



CATÓLICA
ESCOLA DAS ARTES

PORTO

THE PLAYER AND THE CHARACTER: BUILDING IDENTITY THROUGH GAME AUDIO

Dissertation submitted to the Catholic University of Portugal
in partial fulfilment of the requirements for the Master's Degree in Sound and Image

Mariana Vieira de Melo Costa

Porto, July 2017



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Supervised by
Professor André Perrotta

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*To my mother and my grandparents,
my pillars of strength*

Abstract

In spite of the increasing interest that video games have gained over the last decades, there has not yet been an academic effort to identify trend-like patterns in the creation of sound for video game characters. Such studies would be beneficial for amateur sound designers and indie game designers by enabling them to better understand the strategies that may coerce the player into diving and pleasantly navigating within the game world. The search for answers to this research gap entailed a path of research, which unfolded into six chapters.

The Introduction (Chapter 1) describes the research gap and the mixed methods research that was used, while Chapter 2 contextualizes it. Chapter 3 seeks to understand the problem at the theoretical level, examining the concepts of Perception, Emotion and Immersion, and Chapter 4 delves into the research problem, aiming at evincing the importance of character soundprint for the acoustic ecology of the game. Chapter 5 confirms and further develops the previous research findings by investing in an in-depth analysis of two instrumental case studies. Finally, the Conclusion (Chapter 6) levels up the discussion, hinting at the new paths for game audio that Virtual Reality and 3-D audio will lead to.

The dissertation offers a variety of research outputs that were essential for grounding the research hypothesis and which will hopefully be useful in the future: analytical graphs resulting from an online survey; a table systematizing the way different musical structures influence emotion; a table resulting from the direct observation of popular characters' soundprints in a universe of 30 games; a table summarizing the soundprint types from patterns identified in the previous table; a table for structuring game analysis; and several tables analysing the case studies Non-Player Characters' and Player Characters's soundprints.

Even though it is not an exact science, the analysis of video game characters showed it is possible to discern different soundprint types. The research further evinced that, along with the remaining structures of the game, sound and soundprints assist with the immersion process of the players, enhancing their opportunities for identifying with the characters and finding their own place in the game world.

Keywords: soundprint, game audio, identity, immersion, player, character

Resumo

Apesar do interesse crescente que os videogames têm vindo a conquistar nas últimas décadas, não se verificou ainda um esforço académico para a identificação de padrões de tendência na criação de som para as personagens de videogames, o que beneficiaria sound designers amadores e game designers indie, pois permitiria um melhor entendimento das estratégias que provocam a imersão do jogador no universo do jogo. A busca de respostas para esta lacuna de investigação implicou um caminho de investigação que se dividiu em seis capítulos.

O Capítulo 1 (Introdução) descreve a lacuna de investigação e o método de investigação misto utilizado, enquanto o Capítulo 2 a contextualiza. O Capítulo 3 procura entender o problema a nível teórico, analisando os conceitos de Percepção, Emoção e Imersão, enquanto o Capítulo 4 se centra no problema de investigação, procurando evidenciar a importância do soundprint das personagens para a ecologia acústica do jogo. O Capítulo 5 confirma os resultados da pesquisa e vai para além deles, investindo numa análise aprofundada de dois estudos de caso instrumentais. Por fim, a Conclusão (Capítulo 6) eleva a discussão a um nível superior, indicando os novos caminhos que, com a Realidade Virtual e o áudio 3-D, o áudio para videogames virá a trilhar.

A dissertação oferece um conjunto diversificado de resultados de investigação que foram essenciais para a fundamentação da hipótese de trabalho e poderão vir a ser úteis para pesquisa futura: gráficos analíticos de respostas a um inquérito online; uma tabela de sistematização da forma como diferentes estruturas musicais influenciam a emoção; uma tabela resultante da observação direta de soundprints de personagens populares num universo de 30 jogos; uma tabela resumindo os tipos de soundprint identificados na tabela anterior; uma tabela de estruturação de análise de jogos; e várias tabelas de análise do soundprint dos NPCs (personagens não jogáveis) e das personagens do jogador dos casos de estudo.

Apesar de não ser uma ciência exata, a análise das personagens de vídeo jogos revelou que é possível classificar diferentes tipos de soundprint e que, em conjunto com as restantes estruturas do jogo, o som e os soundprints ajudam ao processo de imersão dos jogadores, aumentando as possibilidades de se identificarem com as personagens e encontrarem o seu lugar no mundo do jogo.

Palavras-chave: soundprint, áudio para videogames, identidade, imersão, jogador, personagem

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Glossary

Although the field of Game Audio Studies has gained academic importance over the past decade, a proper glossary with the relevant scholarly definitions of the field has not been developed. The definitions offered in this Glossary are based on both academic and non-academic sources. Quite often, definitions that best suited the dissertation's purpose were only found on the Internet; sometimes, definitions were borrowed from other fields of study – such was the case of the TV Tropes Website, to which a vast community of non-academic readers contribute on a regular basis. The construction of this Glossary has been instrumental to the development of the research hypothesis of this dissertation. In fact, more than just an output of the research, it became part of the process that enabled the understanding of the research topic by naming different categories that needed to be reflected upon.

The sources of the definitions are identified whenever they were borrowed from other books/websites. All the definitions that are not fully referenced were created for the purpose of this dissertation.

A

Absorption: To take in an experience (McMahan, 2003).

Abstract realism: The exaggeration of reality (Grimshaw, 2008).

Achievement sounds: Sound is deployed to signify a positive event during gameplay, such as collecting items or winning a battle (Alves & Roque, 2012a).

Acclamation sounds: Sounds of joy or praise, such as “Yahoo!” and “Yeah!”

Action Genre Hero Guy: A generic male player character with short dark hair and stubble, usually Caucasian and a soldier or former soldier (TvTropes).

Acoustic Ecology: The study of the influence the acoustic environment has on the physical responses and behaviours of those in it (Truax, 1984).

ADR (Automated Dialogue Recording): Recording system that assists in the substitution and synchronization of dialogue performed inside a sound studio over the moving picture (Hartstone & Spath, 1996).

B

Beat'em'up games: Game genre where the player fights one-on-one duels with enemies that are spread across a semi-isometric perspective sort of screen (TvTropes).

C

Character Soundprint: The acoustic identity of a character for the player to be able to distinguish from others (Alves & Roque, 2012b).

Cutscenes: Non-interactive video sequence inserted within a game that usually has a plot (TvTropes).

D

Diegetic music (or source music): Music that exists in the film narrative also presumably heard by the characters present on scene (Wierzbicki, 2009).

E

Embodied Listening

Exteroceptive: Sounds from stimuli originating from outside the body that are perceived as movement or spatial orientation (Farlex, 2012).

F

Featureless Protagonist: Player character void of any sort of characterization to make the player feel like he/she is the protagonist of the game (TvTropes).

FPS (First-Person Shooter): Action game genre that revolves around shooting, in which the player sees through the eyes of the character (TvTropes).

Fight or Flight: A type of response to danger or threat, in which the body prepares to either stay and confront or escape the problematic event (Cherry, 2017).

Fighting Game: One-on-one duels typically fought using martial arts and stylized after martial arts tournaments with a number of selectable characters (TvTropes).

Foley: All sounds recorded in synch after production, such as footsteps and clothes rustling (Hartstone & Spath, 1996).

G

Gameplay: The player interaction strategy designed for the game, such as rules, plot and objectives (Gameplay, s.d.).

Grunts: Low, short sound usually made when hurt or exerting physical strength.

I

Immersion: An experience in which the person is engaged in; the state of becoming involved in something (Ermi & Mäyrä, 2005).

Interjection sounds: Short words or sentences demanding attention, such as “Hey!” and “You there!”.

M

Mimetic realism: The mimicking of reality (Grimshaw, 2008).

MMORPG (Massive Multiplayer Online Role-Playing Game): Online game genre in which players from all over the world can take on the role of a character (TvTropes).

MOBA (Multiplayer Online Battle Arena): Team-based strategy online point-and-click game. Each player controls one character within the game and battle another team to overthrow their base (TvTropes).

N

Non-Entity General: The player commands an army but is not a specific character. Usually, when all units die, the player loses (TvTropes).

NPC (Non-Player Character): A character within the game that the player does not control.

O

Open-world game: Game in which the player has no time restrictions or limits to explore the game world. Doesn't have to advance the plot to play (TvTropes).

P

Platform: Game genre where the player character leaps between platforms and jump over and onto enemies (TvTropes).

Playable Character: One of many characters controllable by the player in a game with no clear protagonist.

Player Character: The in-game character controlled by the player (TvTropes)

Point-and-click Game: The player uses the mouse controller to navigate through the locations and/or select objects (TvTropes).

Proprioceptive: Sounds from stimuli within the body itself that are perceived as movement or spatial orientation (Houghton Mifflin Harcourt, 2016) .

R

Revelation Sounds: Sound cues that imply the discovery of an important item, information or event (Alves & Roque, 2012c).

RPG (Role-Playing Game): The player takes on the role of a character

S

Sandbox RPG: Game with mechanics and systems that the player can toy with freely with not time limit and restriction to the storyline (TvTropes).

Side-scroller games: game perspective in which all objects are seen from the side and the character can only advance through the sides (TvTropes).

SFX (Sound Effects): Manipulated sounds that cannot be recorded naturally.

Soundscape: Acoustic ecology pertaining to a specific location (Truax, 1984).

Sports Game: Sport-based game (TvTrope).

T

Third-person shooter (3PS): Game genre with an over the shoulder perspective that usually uses, for instance, shooting elements or puzzle game elements.

U

Underscoring: Musical phrases that softly fit the dramatic scene, but don't interfere with the dialogue (Wierzbicki, 2009).

Y

Yelping sounds: short cries or shouts, such as when swinging a sword

1. Introduction

1.1. Hear Them Before You See Them

As a child seeking excitement on a neighbourhood park, swaying around or perching down over the slide and feeling the wind on your face, have you ever felt an urge to howl like Tarzan¹ while bravely swinging through the vines of a dangerous forest? As an aspiring swordfighter protecting something precious to his heart, have you ever swung your invisible sword around with swooshing sounds escaping your lips and a triumphant shout much like you would imagine Zorro to clamour whenever he managed to strike down his opponents?

How about right now whenever you are feeling overwhelmed with the buzz of courage brewing deep within the pits of your stomach and the prospect of adventurous unpredictability and discovery when you are hiking up a mountain, power walking through a forest or even touring around the confined walls of historic ancient ruins, have you ever found yourself humming underneath your breath *The Indiana Jones Theme Song*?

It seems that, as we act upon desires outside of our daily routines, we tend to see ourselves in a different skin, as different people, mostly as someone we would aspire to be like or aspire to act like. To achieve that elation, we tend to use our surroundings and available resources to create a context that would justify that feeling of accomplishment, and whenever we don't have the needed resources, we complement in with our imagination and creativity. That is why as one excitedly explores nature, there could be a tendency to sing John's Williams' *The Raiders March*, more commonly known as *The Indiana Jones Theme Song* played for the brave and adventurous main character of Stephen Spielberg's 1981 *Raiders of the Lost Ark* movie and subsequential franchise².

Thus, besides the visual context, one can note that sound is also a provider of representation as the person sings the songs (or plays them) and croaks known sound effects, catchphrases and even accents and voice tones similar to the ones usually associated with a character or certain types of character. According to Kristine Jørgensen, "sound affords information about the functionality or state of things, hence it is *informationable*." By associating sound to a character, we are being given information that allows us to identify something as realistic and plausible (Jørgensen, 2004, p. 3).

One of the biggest providers of identity supported by sound is the cinematic industry, whether it is film or animation. Though this industry gives us characters to identify with, what

¹ Made popular by Johnny Weissmuller in the 1932 movie *Tarzan the Ape Man*.

²As a music-filled movie, *The Raiders of the Lost Ark* teased the audience with only different variations of *The Raiders March* coloured by the widely-known musical phrase. The full theme was only introduced when the end credits rolled in (Wierzbicki, 2009).

happens is that in movies we merely watch everything unfold in front of us without any actual intervention that could make us feel in the skin of the character. This is where video games take identification and identity to a whole new level and why it has become the focus of this research. While playing the game, even though it is actually planned out (i.e. the player has to overcome certain specific obstacles to get to a specific goal), the player is given the sensation of choice and influence by having to react to certain events, thus becoming responsible for the positive outcomes. The player no longer observes: he has to react and take action upon the challenges that are imposed on him. The player character³ becomes, to the player, a role model that fights through obstacles to acquire elation and the feeling of accomplishment over such actions. However, it should be noted that not every character and notion of role model meets the standard of a traditional hero. In video games, the player is also allowed to play as someone violent with ill intent and whose actions are seen as morally incorrect. By allowing so, the player is given the opportunity to, in a safe space, act upon desires that are legally seen as wrong and punishable in the real world.

The video game thus becomes an outlet for the player, and sound is no doubt one of its biggest assets. It is in fact a vessel because, whether we notice it or not, everything we are familiar with in real life has a sound. As Marco Frisina suggests, the gaming experience is greatly enhanced by sound: "It is widely assumed that players are motivated by visual pleasures; but distinct objects, spatial awareness, and environment are fully defined by sound and sound gives these contextual pieces the ability to communicate their meaning in full" (Frisina, s.d., p. 12).

1.2. Research Questions and Objectives

In spite of the increasing interest that video games have gained over the last decades, there has not yet been an academic effort to identify trend-like patterns in the creation of sound and music for video game characters. This would undoubtedly benefit amateur sound designers and indie game designers, by providing them with a deeper look into character sound design and enabling them to better understand the strategies that may coerce the player into diving and pleasantly navigating within the game world. Many amateur and aspiring game audio designers have faced multiple challenges while trying to construct a unique sound design for video games and video game characters. Typically, one would have to go through a trial-and-error process, while also

³ Player character is the in-game character controlled by the player. The game allows you to control "at least one entity, but the extent to which that entity *is* an actual character as opposed to being a Featureless Protagonist or Non-Entity General, depends on the genre, the game, the game's developers, and even (if Character Customization is available) the player him- or herself." (TvTropes). For more information, see <http://tvtropes.org/pmwiki/pmwiki.php/Main/PlayerCharacter>

relying on previous existing practices. Likewise, many rising indie video game sound designers struggle with game audio as more often than not they develop every single aspect of the game (from programming, design and narrative to music and sound). This dissertation seeks then to assist by identifying certain tendency patterns and their different effects on the identification of a video game character and, consequently, the enhancement of a positive gaming experience.

The starting point of this research was Valter Alves's and Licínio Roque's project for the categorization of Video Game Audio terminology: a deck of playing cards with Game Sound Design terms, explanations, and examples. In it, the Character Soundprint card – in which they describe the concept as the character's acoustic identity – stood out. For the authors, this acoustic identity is really important, as it provides “the means for the player to be able to distinguish between different types of characters” (Alves & Roque, 2012b).

Prompted by this definition, the following question emerged: “Is it possible to identify common patterns in the sound design of video game characters that provide them with identities?” However, while digging in deeper within the research (without much success), another appealing subject came up: the player's own identity. Delving into the topic, it became evident that the subject of the character's identity and the player's identity complemented one another.

As the research progressed, it became clearer that sound in video games has increasingly gone from being a supplement, an ornament, a simple addition to the game to make it more entertaining, to its most current use as a crucial and raw source of information with narrative and immersive purposes. But when there is information, a receptor is needed on the other end to interpret it – the player. Surely you have heard the age-old question, “If a tree falls in the forest, does it make a sound?” Many answers are possible, and they can vary with the line of thought, such as the idea that the human being is not the centre of the world, and that events can go on without his presence or that it is preposterous to even consider that if something is not there to witness it, its existence is denied. From a scientific viewpoint, the sound phenomena *per se* does not occur, since it will be reduced to vibrations without something on the latter's receiving end – our auditory system – to interpret it. Accordingly, this is where the understanding of the player's relationship with the game and player character meets necessary requirements to aid in the explanation of how and why a character is even given an identity through sound. In our quality as receivers, we are capable of recognizing and identifying patterns in personality tropes and emotions. The research question has thus naturally mutated into what this dissertation has become: “Is it possible to identify common patterns in the sonic identity of video game characters and its influence on the player's identity?”

The creative input of a video game's sound design varies with its gameplay, type, narrative, art style, and of course, budget. There are many extremely popular video games without characters or player characters: such is the case with popular puzzle smartphone game apps like the *Candy Crush Saga* (2012) or even the most classic puzzle game of all, *Tetris* (1986). There are also a number of popular strategy-based games with Non-Entity General type of player characters, like *Age of Empires* (a saga that began in 1997), in which the existence of a player character is unclear and is not even present in any location⁴ (Non-Entity General, s.d.). Another type of player character is the Featureless Protagonist, which is a character void of any sort of characterization; this was very common in text adventure games and some older point-and-click adventure sort of games⁵ (Featureless Protagonist, s.d.). The numerous existing levels of identity could, as such, have been addressed, but delving into these fainter notions would only blur the purpose of studying sound and soundprint as providers and communicators of identity. For this reason, the focus will be on the analysis of games with characters that fit into a narrative, paying special attention to the intention the game developer had in sight for the characters. As soon as the research started to develop, it became clear that, in order to better explain soundprint, one would also have to take into account the sonic identity of all the characters within a video game and examine its purpose. So even though the focus of this dissertation is the player character, the study also aimed at understanding the remaining characters that surround it, as well as the influence they may have over the player character's actions.

1.3. Methodology

The first step of this dissertation was the identification of the bibliography available on the subject. Not many books or articles were found on this specific topic (which confirmed the urgency of overcoming the research gap); however it was possible to establish a functional bibliography about themes that are related to the main topic. This dissertation has grown out of a dialogue, which was established, from the very first moment, with all the books, book chapters, articles, periodicals, Internet sites, and YouTube videos, as well as with the video games found relevant for the research. By engaging with them, an attempt at critically

⁴ In this type of game, the player keeps playing the game until all of his units are eliminated, which implies that the player is most likely the army itself, in lieu of its commander.

(see: <http://tvtropes.org/pmwiki/pmwiki.php/Main/NonEntityGeneral>)

⁵ A point-and-click game is a game where the player uses the mouse controller to navigate through the locations and/or select objects. In the 1997 point-and-click adventure game *Zork: Grand Inquisitor*, an NPC named Dalboz addresses the player as such: "What's your name? (pause) Okay. I'll just call you Ageless-Faceless-Gender-Neutral-Culturally-Ambiguous-Adventure-Person. AFGNCAAP for short."

(see: <http://tvtropes.org/pmwiki/pmwiki.php/Main/FeaturelessProtagonist>)

presenting the main ideas that came across was implemented, thus setting the basis for the research. As Hossein Tavakoli points out, the phase of the literature review is essential to any research project, as it evinces a research gap, allowing you to “contribute to knowledge in a field by exploring something that has not been adequately explored”; as it organizes the knowledge of a specific field, the review of literature provides rationale for your study (Tavakoli, 2012, p. 512).⁶ As the research progressed, a set of words, phrases, concepts, and ideas were taken as notes that were eventually included in the Glossary of this dissertation. The construction of the Glossary itself was instrumental to the research as these concepts which emerged throughout the research process required careful thought; the Glossary is thus to be seen as a tool for the construction of the dissertation and an output that systematises vocabulary pertinent to the field of research.

After doing the literature review, a mixed methods research was devised, i.e., “a research approach for collecting, analysing and mixing *quantitative* and *qualitative* data at some stage of the research process within a single study to understand a research problem more completely (*ibidem*, p. 362). There was thus an investment and reliance on three tools:

- 1) An Internet survey;
- 2) Two interviews;
- 3) Two case studies.

For the survey, respondents were sampled via the Internet, a strategy to go beyond the community of video game players and professionals one would normally be personally acquainted with (*ibidem*, p. 288). Keeping in mind that this sort of survey could raise coverage and representativeness problems, the questionnaire was chosen to be promoted via Facebook, through a network of friends that would pass it on to the people they knew to be very much into video game playing. Surprisingly enough, the questionnaire got 58 responses after just a few days. It was composed of four parts to be completed according to the respondent’s capacity as a video game player, a game designer, a game sound designer, and a game music composer. Just one questionnaire seemed to be enough, as quite often a video game designer or a game music composer is also a player. The questionnaire included *behavioural* and *attitudinal* questions⁷, as well as *closed-form* and *open-response* items. As Tavakoli explains, “closed-form items are useful in that they can generate frequencies of response amenable to statistical treatment and analysis” (*ibidem*, p. 64). On the other hand, open-response questions, because

⁶ Hossein Tavakoli’s book has been instrumental for the description of (and reflection on) my methodological options, as it very clearly explains all the possibilities one may choose when doing research.

⁷ According to Hossein Tavakoli, *behavioural questions* “are used to find out what the respondents are doing or have done in the past. They typically ask about people’s actions, life-styles, habits, and personal history”. On the other hand, *attitudinal* questions “are used to find out what people think. This is a broad category that concerns attitudes, opinions, beliefs, interests and values” (Tavakoli, 2012, p. 512).

they provide "participants of research with the opportunity to choose the terms with which to construct their descriptions and highlight the topics that are meaningful to them," are "suitable to investigating complex issues"; (*ibidem*, p. 434). The questionnaire then ended up providing data both for *quantitative* and for *qualitative* research. As Tavakoli clarifies, "quantitative research is the primary example of hypothesis-testing research, which begins with a question or hypothesis to be investigated through data quantification and numeral analyses. For this reason, the closed-form items were included in the questionnaire, aiming to identify the "common features of groups of people" (*ibidem*, p. 509) – to confirm, for instance, if the nature of the game platforms the respondents were using had any influence on their game experience. But open-response items were included in the questionnaire in the hope that the respondents would provide other hypotheses, clues that would point to new research directions. In fact, open-response items are primarily "exploratory" and suitable to set the basis for more structured research (*ibidem*, p. 434). The qualitative analysis that these open-response items nurtured was essential for the research, as it offered the grounds needed to select the video game characters under analysis, to define the two chosen case studies (i.e., the two video games), as well as the aspects that should be taken into consideration when scrutinising the video games.

There was also an investment in qualitative research in another moment of the dissertation: an interview to two musicians whose knowledge and expertise are relevant to the project. As Tavakoli explains, informants "offer an insider's perspective and in-depth information that can represent the views of a group or a community. It is the capacity to represent the knowledge of a larger group that distinguishes informants from other types of participants such as respondents to a questionnaire" (*ibidem*, p. 275). Manuel Faria and Sandro Norton were in fact very generous in their answers, which assisted in the systematization of means through which music conveys emotions. The decision to interview them was informed by an *emic perspective*, i.e., "the use of categories that are meaningful to members of the (...) community under study, as well as by our awareness that there are multiple realities and that one needs to document them as much as possible" (*ibidem*, p.504).⁸

Finally, there was an investment in two *instrumental case studies*. This sort of case study aims at "illuminating a particular issue, a problem, or theory." Instrumental case studies are intended to "provide insights into a wider issue while the actual case is of secondary interest; it facilitates understanding (...) and is likely to require interpretation and evaluation, in addition to description" (*ibidem*, p. 47). The choice of which video games were to be analysed was difficult; in fact, only after examining the answers of the respondents to the questionnaire, and

⁸ Emic perspectives differ from etic perspectives "(or researcher or outsider point of view), which is an outsider's understanding of a culture or a group that is not their own".

after a number of games were played, was it possible to choose *BioShock* (2007) and *Metal Gear Solid 4: Guns of the Patriots* (2008), which seemed to potentially illustrate, in a meaningful manner, the concepts and processes dealt with in this dissertation.

The mixed research method was thus informed by two aims: first, by an exploratory aim, i.e., by the attempt to better understand the problem defined for the dissertation and to elaborate a research hypothesis; second, by an explanatory aim, i.e., by the endeavour to identify and validate the variables that determine the phenomenon under study, and to infer cause-effect relationships. The identification and analysis of these relationships are the main research findings of this dissertation, which were synthesized in the form of one table: Table 2. As it was the case with the Glossary, this table allowed for a better understanding of the data to be analysed; and it may turn out to be a useful tool for video game sound designers and music composers. Likewise, for the analysis of the two case studies, a Game Analysis Map was constructed in order to outline the aspects to be looked into, and which will hopefully be productively applied to other video games, thus setting the basis for further research.

1.4.Dissertation Road Map

The core of the research carried out for this dissertation is to be found at the four central chapters, which correspond to the four steps deemed necessary to understand the research problem and devise strategies to solve it.

Chapter 2 contextualizes the research gap, aiming at highlighting the importance of sound in video games. The first section compares sound in cinema and game audio, and describes the techniques sound designers resort to when working on a film or a video game. It then reports on the production of sound effects, evincing the consequences of the interactive and adaptive nature of sound in video games. It further reflects on the aspects music composers for gaming need to take into account, given the fact that music needs to be adaptive as well. Finally, it touches on the strategies sound designers need to implement in order to avoid a sonic repetition that would irritate the player. The second section offers a brief summary of the history of video game production, reporting on the first time sound was used in a video game, and on when sound became interactive. It then pinpoints the most popular characters with a unique sonic identity and reflects on the aspects sound designers need to take into account to generate realism and offer the player a deeper sense of immersion.

Chapter 3 seeks to understand the problem, focusing on sound and on how it is physically perceived by the human ear, in general, and in the context of videogames, with particular focus on the player's perspective. The first part unfolds into three: Perception, Emotion, and Immersion. The first section explains how we grow to recognize certain sounds as attributes of things we have never seen or that have a fictional nature. The second section

reflects on the explanations offered by cognitive and social constructivist theories for human emotional response to auditory stimuli; it then considers the specific case of music, highlighting the difference between the concepts of emotional perception and emotional induction and examining the cognitive responses to key structural components of music; finally, it evinces how an appropriate acoustic ecology potentiates the player's emotional response. The third section unveils the strategies sound designers resort to in order to provide a fully immersive experience, enhancing the effectiveness of first-person shooter games and imaginative immersion. The second part of the chapter comments on the results of an online survey with both behavioural and attitudinal questions in relation to the ideas and concepts addressed in the first part. The analysis of the answers of 58 respondents with different backgrounds (gamers, game designers, sound designers, and musicians) is divided into three sections: overall perception of sound, how the participant perceives the character, and the role of music in the gaming experience.

Chapter 4 delves into the research problem, aiming at evincing the importance of the character soundprint for the acoustic ecology of the game, examining how it plays into the idea of identity and signature, and how it provides the player with a deeper feeling of immersion. The first section starts with a reflection on the role of music, explaining that it can sometimes be seen as part of the character soundprint. It then examines different sorts of game characters, from the ones that do not have a distinct attributable soundprint to first-person shooter non-talking characters. The section closes with a review of a selection of games, highlighting cases where the voice or catchphrases are the most recognizable traits of a character, and describing different ways of using voice in videogames. The second section testifies to the exploratory research undertaken for the purpose of this dissertation by offering a table with data collected by the author regarding game titles suggested by the respondents to the survey. The data resulted from direct observation of those games.

Finally, chapter 5 confirms and further develops the previous research findings by investing in an in-depth analysis of two instrumental case studies and systematizing the elements that make up the character soundprints of the games under consideration. 2K's *BioShock* and Konami's *Solid 4: Guns of the Patriots* were the games selected for the two case studies due to their popularity status within the respondents to the survey and the gaming community in general. The focus of the analysis is on the games, but their previous and latter releases are also taken into consideration. The chapter offers a description of the two games and several tables where the elements that make up the soundprints of the characters are systematized according to a game map analysis that was created to the effect.

The Conclusion of the dissertation levels up the discussion, hinting at the new paths for game audio that Virtual Reality and 3-D audio will clearly lead to while acknowledging the limitations of the research work, which calls to be completed by the study of other aspects underlying the research problem.

All in all, the dissertation offers a variety of research outputs that were essential for grounding the research hypothesis and which will hopefully be useful for further research: analytical graphs resulting from an online survey; a table systematizing the way different musical structures influence emotion; a table resulting from the direct observation of popular characters' soundprints in a universe of thirty games; a table summarizing the soundprint types from patterns identified in the previous table; a table for structuring game analysis; and several tables analysing the case studies NPCs' and Player Characters's soundprints.

Right at the onset of this project, a set of objectives and research questions were defined for each chapter. These questions were crucial to the monitoring process of the dissertation, ensuring the preservation of the rationale behind it and validating the research options that have been taken. As they were a useful road map for the construction of the project, they are presented as part of the dissertation (see *Addendum A*) in the hope that they may also serve as a workable road map for the reader.

2. A World of Video Games

2.1. Film and Video Games

In the last few years, we have witnessed a crossover between the film and game industries, mainly due to two reasons: on the one hand, the similarities as regards execution; on the other, the ever-growing blending overlap of the audiences. Moreover, one medium often borrows techniques and style from the other (Boyd, 2003). Since the turn of the millennium, a variety of increasingly realistic and cinematic video games have been released, such as the *Call of Duty*, and *Assassin's Creed* video game series; simultaneously, there has been a growing number of films resorting to methods more commonly used in video games, of which the 1982 movie *Tron* and 2010's *Scott Pilgrim vs. the World* are good examples.

Both film and game resort to rerecording and dubbing sound⁹, although for different reasons. As very often the quality of the production sound¹⁰ is met with a number of obstacles (for instance traffic and generators, among other forces, that render the dialogue unclear), film sound relies on layering in order to create a rich and suitable scene. Performers and actors record dialogue in the studio and ambiences and sound effects are recorded or acquired through a sound library. On the other hand, game audio needs to be designed from scratch, thus depending heavily on dubbing as well. In both instances, the mix, the layering of effects, the ambience and music are generated with similar techniques (Hartstone & Spath, 1996). By balancing out those layers, film and game sound designers create a variety of soundscapes¹¹ aimed at arousing different emotions from the audience.

As Graham Hartstone and Tony Spath evince, there are three different types of sound in cinema and game audio: speech (dialogue), music, and noise. Speech encompasses the voices of the actors, off and/or onscreen. While film can resort to the sound recorded during shooting, it is common practice to have the actors record inside the studio in synchronization with the image. This process in film is called Automated Dialogue Recording (ADR).¹² Though it is

9 The film industry (particularly in Hollywood) relies heavily on a dynamic editing pace, and if one were to use the sound recorded during shooting it would tend to create inconsistency and discomfort because of sudden jumps in the sound track. To ease the transition through the different editing cuts, avoid undesired sounds and add sounds to support the action and narrative, it is up to the sound department to rerecord the much needed sounds (or resort to existing audio tracks from sound libraries), usually dubbing the dialogue and balancing it out with the sound effects, ambience and music in post-production (Lastra, 2012)

10 Sound track recorded during filming (LoBrutto, 2005)

11 Barry Truax defines the term soundscape "not just as a synonym for 'acoustic environment,' but as a basic term of acoustic communication. It refers to how the individual and society as a whole understand the acoustic environment through listening." (Truax, 1984, p.7)

12 The ADR system automates the actor's performance to synchronize with the original performance by analysing and attempting to match "the shuttling of the picture, (and recorders), the artists' cues, and the record on/off controls" (Hartstone & Spath, 1996, p. 556).

recorded in a studio, it must not seem like it was recorded in one (*ibidem*). To properly match the acoustic ecology¹³ of the picture, it is necessary to be mindful of which microphone to use and which settings to record with (Whittington, 2007). This is where the similarities and differences take place: game dialogue is also recorded in ADR studios devised for film overdubbing and, much like in film sound, the dialogue has to match the acoustic surroundings of the game characters (Collins, 2008).

For both film sound and game audio, music plays a vital part: it provides the action with rhythm and emotional enhancement, thus supporting the plot. In these mediums, music is divided into two main categories: diegetic music (also known as source music) and underscoring. Diegetic music is the sound that pertains realistically to the scene (club music, radio, musicians, etc.), heard by the audience, player and the characters themselves, while underscoring is present to contribute to the dramatic development of the narrative heard only by the consumer (Wierzbicki, 2009).

Noise (also commonly addressed simply as sound) concerns the remaining used sounds, more commonly known as sound effects (SFX). The usual occurrence is the recruitment of a foley artist to record in a studio sounds explicitly made for the film or game or to resort to sound libraries (Whittington, 2007).

Although they resort to similar techniques, processes and skills, films and video games are in the end very different platforms (Boyd, 2003). As a matter of fact, while a movie maintains a fixed linearity, the interactivity of a game contributes to the creation of plenty of different audio combinations (Whittington, 2007); and this is just the beginning of a long list of differences that force us to consider them as two very distinct cases. In a 2003 interview with Finnish children who played digital games with their parents, Ermi and Mäyrä pointed out that interactivity is the distinctive point which separates movies from books. One 11-year-old boy stated that games are more engaging because you actually have to perform actions with the game's character, allowing the player to feel more in its skin; and a 10-year-old girl mentioned that interactivity is not limited to the game because it also motivates social interactivity due to the fact that you can use it as a discussion topic (Ermi & Mäyrä, 2005).

One of the clearest peculiarities of game audio concerns the process of the three different production stages: Pre-Production, Production, and Post-Production. In video games, the Pre-Production is used for the recording and creation of the sound and music (Collins, 2008). The preferred strategy is the development of an audio design document (ADD) to cleanly start a

¹³ According to Truax, Acoustic Ecology is the study of the influence the acoustic environment has on the physical responses and behaviours of those in it. It uses the term ecology as the latter studies the relationship between humans and the sounds in their environment (Truax, 1999).

project. This document usually encompasses the game's content, technology, design and implementation, and serves as a guide throughout the three production stages (Quarles, 2012). After establishing the role the sound design is to have in the gameplay, the next move is spotting, in which the cues of entrances, exits, game properties and such are defined. One can also create, besides the sound cue list, a music cue list. Taking note of a character's personality and the emotional development of the game contributes to a smoother creative process and a cleaner organization of the project. The above-described processes serve as guiding maps for the sound team.

In the Production stage for video games, the same techniques as film are generally applied. The film sound is recorded and produced, be it through location recording, the recruitment of a Foley artist in a studio, or simply the use of existing sound libraries. The process of music creation also happens at this stage and the music, as in the case with film productions, is chunked in loops, splits and such to create a dynamic score.

At last, the Post-Production stage is where the mixing happens. This is known as a chaotic stage, with multiple trial and error dynamics to balance out the mix due to the multitude of overlapping sounds. This implies working the volume and the frequencies of each layer to prevent the imbricate sounds from competing for the attention of the player.

Regarding the sound effects, the biggest difference is that in a film production the character always takes a fixed amount of steps with which the foley footsteps will be synchronized, so it is possible, for instance, to record every single footstep taken. On the contrary, video game sound is interactive – which means that sounds are triggered in response to the player's actions (e.g. the player opens a door, and the familiar creaking is triggered) –, and adaptive – when the sound reacts to the soundscape and events occurring in it (e.g. footsteps in a church have a longer decay in reverb than in a bedroom). So in the case of a video game, it would be extremely difficult to record every single footstep because of the free reign that the player has over the character's movement for whichever amount of time and times he/she sees fit. These interactive and adaptive qualities of video game sound then limits the predictability factor that is so familiar to film sound (Droumeva, 2011). Although it would not be impossible to create each required sound, it would be impractical and would demand an exceeding amount of RAM to store the audio in (Boyd, 2003). The most useful technique to prevent the player from getting irritated with the same sample sound and providing the game with an acoustic diversity is the use of digital signal processing, or DSP. The DSP creates a change in the reverberation of an SFX, depending on the location the character is in. This equips the game with a more realistic feeling as it complies with the laws of physics our ears are so familiar with in real life (Childs IV, 2007).

To avoid a repetitive and possibly boring gaming experience, the sound design should be diverse. In fact, a big investment needs to be made in the game audio to make sure the audio is comfortable enough (for instance, in terms of frequency), allowing for a better enjoyment of the gameplay, unless the purpose of the game (and its sound) is to scare, repulse or arouse any unpleasant feeling in the gamer.

Concerning music, the approach to video game audio is very different. As is the case with sound effects, music is also adaptive. A film composer can choose where to start and end the music; he may opt to repeat a previously used score, but even in that sense, the cue is usually new. The case with video games is diverse as they favour the use of similar styles when analogous events or actions occur around the character. The most common example is the use of a fixed theme for every battle (Boyd, 2003); and one of the most common techniques is keeping the whole soundtrack around the same key and/or having easily loopable music to smoothen the transition from one theme to the next one.

The scope of the research for this dissertation concerns sound design for games. The non-inclusion of sound for films in the research results from a conscious choice and from the perception that, although they may share some techniques, they are in fact different cases. What is really fascinating about sound for video games is the fact that besides resorting to most sound techniques and processes typically used by the film industry, it offers new challenges to overcome through the usually heavily interactive factor that enhances and diversifies the unique experience for the player. Character-wise, in particular, there are plenty of interesting types to deconstruct, from the character's personality (or lack thereof) to the interesting advantage of allowing the character to evolve along with the player, be it through levels or even through the choices the player makes in the course of the game: a brave new world to discover and reflect on.

2.2. The Sonic Evolution of Video Game Characters

The rise of the Video Game industry was definitely not soft-paced, as it boomed with the surge of new technologies to the impressive medium that it is today. The platform is no longer regarded as just a simple pastime, but as a storytelling mechanism and artistic outlet that gathers in itself all forms of art available: drawing, painting, architecture, sculpture, photography, performance, literature and, as it should, music and sound.

In the 1960's, there was already enough technology to make video games possible. Ralph Baers' *Magnavox Odyssey Model ITL 200* was the first-ever home video game system, made possible by Magnavox, a television company – though the game lacked sound. It was not until 1971 that Nolan Bushnell created *Computer Space*, the first ever video game with sound,

set in space with simple geometric-shaped graphics. At the time, the small amount of RAM allowed only for one simple tone at a time, without volume control whatsoever, and the job of sound designer was assigned to one of the game's programmers. The popularity of *Computer Space* inspired Bushnell, together with Atari's engineer Al Alcorn, to make a game that is still known today and is constantly rehashed into updated versions: 1972's *PONG*. The sound of its famous *sonar ping* when the ball hits the paddle is still easily recognized. However, it was Taito's *Space Invaders* (1978) that took sound and soundtrack to a whole new level by displaying an adaptive and interactive soundtrack. The player would shoot the invaders with loud sound effects and the more they destroyed, the faster the invaders would get, along with the increased tempo of the soundtrack.

It was only in 1980 that Namco released the classic with the first widely known character that borrowed its name from the video game title: *Pac-Man*. Sound-wise, *Pac-Man* was rich in sound effects and became famous because of the chewing sound; equally popular was the music created by Toshio Kai¹⁴ with a unique musical demise (Wolf, 2008). Even though these video games are not at all complex, they remain as pillars of the video game industry and are still appreciated, precisely because they are seen as being entertaining and fun representatives of simplicity. As James Newman explains, "*Pac-Man, Space Invaders, Pong, Defender, Parodroid, Monty on the Run, Manic Miner* are no audio-visual spectacles *per se*, although they retain an almost unjaded charm that owes much to nostalgia and retro-chic, but they remain excellent games, because, among other things, they are well balanced and perfectly paced" (Newman, 2004, p. 35).

But as the demand for storytelling arose, so did the need to accompany it with music to increase the gaming experience. It was Nintendo that gave us the most beloved and known video game character up to this date: *Super Mario Bros'* Mario. The Composer Koji Kondo gave the game a complete new depth through the quirky musical composition that adapted to the gameplay (and aesthetic) as the character powered up and levelled up (Wolf, 2008). As time went by and technology evolved, the character even acquired a voice that was so unique that it is still easily associated today with the red Italian plumber, along with the sound-effects of his jumps and destructive punches. The latter's sounds were so distinctive that they have remained to the date almost unchanged, only polished, keeping its classic, retro vibe. It is also worth mentioning Super Mario's contemporary counterpart, Sonic, the Hedgehog, with music as distinct as the character's speed and an iconic ring catching sound-effect.

¹⁴ More commonly known as the waka waka sound

With the ever-so-increasing need to create a compelling storytelling to increase the gaming experience, the sound accompanied the game, carrying with it the need for a clear sound design and soundtrack as it was done in film. Nowadays, the most praised sound design is usually the most realistic one, as it provides the player with a sense of immersion. The amount of enthralling sound design and sound characterization in games is such and so sought after that there are enormous amounts of video games that could serve as examples. The introduction of shooter games was also extremely relevant in pulling the player into the game world. By following the player character's point of view, the feeling of involvement in the game as an active participant increases as the player can reel in watching through the main character's eyes or gaze line. In the RPG genre (Role-Playing Game), the third-person shooter *Assassin's Creed* Saga and the first-person shooter *BioShock* Saga the player is allowed to be and feel in the character's skin by moving around the game while listening to the characters' breath, rustling of its clothes and footsteps, the latter adapting to the environment and flooring they are stepping on. Another particularity of these characters is the use of speech and discourse that helps us better understand their personalities. Other games like the *Call of Duty* first-person shooter war game provides the player with an extremely blank and flat character, as opposed to the layered and story-driven characters of *Assassin's Creed* and *BioShock*. On the screen, only the character's hands are seen and their emotion is translated through the adaptive soundtrack, triggered by the different situations the character is in (dangerous, weary, hurt, and so on). On the subject of First-Person Shooters, Mark Grimshaw states that through "a system of sonic perceptual realism", the player's mind shifts from being aware of his own reality to being uniquely focused on the virtual world. Through the sensation of authenticity, the game world seems to materialize around the gamer and just like that, "in the ideal case, virtuality becomes substituted for reality" (Grimshaw, 2008, p. 2).

What comes in to play as the most important element that provides the player with a sense of immersion is the stereo and most certainly the increased use of surround (generally digital surround) that places the player right in the middle of the action. Riding on the opportunity of the usage of these stereophonic techniques comes into play the adaptive style of programming the sound effects and music according to the character's situation. This style of programming allows sound and music to be triggered and interrupted or faded out accordingly through the proximity of the player to certain elements, be it in a tenser situation in which a more unnerving music is triggered or the proximity of the character to NPC whose dialogue is triggered and whose voice volume is lower or higher depending on the distance between them. The biggest difference between sound design for film and sound design for video games is the reason the latter is the focus of this research: interactivity. Therein lie plenty of possibilities to

give players different experiences and to experience different emotions and connections with the characters and their universe. There is also a different creative freedom to adapt and create a sound print (be it sound effect wise or music wise) unique to the characters because of the different aesthetics, gameplays, and universes that video games have to offer.

Though video games are widely popular and extensively studied and researched under various themes of social (or lack thereof) connectivity, emotional response, visual representation, storytelling, interactivity, and so on, Game Audio is still a very much unexplored field of research. Even upon researching on the most multi-mediated platforms such as *YouTube* and *Amazon*, except for studies on the music of video games, articles and books focusing on the Sound Design are scarce and/or very difficult to obtain. Though the study of the influence of sound on the player's emotional engagement with the game and characters is slowly developing, the focus on audio development for the character themselves has yet to be addressed in depth. Kristine Jørgensen, in *Sound in a Participatory Culture* (2014) suggests that "sound works as an intermediary that decreases the spatial proximity between the player and the virtual space". She further explains that the players respond instinctively to sounds that are similar to the ones in the actual physical space, leading them to a closer identification with the avatar. Karen Collins, in *Playing with Sound* (2013), associates this phenomenon with "embodied listening", in which "our connection between the physical action and the sonic reaction is much stronger when it comes to self-produced sounds (as opposed to externally produced sounds), due to the embodied connection between self and sound. In other words, we have a physical experience of sounds that we produce ourselves that is different from other sounds in our environment, and we use these sounds to help to delineate our body schema" (Collins, 2013, pp. 43-44).

2.3. Conclusion

It is clear that video games started borrowing the film industry's cinematic scene styles for narrative advancement and detailing, all the while heightening the experience through its interactive mechanics, thus creating numerous and diverse immersive environments.

Video games are no longer stereotyped as a source of entertainment only for children. The variety of styles, genres and gameplays made possible by the ever-increasing technological advancements target different audiences and different age groups. The industry vigorously releases and explores games with deeply engaging storylines or even games for mindless fun; and it is obvious that video games with dense narratives demand even more high-quality graphics and an alluring sound design to match the appealing visuals.

The video game character fever is at its highest. Players want to play with the characters, and players want to *be* the characters. In their quality as users, the players are the most important factor for understanding game audio and character sound design.

3. The Player: Understanding Psychoacoustics

3.1. Identify, Feel and Belong: Perceptual Awareness, Emotion and Immersion

We are at the receiving end of an onslaught of sound being emitted from all around us, and we cannot turn away from it. Our omni-directionality¹⁵ allows us to navigate and estimate the location of multiple sound sources. In favour of avoiding sensory overload and the consequential fatigue from it, we manage and process most of what we hear subconsciously. Though we cannot rid ourselves of sound or avoid receiving it, we can focus better on certain sound sources notwithstanding the others. This occurrence is described as the "cocktail party problem" (Liljedahl, 2011). The term used by Colin Cherry in 1953¹⁶ to describe our ability to isolate, for instance, a conversation from others surrounding us. We process, group and select sound that we consciously or subconsciously want to hear (Bronkhorst, 2015). In game audio, by levelling the volume differently, the sound designer can change the focus of the player onto what he wants the latter to pay attention to.

When playing a game, sound also functions as a bridge over the gap between the digital and physical worlds. Sound is mandatorily the result from the contact between two physical properties – i.e., matter. Thus, sound indicates motion. According to Mark Grimshaw, "(...) we are 'hard-wired' to treat sounds as tokens of physical activity, matter in motion and matter in interaction" (apud. Grimshaw, 2011, p. 24), implying that we are subconsciously aware of sound as movement.

This sense of physicality is due to our subconscious association of sound with its physical source. Though they are two separate phenomena, we cannot perceive them as independent events. When setting down a cup on the table we do not separate the sound of the contact between both surfaces from the visual feedback; instead, we identify the action as a single event. Stoffregen and Bardy refer to this as the "global array" phenomenon, in which we do not process what we see and hear separately (apud. Grimshaw, 2010). Hence, sound and its source are experienced simultaneously.

¹⁵ This omnidirectionality is not to be confused with the pattern of an omnidirectional microphone. An omnidirectional microphone is one that is equally sensitive in all directions. The closest way to simulate the sound input of the human ear is with the binaural technique, which consists of two omnidirectional microphones separated by the distance of a regular human head. The microphones are also hidden by the configuration of the ear so as to have the sound bounce off the ear structure in a similar fashion as to how sound works for us (Taylor, 1996).

¹⁶ For further information on the subject, see Cherry, 1953.

Based on personal experiences and memories, we interpret and make assumptions about the source and context of the sound, particularly as regards sources we cannot see. As we cannot see most of the events we hear, it is fair to say that we hear the world beyond what we see (Liljedahl, 2011). This triggers our mind to subconsciously fill in the missing pieces of information by hypothesizing about what the source of the sounds may be and what effects they might have on us. This last reaction is particularly and purposefully used in the video game world, in which off-screen sounds are often used to alert the players and force them to be wary of possible incoming danger. It also aids as a startle factor mostly in horror or suspenseful video games (Jørgensen, 2004).

Researchers on audio for video games, such as Mark Grimshaw, Karen Collins, Christoph Klimmt, Dorothee Hefner, and Peter Vorderer, among others, when referring to the player's experience of the game seem to refer to three particular important elements towards understanding video game enjoyment: Perception, Emotion and Immersion. By understanding these three concepts, the cognitive approaches taken by video game designers and game audio sound designers to heighten the player's experience become clearer and appear to be more thought-out than what would initially look like. To experience a video game in its full potential, there need to be a subject to identify symbols, engage with the game, and respond emotionally to it; the theoretical framework thus encompasses these three stepping stones towards understanding the player's relationship with the game and the character.

3.1.1. Perception

With sound in video games as a link to the physical world and provider of information, our auditory perceptual awareness allows us to interpret meaning and mood, triggering, in turn, an emotional response (Droumeva, 2011). Due to our perceptual awareness, we have the ability to receive the information, process the latter's meaning, and finally manipulate and interpret it, potentiating response and interaction (CogniFit, s.d.).

As previously mentioned, the way to influence our auditory perception is to take advantage of the familiarity of the sounds used. The sounds and acoustic properties we experience on a daily basis are mimicked in the game world, coercing us into unconsciously recognizing the visual-to-auditory nexus we are so unconsciously accustomed to (Grimshaw, 2008). In this matter, the most significant approach is the fabrication of a soundscape to match the location the player character is in. This means that one would have to be aware of the acoustic response to the sound events depending on the space and the individuals in it. When

the soundscape is considered realistic and/or believable, it is (more often than not) not even noticeable. Concerning the awareness of soundscape Donald A. Ramsdell explains:

[Awareness of background noise maintains] our feeling of being part of a living world and contribute[s] to our own sense of being alive... We are not conscious of the important role which these background play in our comfortable merging of ourselves with the life around us, because we are not aware that we hear them. Nor is the deaf man aware he has lost these sounds; he only knows that he feels as if the world were dead. (Burrows, 1990, p. 22)

But what about sounds that do not actually have any real-world counterparts, such as the sound of a magic spell and other caricature sounds? As we grow up and are relentlessly in contact with pop culture, we learn to associate certain sounds with specific fictional symbols like the growling of zombies, the roar of a dragon and the delightful twinkling of a fairy's dust. We know what they represent because we have learned and became accustomed to them as depictive sounds of their source. Thus, sound can be said to fall into two essential categories of representation: mimetic realism and abstract realism (Grimshaw, 2008). By combining the former, we have an exaggerated representation of reality to make the game world more believable and pull the gamer into its borders. Throughout our lives we do not get to experience most of the things we see on TV and movies, so we tend to trust that those sounds are real. The sound of a gun firing is much less dramatic than most movies make it out to be. The sound is shorter and much higher in pitch and frequency than the ones we see in the movies. Swords swinging and clashing in audio-visual mediums are also very different from the actual real sound. In real life fights, the sound produced by swinging is significantly less intense in its lower frequencies, and the sound of clashing is dry and without as much "shine" as we believe it to be. It has now become increasingly difficult to draw a line between what is to be considered a real or an abstract sound due to this proliferation of media.

3.1.2. Emotion

When trying to make sense of the human emotional response to auditory stimuli, researchers usually refer to two particular emotion theories they seem to find some clarity in: the cognitive and the social constructivist perspectives on emotion; both theories seem to further clarify the previously mentioned notions of the importance of perceptual awareness and experience in the auditory experience. According to the cognitive theory, one of the most important factors in the emotional phenomena is the idea of emotion as an object-oriented¹⁷ sort of response. The

¹⁷ In the cognitive theory, an object could range from an animal to any sort of inanimate object.

individual not only (mostly unintentionally) responds to an object emotionally, but the assessment of the individual's own reflexive emotional response – such as fear, comfort and indifference – to an object prompts him to assign a quality to it, evaluating it as harmful or desirable (Davies, 2010). The social constructivism theory, on the other hand, delves further into the reason for the seemingly universal responses to certain events and objects, instead of just focusing on the individual-object relationship. These universal reactions are the reason why the cognitive theory is seen as flawed, having not recognized the seemingly common pattern of emotions to certain stimuli that humans and/or communities seem to have in common. The social constructivist perspective stands for the idea that even though there seem to exist emotions deep-seated in the human being due to the simple common factor of him being human – such as fear out of startle or surprise –, there are emotions that can be learned overtime, for instance, through the conditioning of the family, the social group or the community one belongs to. Thus, this commonality also provides the community with a sense of sympathy and identity apropos the shared sense of understanding. For instance, spiders are, more often than not, loathed because one is taught, while growing up, that spiders are repulsive and uncommon in the urban picture, or because the people we are with on a daily basis (family, friends and/or co-workers) share the same reaction. Based on these assumptions, the game designers or sound designers focus on taking advantage of the players' pre-conceived notions and previous experiences, so that certain events can arouse these mainly common and predictable emotions (Toprac & Abdel-Meguid, 2011).

Nevertheless, what both these theories have in common is the acceptance of the three forms of emotional human expression: “subjective experience (e.g. feeling joyous), expressive behaviour (e.g. smiling), and the physiological component (e.g. sympathetic arousal)” (Ravaja, *et al.*, 2005, p. 2). These concepts echo two very distinct emotional languages that are particularly evidenced through music. Those are the differences between the composer's ability to express emotion and the ability to evoke emotion, between perception and induction. In music, for example, through perception, the listener can recognize certain patterns that, as a whole, could be descriptive of a particular emotion. Beethoven's *Ode to Joy* (1785) is a clear example, as one does not need to know the piece's title to know that it is celebratory, but that does not mean that the listener will immediately share the expressed emotion, as there might not be a pronounced neurological response to it. So even though the listener might recognize the expression of joy from the composition, it does not imply that he/she will immediately feel joy (Sloboda & Juslin, 2010). But when there is emotional induction, it also does not imply that the auditor will experience emotional contagion, that is, feel the joy from the piece. The subject's emotion depends on his/her current state. If, for example, he/she is experiencing

sadness, irritation or frustration could ensue because of the dissimilar wavelengths of emotion. On the other hand, past experiences with the piece itself might influence how a person responds. (Woody & McPherson, 2010). If the listener has watched Stanley Kubrick's 1971 *A Clockwork Orange*, he/she might recall the context of violence in which Wendy Carlos' electronic adaptation of the symphony entitled *March From a Clockwork Orange* was played – and the piece will take on a new meaning. This entails that context is important for the specific case of video games. The context in which the player is playing a game is a different experience, when compared to experiences such as seeing a live performance, reading a book or watching a movie. Hence, just as it is with immersion, the response varies in line with the player and the setting. To improve the emotional experience, the effectiveness of the process of emotion induction, the building up, the feeling of anticipation are instrumental, as they dive way to the intrigue, the suspense and the curiosity that culminates in the heightening of emotions. Having in mind the particular case of horror games, Tanya Krzywinska rightly remarks: “Many video games deploy sound as a key sign of impending danger, designed to agitate a tingling sense in anticipation of the need to act.” (Toprac & Abdel-Meguid, 2011, p. 180).

Emotion Through Music

Even to the casual listener, music is known to be a powerful mechanism of expression capable of evoking emotions in anyone. It is not by chance that calm, quiet music is used to relax children, particularly in their early years. Much like with film music, game music is a tool to heighten emotions and senses in the player, but this is not a recent discovery, nor is it a new field of research (Grimshaw, 2010).

Richard Wagner, the early 19th century romantic composer, had a particular focus on the use of music as an emotional vessel. In fact, it was his main aesthetic goal to intensify feelings from the “man as a creature of heart and mind” (Lippman, 1999, p. 178) by conveying monumental emotionalism. Wagner's music was also considered descriptive of his character, with his feeling and woes transpiring through his orchestral arrangements, something that provided him with a sort of musical identity, uniquely his. His romantic predecessor, Beethoven, had paved the way for him, as he struggled with intense peaks of joy often interrupted by sorrow. His music was extremely transparent, open, in a way that it gave his music an identity and made it seem like he had his own recognizable *Beethovenian* style (Lippman, 1999).

Countless researchers have studied the influence of musical structure on emotion, managing to identify certain universal patterns that seem to stand out.¹⁸ These results do not represent an exact science, because, as we have seen, context is key for the feeling of emotion. The emotional response can also vary with different combinations of disparate structural elements. For instance, even though pieces in a minor key would presumably (as the patterns indicate) be representative of negative, sorrowful sentiments, in case they are played softly they result instead in a sense of bliss or serenity.

The following table outlines some key structural components of music and their observed cognitive responses. It is important to note that the chosen structural elements are bipolar and even though there are in-betweens, the table indicates which of the elements are more frequently used for some of the basic emotions. The table builds on the summary from “Reviewed Studies” by Alf Gabrielsson and Erik Lindström (Gabrielsson & Lindström, 2010, p. 384), simplifying it and highlighting the basic information on music and emotion. As Gary L. Kreps points out, “data reduction processes are essential for making the findings from scientific research available to those individuals who might benefit from the new knowledge generated by the research” (Kreps, 2017, p. 341).

		Positive					Negative				
		Happy	Bright/Cheerful	Strong/Intense	Calm	Confident	Angry	Melancholic/Sad	Weak/dull	Scary	Fearful
Mode	Major	x	x	x	x	x	x			x	
	Minor							x	x		x
Harmony	Simple/consonant	x	x	x		x	x				
	Complex/dissonant				x			x	x	x	x
Melodic Direction	Ascending	x	x	x		x				x	
	Descending				x		x	x	x		x
Pitch	High	x	x		x	x		x	x		
	Low			x			x			x	x
Rhythm	Firm	x		x		x	x			x	
	Flowing		x		x			x	x		x
Tempo	Fast		x	x		x	x				
	Slow	x			x			x	x	x	x
Loudness	Loud	x	x	x		x	x	x	x	x	x
	Soft				x						
Articulation	Staccato	x		x		x	x				
	Legato		x		x			x	x	x	x

Table 1 Musical Structures and Basic Emotions

¹⁸ As to not wander off too much from the main subject, the author formulated a table of identifiable patterns that could be understood equally by musicians and non-musicians. The information is based on *The Role of Structure in the Musical Expression of Emotions* (2010) that delves into the numerous researches and theories on the influence of structure in the expression of music. For more information on the subject, see Gabrielsson & Lindström, 2010.

It should be noted that this table, although useful for the understanding of the influence of music on emotion, is not to be taken as prescriptive. In fact, as Manuel Faria suggests, it all depends heavily on the story: “there is no formula to convey happiness or other feelings”. Not only does it depend on the director’s intention but also on the audience’s listening experience: “It’s very important to release the audience to their own thoughts and feelings; (...) the role of music with narrative is to guide the audience but not force it to feel a hostage of the author's desire” (cf. *Addendum B.1*)

Though music by itself paints the listener a picture of emotion, its emotional effectiveness is indeed increased tenfold by being paired with actual pictures or other media. The visual narrative, accompanied by soundtrack, enables the evocation of specific universal emotions that would hardly be evoked separately (Liljedahl, 2011).

Be it consciously or subconsciously, the human being is already familiarised with the idea of the influence of music on emotion. However, not everyone is aware that sound design, particularly in the audio-visual format, is what, as the expression goes: “hits the ball out of the ballpark.” In fact, it is the overall combination and desired balance of sound, speech and music that heightens the emotional context for the audience, not just music by itself, even if the music plays the most important part. With the use of the appropriate acoustic ecology, sound events and music, context is granted to the player, potentiating an emotional response. As noted in the previous chapter on perception, familiarity is a key factor for the necessary stimulation. By resorting to specific sound events that occur in an emotional state the user is familiar with – and, if desired, by adding music –, one can, for instance, convey sadness and loneliness; the recipe could be, for instance, sobbing in a quiet, long reverberating soundscape and a minor-keyed music.

When describing the way a performer or a composer tells a story, Sandro Norton highlights the importance of breathing moments: “A story should be like a butterfly. When it flies, it’s beautiful, when it stops it's beautiful (you can appreciate the beauty of the wings). In any moment the performer should think about creating interest. It is not about revealing everything in the beginning. No, knowing how to tell a story is a lifetime process” (cf. *Addendum B.2.*). In the same manner that music does not need to always have an abundance of musical information, a good sound design takes into account the need to balance the sonic information.

In fact, despite the abundant use of music in the majority of films and video games, there has been an increased interest in a more minimalistic sound design approach with less

music and more room to experience the acoustic ecology¹⁹. This lack of music not only provides more realism, but it also creates tension, anxiety and need for attentiveness. This occurs in the acclaimed 2013 *The Last Of Us* video game, whose sound design is praised for its stripped-back approach. As Bruce Stanley, the game's director, explained, "Less is more, strip all that away, then when a sound hits it's more impactful." (Robertson, 2013) Tension in the scene is also added by the use of diegetic music, as is the case with the *BioShock* game, in which the use of music coming out from radio and phonograms is spread throughout the dark and damp game environment, tensing and grasping the player's senses.

There is indeed a lack of awareness of the power sound design has as a vehicle for the communication, which mirrors the underdevelopment of research on emotion and identity in video game audio. Lennart Narke and Mark Grimshaw express this opinion when they state that "not much work has been put into sensing the emotional cues of game sound in games, let alone understanding the impact of game sounds on players' 'affective responses'" (Narke & Grimshaw, 2011, p. 266).

3.1.3. Immersion

Emotion from gaming experience can be the result of immersion as much as the cause of it. An emotional scenario needs to be created for the player to feel connected with the game-world and its characters. To facilitate the intended emotional bond to the character, it is necessary to encompass the player within the game-world environment. For a fully immersive experience, one needs to combine every aspect that makes up a game: graphics, gameplay, storyline and, of course, sound.

Immersion is, first and foremost, an experience. In their study on immersion within video games, Laura Ermi and Frans Mäyrä (2005) refer to Pine and Gilmore's 1999 definition of immersion as an experience in which a person can be physically or virtually a part of. The authors also identify gaming as an escapist experience, since it is immersive and promotes active participation, as opposed to simpler entertainment experiences such as television in which there is only room for passive participation²⁰ (Ermi & Mäyrä, 2005).

¹⁹ A great example for this newly found interest in minimalistic sound design is the movie *Gravity* (2013), by Christopher Nolan. *Gravity* is set in space and it portrays sound as heard by the characters from within their spacesuit helmets. Hence, as there is no sound in space, the audience experiences the character's proprioceptive sounds, the radio communications, and the vibrations that the character might feel, through impact.

²⁰ Absorption differs from immersion because it brings the experience to the mind, while the latter carries the mind to the experience (McMahan, 2003).

Precisely because gaming is an escapist and sensory experience, there are certain conditions that need to be met. These conditions may vary from person to person depending on a number of factors: the player's mood, past experience, abilities, and attention, along with the game and sound quality, and even the size of the screen (Grimshaw, 2008). Chris Crawford sustains that “this illusive trait [game play] is derived from the combination of pace and cognitive effort required by the game” (*apud* Ermi & Mäyrä, 2005, p. 2), thus implying that a connection needs to be indeed created between the player and the game itself. On the other hand, according to Allison McMahan, there are three conditions that need to be met for rendering the experience immersive: the game matching the user's expectations, meaningfulness for the player, and consistency in the game world (Ermi & Mäyrä, 2005). McMahan also points out that realism is significant in increasing the immersive experience as it is an exploration of the reality the player is familiar with (Grimshaw, 2008).

With the different outcomes of player-gameplay relationships in mind, Ermi and Mäyrä identified three types of immersion. The first is the sensory immersion, made possible by the audio-visual and gameplay combination. The more the screen occupies the player's vision and the sound overpowers the player's environment the bigger will be the engagement of the player with the game world (Ermi & Mäyrä, 2005). The use of headphones, for example, greatly increases the sensation of immersion because it muffles the sound of the real world (*apud* Grimshaw, 2008). The second type of immersion is the challenge-based immersion, which, as the name indicates, is more effective when there is a pleasant challenge-ability balance. The level of difficulty increases the player's engagement with the game because it requires a more intensive responsiveness and attention to detail. This confirms Ermi's and Mäyrä's conclusion to their afore-mentioned study that the pleasure “of succeeding and advancing (...) was an important factor in the overall suspense of playing.” (Ermi & Mäyrä, 2005, p. 7). The last type of immersion is the imaginative immersion which occurs when the game provides room for the player's imagination, allowing him to more easily feel within the game and identify with a game character (Ermi & Mäyrä, 2005). Not excluding the importance of the other types of immersion, the imaginative immersion is the most relevant since it allows the players to create a connection with the game character, filling in the blanks with their experience, interpreting their actions and intentions and projecting over them what they wish to be like or to, through the avatar, do what they are not able to do in real life. This, of course, also depends on the story and on how much information about the character the player is provided with. In this category, sound is of extreme importance: both proprioceptive²¹ sounds (like breathing changing with the pace of the

²¹ Sounds from stimuli within the body itself that are perceived as movement or spatial orientation (*The American Heritage Dictionary of the English Language*, 2016)

character) and exteroceptive²² sounds (such as the sound of footsteps and the rustling of clothes) feed the player's imagination. The type of gameplay that gives the player a bigger leeway in feeling in the skin of the character is the first-person shooter (Grimshaw, 2008), such as the widely popular *Call of Duty* series or *Counter-Strike: Global Offensive* (2012) games, in which the players are allowed to actually communicate online through microphones and headsets and where player characters are categorized as featureless protagonists²³ due to them being void of a given voice and distinctive characteristics.

Above all, one of the most important elements in enhancing immersion might be positioning, i.e., the position from where the player is listening within the game. The listening position of the gamer depends on the game's mechanics, but the experience is significantly enhanced when playing a third-person shooter²⁴ and even more when playing a first-person shooter, since the player hears as the character hears (in the case of side-scroller, point-and-click and beat'em'up²⁵ sort of games, the sound is not positioned as closely to the player). Mobility-wise, audio positioning might vary from game to game and gameplay to gameplay, but usually the same principle applies: the player should hear, explore, and influence the acoustic environment surrounding the character as if he/she were in the latter's place (Grimshaw, 2010).

3.2. Asking the Players: A Survey on Game Enjoyment and Construction

To further grasp the concepts presented by the previous research, an online survey was developed by the author, aiming to understand how sound is perceived by the gaming community, with a special focus on game characters and the player's relationship with the game. The survey, drawn up for gamers and with additional questions for game designers, sound designers, and musicians, was taken by 58 subjects who were targeted both via social media gaming Facebook groups and by word of mouth (or e-mail in this case). The ice-breaker question concerned the platforms most used by the participants, which turned out to be PCs²⁶, console platforms²⁷, smartphones and handheld consoles²⁸, with PC being the most used, and handheld devices being the least used. Additionally, most of the respondents revealed that they

²² Sound from stimuli originating from outside the body that are perceived as movement or spatial orientation (Farlex, 2012)

²³ Sf. Glossary

²⁴ Sf. Glossary

²⁵ Sf. Glossary

²⁶ Personal Computer

²⁷ Mainly PlayStation, Xbox, and Nintendo consoles that are connected to a screen and are controlled by a specific remote.

²⁸ Such as the widely popular PS Vita, Nintendo 3DS and Nintendo Switch.

tend to play sandbox RPGs²⁹ (most popular in both the first-person shooter and third-person shooter viewpoints), platform games³⁰ and MMORPG. The first section also confirmed that 96.6% of the participants played with the sound turned on and more than half seem to use headphones while playing. The behavioural questions of the survey have thus allowed us to understand how gamers play; however, the most important part of the research findings resulted from the answers to the attitudinal questions, i.e., questions that concerned their opinions beliefs, and interests.³¹ For the analysis of the survey, the author's concern has been to understand the answers offered by the respondents in their relation to the ideas and concepts addressed in the previous sections of this dissertation, thus enhancing the importance of the questionnaire to the ecology of the research. To the effect, the analysis of the answers will be divided into three sections: overall perception of sound, how the participant perceives character, and the role of music in the gaming experience.³²

3.2.1. On Sound Design

Just by skimming through the survey, one can already tell that the participants seem to be aware of the existence of sound design as an important piece for the gaming experience. Concerning the quality and enjoyment of sound design, the gamers were asked which video games they had played in the past and found most appealing. The majority of the answers seemed to direct towards First and Third-Person Shooters. *The Last of Us* turned out to be the most popular, with *The Legend of Zelda* series, *BioShock* and *Overwatch* (2016) competing for the second place. The first two are Third-Person Shooters, while the remaining were first-person. *The Last of Us*, *BioShock* and *Overwatch* are games whose sound design take a minimalist approach on music with more rich and atmospheric soundscapes, rather than the heavily scored *The Legend of Zelda* series. With the majority of the chosen titles focusing more heavily on sound effects and ambience, one can confirm the rising popularity of the challenge sound offers when faced with off-screen enemies.

²⁹ Referred in the survey as open-world RPG, a sandbox RPG is a game that “offers a large variety of mechanics and game systems for the player to explore and toy with” (for more information, see: <http://tvtropes.org/pmwiki/pmwiki.php/Main/WideOpenSandbox>).

³⁰ A gameplay where the character leaps “between platforms of varying heights and over or onto enemy characters” (for more information, see: <http://tvtropes.org/pmwiki/pmwiki.php/Main/PlatformGame>)

³¹ See section 1.3, “Methodology”.

³² For the full survey, please refer to *Addendum C*.

Have you played a game in which the sound design ruined the experience for you? If so, which one(s)?

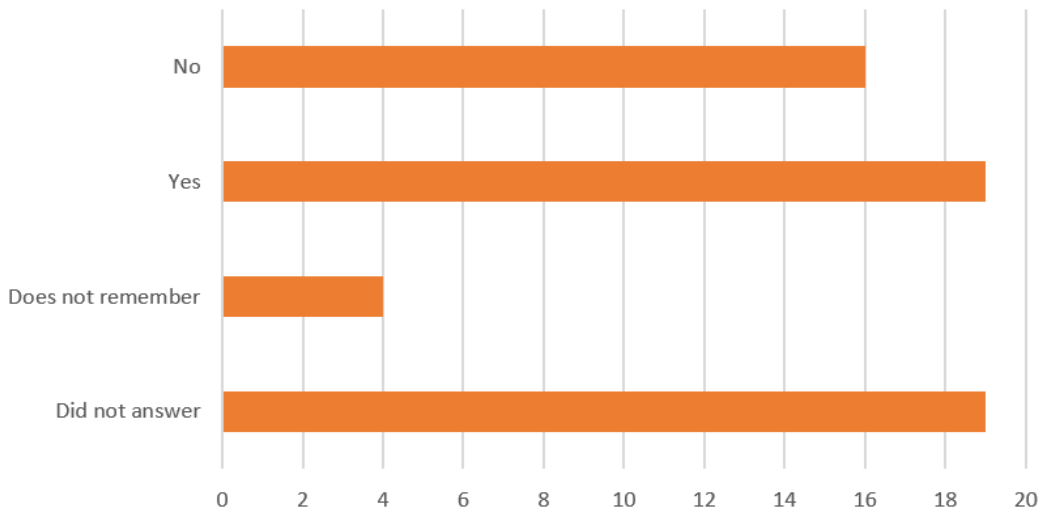


Figure 1 The sound design and the gaming experience - Online Survey (see *Addendum C*)

In turn, when asked how to correctly balance SFX and music, sound designers claimed that it depends heavily on the context and narrative, with the most important part conveying emotions and immersing the players in the story. All in all, the participant sound designers referred to sound as a key engagement medium for the gaming experience.

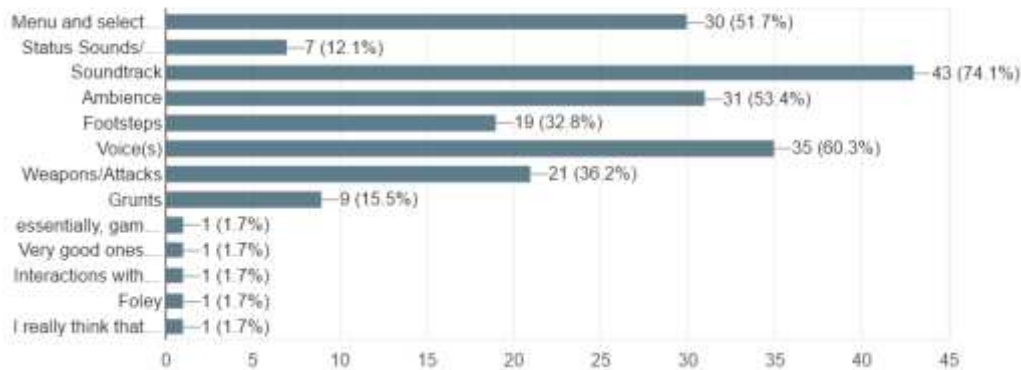
Above all, the sound design depends heavily on the game designer, whose opinion and intention dictates its relevance in the game. When asked about the importance of sound in a video game, 63% stressed it as extremely necessary, while the majority of the remaining point out that it depends on the game. On the other hand, the overwhelming majority of the designers believe music to be imperative for game sound design over voice and other SFX.

3.2.2. On their Sonic Perception

The tricky part about perceptual awareness is the fact that one is not actually aware of that it occurs or when it occurs. If you work closely with sound, you might have often heard a variation of the following: after watching a movie, if the regular audience member does not comment on the sound design, then it was perfect.

What are the sounds you usually notice first when playing a video game? (you can choose more than one)

58 responses



Menu and selection sounds (when moving around menus to select something); Status Sounds/ HUD (health, MP, stress, stamina, etc.); Soundtrack; Ambience; Footsteps; Voice(s); Weapons/Attacks; Weapons/Attacks; Other

Figure 2 Sounds the players notice first – Online Survey (see Addendum C)

Players do not tend to consider footsteps, voice, ambience, SFX and music separately due to a tendency to see sound as a whole block. 43 out of the 58 participants claimed to notice music first, followed by voice and menu selection sounds. This could further prove the immersive character of proprioceptive and exteroceptive sounds within the soundscape, as neither of them has been particularly pointed out. As implied, if they do not comment on it, then it works, it was felt as being natural, as if it *belonged*.

3.2.3. On Music

Sound-wise, music seems to dominate the player’s senses. After all, it is something that the players can enjoy as an extension of the game, without the actual act of playing it. The gaming experience extends to the soundtrack, as it seems that the majority of the participants actually buy or download their favourite games’ music. By being attached to a memorable audio imprint, the gamer searches to recall when it was experienced, allowing him/her to once again dwell onto the game world. Regarding whether music is more relevant when representative of a character’s strength or vulnerability, it seems that gamers are divided.

When composing for emotions, the respondents who are also composers seemed to mostly agree on similar genres and musical structures, also meeting the same observed tendency patterns as the previously mentioned studies have suggested. The respondent’s answers also indicated that sadness is mostly conveyed through slow, stringed music, similar to the cowardly

emotional state, the latter being preferably more atonal and brass-inclined, though; happiness is more quick-tempo, and upbeat, also having jazzy/funky beats recommended for, a genre mostly said shared with a sexy demeanour; despair and anger seem to have the same ideal low pitch and preference for strings, with anger seeming preferable also with heavy distortion; lastly, bravery is mostly suggested to be expressed by the use of a full orchestra with an “epic” sensation and mostly mid-fast tempo.

Finally, regarding the use of a specific instrument for a character, the easiest instruments to use would seem to be strings and piano, mostly because of their practicality. Brass was also mentioned for more specifically strong or evil type of characters. Composers also seemed to find a common ground when stressing the need for a distinctive melody/theme/leitmotiv to differentiate the character from others, while also referring to the weight of the character’s emotions that the music can carry.

3.2.4. On the Characters

The classics, with the exception of the post 2000’s video game characters GLaDOS (*Portal*, 2007) and Solid Snake from *Metal Gear Solid*, seem to be the ones that commit to memory. *Super Mario Bros.*’s popular title character, followed by *The Legend of Zelda*’s Link, *Tomb Raider*’s Lara Croft and *Sonic the Hedgehog*’s own Sonic are characters that have steadily dominated the video game industry along the years as they grew up and matured with their players. While the youngest GLaDOS and Snake are known for their voices and discourse, Link and Lara grunt away with their physical efforts and the eldest Mario and Sonic – who were the introduction to many of today’s player to games – were extremely popular due to their quirky music, leaping and coin/ring-grabbing effects (even though Mario’s voice was made popular after the 1996 release of *Super Mario 64*).

The players appear to indeed nurture a relationship with the player characters, the majority having taken a liking to speaking characters. Interestingly, as mentioned, when something goes wrong in the game, there are quite a few players (20,7%) that tend to blame the character, instead of themselves.

Chose one of the following: "Usually when I play a game and something goes wrong, I tend to _____". (Please answer as truthfully as you can)

58 responses

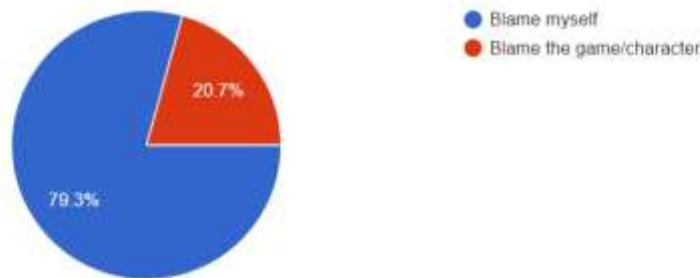


Figure 3 The player's fault or the character's fault – Online Survey (see *Addendum C*)

Both sound designers and composers pointed to emotion as the main hook of the game, though composers mostly search to convey the story's and characters' emotional context, while sound designers mostly search for the way to best serve the player's emotional engagement with the game.

3.3. Conclusion

In video games, audio becomes a vessel for information that builds a path between the physical world and the virtual world. Through the means of mimetic realism, the player can recognize the setting his/her character is in, thus retaining the gamer within the game. As familiarity usually comes with comfort, also the abstract realism works to enhance the experience by giving the familiarity a tad of something new. Because of perceptual awareness, the player (consciously or subconsciously) recognizes the settings he/she is familiar with, but with unfamiliar sound (together with interactivity and visual cues) new meanings are created, and the immersive experience is built – the player gets hooked. It thus becomes increasingly clear that if characters can give the player knowledge, the game world and its properties can do it as well, by providing the player with spatial and sonic context.

In turn, emotional engagement through sound, and particularly music, seems to be a unifying factor, connecting perception and immersion, as the perception of emotions can provide the player with an emotional context of the story, and the induction of emotions, through a purposeful manipulation of sound, can pull him/her inside the game world.

The online survey that was conducted substantiated the theory and resulted in information easy to interpret. The main conclusion it led to was that the respondents do actually appreciate

and pay attention to sound, though they seem to be more easily attracted to music, apparently without being aware of the game's overall sound design. Nonetheless, according to the answers, the players seem to refer essentially to musically dense games with emotional impact, games with a minimalistic sound design and horror and suspenseful games, that more easily arouse fear and fright through tension and anticipation. As we pay more attention to voice rather than other sounds, the players also tend to favour characters with a speaking voice, who usually have repetitive catchphrases when engaging in a fight and/or unleashing special attacks.

In the end, it only comes to whether the player has sonic information to process, or not. All these processes rely heavily on how the player opts to use the game sound: some players may play with no sound at all, with sound low in volume, or with devices that do not allow for sufficient immersive qualities (e.g. low-quality speakers or without enough low frequencies that are usually unconsciously associated with presence). Therefore, the quality of the sound for a greater gaming experience becomes as important as the sound itself. Though it is certainly possible to convey the purpose of the chosen sound, the use of headphones and decent sound drive or system will nourish the sense of involvement just as a filmed landscape would only be as realistic and captivating as the quality and definition of the screen.

4. Game Audio and Identity

4.1. Soundprint: Sound Design at the Service of Identity

When studying sound development for a character, we first have to get to know the ground we stand on. The group of sounds which Alves and Roque have baptized as soundprint gives the character an acoustic identity by providing the player with "a sense of presence and signalling basic activity." (Alves & Roque, 2012b). These sounds usually refer to a character's mobility or action, so a soundprint usually includes the use of footsteps, grunts/breath, dialogue and other SFX. The Character Soundprint, along with the other elements that make up the acoustic ecology of the game, supply the player with a deeper feeling of immersion, which greatly improves the gaming experience (Alves & Roque, 2011).

The soundprint also plays into the idea of identity and signature, and this certainly is one of the reasons why the term is so useful. In fact, even though it is also applicable to just music itself, it may rightly be used to describe the overall sound design pertaining to a character, as suggested by Roque and Alves³³.

In *Sound Print as an Identification Tool*, Ahmad Faudzi Musib argues for the idea that a soundprint is a great asset to the music industry because it aids in the recognition and popularity of a style, band or song. There are in fact many components that may be identified as a soundprint, such as a memorable guitar lick, melody or harmony, a specific way of singing, a distinctive use of an instrument or a unique processing in an instrument or voice (Musib, 2011). A very common practice in music composition when the aim is to represent a character is to associate an instrument with it. As Manuel Faria reminds, "*Peter and the Wolf*, by Sergei Prokofiev, associates instruments and specific melodies to the characters of the story. The clarinet moves like a cat and Peter, a violin, communicates joy and lightness". Likewise, "[i]n the movie *Alexander Nevsky*, by Eisenstein (1938), musical themes represent the two opposing forces: with Teutonic invaders, we have a somber brass melody and dark choir, while the Russian people are represented by an epic orchestral tune and a triumphant choir" (cf. *Addendum B.1.*)

One might wonder how sound design can be as descriptive and representational of character as music; Dario Marinelli's orchestral soundtrack of the film *Atonement* (2007), by director Joe Wright, will help us break into the subject. In the movie, the character Briony is an

³³ It is in this sense that the term "soundprint" is used in this dissertation.

aspiring 13-year old novelist that is obsessed with writing a play and broken down into jealousy and overwhelming irrational actions due to an unrequited infatuation. As it is set in 1935, the typewriter in her room is her creative and emotional output. The ticking of the typewriter, changing constantly from the state of diegetic sound to the state of non-diegetic sound, is heard throughout the film and is in fact the only percussive element in the movie's entire soundtrack. These typewriter sounds in the score have become representative of Briony, surfacing whenever the character's actions are influential to the narrative or when she is writing her own story. In this manner, the sound, akin to a footprint, has become evidence for the character's presence, a soundprint. By almost exclusively associating the act of typing to Briony, the film emphasizes their symbiosis, and the audience is thus inclined to perceive the sounds – either consciously, but mostly subconsciously – as an extension of the character's identity. Such is the case of the Nintendo character Super Mario's famous jumping sound, *The Legend of Zelda's* Link's easily recognizable grunts, *Metal Gear Solid's* Solid Snake's danger alert sound and Pacman's iconic chewing sound (Alves & Roque, 2011). When hearing this type of signature sound, even without a visual reference, it is quite common for the player to be able to associate it with its source. These unique soundprints also assist identification by alerting the player to the presence of friends or foes, playing with the player's sense of awareness (Alves & Roque, 2011).

The soundprint, as a unique group of sounds specific to a character, then becomes one of its biggest identifiable traits. But what happens when the player character does not possess a distinct attributable soundprint? This situation is very common in the immensely popular action-RPG war games. There are some game series, such as the first-person shooters *Battlefield*, *Call of Duty*, *Medal of Honor* and *Counter-Strike* with online multi-player functions that try to maintain the player character as visually and sonically blank as possible within their "action genre hero guy"³⁴ trope, in order for the character to feel immersed in pure mimetic (but still caricatured) realism.

Nonetheless, other widely popular video games also have silent protagonists: player characters that do not speak, but that are nevertheless recognizable through other proprioceptive or exteroceptive sounds, the sound of the weapons that specifically belong to the character or the sound of the music that is triggered in the character's highest achieving moments³⁵. Such is

³⁴ The player character tends to be male, more often than not Caucasian, close cut hair and stubble and soldier or former soldier, among other generic masculine type of traits. For more information, see: <http://tvtropes.org/pmwiki/pmwiki.php/Main/ActionGenreHeroGuy>

³⁵ There are a few different cases, such as Nintendo's *Super Mario Bros.* (1985) game, one of the franchise's first releases, in which the famous plumber did not yet have the unique cheerful Italian voice. Instead, the song that accompanied the game's first level, *Ground Theme*, also known as the *Super Mario Bros.' Theme* by video game music composer Koji Kondo, became a synonym to the series and particularly as the musical identity of the title character.

the case with third-person shooter player characters like *The Legend of Zelda* franchise's protagonist (Link, with his yelping whenever he attacks and his quick-paced and light footsteps), or *Transistor*'s (2014) Red who is always accompanied by her talking sword while only releasing her sultry voice very occasionally by humming a melody.

On the other hand, first-person shooters regularly use a non-talking character, quite often with masculine traits, but with a developed backstory or reason for being in the action. The player character either does not speak at all during the whole game, or only talks in cutscenes or when the player has the ability to choose what the character will say, but never when the player is actually controlling its body across the game world. The supposed intention is that, by doing so, the player will identify and feel like the player character itself, while being able to play his or her part as the hero of the story. If the character were to speak, it would “knock them out of the viewpoint of the character”³⁶. This is the case with many popular first-person shooter video games, such as *BioShock*, *Portal* (2007), *Fallout* (2015) and *Half-Life 2* (2004), and many others. But more than the player character, the most popular characters – with the help of their sonic identities – are the retainers of popular soundprints that almost end up representing the whole game itself. Those are commonly either enemies (such as the eerie heavy footsteps and growling of *BioShock*'s Big Daddy), companions (the deep voice of the *Transistor* main character's charming sword) or game navigation guides (like the sweet and deadly voice of *Portal*'s GLaDOS). Particularly in the case of enemies, the use of soundprint in NPCs is quite popular. The NPCs' footsteps or voice can be used offscreen to warn and prepare the player for a possible hostile attacks. The player has thus to be painfully aware of any incoming sound without an onscreen visual source, which creates tension and compels him/her to act upon the information, be it by fight or flight (Jørgensen, 2004).³⁷

Meanwhile, in Fighting Games³⁸ (like the numerous titles of the *Street Fighter*, *Tekken* and *Mortal Kombat* franchises), sports game (such as 2001's *SSX Tricky* and the majority of the wrestling, football and basketball video games) and plenty of MMORPG³⁹ and MOBA⁴⁰ games, the character's voice or very own catchphrase is the character's most identifiable trait.

³⁶ See: <http://tvtropes.org/pmwiki/pmwiki.php/Main/HeroicMime>

³⁷ However, it is important to note that NPCs are the only characters that can have sound deployed offscreen because the player character is the main and central focus of the screen.

³⁸ Also known as one on one fights, fighting game is, as the name itself indicates, based on the duel between two characters. (For more information, see: <http://tvtropes.org/pmwiki/pmwiki.php/Main/FightingGame>).

³⁹ Massively Multiplayer Online Role-Playing Game in which, as the name suggests, a massive number of players can play in at the same time. For more information, see: <http://tvtropes.org/pmwiki/pmwiki.php/Main/MassivelyMultiplayerOnlineRolePlayingGame>.

⁴⁰ Multiplayer Online Battle Arena or Action Real Time Strategy where several players can play online in a team against another team of players. For more information, see: <http://tvtropes.org/pmwiki/pmwiki.php/Main/MultiplayerOnlineBattleArena>.

One of the best examples might just be the *League of Legends* online multi-player video game, whose avid adherers instantly recognize their favourite player character's voice (if you are friends with a *League of Legends* player, then you most certainly know the character Teemo's popular "Captain Teemo, on duty!" catchphrase said with a child-like tone, without even having ever once heard the original).

In video games, voice and speech patterns tend to be the most recognizable trait of a character (except when the intention is to avoid any sort of specific characterization as is the case with background NPCs and the action genre hero guy type of player characters) (Childs IV, 2007). Voice is used in different circumstances, the most common ones being:

- 1) A human empathy element to add realism to a character;
- 2) An informational voice belonging to a nearby NPC in order to provide context, clues or directions;
- 3) An off-screen commentator-like sort of voice (such as the "Fight!" and "K.O.!" in fighting games and "Great!" and "Better luck next time!" evaluative sort of comments in sports games);
- 4) An off-screen guide voice that will walk the player through what he must do to advance in the game;
- 5) As a spatial location information for offscreen friends or foes (Toprac & Abdel-Meguid, 2011).

All in all, a player character's soundprint, whether it has a voice, other proprioceptive sounds, or even other representational sound effects such as those used to sound a character's movements (jumping, punching, magic, etc.) becomes a key engagement component for the player to take on its role. Particularly regarding FPS, Mark Grimshaw and Gareth Schott assert that the player's identification with the player character tends to occur when character sounds (notably proprioceptive sound) feed his/her imaginative immersion. At "a high level of immersion, [character sounds] may be seen as aural prostheses similar to the prosthetic limbs seen receding into the screen." (Grimshaw & Schott, 2008)

It should be noted that, in the framework of this dissertation, the concept of soundprint applies to sounds that pertain uniquely to the character. For this reason, sounds relating to firearms, knives and other weapons that are used both by the player character and other NPCs

are not considered as belonging to the player character's soundprint. Only in cases where the weapon is exclusively used for a character or a group of characters is it considered for the description of the acoustic identity. Additionally, sounds that result from the contact of the player characters with certain objects (such as Mario's from picking up coins and mushrooms) are considered part of their soundprint, as long as it is unique to them.

4.2. Video Game Characters' Soundprints Analysis

As explained above, the online survey had closed-form and open-response items; the first aimed at hypothesis testing (eg. is the immersive experience enhanced by the use of headphones), which has been described in the previous section, while the latter aimed at exploratory research. The answers offered by the respondents were indeed a valuable contribution to the process of identification of game titles with recognizable character soundprints and memorable sound design.

In search for common soundprint patterns, thirty game titles with characters with a memorable soundprint suggested by the respondents to the survey were selected.⁴¹ *Addendum D* displays the data collected via direct observation of the elements that make up a soundprint, along with notes on the more commonly recognized sounds and catchphrases, whenever relevant. The examination of these games allowed for a categorization of sounds and, subsequently, the identification of nine soundprint types; a label was then created to describe each group. The table below systematizes the description of the sound content of each type and provides examples for a better understanding of the different groups. The table, which turned out to be one of the main outputs of the research, would prove instrumental for the analysis of the two case studies considered in Chapter 5.

⁴¹ The games selected for this study were the first thirty on the list.

Soundprint Type	Sound Content	Examples
Starter Kit	Footsteps; Grunts	Bunnymen (<i>Don't Starve</i>)
Presence Pack	Hum or other continuous noise patterns; Fluctuations for movements	Navi (<i>The Legend of Zelda: Ocarina of Time</i>) Wisps (<i>World of Warcraft</i>)
Minion Pack	Footsteps; Weapons; Varied conversations with other NPCs; Startled interjections; Grunts	Splicers (<i>Bioshock</i>) Soldiers and Guards (<i>Metal Gear Solid 4</i>)
Arena Pack	Multiple catchphrases; Powers / weapons; Grunts	Teemo (<i>League of Legends</i>) Ryu (<i>Street Fighter</i>) Tracer (<i>Overwatch</i>)
Retro Pack	Jumps; Items; Attacks (punches, jumps, etc.)	Mario (<i>Super Mario Bros.</i>) Sonic (<i>Sonic the Hedgehog</i>) Diddy Kong (<i>Donkey Kong Country</i>)
Cartoon Pack	Footsteps; Catchphrases; Interjections; Acclamations Weapons/Attacks	Mario (<i>Super Mario 64</i>) Link (<i>The Legend of Zelda</i>)
Action Pack	Footsteps (+rustle); Grunts; Weapons / powers	Lara Croft (<i>Tomb Raider</i>) Joel (<i>The Last of Us</i>) Commander Shepard (<i>Mass Effect</i>)
Monster Pack	Growls / Hiss / Screech; Footsteps; Grunts	Clickers (<i>The Last of Us</i>) Alien (<i>Alien: Invasion</i>) Bowser (<i>Super Mario 64</i>)
Sports Pack	Footsteps / gear / equipment; Moves; Performance evaluation (voiced by playable character); Grunts (Generally when hurt)	Beat (<i>Jet Set Radio</i>)

Table 2 Soundprint Types

4.3. Conclusion

By taking into consideration the general structure of the most popular character's soundprints, it is possible to have a clearer understanding of how the game and sound designers use sound to their advantage. Memorable characters, for the respondents, seem to use plenty of vocalizations (i.e., grunts, exclamations, and so on) and voice styles, which corroborates the idea of a voice as an immersive experience for it is what we are most familiar with, since we do listen, and listen, and listen to voices every single day. There is no mute button, not even for ourselves.

Though there are plenty of characters recognizable for their own voices and catchphrases, other player characters have only what one could call a soundprint "starting kit", which comes down to the most common sounds that most the characters should have to signal their presence – unless the creators intentionally opt not to do so –, and establish a connection with the player: footsteps grunts, and basic weapon sounds or punches. These types of silent protagonists usually have companion NPCs and enemy NPCs whose soundprints are immediately recognizable. Most of those NPCs are frequently speaking characters through which information on the events of the game and on the player character itself is conveyed.

Through this table, it is possible to confirm that, even though there is a player character, it does not necessarily need to have an immediately identifiable and different soundprint. Many of these characters rely more heavily on unique sonic identities for NPCs. Thus, to understand the choice for player character's acoustic identity, it is important to find out how, and why the NPCs soundprints compensate the player character's soundprint, allowing for a higher identification process between player and character. When the character has a complete identity, then usually it does indeed have some sounds that could be regarded as belonging to it.

While a character soundprint table does help synthesise and identify certain sonic patterns, it is important to understand why the character has that acoustic identity – and here one has to look into the overall game itself.

5. Two Games Under the Microscope

5.1. From Theory to Practice: Identifying Instrumental Case Studies

The previous chapter offered a brief overview of character soundprints in a selection of games that were suggested by the respondents to the online survey. However, a real understanding of how a character soundprint works within the acoustic ecology of a video game can only be reached through a careful examination of instrumental case studies.⁴² Here again the survey was relevant, as the choice of the two case studies was determined by the games' popularity status within the respondents, as well as by their content, which is widely acknowledged by game audio aficionados. The first game under the microscope is one with a critically acclaimed sound design for its relevance in the gameplay's mechanics: 2K's *BioShock*⁴³. On the other hand, as an award-winning game that is regarded as one of the best games of all time by many and a product of a big franchise, Konami's *Metal Gear Solid 4: Guns of the Patriots*⁴⁴ will follow. The choice of which video games to explore was a tough one, and games such as *The Legend of Zelda* and *Super Mario Bros.* were considered for study at a first stage of the research for their sonic popularity and development, but in the interest of steering clear from games particularly known for a soundtrack that tends to overshadow the remainder of the sound design, games with a more soundscape-focused approach were selected instead. Another relevant component in the selected video games is the immersive experience given to the game's player within the game world, with main differences between them being the player perspective and the voiced character (Solid Snake, *Metal Gear Solid 4*) versus the silent protagonist (Jack, *BioShock*). Likewise, games such as *Overwatch* and *League of Legends* that depend heavily on memorable and short catchphrases were disregarded as candidates for case studies, also because they divert the player attention from the remaining sound design. Regarding released titles, *Metal Gear Solid 4* was also chosen for having previously published games within the same franchise, while *BioShock*, though it does have two released titles that follow, is a story with a player character exclusive to the title. One of the biggest hesitations in choosing these video games for analysis was the fact that they are close to each other by release date and have more realistic-looking aesthetics, but in the end, the quality of the game, the fact that their sound has been beautifully designed, and that these are extremely well-executed and successful games among the gaming community, weighed more. These are two extremely popular and immersive

⁴² For the definition of the concept of "instrumental case studies" please see the section "Methodology" in the introductory chapter.

⁴³ The following gameplay walkthrough was used for the analysis:
<https://www.youtube.com/watch?v=nFjMkFwB1ck&t=17514s>

⁴⁴ The following gameplay walkthroughs were used for the analysis:
https://www.youtube.com/watch?v=5mUb5yV8kA0&list=PLU4GD_G543eMt9q1-sPN7wgA-PsrEPQIU

games from which sound cannot be detached be it because of an alluring sound design or because of the actual influence it has over the game’s actions.

Though the focus of the analysis is on a single game, it is important to consider both franchises’ previous and latter releases. As graphics have progressively changed (read: improved) throughout the years, so has sound. In new releases, by giving the game a sliver and a glint of familiarity, the gamer thus experiences the character’s new adventures, while relishing in watching the character’s growth. The analysis will thus address how soundprints are maintained or reformed in previous and later games.

For the breakdown of each game, a game analysis table was created, structuring the sections below.

GAME ANALYSIS		
GAME	Year Creator/Publisher Gameplay/POV/Genre Storyline Recognition	
PLAYER CONTEXT	Personality Backstory Visuals	
OVERALL SOUND DESIGN	Ambience Music User Interface Accomplishment / revelation sounds Sound Design	
SOUNDPRINT: NPCs	Identity Soundprint Role in Game Soundprint Type	
SOUNDPRINT: PLAYER CHARACTER	Character Type	
	Foley	Footsteps Clothes Attack Weapons/Powers
	Voice	Texture Speaking Grunts
	Music Other SFX	
	Player-Character Immersion	
FRANCHISE	Similarities Differences	

Table 3 Game Analysis

5.1.1. *BioShock* (2007): Welcome to Rapture

*BioShock*⁴⁵ is a critically-acclaimed 2007 video game by 2K Games, directed and written by Ken Levine. Initially released for Microsoft Windows and Xbox, the video game is a survival-horror inspired game that follows a biopunk style with a dark and eerie colour palette, complimented by an atmospheric sound design. Besides the RPG elements of survival-horror and stealth, the game garnered attention for its morality-based plot.

Set in 1960, the game follows Jack in a plane that crash-lands at the entrance of an underwater idyllic utopian city: Rapture. Just as he enters, he immediately stumbles upon what seems to be a city in ruins filled with lurking and murderous Splicers: Rapture's citizens addicted to a viscous healing and stem cell-producing liquid called ADAM that, upon withdrawal, deteriorates the mind. About to be attacked, Jack is guided by Atlas, a presumed survivor, through a service radio. Atlas asks Jack to avenge his wife and child that were killed by the city's founder, Andrew Ryan. The latter believes Jack was sent to detain him and so he does everything in his power to create the deadliest of traps within the city.

Inspired by George Orwell's novel *Nineteen Eighty-Four*, the video game was received with tremendous reviews and awards such as BAFTA⁴⁶'s 2007 "Video Game of the Year", Best Original Soundtrack", "Best Writing/Story", and "Best Art Direction".

Jack: The Character

Jack Wynand, the player character, has no recollection whatsoever of what has transpired before the plane crash or what even caused the accident itself. The character is fearless and brave and seems initially morally-driven, but after being confronted with the possibility of killing small girls known as Little Sisters, the character's morality shifts according to the player's choices, as he can either harvest the ADAM brewing inside them (which would kill them) or use a special plasmid⁴⁷ to destroy the ADAM-creating vessel inside them (thus saving their lives). Later on, Jack is revealed to have been manipulated by rivals Andrew Ryan and Atlas, the latter's identity turning out to be that of the presumably dead Frank Fontaine. The manipulation control of Jack's mind is triggered by the use of the sentence "Would you kindly (...)" before a suggestion. Jack is also revealed to be the illegitimate child of Andrew Ryan, who was also

⁴⁵ For more information on the game and its characters, refer to the source of this research:

<http://bioshock.wikia.com/wiki/BioShock>

⁴⁶ The British Academy of Film and Television Arts award show

⁴⁷ "Plasmids are special serums made from processed ADAM that introduce modified stem cells into the body, allowing for genetic modification and mutation, giving the user what some might call 'super powers'" (Fandom, s.d.).

born in Rapture. By using power-inducing Plasmid substances, as suggested by Atlas, Jack acquires “super powers” aiming to defeat Andrew Ryan and escape.

Visually, not much is known about the main character, because – apart from a single faded photo – the character’s, and consequently, the player’s point of view, both in gameplay and most cinematic cutscenes, is in first-person style with only his arms in the player’s field of vision. From the photo, one can assume that Jack is the generic good-looking, muscled male close to the Action Genre Hero Guy type.

The Sound Design: Listen, “Would You Kindly”

Before moving on to the character’s soundprint, it is important to have an idea of the game’s overall sound design. A light and slightly electric hum permeates the whole game, occasionally detailed with the sounds of machines crackling, electric light defaulting and propulsion-working doors opening and closing, hinting at the enemies lurking around. Sometimes, some locations have fire crepitating and the quiet trickling and flow of water running. The attention to an organic acoustic ecology is evidenced by the reverberation from the metallic and iron-based construction. This eerie atmosphere is at times punctuated and enhanced by 40’s and 50’s style American and French licensed music, seemingly played by radio and phonograph⁴⁸. The Original Soundtrack of *BioShock*, by Garry Schyman, is almost positively unnoticeable, as it blends with the atmosphere and flows nicely with the licensed music. The score is eerie, distressing with the constant use of strings, atonal and dissonant harmonies and with a wavering sensation.

The soundscapes also include the presence of enemies, such as Splicers, Little Sisters and their Big Daddy companions with their own soundprints that will be addressed further.

Throughout the game, as the player character collects health tonics to replenish his health, money, food and other collectible elements, achievement sounds are played as an auditory feedback to the acquisitions (Alves & Roque, 2012a). When the character encounters elements (objects, characters, events, etc.) that have relevance to the story, these sounds play a different role in the game: they are *revelation sounds*, as Valter Alves and Licínio Roque suggest we should call them. (Alves & Roque, 2012c).

One of the major sound-deploying collectible items is the audio diary through which, while proceeding with playing the game, the gamer can listen to Rapture’s citizens’ accounts before its collapse. The audio logs include contextual details on how life was like in the

⁴⁸For the full list of the licensed music, refer to <https://majornelson.com/2007/10/11/bioshock-music-list/>

underground city and personal accounts that are relevant to the understanding of the story's development.

The NPCs' Soundprints Season the Game

BioShock's NPCs' soundprints are one of its most recognizable traits for their uniquely ominous presence in the storyline. The NPCs' soundprints are essential to the game, since the player has to actually be attentive in order to respond to their attacks or presence. The tables below systematize the elements that make up each soundprint.

Splicers

Character type	NPC – enemy
Personality	Insane, erratic, unpredictable
Voice	Female: mostly shrill, loud, babbling and maniacal laughter Male: mostly frantic and muttering
Grunt	Both male and female splicers grunt and wail when attacked and hurt
Foley	Footsteps depending on the flooring
Weapon	The weapons vary with the type of splicer, but they mostly use cutting-type of weapons, such as knives and firearms
Popular sound	Splicers are usually most recognizable by their distant babbling and jeering
Soundprint Type	Minion Pack

Table 4 Soundprint: Splicers (*BioShock*)

The splicers are the most common enemy. Not only is their distraught babbling and maniacal laughter an indication of their presence and location, but they also supply the game's uncanny atmosphere with diverse soundscapes, in which the player's tension and nervousness is constantly stimulated.

Little Sisters

Character type	Enemy Little Sisters	Harmless Little Sisters
Personality	Mischievous, creepy, chatter	Innocent, helpful, kind
Voice	Child-like female voice doubled by a low-pitched male voice	Sweet, child-like female and quiet voice
Grunt	When struggling and when hurt	When struggling and when hurt
Weapon	Big syringe	None
Music	None	Slight musical cue that hints to a salvation feeling when they are rescued by Jack
Popular sound	“Mr. Bubbles!”	“Thank you, mister.”
Soundprint Type	Starter Kit + speech	

Table 5 Soundprint: Little Sisters (*BioShock*)

There are two types of little sisters: the ADAM-induced ones and the ones rescued by Jack (if the player opts to do so).

The Enemy Little Sisters are the chattery type, always with a mischievous lilt to their voice. In addition to the child-like female voice, an underlying male voice doubles the Little Sister’s speech, which grants the child a ghoulish, ominous sensation. The character’s most identifiable sound is her speech, when addressing her protector, Big Daddy. An enemy Little Sister often addresses the Big Daddy affectionately as “Mr. Bubbles” and even though she does not directly attack the player, she encourages her companion to do so.

The Little Sister, after being rescued by Jack, becomes a normal little girl; her tone is no longer mischievous, but instead soft and kind. When turned back to a normal little girl, the character is surrounded by a musical cue that suggests rescue, salvation and hope through the use of a major scale mode, an orchestral ensemble and a slowly, increasingly high-pitched flourish. The character also has a discernible expression for she thereon after addresses the player sweetly as “Mister”.

Big Daddies

Character Type	NPC enemy
Personality	Protective, rage-induced, zombie-like
Voice	No speaking voice Long, somewhat pained wailing
Grunts	When attacked and hurt
Foley	Loud, rusty-sounding and slightly hollow footsteps
Weapon	Carries a drill that makes a sound that pierces the air when used
Popular sound	Footsteps and wailing
Soundprint Type	Monster Pack + Weapon

Table 6 Soundprint: Big Daddies (BioShock)

The Big Daddy is, by far, the most popular *BioShock* character – so much that it is the player character in *BioShock 2*. Cladded in metal and a steampunk diving suit, the Big Daddy’s size is emphasized by heavy, metallic, rusty and loud footsteps, which the player can immediately recognize at a distance. Besides the forewarning footsteps, the deep monstrous growls and wails of the character are also distressing and frightening, particularly when fighting with the player. The distress is also increased by the piercing sound of the drill embedded in Big Daddy’s arm. Much like the Splicer enemy, the Big Daddy’s soundprint is an indicator of its presence and location, the difference being that the player is allowed to choose whether or not he/she wishes to engage in combat with the former, since the Big Daddy only attacks if it senses that itself or the Little Sister are in peril.

The Player Character: Jack Wynand

Character type		Player Character	
		Silent Protagonist	
Voice		Non-Speaking	
Grunts		When physically distressed	
Foley		Boot-heavy footsteps	
		Slight rustle of clothes	
Weapons	Plasmids	Cyclone Trap	Low, windy hum when released
		Electro Bolt	Electric crackle (electric hum when selected)
		Enrage	Slight whoosh throw
		Hypnotize Big Daddy	Timer ticking increased when time-limit is up
		Incinerate!	Deep burn and crackle. Slight hum when launched
		Insect Swarm	Swarm of bees buzzing
		Security Bullseye	Small throw
		Sonic Boom	No discernible sound
		Target Dummy	No discernible sound
		Telekinesis	Punctuated small pulling-like whoosh
		Winter Blast	Freezing sounds and slight glass-shattering sounds
		Firearms	Loud, heavy. Identical audio to weapons used by NPCs: not exclusive to the character
Popular sound		Electric hum of electro bolt	
Soundprint Type		Action Pack	

Table 7 Soundprint: Jack Wynand

As mentioned above, the player character is a silent protagonist. The only time the player ever hears Jack's voice is when he utters three small sentences on the plane, before the crash. His voice is deep, with an intonation that a typical Action Genre Hero Guy would have, a generic male protagonist trope. Other than that first scene, we never see the character speak ever again, though, as expected, there are grunts. Whenever the character is hurt, is startled, struggles or is straining physically, the character grunts, giving the player an immediate feedback on the character's condition.

Foley-wise, the most noticeable sounds are Jack's heavy footsteps seemingly made of a heavier boot-like material. As the tradition goes, they change according to the surface. In terms of clothes, the footsteps are accompanied by a very discreet rustling sound, probably recorded at

the same time as the footsteps so as to keep the latter organic, but realistic. This sort of auditory information acts as a feedback to the character's location and aids in the imaginative visual representation the player might have from the character.

Throughout the game, Jack's weapon arsenal increases as he collects weapons and injects in his blood stream the power-inducing liquids. In the firearm group, bullets are generally loud, with heaviness varying from firearm to firearm. Though he does use weapons, since other NPCs are allowed to use the same or similar weapons, it will not be considered as a part of the character's soundprint, as it does not pertain uniquely to it.

Jack acquires powers, most of which are elemental, thus having a matching sound, such as the burning and crackling sound of the enemy's bodies when attacked by "Incinerate!". The sound that one most remembers – though there is not really one that particularly stands out –, is the slight hum of electricity that is triggered whenever the character changes his weapon to the "Electro Bolt" power, offering a sonic response to the visual representation of the power's activation as electricity courses through Jack's hand.

The sound that is common to all weapons is a very present heaviness, which contributes to a deadly and overwhelming (in the good sense of the word) gaming experience. This type of piercing loudness gives combat scenes intensity and perhaps even frustration, guaranteeing that the player is always on alert, having to be particularly attentive to other off-screen incoming enemies as well.

All in all, the player character-related sounds provide the player with the opportunity of filling-in the blanks, as his/her imagination is constantly active in the processing of the auditory information. This sort of partial identity allows the player to identify and feel in the character's skin, while simultaneously conveying enough information to empower the gamer as an actual character that bravely beats adversity in spite of the circumstances.

An Event Under Analysis

When an ally undoes some of the mind control implanted on Jack's mind, Frank Fontaine uses a back-up command by uttering the key "Code Yellow". With this command, Jack's brain is told to stop his heart from beating, progressively diminishing the player's life gauge. When affected by the command, the player quite literally sees red and the character heaves, struggling to overcome the pain.

As the player starts the journey to save the character from the mind control by searching for a cure, a hopeful, yet melancholic orchestral piece starts playing. Even though the song could be used for a moment of reflection, the player has no time to do so because his/her time is limited, so while the melody is playing the brutal shouting of the Splicers, firearms going off

and wails of death and violence disrupt the pleasant tune for the first part of the path. In the meantime, the music stops, returning to the regular eerie soundscape. This is no indication to stop, though. Every once in a while, the player is hit with a health decrease due to the imputed mind control. The sound of the character's heart pounding in the player's ears informs that, for the player to survive, the player must never stop fighting his/her way through the many deadly enemies.

This "Code Yellow" section of the game creates in the player a sense of urgency by bothering and interrupting his/her concentration through the sporadic strain of the character's heart. The unearthly ambience is filled with more Splicer voices, particularly with spooky distant whistling and the too-close-for-comfort peaceful humming of a random tune.

The *BioShock* Franchise

The *BioShock* series has two other releases. In *BioShock 2* (2010), the story focuses on a Big Daddy in Rapture. The identifiable sounds are still there as Splicers lurk around and classic tunes play every once in a while. The Little Sister's voices maintain the same texture and the Big Daddy, though still wailing, has a further developed visual and sonic identity. The sequel is thus faithful to the sound design⁴⁹.

BioShock Infinite (2013) portrays a different storyline, but the themes, gameplay and sound design aesthetics are maintained. Instead of being set underwater, it is set in Columbia, a city in the clouds. Though the same type of sound is maintained in Booker DeWitt's – the player character – supernatural powers (this time called "Vigors"), the main difference is that the character does actually speak both in cutscenes and gameplay and his voice is close to the player's ears, contributing to the sensation that the player is in the latter's skin. Throughout all three games, the most common sound feature is certainly the use of audio diaries as a story-advancing and detailing informational mechanism.

The *BioShock* series is popular mainly due to its beautiful animation style and intricate storylines that deal with breaking the characters (the player character and some of the NPCs) out of their shackles, while also having the player question his/her morality. The sound is as equally praised as the aesthetics, with realistic but always eerie and suspenseful acoustic ecologies.

⁴⁹ <http://www.bioshock2game.com/>

5.1.2. *Metal Gear Solid 4: Guns of the Patriots* (2008): A Snake in a Box

*Metal Gear Solid 4: Guns of the Patriots*⁵⁰ is a third-person action and stealth game published by Konami Computer Entertainment Japan in 2008 and directed by Hideo Kojima and Shuyo Murata for PlayStation 3. The sixth installment of the acclaimed *Metal Gear* series, as it usually is Kojima's style of storytelling, has hours of cutscenes⁵¹ and a complex webbed narrative.

The storyline is extremely long to be explained briefly, so only the main plot of MGS4⁵² will be addressed. *Guns of the Patriots* follows the main and player character, Solid Snake, who finds himself aging aggravatingly fast, consequently having only one year left to live. While still trying to figure out what is happening to his body, Snake, as his final mission, has been asked to terminate Liquid Ocelot, a long-time enemy set on world domination.

The game is considered a masterpiece, both by the gaming community and the most relevant gaming publications, having often received perfect or almost-perfect scores. Besides winning multiple "Game of the Year" awards, *MGS4* also won awards for the "Best Story", "Best Audiovisual Experience" and "Best Original Score".

This particular instalment of *Metal Gear* was chosen for study mainly because it is very difficult to recognize in it a specific soundprint. The soundprints are in fact not very fantastic and supernatural, but rather organic in the characterization. The analysis goes to show that a soundprint does not have to be a caricature-like sound like Mario's jumpy sound; what is really important is that it is complementary to the character's aura and that it provides the player with an immersive experience.

Solid Snake: The Player Character

As opposed to *BioShock*'s Jack, Solid Snake – also referred to Old Snake because of his aging appearance in this game – has an immense and complex backstory that the player must indeed understand in order to be able to keep up with the storyline. Snake is a war hero that was created as a clone with purposefully altered genetics, who has his body aging at an abnormal and accelerated rate. The character is as capable of being deadly serious and ruthless as much as he is snarky. He is calm and seemingly fearless, but actually compassionate and self-sacrificing.

The character wears green camouflage-like military clothes with the now iconic green headband that covers his forehead. Often seen with a cigarette in hand, he also wears an eye

⁵⁰ For more information on the game and its characters, refer to the source of this research:

http://metalgear.wikia.com/wiki/Metal_Gear_Solid_4%3A_Guns_of_the_Patriots

⁵¹ The game has even been awarded the longest cutscene in a video game by *Guinness World Records Gamers Edition 2011* because of its 27 minutes runtime. It was also awarded the longest cutscene sequence for 71 minutes of cinematic in the game's epilogue. (See:

<http://web.archive.org/web/20130616204427/http://www.guinnessworldrecords.com/records-5000/longest-cutscene-in-a-video-game>)

⁵² Acronym for *Metal Gear Solid 4*

patch on his left eye called Solid Eye, a gear that he often uses with a binocular-sort of effect. His features are strong, though his old age is noticeable in the lines of his face, hands and greying hair. In spite of his deteriorating body, he still remains physically apt and intelligent.

Again, the tables below systematize the elements that make up each soundprint.

The Sound Design: Listen, “You’re Pretty Good”

As opposed to *BioShock*, *MGS4* is not much limited in terms of space (one of the games being exclusively in an underwater city). Amounting to about 11 hours of gaming experience, *MGS4* has an open-world setting in which the player has the opportunity to visit numerous locations both indoors and outdoors. Though the settings are different, there is a consistency in the sound design style. Maintaining throughout the game a realistic approach to war scenarios, sound is more broadly focused on a war zone aesthetic as the player can discern weapons, explosions and general conflict in the background. Some disparate details such as the slight buzzing of flies, roosters and machinery pepper the soundscapes. During the more regular warzone scenes, most of the time music is not heard, but whenever a mission is relevant to the story, tension through music is added.

Indoor locations usually match the structure; regarding ambience sound, a slight hum is heard for most of the time, sometimes shattered by conversations and the sound of machinery working at the background.

Music is suspenseful, frequently using world-music percussion, strings, clean electric guitar and highly reverberating electric guitar. It is mostly used to enhance an impactful scene, specifically in cutscenes.

The game’s user interface sound comes from the same beeping family of sounds. When a digital interface is shown, or the user pops out the menu, beeping sounds are deployed with the opening, closing, selecting and navigating functions through the interface. Revelation sounds are not as noticeable as in the previous games. When there is a reveal, the soundtrack is usually triggered and continues throughout the event. However, not many achievement sounds are deployed, as the creator seems to want to maintain a more realistic atmosphere.

Whenever Snake pauses to speak to his allies, even as they are speaking through radio frequencies, the others’ voices sound clean and do not seem to be filtered, as opposed to when the player character is actually moving around.

Character Soundprint: The NPCs' Soundprints Pep Up the Game

Soundprint Gekko

Character Type	Enemy NPC
Personality	None
Voice	None
Grunts	Occasional long, slow animalistic growls and grunts When hit
Foley	Mechanical movement and heavy footsteps
Weapon	Legs, foot stomps, cannons
Popular sound	Wailing
Soundprint Type	Monster Pack

Table 8 Soundprint: Gekko (*Metal Gear Solid 4*)

The Gekko is a popular enemy NPC. Its heavy footsteps reflect its towering height and machine-like body. While walking, the enemy voices long and slow wails, very similar to those of an animal. In a video on the sound studios used for the *Metal Gear Solid V: The Phantom Pain* (2015), foley artist Akihiro Teruta explains that the sound was made by combining recordings of a cow's moo and moaning slightly into a cardboard tube to improve the variety of sounds⁵³.

Laughing Octopus

Character Type	Enemy NPC
Personality	Angry, hysterical, taunting
Voice	Predominantly female voice, overlaid by male monster-like voices Constant laughter and howling
Grunts	When hurt
Foley	Wet and slightly mechanical sounds of the suit
Weapon	Tentacles
Popular sound	Laughter; "Rage!"; "Laugh!"; "Snake!"
Soundprint Type	Cartoon Pack

Table 9 Soundprint: Laughing Octopus (*BioShock*)

The Laughing Octopus is easily recognized by her maniacal laughter. Wet and organic sounds come from her tentacles and other movements. In confrontation, the character taunts Snake

⁵³ For the video, visit <https://www.youtube.com/watch?v=1i6hXG4wJvo&t=584s>

while screeching mainly his name, and her voice comes from disparate locations while hiding. The voice is predominantly female, but it is accompanied by several textured male voices, supplying her with a supernatural and monstrous nature.

Soldiers and Guards

Character Type	Enemy NPC
Personality	Vigilant, unintelligent, trigger-happy
Voice	Generally male voices: comments and chatters about. Shouts when spotting the player character
Grunts	When hurt
Foley	Footsteps and firearms
Weapon	Firearms
Popular sound	Alert sound when spotting a moving cardboard box
Soundprint Type	Minion Pack

Table 10 Soundprint: Soldiers and Guards

Soldiers and guards are the most common enemies. Their sounds are simple and generic: boot-clad footsteps, air-piercing bullets and overall generic shouting and grunting when engaging in battle; the ones that certainly need to be addressed are those tasked with being on the lookout who get startled when witnessing a moving cardboard box.

A *Metal Gear* game would never in fact be complete without the player character's favourite stealth hiding spot: a large cardboard box. Even with the increasing realism of the game, the absurd fan-favorite cover is now an endearing feature to look forward to in every game. By walking around and crouching under the cardboard box, the player character stays out of the enemy soldiers' and guards' sight, knowing however that, in case it is too noticeable, the enemy NPCs will be startled and engage in combat. This is where sound comes in. When caught, a red, cartoon-ish exclamation point hovers over the NPC's head and an alert FM-synthesized⁵⁴ sort of sound is triggered. This sound is so popular that even nowadays some gamers use it as a notification sound on their smartphones.

⁵⁴ Frequency Modulation Synthesis uses the frequency of one wave to modulate another, therefore increasing or decreasing the latter's pitch (Rise, s.d.).

The Player Character: Old Snake

Character Type	Protagonist
Personality	Calm, collected, rational
Voice	Deep and slightly roughened by old age
Grunts	In stealth mode: very rarely when hurt In 1-on-1 mode: When attacking, evading and when hurt
Foley	Sharp footsteps Almost undetectable rubbing on clothes When crawling: clothes rustling and gear rubbing on the floor
Weapon	Firearms and knives. Identical audio to weapons used by NPCs: not exclusive to the character
Popular sound	None

Table 11 Soundprint: Old Snake (*Metal Gear Solid 4*)

The player character, this time, is acknowledged as the protagonist only because he is at the centre of the game and he does, indeed, speak and have a solid identity and backstory. Snake’s voice matches with the trope of an experienced, well-built male soldier with a tragic past: it is rough and deep. The difference between Snake and other characters such as himself is the fact that the others tend to be young, while *Old Snake* is (albeit handsome), well, old. Presumably because of the stealth component of the gameplay, when in open-world mode, the character does not actually grunt a lot when exerting physical strength (such as throwing himself on the ground and climbing), only grunting slightly when hit. In contrast, when the player finds himself on a 1-on-1 type of fight (such as the final battle with Liquid Ocelot), Snake does actually grunt a lot when attacking, when being hit, and even when evading attacks. This is also unusual, since fighting games do not typically use grunts when the character is evading.

The sharp and slightly loud footsteps the character takes are also a bit different because – in comparison to other mainstream games – they are usually a bit quieter than that. However, the footsteps do fit in the atmosphere quite nicely and, as is common practice, vary in texture and pitch, depending on the ground the character is stepping on. A slight rustling of clothes is also present, hinting at the material of the muscle suit that Snake is wearing. This sound is enhanced when the player has Snake crawl on the floor: clothes rustle and even what it sounds to be the friction of gear on the surface can be heard.

Snake shoots only with firearms, which are used by the majority of the characters. Since it is not a weapon unique to the character, it is not considered a soundprint.

The player-character relationship is, in this case, different from *BioShock*’s. While in the latter the player can fill in the characteristic purposefully left blank, *Metal Gear Solid*’s case is disparate. This is where the Indiana Jones example applies. As a brave, ruthless, talented,

intelligent and honour-led character, Snake becomes something that the player admires and wishes to be like (this sort of identification works particularly well with the male demographic). The story development is extremely important for engrossing the player but the immersion is not complete until the sound comes around. The actions that the player chooses for the character are immediately mirrored by a sonic feedback. As mentioned in the section of the thesis devoted to *Immersion*, the most immersion-enabling type of representation is mimetic realism. By doing so, the player associates the experience to real-life sound events. This informs the player that he himself is controlling the character, that he himself is influencing the surrounding world and, thus, that he himself is, in that world, Solid Snake. Through exaggeration (abstract realism), the experience becomes even more enthralling.

An Event Under Analysis: The Microwave Corridor

In order to stall an enemy, Old Snake has to cross a hallway filled with microwaves frequencies that have physically excruciating effects on the body⁵⁵. Battling through intense pain, Snake crosses the corridor, accompanied by Metal Gear MK. III, a small robot through which Otacon, friend and science engineer, can communicate.

This scene might just be one of the most daunting and anxiety-filled experiences in the game. It is simultaneously a cutscene and gameplay, as the player watches, on the upper half of the screen, scenes with the people close to him, intertwined with scenes of his companions being attacked, while at the same time having to push Snake through the corridor. “Push” is a quite fitting word considering that the player has to incessantly push just one button on the control in order to keep the player character moving.

The sound design of this particular scene is evidence of just how necessary and influential sound is in a game, with respect to emotion and immersion. Immediately after entering the hallway, a version of the Original Soundtrack’s *Love Theme*⁵⁶ starts playing. The song is painfully sung in Hebrew and uses only stringed instruments, such as violins and acoustic guitar. With a slow tempo, it is composed in a minor mode and the notes of the solo violin are as important as the harsh articulation of the bow over the strings. This theme provides the slow-motion cinematic imagery with the adequate emotion of melancholy and pain. The soundscape is simple, quiet, with a slight hum and the sound of regular punctuating beeping sounds.

⁵⁵ For the scene, see the following walkthrough: <https://www.youtube.com/watch?v=mdjLBYxAcUI>

⁵⁶ The song, released in the game’s soundtrack in 2008, was orchestrated by Nobuko Toda; the lyrics were written by Hideo Kojima himself.

In terms of soundprint, Snake's footsteps are heavy with their strained impact over the metallic-sounding floor, and as he drags himself through the floor, the rustling of his suit is rubber-like and a little grotesque, since the gear is deteriorating with the waves. Snake painfully grunts, groans and his breathing is heavy and over-exerted, while Otacon begs him not to give up. Nonetheless, all these previous sounds are easily overpowered by the sound of his heart pounding.

The Microwave Corridor scene is loud and stripped back, focusing only a few sets of sounds to create an abstract emotional scene. While the player incessantly and quickly pushes a single button on the control, physical strain starts to make its way along the player's arm, hand and finger muscles in an attempt to also convey a sensation of struggle in both the player and the player character. By fighting together with the character, when the latter finally reaches the end of the corridor – with a deteriorated body, but safe – a sense of relief overflows both of them. Though as one would expect Kojima to do so, the player, as much as Snake himself, is not allowed to rest for he/she has to carry on with the game.

The *Metal Gear* Franchise

Since the first instalment of the *Metal Gear* series in 1987 Hideo Kojima's vision is evident in every single one of the releases. Since there are many instalments of the series, only the first *Metal Gear Solid* (1998)⁵⁷, and the most recent one: *Metal Gear Solid V: The Phantom Pain* (2015) will be looked into.

Metal Gear Solid, released in 1998 is, right off the bat, evidently a Metal Gear game. Snake's voice texture is as low and gruff as the other Snakes that would eventually follow⁵⁸, being immediately recognisable as the soldier's. Snake's preferred method of communication with his allies that carries the same basic structure that the future games present: a green-ish screen with the static or moving image of those speaking with familiarly-sounding beeping sounds. The iconic alerting sound previously mentioned is almost seemingly unaltered when used in later titles (though he does not have to necessarily be inside a cardboard box to surprise them). The music style of choice is also familiar due to the action-oriented orchestrations and the uncanny melancholic female-sung songs.

On the other hand, *Metal Gear Solid V: The Phantom Pain* is the most recent one, having been highly praised by its stripped-down sound design. As a fully open-world style of game, the player character Venom Snake can travel across numerous locations like an operations base

⁵⁸ Throughout the series, there are many characters with the codename "Snake", such as "Naked Snake", "Solid Snake", "Liquid Snake" and "Punished Venom Snake".

in the middle of the ocean or a desert, which helps diversify the sound design. If one compares the game's musical choices side-to-side with *Metal Gear*, the soundtrack will seem one and the same for its daunting orchestrations and preference for a wistful female voice. However, the communication method used in the previous games is now almost exclusively reduced to just sound coming from the character's earpiece during the gameplay. As it is now a tradition, the cardboard box (though without the alert sound) is still present with more stealth options incorporated. You can even hear the soldiers commenting on the unusualness of a cardboard box moving by itself.

5.2. Conclusion

BioShock and *MGS4* offer a wide variety of characters, evince an array of approaches to the construction of soundprints, and significantly invest in a riveting narrative that delivers an immersive experience. These are, however, the main features the games have in common, as the strategies their designers have resorted to for the construction of the games could hardly be more different. In true fact, if, on the one hand, *BioShock* relies on a sense of urgency to engage the player, demanding quick action-sort of responses from him, *MGS4*, on the other hand, being a stealth-based game, does the exact opposite by asking the player to be patient and cautious. These options are reflected on the character's sound design and the games' overall sonic approach.

With a horror-like setting, *BioShock* relies heavily on the NPC's easily recognizable soundprints to startle the player into the *fight or flight* mode. This implies that the players have to opt to escape or choose which weapons to use, depending on which NPCs they are going to have to face. The sonic cues thus provide them with at least (even if just a small) margin to decide. As to Jack – the player character –, the fact that he is a silent protagonist ensures that the player is not overwhelmed and confused by excessive amounts of information coming from the ambiance, NPCs and firearms, all of which are often topped by voices from the audio diaries collected throughout the game. The first-person perspective furthers the immersion by only letting the player see Jack's arms. This intention can be confirmed as every cutscene, throughout the game, is also seen in the first-person mode, a point-of-view which never suffers any changes. Hence, Jack's unique powers, matched with unique sounds are more often than not the player's, rather than the character's.

Metal Gear Solid 4's more easily identifiable soundprints are those of the more surreal characters, such as the above-mentioned Gekkos, and the Laughing Octopus (the name of the latter does imply a sort of audio counterpart). The remaining NPCs' soundprints, such as the

soldiers' and the guards', basically use the soundprint "starter kit" as information for their position, but they are not, in most cases, extremely necessary for the players' decisions, as the stealth style of the game often provides room to visually observe the player character's surroundings. Nevertheless, these soundprints do provide, as expected, contextual information on the locations' soundscape. The player character is an Indiana Jones type. The player recognizes Snake as a separate identity with its own story but wants to feel how it is to be brave and fearless. Snake's soundprints are, once again, providers of how the player is actually the one to set the narrative's course. Snake's voice and radio communications with his companions also fill the gaps left by the already dense cutscenes, and through the other NPC's voices the player can create an extension of their identity by assuming gender, emotional state, and personality.

Although both games rely on a blander soundprint for their player characters, letting the other NPC's more unique soundprints fill and enrich the game world, they do it differently, in terms of sound. *BioShock* relies on sound as a gameplay component as it is often used to directly influence and prompt the player to respond accordingly with his/her own judgement. MGS4, on the contrary, often uses sound more to convey an emotional and physical state (the character's health), as the Microwave Hall illustrates, where the music, the crawling, and the heartbeat create an emotional atmosphere and an almost physically distressing situation, pairing it with the physical exertion of having to quickly press the same button.

What was rendered evident by the research was that it would be impossible to analyse the characters of both games without also taking into consideration the mechanics, the narrative and the sonic context that set the basis for the character's identity and development. It is very clear that the sound designer paid careful attention to every single aspect of the game, being aware that it is critical to create a sonic identity for the character, as it, in the end, stands for the game itself.

By centring the game on the player character, all these components become intricate. When referring to a game, a player will immediately think of the main character as the game itself, for it is through the character's eyes that the player moves forward, changes the narrative and influences the game world. Because the player feels that he/she does have a choice (for, all in all, the player does what he/she wants within the rules and permissions of the games), he/she believes the character's activity to be his/her own, an assumption which is validated and confirmed through the sonic response to the actions.

6. Conclusion: Wrapping up & Levelling Up

6.1. Wrapping Up

The experience provided by video games is unlike any other, mostly due to the interactive storytelling mechanisms that film does not possess. With the use of adaptive audio, the game world reacts naturally to the player's actions and is populated by a multitude of different characters with disparate gameplay purposes.

The research led to a path with many intersections but it was possible to answer the questions formulated at the onset of the research and reach some relevant conclusions. The most important finding was the confirmation of the working hypothesis that it is possible to identify a few acoustic identities of certain characters. The Soundprint Types table (cf. Table 2) which resulted from the direct observation of thirty games became an important analysis tool and is presented in the hope that it may be productively used by other researchers in the future.

However, the research also evinced that, much like the influence of musical structures in human emotion, nothing is ever black or white. Different visual, programming, storytelling and sonic combinations do actually make up very different representations and support different narratives, even if they share the same type. Many character's soundprints spill over the outlines of the many appointed categories due to added elements that enrich the dimension of the story or make the experience more unique and fun.

The game genre with the most standardizable soundprints and better immersive success ends up being the horror/survival game. Players play with the intention of experiencing fear, or challenging the game out of pride and skepticism, so they already have the right mindset. The player character is usually a Silent Protagonist with an Action Pack soundprint; the enemy is usually a growling beast, humanoid or a variation of a zombie-like mindless civilian; and the atmosphere is either too quiet or too loud.

While it is easier to find common formulas in the horror/survival genre, the case with the fantastical, abstract and out of the box games is far more complex, as there are no particularly limits imposed on them. These games do not have to be particularly scary, they do not have to keep the player either on a fear and adrenaline high or an eerie and tense quietness. Instead, they are free to take any direction they want to and the artists responsible for sound have the option to be creative, inventive, and to break away from standardized tropes – and this, of course, makes the search for patterns all the more difficult.

The research carried out for this dissertation has obviously not exhausted all the possibilities of addressing the problem. With one step forward, the answers take a leap back by

unveiling a web of elements and phenomena yet to be understood. For better results, the search for a character's soundprint would have to go around every variable possible. Regarding games, an analysis of soundprint creation for different styles (cartoon, realistic, surrealist, minimalist, etc.), narratives (linear, non-linear, etc.) dimensions (16-bit, 2-D, 3-D etc.), genres (horror, juvenile, adventure, violence, etc.), points-of-view (FPS, 3PS, overhead, etc.), and many other elements likely to have an effect on the game enjoyment is still to be done. As to characters – particularly player characters – a study of the different levels of independent personality and their impact on player identification is also much needed.

Meanwhile, besides all the attention that needs to be paid to games and characters, the contact with a larger and more diversified gaming community – from the gamers themselves to the game audio designers, the game music composers, the game designers, and others – would certainly provide interesting research findings.

All in all, this is still a very new focus of research that depends heavily on diverse fields of study that complete and clash with each other: game audio branched out to sound, music and sonic perception; the video game branched out to film and narrative; and finally the player branched out to psychoacoustics, emotion and immersion. And there is, of course, 3-D audio, which comes as an important asset for immersion in Virtual Reality games.

6.2. Levelling Up

The research undertaken was limited in time (one year) and in scope: the literature review, the games under analysis, all the research tools and strategies (online survey, interviews) were meant to confirm the working hypothesis that it is possible to identify common patterns in the sonic identity of video game characters and its influence on the player's identity. Besides the research gaps mentioned in the section above that need to be tackled, the cases of Virtual Reality and 3-D audio are still to be considered when the issue at hand is immersion, emotion and identity.

Virtual Reality gaming is seen by many as a novelty but it has, in point of fact, already been within the technological and gaming world's grasp for decades. In virtual reality video games, the player wears a headgear or visor to fill his/her field of vision (with a remote or gloves in hand) and is placed within a 3-D, 360-degree domain in which he/she can navigate and interact with.

Today's younger generations seem to be constantly in search of technological novelties, of new immersive experiences in a dynamic medium. In these experiences, the synthetic environment becomes quite literally the only reality in sight – i.e., a virtual reality (Shilling & 68

Shinn-Cunningham, 2002). The suspension of disbelief offered to the player is only complete when his/her senses are stimulated, and especially when sight and hearing are combined. The merge of these senses is indeed crucial as, by completing one another, they provide the player with a thoroughgoing experience.

The excitement about VR was first triggered by the announcement, back in 2012, of the Oculus Rift visor, which would eventually be released four years later. However, it was only with the launching of the PlayStation VR headgear for the PS4 that the popularity of the concept really skyrocketed. The product was released by Sony with a pledge to “[r]edefine [the players’] expectations of immersion in gaming (...)” (Sony Interactive Entertainment LLC, 2016), a commitment undoubtedly fulfilled by the 3-D audio, and the 7.1 virtual surround wireless headphones.

VR takes in fact the game experience to a whole new level: wearing headphones and goggles, the player’s vision becomes limited to the visual spectrum of the game world, which acquires, even though for the duration of the game, the status of reality. Especially in the case of a first-person experience, the world revolves around the character – i.e., the player, who feels he/she is in someone else’s skin on a three-dimensional plane. It is here that sound becomes important. As Kay Stanney notes in the *Handbook of Virtual Environments: Design, Implementation, and Applications*, virtual environments need to engage the user emotionally through a balance of realistically familiar sound and sound effects.

Though immersion is possible with stereo sound, the experience is only truly complete when the centre of the sound design is the player, when the character’s ears become the players’ ears, when character and player overlap, squirming on the seat or walking around the room. But for it to work, as Durand Begault has remarked on his study on the use of 3-D sound, the player must use headphones. If he/she listens through speakers, the sound quality will be affected, among other factors, by the acoustic conditions of the room – and in such a case, the situation escapes the control of the sound designer. If, on the contrary, he/she wears headphones, the information will be transmitted correctly (Begault, 2000). 3-D sound is virtual reality’s most trusted companion, as it “unmutes” the game’s 360° environment. Sound can provide information, and run many events through the player without overwhelming the senses. When the source is offscreen, the player actually searches for it, with the placements of both visual and sonic elements remaining in the properly intended locations, even while the player changes his/her position.

Virtual Reality still has plenty of downsides, such as motion sickness and lack of space to move in. For it to work, the player must get engaged with a close-to-reality world, a situation very different from what happens in normal video games, which do not forcibly require the

entire player's attention. Audience interaction with the players is also different in VR games, as players and audience are seeing different things. For the audience, the entertainment might not exactly be the game, but the reaction of the players to it.

A bigger investment in 3-D audio and Virtual Reality for the sake of gaming immersion is the next logic step, though the possibility of the novelty of VR gaming wearing off is a very realistic threat (Hawkins, 1995).

6.3. To Be, or to Spectate

Why do we always start our children's stories with "Once upon a time..."? We want to provide them with context, with a setting believable enough for the world in which the story unfolds. It is so that the action, the magic and the characters seem real. It is also how we say that that world is similar to ours, but that it is not the same: it is not mundane, repetitive or dull.

Sound design for narrative is like beginning the story with "Once upon a time...", without actually having to say it, and just as we keep the plot twists and knots for the good part, sound feeds the player, little by little, with new details that enrich the tale. Now add audio to the visual and the interactive and you have your adventure. As sound is always representative of a source, it can be representative of personality and character, providing the listener with enough pattern-like conditions to link to an identity.

Though there are stereotypical ways and tropes to represent the emotional state of a character, they will only ever truly work as a guideline: because nothing is black and white. It is a grey scale of senses, experience and storytelling, so much so that the character is not identifiable just because of its looks or sounds, but also due to its environment, due to the actions it takes with and within it. In this dissertation, it was practically impossible to talk about the character alone without addressing its context, its virtual world, its "Once upon a time...". Therefore, the game could be said to be the character itself.

Nevertheless, in the end, all is for nought if the sound is turned off.

Just as we need to be there to listen to the falling tree; there needs to be a listener to take in the sensations the game and sound designers want to convey, which, in turn, depends on the player's current state of mind. On music, but also applicable to audio in general, Manuel Faria states that "[t]he more complex the feelings, the more unlikely it is to communicate the same to different people. The right balance is quite personal and the role of music with narrative is to guide the listeners (...) [without] "forcing them to feel [like a] hostage to the author's desire"⁵⁹. It is a shared experience, and there is never one experience alike the other (Hefner, Klimmt, &

⁵⁹ See *Addendum B.1*

Vordorer, 2007, p. 3).

Immersion should be the game designer's ultimate goal, as it is a crucial key to enjoyment. Games offer an escapist experience, considering they enable the player to hop from one reality to another. The player escapes his/her own daily concerns to seek completion in qualities he/she wishes to have and is allowed to perform actions that one would not be able to do in the real world.

In video games, players interact, they lose and they fight until they win and they feel they are important. They actively participate in the game and they "are not mere observers of the media environment (and of the media characters in it) as they are in television settings" (Hefner, Klimmt, & Vordorer, 2007, p. 4). If you put on a film and you leave the room, it will go on without you, but if you leave during a running game, it will not continue without you, as you are needed to help it progress. So in the end it does amount to your desires. Do you wish to be, or to spectate? There is no right answer, but if you choose to be, then take [the] control, unmute, pluck those headphones in and listen.

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Addendum A

Dissertation Road Map

This table, created at the beginning of the research project, describes the objectives and research questions that would inform the four chapters (chaps. 2 to 5) that form the core of the dissertation. It was useful for the all the stages of the project: first, for the planning of the chapters; second, for the monitoring of the direction the study was taking, namely the preservation of the rationale behind it; and third, after the project was concluded, for the validation of the research options.

Chapter	Section	Objectives	Research questions
2. A World of Video Games	2.1. Film and Video Games	To highlight the differences, regarding sound design, between films and video games	<i>How different is sound in cinema and game audio? How do the techniques used for designing sound at the stages of Pre-production, production, and post-production differ as regards films and video games? How disparate are the sound effects, given that sound in video games is interactive and adaptive? And how is music to be used in video games since it needs to be adaptive as well? What techniques are used in video games to avoid sonic repetition?</i>
	2.2. The Sonic Evolution of Video Game Characters	To offer a brief summary of the evolution of sound in video games	<i>When was sound used for the first time in a video game? When did sound in video games become interactive? When was music used for the first time to provide the gaming experience with complexity and depth? Who were the first characters with a distinct sonic identity? What sort of sound design improves the player's feeling of realism, deepening the sense of immersion?</i>

Chapter	Section	Objectives	Research questions
3.The Player: Understanding Psychoacoustics	3.1. Identify, Feel and Belong: Perceptual Awareness, Emotion and Immersion	To understand how sound is perceived by the human ear, in general, and by the gamer, in particular	<p><i>How is sound perceived by the human ear? What role do personal experiences and memories play in the process of sound perception? How do we associate certain sounds with things we have never seen or that have a fictional nature? How do cognitive and constructivist theories explain human emotional response to auditory stimuli? In the case of music, what is the difference between emotional perception and emotional induction? How does music structure influence human emotional reactions? What strategies do sound designers resort to in order to heighten the player's experience? What types of immersion are there? Which is more effective?</i></p>
	3.2. Asking the Players: A Survey on Game Enjoyment and Construction	To get to know the preferences of the gaming community and the tools game designers, sound designers, and music composers for video games resort to	<p><i>What platforms do gamers prefer? What is the playing style they are most attracted to? Do gamers usually play with the sound turned on? Do they play with headphones? Which video games and characters do they prefer sound-wise? Do they own or listen to any video game soundtrack music? What are the sounds they notice first when playing a video game? What are the sound effects that best give them the feeling of closeness to a character? Do they prefer speaking or non-speaking characters? What is the role of music in a video game and how can it be used to describe a character?</i></p> <p><i>What tools do game designers usually resort to when creating video games? Are video game designers normally responsible for the sound design as well? Sound-wise, what are the aspect they believe to be important in a video game?</i></p> <p><i>What tools do sound designers use? How do they balance out the SFX and music?</i></p> <p><i>What tools do music composers use? What are the most important things they need to know when composing for a character? What instruments do they use for that purpose? What music styles/genres are used to convey emotions?</i></p>

Chapter	Section	Objectives	Research questions
4. Game Audio and identity	4.1. Soundprint: Sound Design at the Service of Identity	To evince the importance of the character soundprint for the acoustic ecology of the game; to examine how it plays into the idea of identity and signature and how it provides the player with a deeper feeling of immersion.	<i>What elements does a soundprint include? How does a soundprint play into the idea of identity and signature? How can a character soundprint contribute to provide the player with a deeper sense of immersion? Can music be seen as part of a character's soundprint? What sort of game characters are there? Is the player's identification with the character easier when the latter does not talk? Why has the use of soundprint become popular with NPCs? How is voice used in videogames?</i>
	4.2. Video Game Characters Soundprint	To systematize data regarding game titles with recognizable character soundprints	<i>Is it possible to identify different soundprint patterns? If so, what will the main characteristics of each pattern be? Which examples of video games may be offered to illustrate each pattern? Will an analysis of a significant number of video game characters contribute to a categorization of the soundprint patterns?</i>
5 Two Games Under the Microscope	5.1.From Theory to Practice: Identifying Instrumental Case Studies	To offer an in-depth analysis of two case-studies, showing how what was considered at the theoretical level in the previous chapters works in practice. To create a map for the analysis of soundprints that may be used for the study of other video games.	<i>What criteria should be followed for the selection of instrumental case-studies? How important are previous and subsequential releases of a video game important for this sort of analysis? What categories should a soundprint map analysis take into consideration? Does the systematization of the elements that make up the character soundprints lead to any relevant conclusions?</i>

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Addendum B

The two interviews below were part of the qualitative research this dissertation entailed. The objective was to benefit from the knowledge and expertise of two professional musicians and composers, Manuel Faria and Sandro Norton. For the purpose of the research, they were considered informants, i.e., specialists “offer[ing] an insider’s perspective and in-depth information that can represent the views of a group or a community (Tavakoli, 2012, p. 275). The added value of their contribution was that they not only validated many of the research findings but also provided new perspectives on the issues under consideration.

B.1. A Musician's Perspective on Emotion, Characters, and Game Audio: Interviewing Manuel Faria

July 23rd 2017

Mariana Costa

First and foremost, thank you very much for conceding your time for this interview. For my dissertation, I have been diving deep on the multiple approaches taken when creating sound for video game characters, and one of the vastest and most interesting subjects is the way music seems to influence our emotions and becomes symbolic and representational of personality.

Let's start with the introductions. Would you please introduce yourself and state what you do for a living?

Hi, my name is Manuel Faria, I started learning piano at the age of 4, and have been a professional musician for 37 years. I played in a Portuguese band, "Trovante," and once that band was over (1992), I became a music producer. Later on, in 1990, I embraced sound and music for communication business, and in 1996 I founded *Indigo*: our audio and music post-production company.

We are pioneers in immersive sound research and specialize in Audio Branding.

I also teach Music for Motion Pictures at the World Academy in Lisbon.

Universally, what do you consider to be the purpose of music?

All over the world, there isn't a human culture without music. Music is the expression of the human soul and it is the universal language.

It's been thought that its origins are in the human gatherings, where music would create a kind of rhythmic link between all the participants to generate a sort of collective trance. Some percussion instruments date back from the Paleolithic period. The human singing is also present in every culture.

The answer to this question is not simple at all.

If I had to name a purpose for music, I think it would be to unite people within the same emotional wavelength, but music is also meant for oneself, it's a way of regaining our inner balance.

What do you feel is the role of music when conveying a narrative?

A narrative is mainly based on pictures and words that convey the factual side of the story – the rational link of "what is really happening." Music helps in the way it conveys the emotions the author wants the audience to feel.

Sometimes it "underlines" the narrative, sometimes it will remain neutral, and sometimes it contributes to the narrative. I use a scale from -5 to +5 to choose the role of music inside a narrative. A good -5 example is the scene in Quentin Tarantino's *Reservoir Dogs* where a policeman is being tortured by one of the main characters. (https://www.youtube.com/watch?v=D_04Y--Nj50)

How would you say music influences one's emotions?

In the previous example, the author manipulates us through music. By choosing *Stuck in the Middle With You*, Tarantino withdraws the victim's agony from our thoughts turning us into accomplices to the main character. The director makes us choose the wrong side. In the movie

ET, (<https://www.youtube.com/watch?v=a-9990dlfvo>), the music guides our emotions from deep sadness to tears of happiness. It's irresistible!

What gets us is not just the narrative, it's the power of music to break us down in pieces, completely vulnerable to the narrative.

Nowadays, which musicians do you consider to be the best storytellers?

Mostly songwriters such as Leonard Cohen, Bob Dylan, Bruce Springsteen, Paul Simon, Eminem, and Ben Harper. Also younger ones like Lady Gaga, Ed Sheeran, and Jay-Z. All of them have created a great balance between music and lyrics.

In Pop music, there's a lot of investment in production and, sometimes, very little in storytelling. Some of the charts are full of empty songs. But the new sounds inspire others, so we should not reject any genre of music.

What were your childhood video games growing up?

When I was a child, there were no videogames. I was around 15 when some machines, with a black and white display, performed a very simple tennis game, provided you inserted a coin. It was called Pong (<https://www.youtube.com/watch?v=-vbGBlxVxcQ>).

Later came the Spectrum 48k with lots of videogames that you had to load via a cassette player with a lot of noise during loading.

As a musician, have you ever been involved in any video game project?

I did several music scores for some iPad games. We also built a lot of functional sounds for those games.

Do any soundtracks (or sounds in general) come to mind when thinking about video games and video game characters?

I'm not much of a gamer myself, but I instantly recall *Pac-Man* and *Super Mario*.

Is it possible for music to represent a personality? If so, please mention why and state a few examples.

Yes, although personality is always a complex subject. *Peter and the Wolf* from Sergei Prokofiev associates instruments and specific melodies to the characters of the story. The clarinet moves like a cat and Peter, a violin, communicates joy and lightness.

In the movie *Alexander Nevsky*, by Eisenstein (1938), musical themes represent the two opposing forces: with Teutonic invaders, we have a somber brass melody and dark choir, while the Russian people are represented by an epic orchestral tune and a triumphant choir. By the end of the film, there's the *Battle on the Ice* scene where the two melodies fight within the Prokofiev orchestral score. Eisenstein filmed most of the battle scenes according to the music (and not the opposite).

How would you personally attempt to convey emotions such as happiness, sadness or anger?

Again, there should be a balance between the role of music and too much of it.

When the music tries to convey all emotions of a movie we may arrive at an almost ridiculous situation where it's simply too much. Cartoon movies, for example, overuse music, and the effect of underlining everything is called *Mickey Mousing*.

It's very important to release the audience to their own thoughts and feelings, and music should

create an interesting layer in the narrative, not a repetition.

Adagio for Strings, by Samuel Barber (1938), is considered by some the saddest musical piece ever. It was used as score in *The Elephant Man* and *Platoon*, which are undoubtedly sad, but in *Platoon* it adds a quasi-romantic layer to the war scenes that seem to be in slow motion, adding to the movie a reflective layer on the stupidity of war. I listen to this adagio very often, and I get a lot of happiness from the listening experience so, in my point of view, there is no formula to convey happiness or other feelings.

Jealousy, frustration, wonder, and numbness are just a few examples of some of the most complex emotions; how can one attempt to convey such sentiments through music?

The more complex the feelings, the more unlikely it is to communicate the same to different people. The right balance is quite personal, and the role of music with narrative is to guide the audience but not forcing it to feel a hostage of the author's desire. I guess it would depend a lot on the action, the cinematography, the story, the character, the light, and the movement.

What is the role of the performer and performance when telling a story through his/her Instrument?

Music is all about feeling-playing-making feel. A good performer will play according to his/her reading of the piece and his/her emotions but will have the discipline not to be carried away by his emotions all the time. He/she will choose the right moments to rise and make shine the music score keeping the musical balance all the way.

We cannot stand a state of pure emotion for a long time, so highlighting the right moments is very important.

Could you please name a few instruments you tend to use when representing a character's personality through a leitmotif?

I always express myself through the piano, my instrument. From that point of departure, I can write for any other instrument. Strings, for example, are my favorite score instruments. I never treat them as a whole and always write the violins, 2nd violins, violas, cellos and bass separately. I also use a lot of percussion and some electronic instruments. Today's scoring is a mix between music and sound effects, so, in the end, anything goes.

Please explain what musical genres and structures (tempo, pitch, volume, melody, instrumental density, mode, etc.) would you typically use for the following personality tropes: Brave; Mysterious; Hyperactive; Quiet; Conflicted; Sexy; Dangerous; Scary; Fearful.

I could give all the obvious answers like in a recipe. But I'd rather not. Music history has shown us that there are always other ways to express ourselves.

In *Psycho*, for example, the killing scene is scored with violins, which were always a romantic instrument. It is this kind of disobedience that brought the score piece to fame, and its effect on the audience was striking.

How do you find a balance between your own composing preferences and what you know that the public is used to?

In the communication business, I always receive a briefing, reference contemporary music that the client likes. For decades I learned to feel happy outside my own taste and comfort zone, but I always add something from my personal taste. At the end of the day, it will be my music, so I have to like it.

How do you feel about new tools for composition and performance, such as MIDI and computer software's that have been increasingly dominating the musical production market, and what advantages/disadvantages would they have when trying to tell a person's story?

I started to use MIDI in the early 80's with the Spectrum. Rapidly I turned to the Atari and the new Steinberg Pro-24, a 24-track software sequencer. Then Cubase came up – a great MIDI tool. In the path of sound editing the first non-linear editors appeared: Sound Tools and Diaxis. When Protools came, we still had to have to stand-alone machines: a MIDI one and a Recording one. Usually, two computers, connected through TimeCode.

All sound sources were outboard instruments stacked in piles in the studio.

Now, Protools has a lot of MIDI capabilities, and most of the sources are virtual. Everything inside a computer.

It has brought a lot of democracy to the business, allowing almost any kid to have access to a whole orchestra and produce decent professional-like recordings.

But nothing replaces the human brain on music. In the Beethoven era, he himself didn't need to know how to play bassoon or trombone. But he had to know how this instrument should be played.

That's the expertise we have to gain today. Program a violin as we knew how to play it and place it in the right place in the recording, that's a lot for DIY! But, unlike Beethoven, we can instantly hear it back and replace what's wrong.

***Once again,
thank you very much for your time.***

B.2. A Musician's Perspective on Emotion, Characters, and Game Audio: Interviewing Sandro Norton

July 23rd 2017

Mariana Costa

First and foremost, thank you very much for conceding your time for this interview. For my dissertation, I have been diving deep on the multiple approaches taken when creating sound for video game characters, and one of the vastest and most interesting subjects is the way music seems to influence our emotions and becomes symbolic and representational of personality.

Let's start with the introductions. Would you please introduce yourself and state what you do for a living?

Hi, my name is Sandro Norton, I am 38 years old, and I am a musician.

Universally, what do you consider to be the purpose of music?

Well, music is something that makes me feel happy inside and inspired. The purpose of music is what it has been made to give us when we listen. We need to be open to it.

What do you feel is the role of music when conveying a narrative?

Always understanding the message and feed the narrative with emotions.

How would you say music influences one's emotions?

Music influences all sorts of emotions. It can drive us to some places where words don't exist. The beauty of music, of course, also has to do with who's playing and who's delivering the message.

Nowadays, which musicians do you consider to be the best storytellers?

Depends on the style. We can't say there's one that is the best. I really enjoy Pat Metheny, Dori Caymmi, and Diana Krall.

They are all great, but they also have completely different styles.

What were your childhood video games growing up?

Sonic, pro evolution.

As a musician, have you ever been involved in any video game project?

I have not.

Do any soundtracks (or sounds in general) come to mind when thinking about video games and video game characters?

Yes, definitely. I instantly recall Silent Hill. It's very creepy.

Is it possible for music to represent a personality? If so, please mention why and state a few examples.

Yes, it is possible. You associate a melodic motive to a character. There are some good examples, such as the *Lord of the Rings*, *Star Trek* and *Indiana Jones*.

How would you personally attempt to convey emotions such as happiness, sadness or anger?

I first work on the harmony, followed by rhythm. Then melody, of course, ends up being the main storytelling device. With a major melody, we can experience happiness while a melody can be a representative of sadness. The rhythm can control the dynamics of the piece.

Jealousy, frustration, wonder, and numbness are just a few examples of some of the most complex emotions; how can one attempt to convey such sentiments through music?

It's a challenge, but can it be done. We could, for instance, apply the elements earth, water, wind, and fire in a musically creative way. It's important to think both inside and outside of the harmony.

What is the role of the performer and performance when telling a story through his/her Instrument?

A story should be like a butterfly. When it flies, it's beautiful, when it stops it's beautiful (you can appreciate the beauty of the wings). In any moment the performer should think about creating interest. It is not about revealing everything in the beginning. No, knowing how to tell a story is a lifetime process.

Please explain what musical genres and structures (tempo, pitch, volume, melody, instrumental density, mode, etc.) would you typically use for the following personality tropes: Brave; Mysterious; Hyperactive; Quiet; Conflicted; Sexy; Dangerous; Scary; Fearful.

- Brave: Uptempo, major melody, and repetitive rhythms with melodic development
- Mysterious: Slow tempo, chords with long length, low volume
- Hyperactive: Uptempo, lots of melodies, not much harmony, Constant tempo changes
- Quiet: Slow tempo, chords with long duration
- Conflicted: Lots of rhythm syncopations
- Sexy: Swing tempo, minor mood, dangerous
- Scary: Diminished, minor chords. Repetitive rhythm. Avoiding a resolution chords to create tension.
- Fearful: Minor mood, slow tempo, minor melodies, and harmony.

How do you find a balance between your own composing preferences and what you know that the public is used to?

A musician needs to find a balance between what is personal work and music as a job. Sometimes I find myself involved in projects where my creativity is precisely to know what the public wants, and that is a challenge in itself.

How do you feel about new tools for composition and performance, such as MIDI and computer software's that have been increasingly dominating the musical production market, and what advantages/disadvantages would they have when trying to tell a person's story?

New tools are great for inspiration, and certainly they give musicians new opportunities for new sounds, but music lives inside of us without any tools. Everything is in our head, and the more music we study, the more options we have to enhance our beautiful melodies (that we all have).

***Once again,
thank you very much for your time.***

Addendum C

As part of the mixed methods research adopted for the dissertation, an online survey was conducted. The respondents, totalling 58, were sampled via Facebook. The questionnaire, which included behavioural and attitudinal questions, as well as close-form and open-response items, allowed for quantitative and qualitative research. The next pages present the questions and the answers; when pertinent, these are offered in the form of graphics.

QUESTIONS

RESPONSES

58

Section 1 of 5

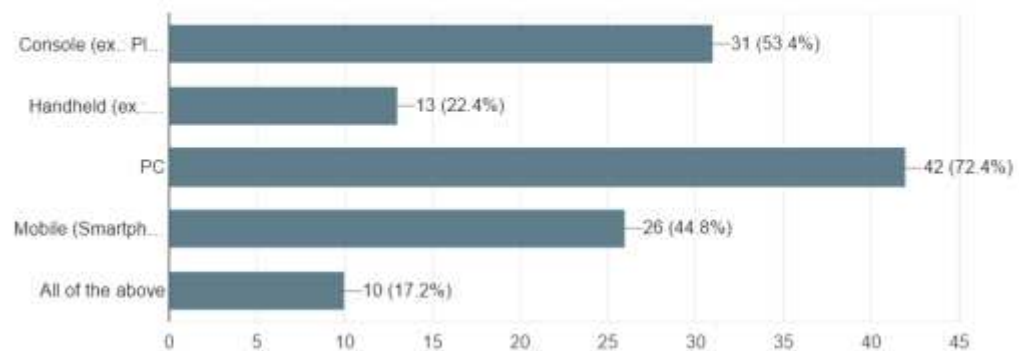


Sound in Video Games

A survey to ascertain one's thought about sound design in video games and particularly creating sound for video game characters. Please answer accurately. Thank you very much.

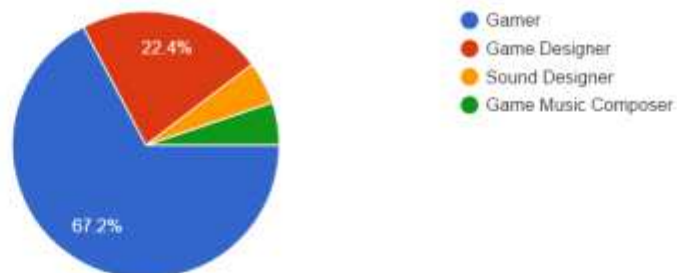
What game platforms do you use?

58 responses



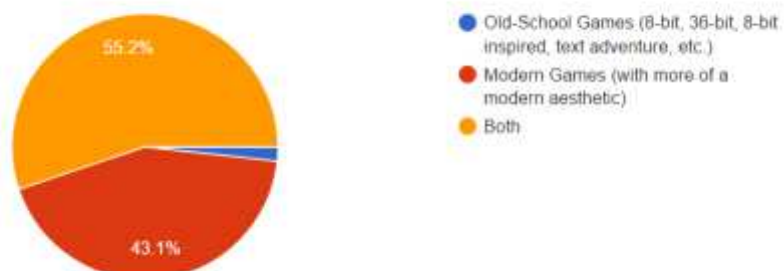
Please choose the category that best describes your relationship with Video Games

58 responses



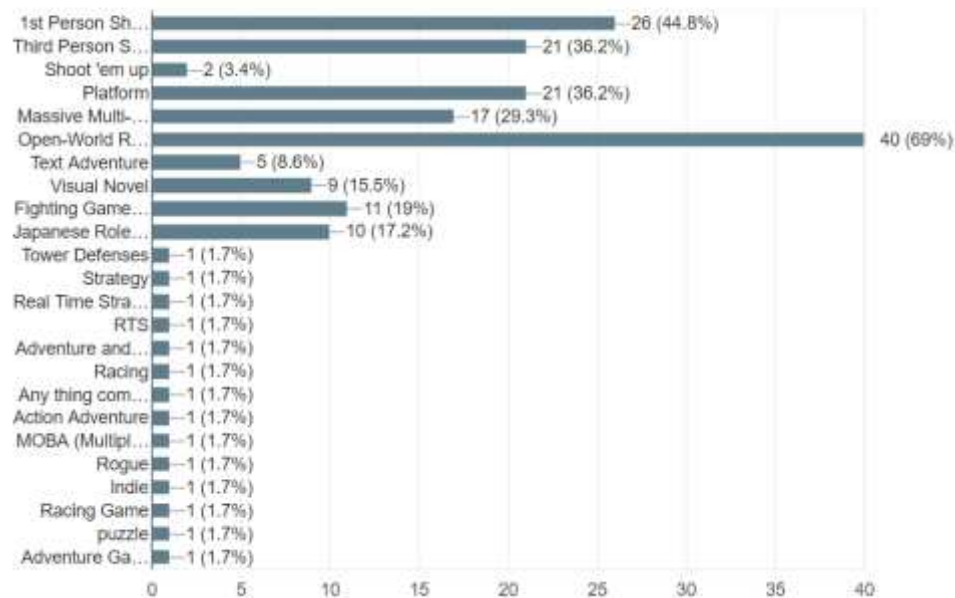
Which of the following do you tend to play more?

58 responses



Between the following, what is the playing style that you are most attracted to? (please choose a maximum of three options)

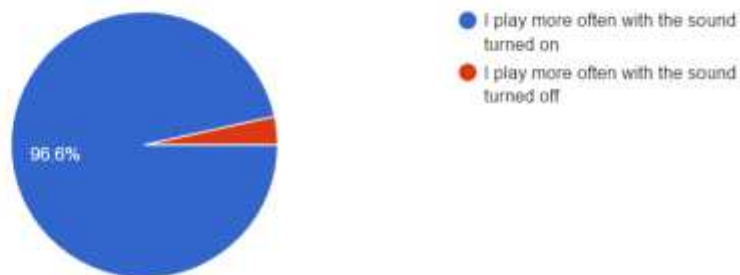
58 responses



1st Person Shooter; Third Person Shooter; Shoot 'em up; Platform; Massive Multi-Player Online Role-Playing Game; Open-World Role-Playing Game; Text Adventure; Visual Novel; Fighting Game/Beat 'em Up; Japanese Role-Playing Game; Other

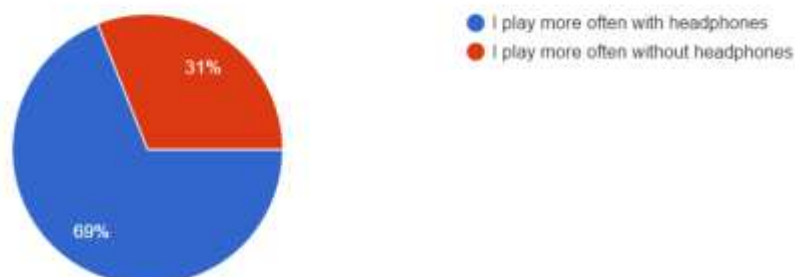
Do you usually play with the sound turned on?

58 responses



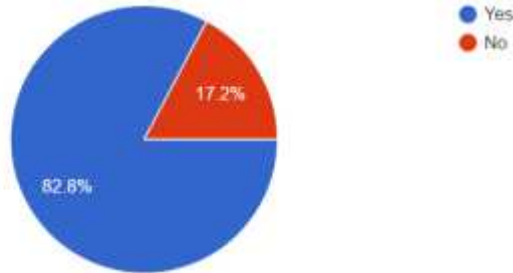
Do you usually play with headphones?

58 responses



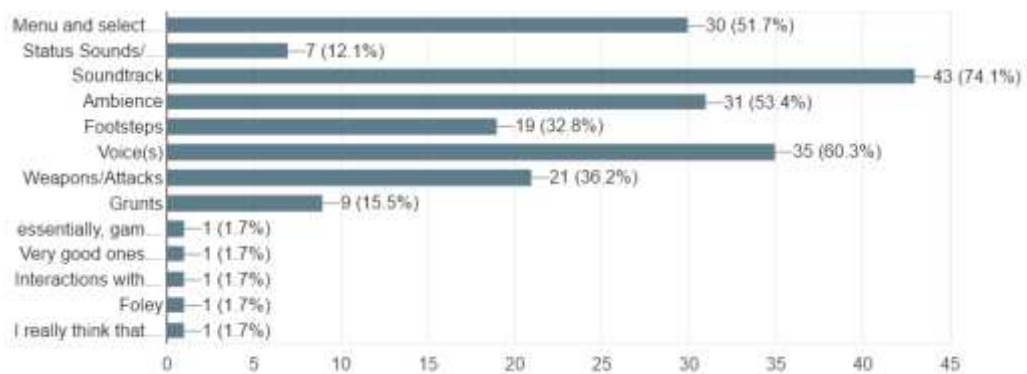
Do you own or listen to any video game soundtrack music?

58 responses



What are the sounds you usually notice first when playing a video game? (you can choose more than one)

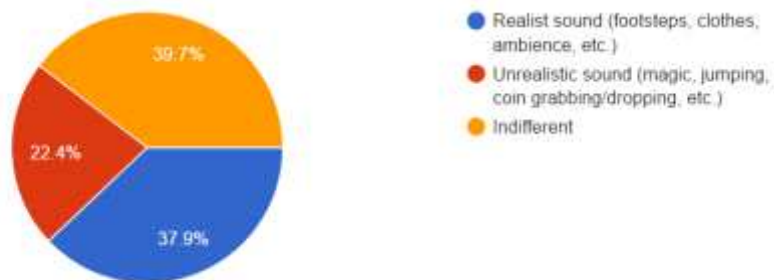
58 responses



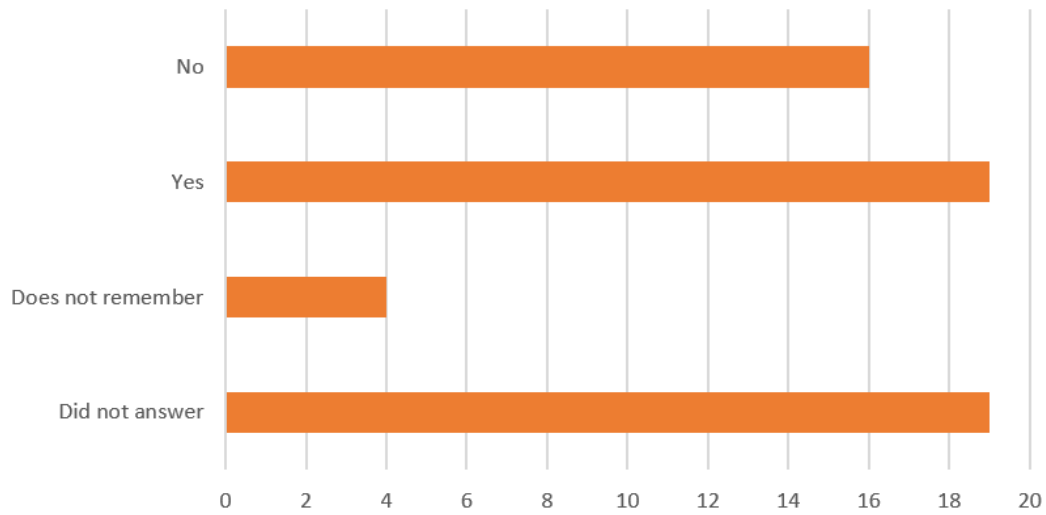
Menu and selection sounds (when moving around menus to select something); Status Sounds/HUD (health, MP, stress, stamina, etc.); Soundtrack; Ambience; Footsteps; Voice(s); Weapons/Attacks; Weapons/Attacks; Other

Which of the following sound categories are you usually drawn to?

58 responses

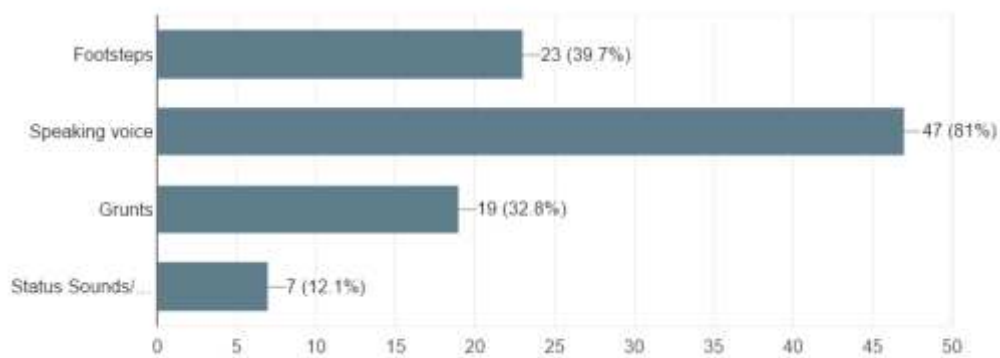


Have you played a game in which the sound design ruined the experience for you? If so, which one(s)?



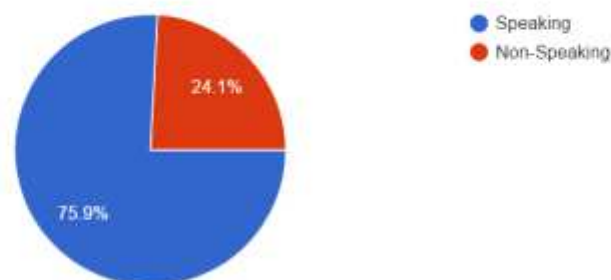
What are the sound effects that best give you the feeling of closeness to a character? (you can choose more than one)

58 responses



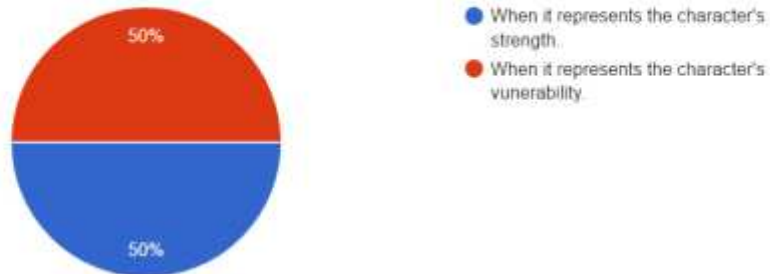
Do you prefer speaking or non-speaking characters?

58 responses



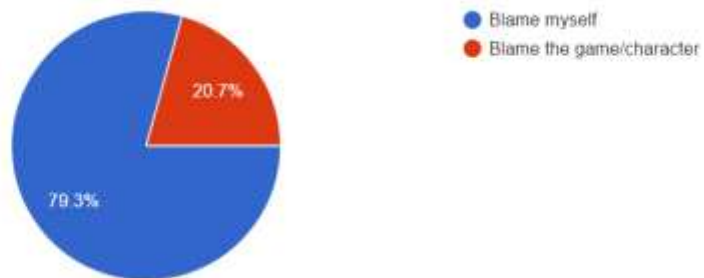
When does music best describe a character?

58 responses



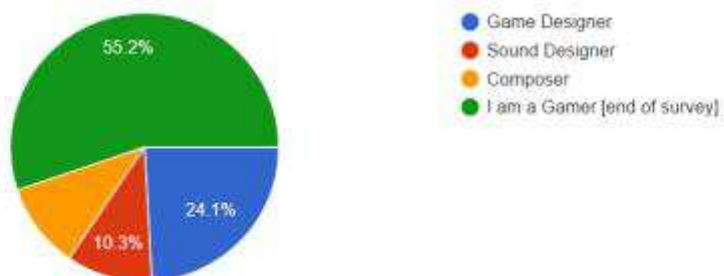
Chose one of the following: "Usually when I play a game and something goes wrong, I tend to _____". (Please answer as truthfully as you can)

58 responses



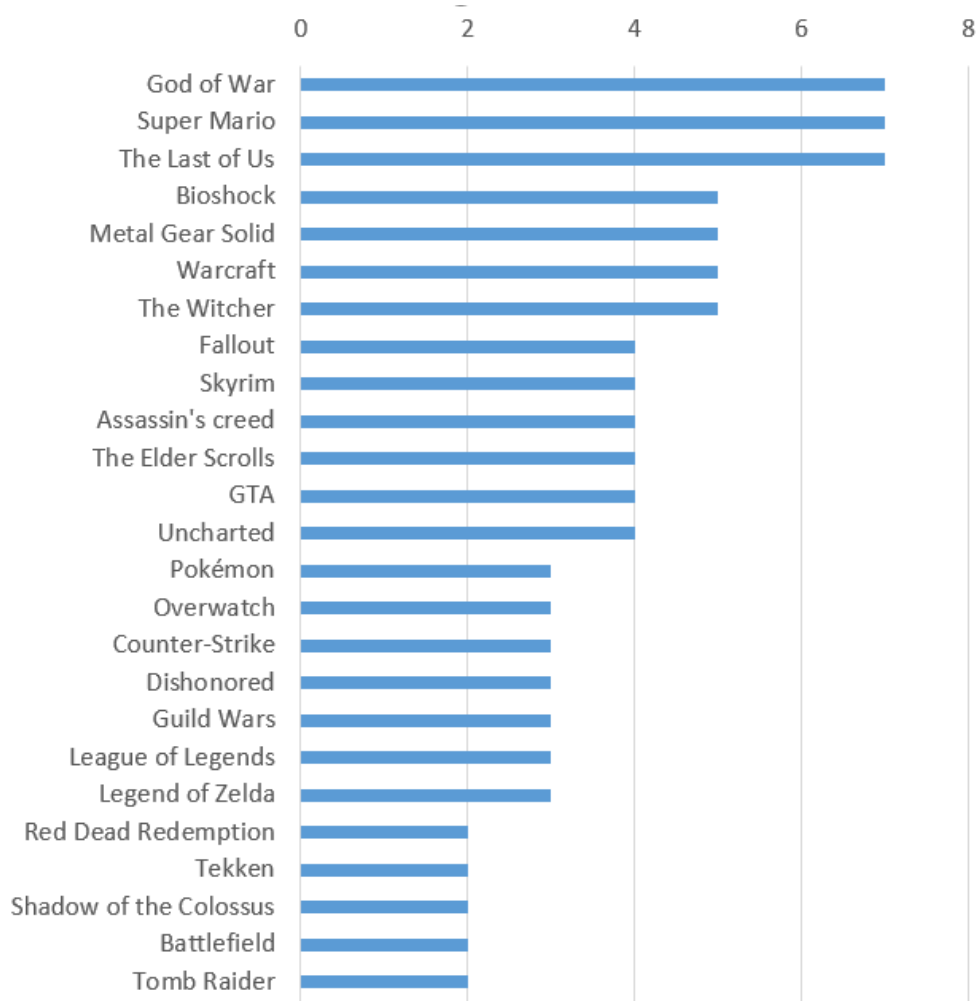
If you are a Game Designer, Sound Designer or Composer, please choose your correct title to answer some job-specific questions.

58 responses



Name three of your favourite video games.

58 responses



Top 25

Name a few video games you believe have a good Soundtrack.

58 responses

Limbo, Talewind
Legend of Zelda Series, Super Mario Series, Pokémon Series, Chrono Trigger
Kingdom Hearts, Journey, Shadow of Colossus
CSGO
The Witcher 3, FFXV, FFXII, Metal Gear Solid (whole saga)
God of War, Fate Stay/Night, Assassin's Creed Franchise
Super Mario World 2: Yoshi's Island; Bastion; Jet Set Radio.
The witcher 3
Zelda's
Doom 3, Call Of Duty: Infinite Warfare
Hotline Miami; Shogun Total War II; Hyper Light Drifter
The Elder Scrolls (From Morrowind upwards, all the Jeremy Soule stuff), Guild Wars 2 (Soule & Diemer), ARK: Survival Evolved, Dark Souls 3.
Silent Hill Silent Hill 2 Shin megami tensei Hotline miami
Bloodborne, Undertale, Grim Fandango, Transistor & Dark Souls III
Witcher 3, Skyrim ; Child of light;
God of War, Metal Gear Solid, Getaway
Ori and the blind Forest (Best OST ever), The binding of Isaac, Return of the Tomb Raider
Nintendo titles usually have really good soundtrack, for the example, any game from the legend of zelda series. Also world of warcraft has an amazing soundtrack.
DOOM
Undertale, Minecraft, World of Goo, The Elder Scrolls IV: Oblivion

Ori and the Blind Forest, Shadow of the Colossus, The Last of Us, Bastion, and Any Zelda, Metal Gear, Final Fantasy or Witcher Game. Also many RPGs could be here.

The Last of Us; Shadow of the Colossus; Bioshock: Infinite

Witcher 3; Bloodborne; Final Fantasy saga (X, XV); Fallout 4; Bastion;

Hotline Miami, Undertale, The Witcher, The Last of Us, Red Dead Redemption

The Last of Us. The Witcher 3. Mirror's Edge. Need for Speed the Run

assassin's creed; skyrim; dark soul

Undertale, Skyrim, Danganronpa

Guild Wars 2

Mass Effect Trilogy, Doom (2016), Quake, FTL, Journey, any Sonic (first/second generation), Mario (any), Zelda (any), Final Fantasy (any), SimCity 3

Dishonored, Borderlands, Bastion

Terraria, Diablo 2, civ 5, NieR, Final Fantasy

Diablo 2, World of Warcraft, Call of Duty: Modern Warfare 2, The Elder Scrolls V: Skyrim, Hotline Miami, The Witcher 3

Donkey Kong Country, Street Fighter II, The Legend of Zelda, Journey, Transistor, Sonic, Megaman 2, Streets of Rage 1/2, Final Fantasy 8

Zelda, final fantasy, skyrim

GTA San Andreas. Tony Hawk

Batman: Arkham Knight, The Last of Us, New Super Mario Bros

Zelda series, Uncharted

NieR, Final Fantasy XV, Chrono Trigger

Transistor, Bioshock, Star Wars Battlefront

Fifa 15

Gta V

Mafia 3

Max Payne 3, Red Dead Redemption, God of War 3, Uncharted 3, Grand Theft Auto Series, Shadow of the Colossus, ICO and Final Fantasy VII.

Soulcalibur, Ace Combat, Xenogears
Transistor, Bastion, Hotline Miami
The Last of Us, Transistor, Uncharted, Chrono Trigger, Journey
League of Legends, World of Warcraft
Deus Ex: Human Revolution Assassin's Creed 1 The Division
Okami, Final Fantasy VII, Street Fighter V
Grim Fandango, Monkey Island 2, Mass Effect Series, Brutal Legend, Rayman Series
Mass Effect series, Civilization series, Skyrim
Destiny, Skyrim, Sly 3, Ratchet and Clank
The Elder Scrolls: Skyrim, Gothic, Ori and the Blind Forest
Orion, God of War, Pokemon, Nier, The Last of US
Machinarium, Red Dead Redemption, Final Fantasy X, Bastion
Any game with a soundtrack by Danny Baranowsky
God of War, Journey, DOOM
Super Mario Galaxy, Zelda: Twilight Princess, Ni no Kuni
FTL, Va-11 Hal-A, VVVVVV, Professor Layton, Legend of Zelda: Windwaker, Risk of Rain, Bastion, Sword and Sorcery, Crypt of the Necrodancer
Hotline Miami, Transistor, The Metal Gear Solid series, Persona 4, Final Fantasy VII

Name a few video games you believe have a good Sound Design.

51 responses

Limbo
Legend of Zelda Breath of the Wild, Dragon Age Inquisition
Bioshock Infinite, Child of Light, The Witcher 3
The Witcher (whole saga)
God of War, Darksiders, Shadow of The Colossus
Bastion; Patapon.
Doom 3, Call Of Duty: Infinite Warfare, Star Wars Battlefront
Dead Space II; Sniper Elite 3; Red Dead Redemption
Dark Souls 2-3, Guild Wars 2, Spore
Minecraft DayZ Half life 2
Alien Isolation,
INSIDE; Lineage II
L.A.Noire, Ori ans The Blind Forest, Tomb Raider
DOOM
Don't Starve, Overgrowth, The Legend of Zelda Windwaker
Any Bioshock game, Portal 1 and 2, Transistor, Dark Souls, Dishonored...
The Last of Us; Metal Gear Solid 4: Guns of the Patriots; Bioshock: Infinite
Fallout 4; Bloodborne; Assassin's Creed Saga (Revelations, 3, Black Flag, Unity)
Bioshock, The Witcher (1, 2 and 3), The Last of Us, Red Dead Redemption
Rez. Star Wars Battlefront (2015). Battlefield 4
Overwatch Battlefield
League Of Legends
journey, absu, dark souls

Styx: Master of Shadows
Terraria, Diablo 2, civ 5, NieR, Final Fantasy
God of War, Limbo, Dead Space, Overwatch, Doom (2016)
The Last of Us, Infamous, Papa Sangre, Journey,
Zelda, final fantasy, skyrim, pokemon
Minecraft
The Last ofUs, Resident evil
Uncharted 4, Bastion, Final Fantasy XV
Overwatch, League of Legends, Portal, Minecraft (visual and sonic aesthetic cohesion)
COD: MW3 GTA IV LA NOIRE
Red Dead Redemption, Max Payne Series, God of War Series, Uncharted Series, Shadow of the Colossus, ICO and Final Fantasy VII.
Devil May Cry, Soulcalibur
Transistor, Hotline Miami
The Last of Us, Uncharted, Battlefield 1, Forza Horizon 3
League of Legends, World of Warcraft
L.A. Noire
Okami, Overwatch, Tomb Raider
Counter Strike: Global Offensive, Dirt Rally, The Witcher 3, Portal 1-2
Civilization
Inside
Inside, Spyro: Year of the Dragon, Crash Bandicoot
Amnesia, The last of Us
DOTA 2, Last of Us, Bioshock, Machinarium
Any game with a soundtrack by Danny Baranowsky
Ratchet and Clank, DOOM
Zelda (Series), Naruto: Ultimate Ninja Storm (Series),
Valkyria Chronicles, LoZ: Breath of the Wild, Transistor, Portal, Resident Evil 7, MGS 3: Snake Eater, Journey, Overwatch
The Battlefield series (Battlefield 3, Battlefield 4, Battlefield 1 for example), Gone Home

Sound-wise, what are some video game characters that immediately come to mind?

Earthworm Jim

Link, Chrono, Prince Sidon, Kass, Vyse

Wisps, Orc Workers (Both Warcraft 3)

Teemo (LOL)

Geralt (The Witcher), Noctis (FFXV)

Kratos, Ryu, Batman

Patapons; Jet Set Radio (Beat); Overwatch (Lucio).

Sonic

Gnar - league of legends

The Butcher (from Diablo I)

Link;

All Voiceactors in Dark Souls.

Mario
Sonic
Yoshi

Alien (Alien Isolation)

Any NPC in Skyrim

Kratos

Tomb Raider in the last era

Mario, Link

League of Legends

Animal Crossing animals, World of Goo goo balls, Giant rabbits from Don't Starve (specifically, the biting sound), Coach from Psychonauts (his repetitive dialogue became really annoying)

Wheatley + GLaDOS (Portal 1/2) and Elizabeth (Bioshock Infinite)

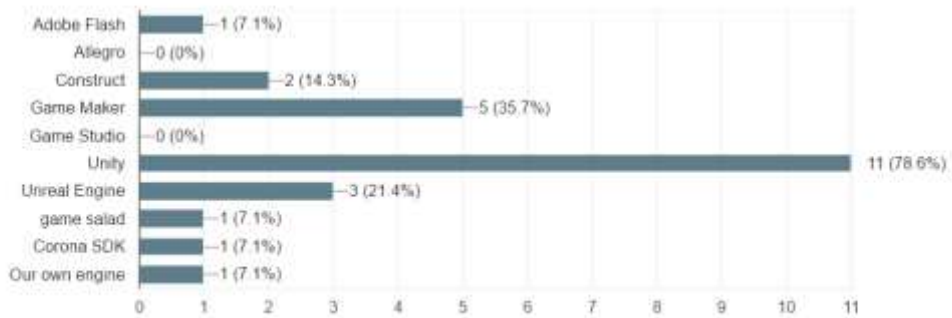
Kratos; Solid Snake; Joel (The Last of Us)

Paladin Danse, Fallout 4;
Flowie (Undertale), all the characters in TF2, Geralt in The Witcher
Joel and Ellie from the Last of Us
super mario ; sonic;
i just imagine some quotes from characters like Tracer from overwatch
Lara Croft, Solid Snake
commander shepard, mario (post n64), duke nukem
early Lara Croft and Zia from Bastion
Link, Geralt of Rivia
The Prince (Prince of Persia: Sands of Time), GLaDOS (Portal Series), Jack (BioShock),
GlaDOS, Locoroco, Crash Bandicoot, Dexter, the seller from Resident Evil 4, Amaterasu, Snake
Zelda
Counter-strike
Lara Croft, Mario, Link
Link
Nathan Drake, Solid Snake, Joel
Tracer (Overwatch) and Red (Transistor)
Niko Bellic Lincoln Clay Jimmy Hopkins
John Marston, Wander, Carl Johnson, Max Payne and Kratos.
Nightmare (Soulcalibur), Link (Legend of Zelda)
Red (Transistor)
Mario (Super Mario Bros.), Nathan Drake (Uncharted), Crash (Crash Bandicoot)
Any League of Legends character
Adam Jensen from Deus Ex: Human Revolution
Issun (Okami), all Overwatch characters
Captain LeChuck (Monkey Island), Darth Vader, Geralt (Witcher series), CJ (GTA San Andreas)
Tomb Rider
Annie from League of Legends
none
Joel from The last of Us (voice acting), Mario from Super Mario
Last of Us Clicker, Crash Bandicoot, Left 4 Dead Hunter,
None
Kratos, Ratchet, Dexter
Navi, Toad, Super Mario, Mini Ninjas, Link, Diddy Kong, Bowser
Mario, GLaDOS, Snake

Game Designer

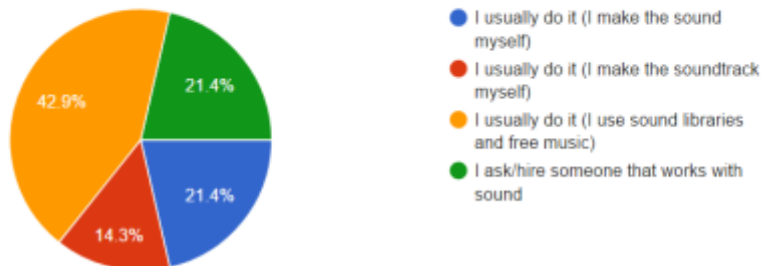
Which tools do you usually use to create video games?

14 responses



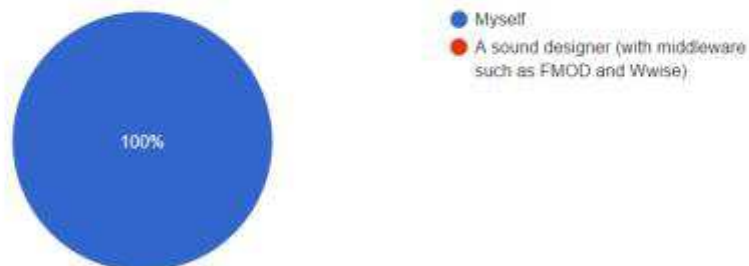
When developing a new game, who is responsible for the sound design ?

14 responses



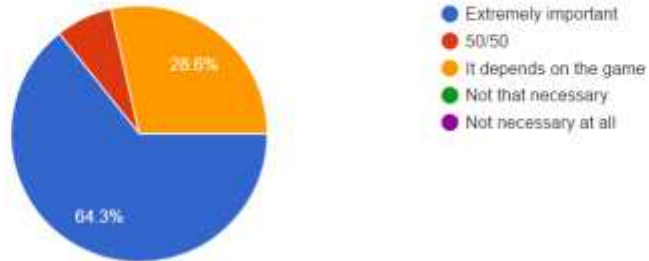
When developing a new game, who is responsible for integrating the sound into the game engine?

14 responses



How important is sound in a video game?

14 responses



Between the following, please choose one that would you consider to be imperative for the sound design of your game

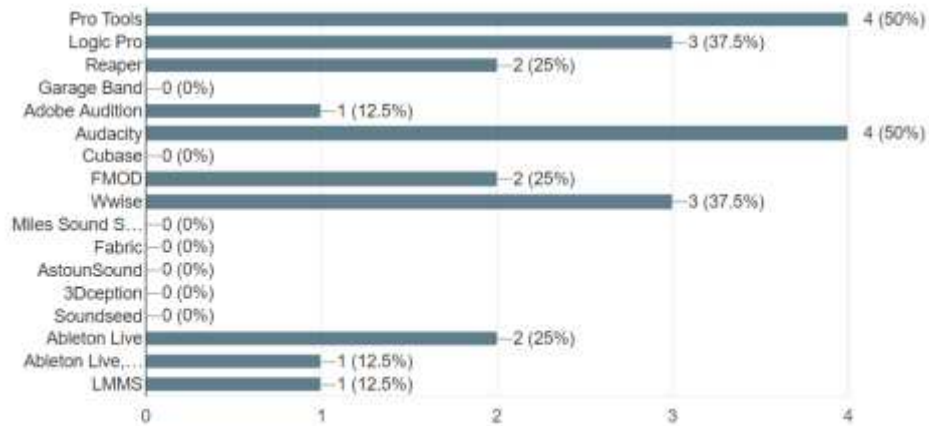
14 responses



Sound Designer

Which tools do you use?

8 responses



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Are you usually responsible for the SFX and/or Music?

8 responses



How does one balance out the SFX and music? (ex.:by highlighting the sounds that are more relevant to the narrative)

7 responses

Applying sound dynamics that allow the player to immerse him/herself in the different contexts of the game.

Usually the SFX has to have higher intensity than the music, unless they aren't important.

It's a question of storytelling. There are moments when music and SFX convey the necessary emotions for the player never to leave that suspension of disbelief state when he's playing. The trick comes during the game mix while making these narrative choices.

It all depends on context, the importance of each sound should be considered in each situation, because when the context of the gameplay changes, it also impacts which sounds should be heard by the player.

SFX and music should be interlinked. SFX are directly related to the on screen actions, while music isn't. So, by adapting the music the on screen actions, both SFX and music feel more rewarding and more connected to the player's experience. On a more technical side, an easy way to mix between SFX and music is through side-chained compression.

Depends on the intent of the scene, tension plays a big part in which sounds to highlight

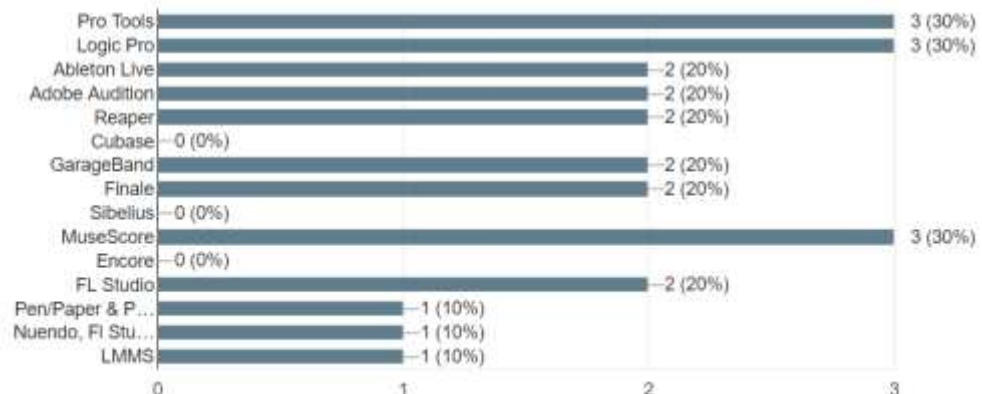
It's an issue between the mood you're trying to convey and the closeness to the character. Games like RE7 set a feeling of dread and powerlessness so they rely heavily on ambient noises, SFX and the use of silence. The music is not completely unimportant but it's used to back up the other sounds in the first place. Now if you were trying to convey a feeling of wonder, like for example entering a major town in an rpg, the SFX help make the place feel lively and real but it could be the music that sets the major tone of the place.

Section 4 of 5

Composer

Which tools do you use?

10 responses



What is the most important part in composing for a character? (ex.: find an instrument to associate to the character; the musical description of a character's emotion)

10 responses

Find the right tone and the instrument that represents better the character

A strong melodic hook that can translate his attitude

Creating the appropriate soundtrack for every possible context and emotions that character can have.

Clearly point out how the different parts of the musical piece are going to reflect the visual layer. Whether this relation is done by setting different main instruments to different characters or simply to expose the relation of given characters as musical 'questions' and 'answers'.

make the music best describe the character without it saying a word and make it relate to it's appearance

Musical description of the character's emotion.

Find a theme for a character

Catching the essence of a character in a single theme/motif

melody/ leitmotiv

The description of their emotions and attitude as well as their role.

Sometimes a composer chooses a particular instrument that they would associate to a character. (ex.: using a flute when a character with wings appears) Which ones would you more commonly use and why? (personal opinion, practicality, etc.)

8 responses

Piano usually works always well, but I must say violin

Piano/Organ because it can easily adapt to any kind of personality and it's used for a wide variety of soundtracks therefore its use it's not biased.

Strings, I believe it's an universal instrument for most of the characters.

Strongly depending on the context but - The most common association that I usually do is with the brass section to an evil or grim emotional state, or strings to a dramatic scene.

I'm more of a synth & strings guy, so I don't go for specific instruments. one common trait I can say I used more than once was associating a saw wave synth to a villain

It depends. If the character has a strong character, maybe I can choose a brass instrument, for example. While if he has some vulnerabilities, I may choose a woodwind or string instrument.

Depends on the project and the means I have at my disposal.

Pizzicato - usefull for stylized, humouristic characters.

What music style(s)/genre(s) are usually used for the following emotions and characteristics?
(optional: which tempo/speed would you use?)

Emotion: Sad

7 responses

Drama

Ballad

Slow, strings and piano/ 60-70 RPM

below 90bpm, wouldn't be able to pick one single genre

Slow tempo

Solo instrument, bowed strings, slow tempo

classical, strings, slow

Emotion: Happy

7 responses

Uptempo / Upbeat

UpTempo Jazz/Traditional songs

Mild, strings, choir and piano / 120 RPM

defintely allegro, electronic stuff

Fast tempo

Allegro, Brass instruments, Percussion

classical, fast paced

Emotion: Despair

7 responses

Steampunk

Classic, Atonal, Uptempo

Fast, strings and brass, fast percursion / 180 RPM

strings to the max! around 60/70bpm

Slow-mid tempo

Dissonanec

free jazz, varied or fast

Emotion: Angry

7 responses

Punk, Metal
Atonal, Slow Tempo
Mild, low strings, brass and choir, strong percursion / 100 RPM
electronic-metal-industrial-thingy, above 140bpm (take the doom soundtrack)
Mid-fast tempo
Distorted Guitar, Death Metal/Hardcore
metal

Characteristic: Brave

7 responses

Epic
Epic, Heroic, Classic, Allegro
Mild; high and middle strings and choir / 100 RPM
epic orchestral stuff (bpm may vary)
Mid-fast tempo
Power Metal, Brass (French horns)
fanfare

Characteristic: Cowardly

6 responses

Piano music
Uptempo, Atonal, Sliding melodic lines
Slow, brass and choir / 80 RPM
depends: is it funny to be a coward or should we relate?
Trombone
not sure

Characteristic: Mysterious

7 responses

Danny Elfman's style

Strings, Largo, Late 19th century music

Slow; piano, strings, week, percussion (open and hi-hats) / 100 RPM

kind of biased by "stranger things" here, but 80's synth pop

Slow-mid tempo

Solo Shakuhachi/Tremolo Strings, Ethnic Music, Slow tempo

jazz

Characteristic: Sexy

6 responses

70's, funk

Jazz, Varying Tempo, Saxophone

Slow; flanger guitar, bass / 60 RPM

dat funk, doe! bow chicka wow wow (and bass, loads of funky-ass bass)

Smooth Jazz, Solo saxophone, slow tempo

latin

Section 5 of 5

Thank you for participating!

Addendum B

The answers offered by the respondents to the online survey (cf. Addendum C) contributed to the process of identification of game titles with recognizable character soundprints and memorable sound design. The tables displayed on the next pages offer the results of an analysis via direct observation of the elements that make up a soundprint, along with notes on the more commonly recognized soundprints and catchphrases in a universe of thirty game titles.

Game	Year	First Platform Release	Character	Character Type	Gameplay/Genre	Personality	Voice	Grunt	Foley	Weapon	Music	Popular Sound	Soundprint Type
Super Mario Bros.	1983	NES	Mario	Player Character	Platform	Heroic, Energetic, Powerful	-	-	Jump	Punch, Fireball, Jump	"Ground Theme"	Jump, Fireball, Mushroom	Retro Pack
Super Mario 64	1996	Nintendo 64	Mario	Player Character	Platform	Heroic, Energetic, Powerful, Cheerful, Happy	Catchphrases and exclamations	Attack; jump; hurt	Footsteps	Kick, jump, smash	Not as well known	Star "Yahoo!" "Here we go!"	Cartoon Pack
Super Mario 64	1996	Nintendo 64	Bowser	Enemy NPC	Platform	Evil, Dumb, Persistent	Deep monster-like laughter	Groaning and groaning	Heavy footsteps	Body slam Spit flame	-	Laughter	Monster Pack
Sonic the Hedgehog	1991	Sega	Sonic	Player Character	Platform	Heroic, Brave, Confident, Energetic	-	-	Jump, Speed boost,	Speed boost, jump, whirling	-	Drops coins	Retro Pack
Legend of Zelda: Link's Awakening	1993	Nintendo 64	Link	Player Character	Overhead perspective	Humble, Brave, heroic, strong	-	-	Jump, land	Jump, sword	-	Jump	Retro Pack
Legend of Zelda: Ocarina of Time	1998	Nintendo 64	Link	Player Character	3PS, open-world puzzle	Humble, Brave, heroic, strong	-	Yelp with attack and jump	Jump, footsteps	Sword, ocarina	Ocarina	Yelp, ocarina	Cartoon pack
Legend of Zelda: Ocarina of Time	1998	Nintendo 64	Navi	Companion NPC	3PS, open-world, puzzle	Moody, kind, doubtful	Female, catchphrase "hey! listen!" "Watch out"	-	Synth hum for flight	-	Synth for flight	Synth for flight	Presence Pack + Catchphrase
Legend of Zelda: Breath of the Wild	2017	Nintendo Switch Wii U	Link	Player Character	Open-world RPG	Humble, Brave, heroic, strong	-	Yelp with attack and jump	Footsteps	Sword, shield, bow, other weapons	-	Yelp	Action Pack

Game	Year	First Platform Release	Character	Character Type	Gameplay/Genre	Personality	Voice	Grunt	Foley	Weapon	Music	Popular Sound	Soundprint Type
Earthworm Jim	1995	Sega Genesis SNES	Jim	Player Character	Platform, shooter	Rough, strong, unapologetic	Catchphrases: "yuppie!" Performance comments "tender!", "groovy!"	With effort and pain	Helicopter with head	Gun, Slime, Whip	-	Voice tone	Retro pack
League of Legends	2009	Windows; Mac	Teemo	Playable Character	MOBA	Temper; Mischievous; bipolar personality	Young, male, childish, catchphrases	Yelp, grunt, acclamations	jump	Darts, Spells	-	Catchphrases "Captain Teemo, on duty!"	Arena Pack
League of Legends	2009	Windows; Mac	Annie	Playable Character	MOBA	Mischievous, wicked, childish	Young female, childish voice, Catchphrases	Yelp, grunt, acclamations	jump	Spells, summoning magic	-	Catchphrases "Don't be a scaredy cat!"	Arena pack
Portal	2007	Windows Xbox 360 PS3	GLaDOS	Enemy NPC	Action, puzzle, FPS	Threatening, spiteful, petty	Robotic, female voice, always chatting	-	-	The building's system	"Still Alive"	Robotic and calm voice texture, constant reference to cake	No pack - Voice only
Portal 2	2011	Windows Xbox 360 PS3	Wheatley	Enemy NPC	Action, puzzle, FPS	Frantic, restless, bad	Male, British, always babbling	Yelp, grunt	Robotic, mechanic movements	Hacking	-	Constant British babbling	No pack - Voice and robotic movements
Alien: Isolation	2014	Windows PS3; PS4 Xbox 360 Xbox One	Alien	Enemy NPC	Survival Horror FPS	Impulsive, violent	-	Growl, hiss, grunt, screech	Slimy, reptile-like sounds for movement; footsteps, snake-like rattle	Tail, mouth	-	Screech, hiss, snake-like rattle	Monster pack
The Witcher	2007	Windows; Mac	Geralt	Player Character	Action RPG 3PS	Strong, cynical, loyal, threatening	Male, deep	Grunt, yelp	Footsteps, metallic jiggling	Sword, magic	-	-	Action pack
Jet Set Radio	2000	Dream Cast	Beat	Playable Character	Platform action sports game	Energetic, mischievous	Young male voice; Performance comments "Nice!"	Acclamation s, yelps	Can of spray paint, rollerblades	-	-	"Yeah!"	Sports pack

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Earthworm Jim	1995	Sega Genesis SNES	Jim	Player Character	Platform, shooter	Rough, strong, unapologetic	Catchphrases: "yuppies!" Performance comments "tender!" "groovy!"	With effort and pain	Helicopter with head	Gun, Slime, Whip	-	Voice tone	Retro pack
League of Legends	2009	Windows; Mac	Teemo	Playable Character	MOBA	Temper; Mischievous; bipolar personality	Young, male, childish, catchphrases	Yelp, grunt, acclamation	jump	Darts, Spells	-	Catchphrases "Captain Teemo, on duty!"	Arena Pack
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Overwatch	2016	PC; PS4; Xbox One	Lúcio	Playable Character	FPS/MOBA	Energetic, cheerful, uplifting	Male, cheerful voice	Jumping, landing, attacking, hurt, grunts and yelps	Footsteps, weapon on idle	Gun with sonic projectiles and other sound-based attacks.	-	Catchphrases "Come on, let's bring it together!"	Arena Pack
Overwatch	2016	PC; PS4; Xbox One	Tracer	Playable Character	FPS/MOBA	Energetic, Cheeky, fearless, enthusiastic	Female, bubbly, giggling	Panting when hurt, grunt, yelp	Footsteps, spatial-shifting SFX	Rapid firing pulse pistols	-	Catchphrases, Spatial-shifting SFX "Cheers, love!"	Arena Pack
Chrono Trigger	1995	SNES	Chrono	Player Character	Console RPG	Fearless, strong	-	-	-	Sword attack - pink noise type of sound	-	-	Only Attack Sounds
Skies of Arcadia	2000	Dreamcast	Vyse	Playable Character	Console RPG	Compassionate, positive, strong	Male young	Interjection, yelp	Scabbles	Sword (cut sound)	-	Catchphrases "Hah, that was easy!"	Cartoon Pack
Street Fighter	1987	Arcade	Ryu	Playable Character	Fighting Game	Humble, moral, self-deprecating	Male, deep	Yelp, attack, hurt	Jump	Punch, kick, fireball	-	"Shoryuken!"	Arena pack
Patapon	2007	PlayStation Portable	Patapon Tribe	Playable Character	Rhythm game, Real Time Strategy	Brave, energetic, excited	Multiple, high-pitched voices	Yelp, acclamation	-	music	Move with music when player hits the correct buttons	Chants "Pon, Pon, Pata Pon!"	No pack - Only rhythmic chants
BioShock	2007	Windows; Xbox	Splicers	Enemy Characters	Survival FPS	Francis, erratic, violent, insane, impulsive	Either male or female, shrill, demented, wailing	When hurt	Footsteps	Firearms	-	Voice tone	Minion Pack

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Donkey Kong Country	1994	SNES	Diddy Kong	Playable Character	Platform	Playful, Mischievous		Yelp/squeal	Jump	Jump		Yelp	Retro Pack
Tom Raider	1996	Sega Saturn; PlayStation; MD-DOS	Lara Croft	Player Character	Action-Adventure, puzzle, platform	Sexy, confident, skillful		Jumping and climbing effort, hurt; scream when falling from great heights	Footsteps, jump	Pistols		Climbing effort	Action pack
World of Goo	2008	Windows, Wii	Goo Balls	Player Characters	Puzzle	Organized, patient, positive	High pitched laugh	Yelp acclamations, squeaks	Jump, constructing			Squeak	No pack - Only grunts
Don't Starve	2013	Windows, Mac, Linux	Bunnymen	Friendly/Enemy NPCs	Action-adventure, rogue, survival	Crazed, impulsive		Grumble, yelp, acclamation	Hop around	Bite		Hop around	Starter Kit
The Last of Us	2013	PlayStation 3	Joel	Player Character	Action-adventure survival horror, 3PS	Brutal, strong, haunted, moral	Male, low	Hurt, climbing, overall exertion	Footsteps, jiggling, crawl	Pistol, close-combat		Voice tone	Action pack
The Last of Us	2013	PlayStation 3	Clicker	Enemy NPC	Action-adventure survival horror, 3PS	Uncontrollable, frantic, violent		Broken screeches, hissing, slight clicking sound with throat	footsteps	Hit, bite		Clicking sound with throat	Monster Pack
Fallout 4	2015	Windows, PS4, Xbox One	Paladin Danse	Guide NPC	Action RPG	Brave, moral, committed, honourable	Male, low, deep	Hurt	Metal-clad footsteps	Firearm		Voice Tone	Action Pack + voice

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Undertale	2015	Windows, Mac	Flowie	Enemy NPC	RPG	Immoral, evil, disturbed, wicked	.	.	Series of beeps for dialogue friendly dialogue. Lo-fi sounds for evil dialogue	.	.	.	No pack - Only beeps
Metal Gear Solid 4: Guns of the Patriots	2008	PlayStation 3	Gekkos	Enemy NPC	FPS	Robot	.	Wailing, growling, grunting	Heavy footsteps	Stamps, cannons	.	Wailings	Monster Pack
Metal Gear Solid 4: Guns of the Patriots	2008	PlayStation 3	Soldiers	Enemy NPC	FPS	Distracted, dumb, loyal, impulsive	Generic male voice, interjections, Chatter	When hurt	Footsteps, weapons	Firearms	.	Alert sound	Minion Pack
Duke Nukem 3D	1996	MS-DOS	Duke Nukem	Player Character	FPS	Macho, Brave, Badass, Cool	Male, deep, performance commentary, exclamations, calm	Just	loud	Firearms	.	Performance commentary "Hail to the King, baby!"	Action pack + performance commentary
Mass Effect	2007	Xbox	Commander Shepard	Player Character	Science-fiction RPG	3 types: survivor, hero or ruthless (player choice)	Male or female (player choice)	Just	Footsteps, rustle	Plasma-type firearm	.	Voice Tone	Action pack + voice
Bastion	2011	Xbox	Zia	Friendly NPC	Action RPG	Kind, curious	Female, soft	.	.	.	Sings	Soft singing	No pack - Only voice

