/19.
- Rose, Mike.** 2012. "There's something primal about Super Hexagon". *Gamasutra*. At http://gamasutra.com/view/news/177490/Theres_something_primal_about_Super_Hexagon.php. Retrieved on 2014/01/19.
- Smith, Graham.** 2012. "Super Hexagon review". *PC Gamer*. At <http://www.pcgamer.com/review/super-hexagon-review/>. Retrieved on 2014/01/19.
- Totilo, Stephen.** 2012. "You Probably Can't Last 30 Seconds In Super Hexagon, But Buy It Anyway." *Kotaku, Play This*. At <http://kotaku.com/5940426/you-probably-cant-last-30-seconds-super-hexagon-but-buy-it-anyway>. Retrieved on 2014/01/19.