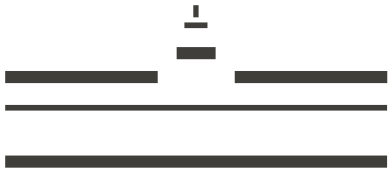

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Video Games - Motives and Barriers

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List of Abbreviations

B	billion(s)
CLV	Customer Lifetime Value
e.g.	exemplia gratia (for exampe)
et al.	et alia (and others)
etc.	et cetera (and so on)
DV	dependent variable
f., ff.	following page(s)
Ed.	Editor
EFA	Exploratory Factor Analysis
IAP	In-App Purchase
ibid.	ibidem (in the same place)
i.e.	id est (that is)
IV	independent variable
KMO	Kaiser-Meyer-Olkin
M	million(s)
MMORPG	Massively Multiplayer Online Role Playing Game
MUD	Multi User Dungeon
no.	number
OLS	Ordinary Least Squares
p.	page
PC	Personal Computer
PCA	Principal Component Analysis
UAC	User Acquisition Costs
VGU	video games use
VIF	Variance Inflation Factor
Vol.	Volume

Declaration of Brand Name Usage

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1 Introduction

"Playing a game is the voluntary attempt to overcome unnecessary obstacles!"
Bernard Suits [Suits and Hurka, 2005]

Marketing analysts predict that in 2017 the worldwide revenue with video games will reach 108 billion US$. [McDonald, 2017] That means that people are spending more than 2.5 times the money on "overcoming unnecessary obstacles" in their free time than on going to the movies, as [Statista, 2016a] reports a yearly worldwide box office result for 2017 of "just" 41 billion US$.

The top single day grossing of a movie, Star Wars: The Force Awakens with a revenue of 119 million US$ [Box Office Mojo, 2017], pales in comparison to the best single day revenue of a video game: Grand Theft Auto V turned in over 800 million US$ in 24 hours. [Goldfarb, 2013]

According to the Entertainment Software Association, there are 1.7 gamers in every US household. Of the 82 million people inhabiting Germany [Statistische Ämter des Bundes und der Länder, 2017] more than 34 million can be considered as gamers. [Statista, 2017a]

As the numbers clearly demonstrate, video gaming is a massive economic factor and therefore a lot of scholars have investigated it in detail. From showing how value is created in the games industry [Hennig-Thurau and Marchand, 2013], shining a light on the two-sidedness of the video games market [Landsman and Stremersch, 2011], towards treating and researching video games as a serious medium [Oliver et al., 2016].

But what exactly are video games, why do people play them and why do some people refrain from gaming?

Extendin [Suits and Hurka, 2005]'s definition of games, video games are the "voluntary attempt to overcome unnecessary obstacles" in a digital environment. But why should people spend limited resources like time and money on something like this?

An individual's reason to act in a certain way or to lean towards a specific behavior is called a motive. [Pardee, 1990] Motives for video game consumption are a common topic in scientific research. Noteworthy contributions include, but are not limited to [Bartle, 1996], [Lazzaro, 2004], [Ryan et al., 2006], [Klimmt and Hartmann, 2006], [Sherry et al., 2006], [Yee, 2007] and [Kallio et al., 2011]. These works use different theoretical approaches, e.g. the self-determination theory or the uses and gratifications model, to explain why people are playing video games.

On the other hand, an entity that impedes or seperates an individual from a specific behavior is called a barrier. [Merriam-Webster, 2017a] Scientific research dealing with the topic of barriers for the use of video games turned out to be scarce. Some of the works focussing on motives casually mention barriers on a more subtextual level, e.g. [Lazzaro, 2004], [Klimmt and Hartmann, 2006] or [Kallio et al., 2011]. Articles purely

focusing on figuring out why some people avoid video games, like [Gandasegui, 2010], are even more rare, opening up a promising research opportunity.

In the course of this thesis, answers to the question: "How do motives and barriers drive and impede the use of video games?" will be provided. In order to provide these insights, I will first introduce the reader to the foundations of the video games industry to establish a common pick up point. Afterwards, I will familiarize the reader with foundational theories of motive research that have been applied to video gaming. I will follow this with an overview of motives and barriers for video games that can be found in current scientific literature.

Based on these groundworks I will synthesize these motives and barriers and, by analyzing them regarding their similarities, segment them accordingly. When the motive and barrier segments are established I will propose several hypotheses regarding their direct effects on the use of video games.

To test this model I will first introduce the used research methodology, evaluate the gathered data and show the research results by testing the proposed hypotheses.

Finally, I will conclude this thesis with a discussion of the results, the limitations of the research conducted and give an outlook for future scientific research opportunities.

2 Foundations

This chapter will familiarize the reader with the most important concepts that are necessary to understand how the video game industry is structured and creates value. In the next step, foundational theories of motive research will be provided as knowledge basis, before a literature overview of the current status on motives and barriers in scientific and practical literature is presented.

2.1 Foundations of the Video Game Industry

The video games industry is one of the most important entertainment industries worldwide, as the revenues shown in the introduction, but it is also a very young one. Video games as an industry was only born in the early to mid-1970s with the introduction of the Pong arcade cabinet [Kent, 2010] and the first home video console, the Magnavox Odyssey in 1972. [Langshaw, 2014] Outgrowing its infancy it overcame the video games crashes in 1977 and 1983 [Ernkvist, 2008] and evolved into a multi-faceted, highly dynamic and innovative industry incorporating multiple key players in its value chain. [Hennig-Thurau and Marchand, 2013]

The video games industry is cyclical platform market, at least in its major segment, the consoles. That means, it is regularly and frequently changed by the introduction of new console generations. [Hennig-Thurau and Marchand, 2013] These console genera-

tions usually last around 6 years and include stationary home video game consoles and gaming handhelds. On the other hand, personal computers (PC) have traditionally been a major factor for the gaming industry, too. The recently released multiplayer title "PlayerUnknown's Battlegrounds" managed to sell 10 million copies in just over 6 months time. [Sinclair, 2017] Nevertheless, the gaming market in the "classic" segment of stationary gaming is dominated by the consoles. In 2016 only one-third of the video games industry's revenues in Germany were generated with PC games. [Statista, 2016b] On the way to the top are mobile games, i.e. games that are run on either smartphones or tablets. According to [McDonald, 2017] these games were making up 42% of the worldwide games market and are expected to reach 50% by 2020, bringing in nearly 65 billion US$.

The video games market is a two-sided market [Rochet and Industrielle, 2003] and therefore subject to direct [Katz and Shapiro, 1985] and especially indirect network effects [Economides and Salop, 1992] as described by [Clements and Ohashi, 2005]. Direct network effects describe that the increased usage of a product leads to an increased value for all consumers or users of that product, e.g. a telephone network. [Rohlfs, 1974] Indirect network effects introduce another aspect. They explain how increased usage leads to additional products that indirectly lead to an increment of the original product's value [Economides and Salop, 1992], i.e. the more games there are available for one specific platform the more valuable the platform is to the consumer. The two-sidedness of the games industry can be shown by the fact that a large installed base of a gaming platform is attractive for game developers. They produce and offer a larger variety of game titles which in turn increases the attractivity of the platform to those consumers currently not in possession of the platform. These consumers are potentially new customers of the platform provider as well as the game developers. [Rochet and Industrielle, 2003, Marchand, 2016]

In order to establish a common understanding of the notions used throughout this thesis, two terms have to be defined. First, a video game is the "attempt to achieve a specific state of affairs [prelusory goal], using only means permitted by rules [lusory means], where the rules prohibit use of more efficient in favour of less efficient means [constitutive rules], and where the rules are accepted just because they make possible such activity [lusory attitude]" in a digital context. [Suits and Hurka, 2005] Addtionally the term player has to be agreed upon. In the present thesis, a player or gamer is a human being interacting with a (video) game. [Juul, 2010] Player and gamer will be used synonymously in this paper.

2.2 Foundational Theories in Motive Research

As mentioned before, video gaming is one of the younger, scientifically researched areas. Therefore, scholars applied existing theories and models on their research of motives regarding video games. In order to give the reader a solid understanding of these

theories, these theories will be introduced before they can be applied on games research. To ensure that the theories included in this thesis adhere to a high standard, they had to be widely recognized by fellow scholars. This could be proven by either being published in a journal with a JOURQUAL 3 rating of at least "B" [VHB, 2017] or by being used as reference at least 200 times according to Google Scholar.

One well-known theory used to explain why people play video games is the self-determination theory proposed in [Deci and Ryan, 2000, Deci et al., 2004, Deci and Ryan, 2008]. The self-determination theory deals with intrinsic motives, that means, those choices and behaviors people demonstrate without being externally influenced or being exposed to external interferences. According to the self-determination theory, three needs are universal, innate and essential for psychological health and personal well-being. Th authors list these three main psychological needs as drivers of self-initiated behavior: competence, autonomy and psychological relatedness. Competence is defined as the need to control the outcome and to experience mastery. [White, 1959] Autonomy is the urge to be the causal agent responsible for one's own life. [DeCharms, 1968] Finally, relatedness is the need to interact with and be connected to other human beings. [Ryan and Deci, 2000]

In their articles [Ryan et al., 2006] and [Przybylski et al., 2010] expand their use of the self-determination theory to explain video games use, by establishing a utilitarian perspective that puts video games as a tool in the hand of its users. This tool gains its appeal based on the ability to satisfy the mentioned psychological needs and thereby enhancing personal well-being.

A complementing theoretical approach to illuminate motives for playing video games is introduced in [Klimmt and Hartmann, 2006]. Their construct is also based on the notion of self-effectance established by [White, 1959], clearly demonstrating parallels to the works of Deci and Ryan. The second column Klimmt and Hartmann built upon is the concept of self-efficacy, formulated in [Bandura, 1977] and expanded in [Bandura, 1997]. Also in line with the self-determination theory, Klimmt and Hartmann focus on intrinsic motives for play. They argue that the motivation to play video games is the result of self-reflection. The potential video game user will compare the mental and cognitive conditions the game will enable him to experience, with those conditions he prefers. Effectance and self-efficacy are important factors in the process of deciding whether to play or not. [Klimmt and Hartmann, 2006] Effectance is defined as the satisfaction of having an imposed effect on the environment. [White, 1959] In the case of video games this is reflected by continuos feedback loops between player and game, resulting in interactivity.

The second factor of Klimmt and Hartmann's model is self-efficacy, which is defined by [Bandura, 1977] as "the conviction that one can successfully execute the behavior required to produce the outcomes". Applied to video games, this means that the gamer has to be convinced to master the obstacles present in the game world, in order to achieve a specified winning condition and demonstrate mastery.

[Klimmt and Hartmann, 2006] state that "Players who never enter the cyclic process of mastery, increase of efficacy beliefs, performance gain, and new mastery experiences will not display a strong general disposition that favors engagement in the given activity".

[Sherry et al., 2006]'s work on video games motivation is also to be classified as utilitarian. Sherry's model is based on the uses and gratification theory, that tries to explain how people use media to achieve a certain effect. [Katz, 1959, Katz et al., 1973, Ruggiero, 2000] The uses and gratifications theory contains the proposal that media users are not purely passive consumers, but take over an active role in the integration of media into their life. It also states that the users' choice is based on the desires and needs they want to satisfy with the media of choice. According to the theory, needs that can be satisfied are the enhancement of knowledge, relaxation, social interaction, diversion, and escapism. [Katz et al., 1973, Sherry et al., 2006]

Another theory that is used to explain the motivational suction of video games, is the theory of mood management introduced by [Zillmann and Bryant, 1984, Zillmann, 1988]. The mood management theory assumes that the individual is predisposed to be motivated by pleasurable experiences and to avoid such experiences, that have a negative connotation. This approach focusses on arranging the individual environment in a hedonically positive way by choosing specific media, which support achievement of the desired mood.

Zillmann's hypotheses have been recapped by himself in [Zillmann, 2000]: The indicated hedonistic objective is best served by selective exposure to material that (a) is excitationally opposite to prevailing states associated with noxiously experienced hypo- or hyperarousal, (b) has positive hedonic value above that of prevailing states, and (c) in hedonically negative states, has little or no semantic affinity with the prevailing states.

Applying the mood management theory to video games, [Yee et al., 2008] argue that, in line with Zillmann's theory, players are likely to choose video games that match their individual motivations in order to maintain or achieve a hedonically positive state. Therefore it seems worth to consider it when further reviewing video game motives.

The last theoretical model in this foundational introduction is not quite in line with the three models presented above. [Graham and Gosling, 2013] use the Big Five personality traits in order to determine how different personalities have different motives for play associated with them. The approach is based on the works of [Yee and Ducheneaut, 2011] who demonstrated that personality determines behavior in virtual worlds which lead to [Graham and Gosling, 2013]'s hypothesis that motives are personality dependent. A player's standing on the Big 5 traits extraversion, agreeableness, conscientiousness, neuroticism, and openness is associated clearly with their motivations to play, at least in the considered gaming environment of a massively multiplayer online role playing game (MMORPG). This thesis will not investigate personality traits, but nev-

ertheless the motives brought up in [Graham and Gosling, 2013] are very promising as [Winter et al., 1998] argues that personality traits are just a channel through which motives are expressed.

2.3 Motives and Barriers: Literature Overview

In the present section, the reader will be provided with an overview of current scientific and practical literature. As video games research is a young science, practical research still dominates regarding the number of publications. An exemplary Google search for the generic scientific term "video games motives" listed approximately 320.000 results, the more practical search term "why do people play video games" returned 159.000.000 results. Therefore, relevant practical literature is included in this literature overview. To be included, articles had to be either based on one of the theories introduced in chapter 2.2 or had to support the development of a conceptual model by providing aspects, which could not be extracted from scientific literature. This overview is presented in chronological order of the respective publications.

One of the most widely known publications about motives for video gaming, is [Bartle, 1996]. Bartle was one of the first to segment users of video games, more specifically MUD (Multi-User Dungeon) users, into distinct groups on the base of their main motives. He identified four player types: the achiever, the explorer, the socializer and the killer and their respective base motivations: achievement, exploration, sociability, and imposition on other players. Bartle arguments originate from anectodal evidence and intensive studies of gamer behavior, as he extrapolated these motives from observing the users of a specific MUD over a longer time period. The Bartle motive of achievement is defined as points-gathering and rising in levels being the main goal. The explorer is driven by having the game expose its internal machinations and discovery. The sociability motive focuses on building and maintaining inter-player relationships. The killer archetype is motivated by imposing themselves on others. Even though Bartle mentions the possibility of doing this by being "nice" to people, the common way is to attack other players in order to cause massive distress. [Bartle, 1996]

[Lazzaro, 2004] published a report about how to evoke emotions in the users of video games without making use of story elements. She identified four motives for the use of video games by players: The first key motive is called "Hard Fun", which Lazzaro defines as "emotions from meaningful challenges, strategies and puzzles." Gamers with this key motive use video games to test their skills and to feel accomplishment as well as to experience competitive and cooperative gameplay via interacting with other players. Lazzaro's second key motive is "Easy Fun", described as "grab[ing] attention with ambiguity, incompleteness and detail" to make the player become totally immersed in the game world. This key also includes using video games to experience something new, to satisfy the need for awe and mystery. The generation of "emotion with perception, thought, behavior and other people" is called "Altered States". According to Lazzaro,

players using this key play to move from one mental state to another or to think or feel something different. This shows some intersection with the mood management theory. Lazzaro's fourth motive "The People Factor" includes the creation of opportunities for player competition, cooperation, performance and spectacle. A gamer with this key motive makes use of video games to socially interact with other people. [Lazzaro, 2004]

In 2006 three works based on foundational theories were released: [Klimmt and Hartmann, 2006] built on the concepts of effectance motivation [White, 1959] and self-efficacy [Bandura, 1977] in order to show that video games are used to feel "enjoyment of causing change in the environment, achieved through game play". In this context, game play can be defined as the interactivity between player and game through continuous feedback-loops. [Klimmt and Hartmann, 2006] identified the feeling of self-efficacy as another motivating factor that facilitates video game use and defined it as "the expectation of mastery, continuously challenged by game opponents".

[Ryan et al., 2006] applied the concept of self-determination on the investigation of video gaming motives. Ryan and colleagues argue, that video games are motivating primarily by letting the player experience autonomy, competence, and relatedness and thereby satisfying psychological needs. Autonomy is seen as the absence of external control over the individual's behavior which should be typically high for a user of video games, as gaming is usually a voluntary act. [Suits and Hurka, 2005] Competence is the need for challenge and effectance [White, 1959], so the approach of Ryan et al. is intersecting with Klimmt and Hartmann. [Klimmt and Hartmann, 2006] Another motive mentioned is the psychological need for relatedness, that is the need to feel connected with others. [Ryan and Deci, 2001] This need can be satisfied by other human players or by "computer generated personalities". [Ryan et al., 2006] The model was advanced in [Przybylski et al., 2010] where the authors suggested the investigation of how specific game features influence basic need satisfaction.

[Sherry et al., 2006] published a paper on video game motives and employed the uses and gratification theory. Following along the lines of [Zillmann and Bryant, 1985], they argue that individuals use media to manage fluctuations in positive and negative emotional states, in order to maintain equilibrium. Sherry et al. identified six motives for video game use: Arousal, the wish to stimulate emotions; Challenge, as in being pushed to a higher skill level and to feel personal accomplishment; Competition, proving oneself to others and to display dominance; Diversion, as in using video games to "fill time, relax, escape from stress or because there is nothing else to do"; Fantasy, using video games because they allow the player to do things he would not be able to in real life; Social Interaction, which is self-explaining. The authors were able to show that the identified motives could be used as effective predictors of hours played by employing multiple linear regression analysis. [Sherry et al., 2006]

Supplementing Sherry et al., [Yee, 2007, Yee et al., 2008] investigated motives for video game use and demonstrated, that different types of players may have different sets of

motives for game play. The scholars carved out a set of ten motives that could be segmented into the three overarching components: achievement, social and immersion. The achievement component includes the desire for ingame advancement, the optimization of character performance by game mechanics analysis and the competition with other players. Socializing with others, forming relationships and teamwork make up the social component. The immersion component consists the urge for discovery, role-playing and customization, and escapism, i.e. using the game to avoid thinking about real life problems. [Yee, 2007] performed an exploratory factor analysis to demonstrate, that these motives are not mutually exclusive.

[Kallio et al., 2011] identified a comprehensive set of motives when they investigated gamers in a socio-cultural way. After approaching their search with quantitive methods they conducted qualitative interviews and proposed the concept of gamer mentalities. The motives sociability, diversion, time spending, time killing, immersion and relaxation can be seen as iterations of those identified in the works cited above. Nevertheless, Kallio et al. provided valuable insights, as they explicitly put their focus not only on the core of the gamer community but included what they called casual gaming mentalities as well. This inclusive approach is also followed in this thesis.

In his Gamasutra article, [Stewart, 2011] tried to create a unified model to understand player behavior. He relied on the works of [Bartle, 1996], [Keirsey and Bates, 1984], [Bateman et al., 2011], [Lazzaro, 2004], [Caillois, 1961] and others. Four motives end up in his unified model: power (manipulative sensation), security (competitive accumulation), knowledge (logical rule-discovery) and identity (emotional relationships).

[Tseng, 2011] performed a dimensionality reducing factor analysis on player data gathered in an online survey performed in Taiwan. The author was able to identify two underlying motivational factors: the need for exploration, defined as "exploring the extremes of the games, exploring new maps or frontiers in the games, explore different identities and future selves for new friend-ship in the games" and the need for aggression, defined as "killing the characters of other gamers, winning over other gamers, and so on". Tseng's exploration motive can be seen as a motive set, including motives already present in this literature overview. e.g. curiosity/eploration, role-playing, immersion or sociability. The aggression construct consists of very competitive motives, also well reflected in the works of others.

[Billieux et al., 2013] and [Graham and Gosling, 2013] both reconnoitered the virtual worlds of the most successful MMORPG, World of Warcraft [Leack, 2017], in order to investigate player motivations. Billieux et al. conducted a long-term observation of in-game behavior in comparison with self-reported motives, while Graham and Gosling took a look at how personality traits are associated with different motives for game play. Both papers iterate the already listed motives for general video game use. The approach of [Billieux et al., 2013] showed that different motives are visible in actual player behavior and [Graham and Gosling, 2013] added the consideration of personality traits as a channel through which motives are displayed.

In contrast to the extensive research performed on the motives for video game use, researching barriers for video game use definitely appears to be less popular. Some scholars, that researched motives, mention barriers more or less casually. [Lazzaro, 2004] lists reasons like job responsibilities, raising a family, graphic violence and moral theme or individuals assessing games as not being fun. In the works of [Ryan et al., 2006, Przybylski et al., 2010] the authors discuss intuitive controls as a motivating factor. From this, unintuitive controls can be deduced as a barriers for the use of video games. In a similar fashion [Klimmt and Hartmann, 2006] contribute to the short list of barriers: the assumption of low effectance and/or of a low self-efficacy regarding video games can act as a barrier for video games use. Klimmt and Hartmann add general complexity and a steep learning curve as further show stoppers for game play. [Kallio et al., 2011] put financial resources and inaccessibility of games and the according game devices on the tab.

Very few authors explicitly deal with the topic of barriers for video game use: [Leigh, 2011], [Cheese and Wong, 2011], [Carmichael, 2011] and [Holmes, 2017] published blog posts on renowned gaming websites like Kotaku or Pixelkin, but scientific literature is rare. Sociologist [Gandasegui, 2010] published an article about "The non-gamer" in which he discusses the sociological aspects and psychological characteristics of those individuals who are not using video games. He differentiates between more casually orientated gamers and those that are highly involved in the gaming culture. He argues that a strict definition of "the gamer" is impossible and contrasts his argument by defining the non-gamer: one who never plays games. His paper features an extensive list of items that might lead someone to become or stay a non-gamer, essentially barriers for the use of video games: accessibility of games, costs, time constraints, fear of addiction, technical/technological requirements, preference for other hobbies/media, aesthetic judgmentment, unfamiliarity. Gandasegui's paper is mainly based on anecdotal evidence and is not backed by qualitative or quantitative research methods.

GameAnalytics.com analyzed over 400 free to play games and published an article about player churn. [Lovato, 2015] Even though it is not a scientific publication, it provides valuable insight on why individuals might not be playing, at least with regards to free to play games. Their data are used by well-known mobile game developers like PopCap Studios [PopCap, 2017] or HipsterWhale Games[HipsterWhale, 2017] and therefore seem reliable enough to be included in this thesis. The main barriers Lovato points out are time constraints, complexity and the learning effort requested from the player.

To sum up, I want to emphasize the lack of scientific research investigating barriers for the use of video games. In order to light up this topic, the next chapters will synthesize and extend the literature based motives and barriers regarding video games, in order to come up with a conceptual model, that can be tested using empirical methods.

Author(s)	**Year**	**Title**	**Motives**	**Method(s)**
Bartle	1996	Players who suits MUDs	Achievement, Exploration, Sociability, Imposition	conceptual work based on anectodal evidence and long time observation
Lazzaro	2004	Why we play games: Four keys to emotion without story	Hard Fun, Easy Fun, Altered States, The People Factor	qualitative research: interviews, questionnaires and experiments (45 participants)
Ryan et al.	2006	The motivational pull of video games	Autonomy, Competence, Relatedness, Presence, Mastery of Controls	experiments and questionnaires (89/50/58 participants in 3 studies), online survey (730 participants), correlation analysis
Sherry et al.	2006	Video Game Uses and Gratifications as Predictors of Use and Game Preference	Arousal, Competition, Diversion, Fantasy, Social Interaction	field surveys (1256 participants), linear regression analysis
Klimmt, Hartmann	2006	Effectance, self-efficacy, and the motivation to play video games	Self-Efficacy, Effectance	conceptual work
Yee et al.	2007	Motivations of play in online games	Sociability, Achievement, Immersion, Escapism	online survey (3000 participants), exploratory factor analysis, linear regression analysis
Yee et al.	2008	Who plays, how much, and why? Debunking the stereotypical gamer profile	Sociability, Achievement, Immersion, Escapism	online survey (7700 participants), game database analysis, exploratory factor analysis, linear regression analysis
Przybylski et al.	2010	A Motivational Model of Video Game Engagement	Autonomy, Competence, Relatedness, Presence, Mastery of Controls	conceptual, linear regression analysis

Author(s)	**Year**	**Title**	**Motives**	**Method(s)**
Kallio et al.	2011	At Least Nine Ways to Play: Approaching Gamer Mentalities	Sociability, Diversion, Time Spending, Time Killing, Immersion, Relaxation	quantitavive survey (4000 participants), qualitative interviews (73/33 participants)
Stewart	2011	Personality And Play Styles: A Unified Model	Power, Security, Knowledge, Identity	conceptual
Tseng	2011	Segmenting online gamers by motivation	Exploration, Aggression	exploratory factor analysis, k-means clustering
Billieux	2013	Why do you play World of Warcraft? An in-depth exploration of self-reported motivations to play online and in-game behaviours in the virtual world of Azeroth	Advancement, Mechanics, Competition, Socialising, Relationship, Teamwork, Discovery, Role Play, Customising, Escapism	online survey and game database analysis (690 participants), correlation analysis
Graham, Gosling	2013	Personality profiles associated with different motivations for playing World of Warcraft	Sociability, Immersion, Achievement, Leadership, Independence	online survey (1413 participants), linear regression analysis
Kahn et al.	2015	The Trojan Player Typology: A cross-genre, cross-cultural, behaviorally validated scale of video game play motivations	Sociability, Immersion, Narration, Escapism, Achievement, Completionism, Knowledge, Competition	online surveys (18627/18819 participants), confirmatory factor analysis

Table 1: Videogame motives in literature

Author(s)	**Year**	**Title**	**Barriers**	**Method(s)**
Lazzaro	2004	Why We Play Games: Four Keys to More Emotion Without Story	Job responsibilities, raising a family, graphic violence, moral theme, waste of time	qualitative research: interviews, questionnaires and experiments (45 participants)
Ryan et al.	2006	The motivational pull of video games	Steep leaning curve, Mastery of Controls	experiments and questionnaires (89/50/58 participants in 3 studies), online survey (730 participants), correlation analysis
Klimmt, Hartmann	2006	Effectance, self-efficacy, and the motivation to play video games	Learning Effort, Complexity, Assumed low self-efficacy, absence of effectance, technical/technological requirements	conceptual work
Gandasegui	2010	The non-gamer	Accessibility of Games, Costs, Time Constraints, Fear of addiction, Technical/technological requirements, Preference for other hobbies/media, Aesthetic judgment, Unfamiliarity	conceptual work
Kallio et al.	2011	At Least Nine Ways to Play: Approaching Gamer Mentalities	Accessibility of Games and Game Devices, Complexity, Costs	quantitavive survey (4000 participants), qualitative interviews (73/33 participants)
Leigh	2011	Why Don't I Lose Myself In Games Anymore?	Time Constraints	anecdotal evidence, practical oberservation

Author(s)	**Year**	**Title**	**Barriers**	**Method(s)**
Carmichael	2011	Five Reasons Why We Stop Playing Video Games	Time Constraints, Preference for other hobbies/media	anecdotal evidence, practical oberservation
Wong, Cheese	2011	5 Ways to Tell You're Getting Too Old for Video Games	Learning Effort, Complexity, Time Constraints,	anecdotal evidence, practical oberservation
Lovato	2015	16 Reasons why players are leaving your game	Complexity, Time Constraints,	app store metrics evaluation
Holmes	2017	5 reasons why you don't like video games	Complexity, Learning Effort, Time Constraints	anecdotal evidence, practical oberservation

Table 2: Videogame barriers in literature

3 Development of a Conceptual Model

This section will be used to develop a conceptual model for the use of video games. First an overview of the model will presented for the ease of understanding and to provide the reader with a guideline through the following parts. To build the foundation of the model, motives and barriers for video games use will be synthesized from current scientific and practical literature, before they will be segmented according their underlying effective directions and hypotheses about their direct effects on video games use are proposed. The basic model will be factorized based on these segmentations, providing a second model for the empirical part, which will investigate the research question of this thesis: how do motives and barriers drive and impede the use of video games?

3.1 Model Overview

Building on the foundational theories of motive research and the literature overview provided, I argue that it is possible to synthesize distinct motives, exerting direct positive effects on video games use, and distinct barriers, exerting direct negative effects on video games use. Figure 1 provides an overview of the conceptual model, showing the direct effects of motives and barriers on video games use.

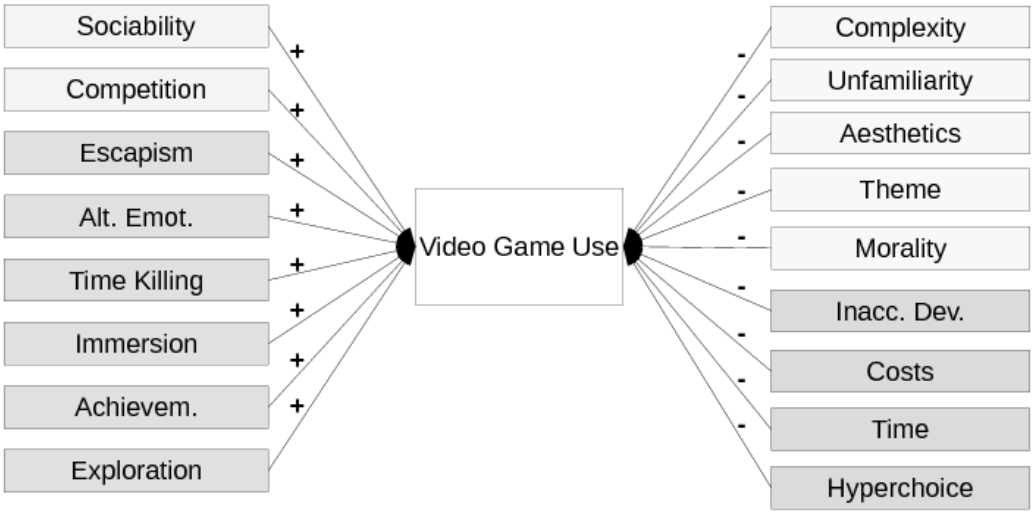

Figure 1: Model 1 - Motives and barriers for video games use

3.2 Motives and Barriers: Literature Synthesis

As the literature review in chapter 2.3 revealed, several motives and barriers appear in multiples articles, although these similarities are not always discernible at first sight. The review also shows the massive amount of heterogeneity regarding the terminology in the field of video games research.

Using games to build and maintain relationships with others, is one of the most commonly mentionend motives for the use of video games. It is used to define the archetype of the "socializer" by [Bartle, 1996] and still common in recent publications like [Kahn et al., 2015]. According to the self-determination theory, feeling connected to other humans through video games fulfills the psychological need for "relatedness" and increases personal well-being. [Ryan et al., 2006, Przybylski et al., 2010] The construct of sociability is known by different names, e.g. "The People Factor" [Lazzaro, 2004] or "The Social Component" [Yee, 2007, Yee et al., 2008], but it always includes using games to spend time together [Kallio et al., 2011] to form meaningful relationships [Stewart, 2011] of variable lifespans, i.e. short term in order to solve problems via teamwork [Billieux et al., 2013] or long-term as in creating new friendships with the help of video games [Kahn et al., 2015]. [Tseng, 2011] applies the need for exploration, found as one of two motives for video games use, to the need "to explore different identities and future selves for new friendship in the games".

$\boldsymbol{\delta_{M1}}$: Sociability as a motive for the use of video games is understood as the motivation to play videos games, to interact with other human beings. This interaction can take place in the same physical location, e.g. couch coop gaming, in the same virtual location, e.g. on the same multiplayer server, or even on a meta-level, e.g. by taking part in discussions about gaming.

The motive of competition is closely related to sociability, as it also is about the interaction with other players. In contrast to playing with others, competition is about the desire to challenge and compete against them. [Billieux et al., 2013] In the context of the uses and gratifications theory, games can be used to prove oneself to others and display dominance, as well as to establish oneself in a social hierarchy. [Sherry et al., 2006] In the self-determination theory the competitive motive can be identified in the psychological need for competence, the need to be challenged, and the need for relatedness, the connection to others. [Ryan et al., 2006, Przybylski et al., 2010] According to [Kahn et al., 2015] video games are played because they allow the player to live out the desire to win the game and be the best. This is in line with the work of [Tseng, 2011] who identified the need for aggression as one of two basic motives for playing video games.

$\boldsymbol{\delta_{M2}}$: Competition is defined as the motivation to use video games in order to compete and compare against others, which includes mainly other human players, but can also be applied to artifical, i.e. computer controlled, opponents. [Vorderer et al., 2003]

[Graham and Gosling, 2013] proposes that video games can be and are being used to "escape the realities of the offline world". This idea of escapism is shared by [Kahn et al., 2015], [Billieux et al., 2013] and [Yee, 2007, Yee et al., 2008]. [Kallio et al., 2011] call this motive "playing to get one's mind off business". [Sherry et al., 2006] establish the use of video games to escape from stress and provide diversion in line with the uses and gratifications model. In her article, [Lazzaro, 2004] elaborates on the key motive "altered states", which includes the relief from thoughts

Motive	[Bartle, 1996]	[Lazzaro, 2004]	[Ryan et al., 2006]	[Sherry et al., 2006]	[Klimmt and Hartmann, 2006]	[Yee, 2007, Yee et al., 2008]	[Pryzybylski et al., 2010]	[Kallio et al., 2011]	[Stewart, 2011]	[Tseng, 2011]	[Billieux, 2013]	[Graham and Gosling, 2013]	[Kahn et al., 2015]
Sociability	Archetype: Socialiser; Interest in people; Empathising: Symphathising; Build and maintain relationships; Archetype: Achiever: Cooperate to pursue difficult goals; Interacting with other Players	The People Factor; Player to Player Interaction; Teamwork; Camraderie; Spend time with friends; Social Interaction; Cooperative Play	Relatedness; Feel connected with others; interactions between real players	Social Interaction; interact with friends; learn about the personalities of others; keep up on games to be cool	-	The Social Component; Socializing; Relationship; Teamwork	Relatedness; Social Interaction; Cooperative Play; Development of Social Bond;	Social Mentality; Cooperative Play; Do something together; Keep/have company; Spend time together	Motivation: Identity (emotional relationships)Meaningful relationships; Internal Change; Interacting with others	The need for exploration (regarding interpersonal relations); explore different identities and future selves for new friend- ship in the games	Social interactions: Create new relationships; Solve problems through teamwork;helping others; chatting with others;	Socialize; form relationships; collaboration; social support	Player Type: Socialiser; Build and maintain social relationships;Playing in teams; bonding; reach out for new friends
Competition	Archetype: Killer; Imposing on others; Cause distress; Archetype: Achiever; Compete for high-score; Gain status; Hierarchy; Acting on other Players	The People Factor; Competition; Player to Player Interaction; Rivalries;	Competence: A need for challenge; Relatedness: Social Interaction	Competition; Prove to other people; display dominance; establish position in hierarchy of peer group;	Self-Efficacy	Competition; Challenge and compete with others; Provocation; Domination; Manipulation;	Competence: A need for challenge; Relatedness: Social Interaction	Social Mentality; Competetive Play;	Motivation: Power; Manipulative sensation; External Change; Competition; Status; Hierarchy	The need for agression; Winning over others; Killing characters of other players	Competition (desire to challenge and compete with others)	-	Player Type: Competitor; Competition; Desire to win the game; Be the best
Escapism	-	Altered States; Relief from thoughts and feelings; Think or feel something different; Relief	-	Diversion; Escape from stress	-	Escapism; Relax; Escape from RL; Avoid RL Problems	-	playing to get one's mind of business	-	-	Escapism; use the online environment to avoid thinking about real-life problems	Escapism; Escape reality; Escape the realities of the offline world	Player Type: Escapist; use games to escape from real life:
Time Killing			-	Diversions; nothing else to do	-	-		Killing time; Filling gaps; Move from one task to another;	-	-	-	-	-
Altering Emotional States	-	Altered States; Relief from thoughts and feelings; Move from one mental state to another; think or feel something different; Excitement; Relief	Enhance well-being by psychological need fulfillment	Arousal; Stimulate emotions;	Gain pleasurable emotions through the belief that one causes observable change in the gaming environment	-	Enhance well-being by psychological need fulfillment	Relaxing; Relax from routines;	-	-	-	-	-
Immersion	Archetype: Achiever; immerse in the game environment (a fully fledged world)	Easy Fun; Enjoyment of experiencing the game activities; become immersed in the experience; Maintain focus with player attention;	Effectance stimulates feeling of being part of the gaming environment; Presence;	Fantasy; Games allow players to do things they would normally not be able to;	Effectance; Having imposed an effect on the gaming environt; Interactivity; I/O-Loops; Feedback;	Immersion; Role-Playing; Avatar Customization; Geographical exploration;	Autonomy and competence need fulfillment leads to more immersive experiences	Commited Mentality; Immersive Play;Agency and participation in digital games culture through discussion, new contents/structures	Immersion	-	Role-Play; Customisation	Immersive Motivations	Player Type: Story-Driven; desire for interesting stories in the game world; identify with and learn about game characters
Achievement	Archetype: Achiever; main goals: point gathering, rising in level; Acting on the World	Hard Fun; Emotions from meaningful challenges; pursuit of a goal; feel accomplishement; test their skills;	Competence: A need for challenge; acquire new skills; be optimally challenged; get positive feedback (reward); Autonomy;	Challenge; push themselfes to a higher level of skill; personal accomplishement; get to the next level; beat the game	Competence; making progress in the knowledge and abilities; Gain new competences; Effectance; Self-Efficacy: Feeling that one can deal competently with the challenges of the gaming environment as basic construct for the feeling of mastery/ achievement	Achievement; Advancement; Arousal	The need for competence; The need for autonomy	Commited Mentality; Gaming for Fun; Progression; Skillfulness; playing as gaming/sports	Motivation: Security (competitive accumulation)	-	Advancement (desire to gain power, progress rapidly and accumulate in-game symbols of wealth or status)	Achievement Motivations	Player Type: Competitor; Competition; Desire to win the game; Be the best
Exploration	Archetype: Explorer; Find out as much as possible about the game world; Expose internal machinations of the game; Figure out how things work: Real fun comes from discovery; Make the most complete maps;	Easy Fun; Sense of curiosity; Wonder, awe and mystery; Explore new worlds; Wanting to figure it out;	Competence; acquire new skills/knowledge	-	-	Immersion – Discovery;	Competence; acquire new skills/knowledge	-	Motivation: Knowledge; Logical Rule-Discovery	The need for exploration; Exploring the extremes of the game; new maps or frontiers;	Discovery; desire to find out and know the game's elements or places that most players do not know about	-	Player Type: Completionist; explore every element of the game to the maximum extent

Table 3: Literature synthesis of motives for video game use

and feelings, which can be considered as partly intersecting with the escapism motive.

$\boldsymbol{\delta_{M3}}$: Escapism in the context of video games is defined as using a game in order to avoid or escape real life obligations or problems.

The before-mentioned construct, "altered states" [Lazzaro, 2004], includes another important motive, that is refered to as altering emotional states in accordance to the concept of emotion regulation. [Cole et al., 1994] In the words of Lazzaro, this means the use of video games in order to "move from one mental state to another", "to think or feel something different". In the context of the self-determination theory, this is equivalent to using video games because they enhance the personal well-being by the fulfillment of psychological needs. [Ryan et al., 2006, Deci and Ryan, 2008, Przybylski et al., 2010] The construct altering emotional states has to be differentiated from escapism, as it includes actively changing one's mental state [Lazzaro, 2004] by the stimulation of emotions [Sherry et al., 2006], compared to just avoiding to think about real-life problems. [Yee, 2007, Yee et al., 2008] This includes using games to regulate aggressive feelings with a cathartic effect[1], to cope with anger. [Boyle et al., 2012]

Other emotional states that are sought to be achieved with the help of games are relaxation [Lazzaro, 2004, IGDA, 2006, Kuittinen et al., 2007, Tseng, 2011, Boyle et al., 2012] and its counterpart excitement or sensation [Lazzaro, 2004, Stewart, 2011, Zeigler-Hill and Monica, 2015]. The relaxing and recovering qualities of video games are shown in [Reinecke, 2009].

$\boldsymbol{\delta_{M4}}$: The motive altering emotional states is defined as the individual's desire to achieve a different emotional and mental constitution with the use of video games.

Using video games to "kill time", is not a very widespread motive in literature, but backed up by scientifically sound research, as [Kallio et al., 2011] dealt with this motive extensively by employing a large scale survey (4000 participants) in combination with qualitative research. (see table 1) In her works, she differentiated between playing video games to "fill gaps" and "kill time". Filling gaps according to Kallio means to play games when "moving from one task to another", whereas killing time is the use of games when someone has nothing else to do or there is nothing else that needs to be done. The uses and gratifications approach of [Sherry et al., 2006] included the use of video games to provide some diversion when there is nothing to do, an equivalent to Kallio's definition.

$\boldsymbol{\delta_{M5}}$: Time killing is the use of video games with the intention of filling available time slots with activity.

According to the reviewed literature, immersion is an important motive for the use of video games use. It is mentioned in nearly all articles that were included in the review. [Murray, 1999]'s definition of immersion is widely accepted in scientific lit-

[1] According to [Merriam-Webster, 1995] catharsis is defined as "the purification or purgation of emotions". Scholars like [Ferguson et al., 2014, Vaughn, 2015] investigated the approach but found ambiguous results whether catharsis is achievable through video gaming or not.

erature: "The experience of being transported to an elaborately simulated place is pleasurable in itself, regardless of the fantasy content. We refer to this experience as immersion. Immersion is a metaphorical term derived from the physical experience of being submerged in water. We seek the same feeling from a psychologically immersive experience that we do from a plunge in the ocean or swimming pool: the sensation of being surrounded by a completely other reality (...) that takes over all of our attention, our whole perceptual apparatus ...in a participatory medium (...) to do the things that the new environment makes possible (...) the enjoyment of immersion as a participatory activity" In the context of video games immersion is defined as a reason for their use by [Lazzaro, 2004] in her key construct "Easy Fun", the enjoyment of game activities. These activities are often things the players normally would not be able to perform in real life, therefore allowing them to live out their fantasies. [Sherry et al., 2006] An important and necessary condition for a player, to be immersed in the gaming environment, is the effectance motivation, as described by [Ryan et al., 2006] and [Przybylski et al., 2010]. They define effectance as the gamer experiencing that he has imposed an effect on the gaming environment and perceiving himself as the causal agent for this due to the constant feedback loops between player and gaming environment existing in the interactive medium. Immersive play is one of the committed gamer mentalities, defined by [Kallio et al., 2011]. Those players put their soul into the game and are "living in another world", sometimes having a hard time differentiating between game space and non-game space.

$\boldsymbol{\delta_{M6}}$: Immersion as a motive for the use of video games means using a game with the intention of being transported into the gaming environment and feeling as an integral part of it. [Murray, 1999]

Another motive synthesized from the reviewed literature is achievement. This integrates all motives that are based on the psychological need for competence as it is depicted in the self-determination theory. [Ryan et al., 2006, Deci and Ryan, 2008, Przybylski et al., 2010] Competence is the need for challenge [White, 1959] and feelings of effectance, i.e. imposing an effect on the gaming environment as causal agent [Ryan and Deci, 2000]. This is also described in detail in [Klimmt and Hartmann, 2006] with reference to [Bandura, 1977] who defined self-efficacy as "the conviction that one can successfully execute the behavior required to produce the outcomes". When this conviction can be played out in the gaming environment, feelings of accomplishment [Lazzaro, 2004] arise in the player and a major psychological need is fulfilled. This leads to the enhancement of personal well-being. [Ryan et al., 2006] The achievement motive takes different forms: Bartles's player archetype, the achiever, is focussed on gathering points and leveling up [Bartle, 1996], which coincides with [Stewart, 2011] who proposes that "competitive accumulation" is the underlying motive of achievement focussed gamers. [Lazzaro, 2004] integrates the achievement motive into her "Hard Fun" key construct. Players with this key motive play games to pursue specific goals, test their skills and to feel personal accomplishment. Advancing or progressing in the game is also mentioned as key motive

in [Sherry et al., 2006], [Klimmt and Hartmann, 2006], [Yee, 2007, Yee et al., 2008], [Kallio et al., 2011], [Billieux et al., 2013] and [Kahn et al., 2015]. It is one of the most commonly used motives for video game use in literature.

$\boldsymbol{\delta_{M7}}$: The term achievement is used in this paper as a term to describe the "intra-game" motivation of a player, that means being motivated by advancing and experiencing accomplishment inthe game context.

The exploration motive is based on a sense of curiosity, wonder, and awe. [Lazzaro, 2004] Players motivated by exploration are driven by knowledge-seeking. They want to achieve "a strategic understanding of the system as a whole thing". [Stewart, 2011] This includes figuring out game mechanics or "the internal machinations of the game" [Bartle, 1996], the game world [Scharkow et al., 2015] or generally said, "to explore every element of the game to the maximum extent", as [Kahn et al., 2015] state as the main motivation for their completionist player type. According to [Stewart, 2011], this is based on the motive of gathering knowledge and discovering the logical rules of the gaming environment. The wish to explore is not necessarily limited to gaining in-game insights, it can also originate from the wish to learn new skills or gaining knowledge for the application in "real life". [Kiili, 2005, Freitas, 2006] With regards to the self-determination theory, exploration can be linked to the need for competence, the need to acquire new skills and expertise. [Ryan et al., 2006, Przybylski et al., 2010]

$\boldsymbol{\delta_{M8}}$: Exploration is defined as being motivated to use video games in order to acquire knowledge of the formerly unknown.

Table 3 provides an overview of those motives, that could be derived from literature.

Synthesizing barriers for the use of video games from literature was considerably more complicated than the synthesis of motives. As mentioned before (see chapter 2.3), there is not much literature available that focuses on reasons for not playing video games. Some barriers were included as sidenotes in articles dealing with motives and will be included here, as well as those that could be extracted from a subtextual level. Additionally, I looked for anecdotal evidence giving a reason why people refrain from digital gaming in blog posts and by asking for it in an online community focussed on video games. [Gebauer et al., 2017]

As derived and highlighted during the motive synthesis above, patterns also emerged when investigating barriers for video game use. The overlappings between the different scientific and practical sources were not as pronounced, because of the scarcity of literature focussing explicitly on barriers for video games use.

One of the more prominent barriers can be condensed into the construct complexity. [Klimmt and Hartmann, 2006] describe, that it takes some effort to learn how to use a game, especially to "understand the causal connections and regulatory mechanisms in the game world", the game mechanics or as [Juul, 2010] calls it, the rules of the game. The barrier of a steep learning curve in terms of dealing with game mechanics is seconded by [Ryan et al., 2006] and [Przybylski et al., 2010] and extended onto learning

and mastering the controls. The user has to "memorize functions of keys and input devices". This can be a complex task even for seasoned gamers, e.g. having an unintuitive interface like the rogue-like Dwarf Fortress [Johnston, 2013], which makes it hard to achieve what [Przybylski et al., 2010] calls "mastery of controls" and is, according to the authors, "a necessary but not sufficient condition for video game engagement to satisfy psychological needs, be enjoyable, and bare positively on well-being". If this condition is not fulfilled, it seems logical that this kind of complexity can act as a barrier for the use of a video game. A steep learning curve, complex mechanics, and controls as barrier are backed by [Kallio et al., 2011], [Cheese and Wong, 2011] and [Holmes, 2017]. In his analytic blog post [Lovato, 2015] cites unresponsive or imprecise controls as one of the main reasons for a high player churn rate: "Poor controls make your game hard to pick up and unpleasant to play." The complexity of video games is also founded in the fact, that games are an interactive medium, which requires more attention than more passively consumed media, e.g. TV or radio, because they depend on player choice and action. [Qin et al., 2009]

$\boldsymbol{\delta_{B1}}$: The complexity barrier is defined as the individual assessing the cognitive and/or coordinative demands of video games, either specific titles or the medium in general, as excessive and overtaxing.

The barrier of unfamiliarity is closely related to complexity, but the reason for not playing differs. It shares some arguments with complexity, like the fact, that people who are unfamiliar with video games are most likely not knowledgeable about control schemes or basic game mechanics. But the reason that someone impeded by this barrier, called a video game illiterate by [Gandasegui, 2010], will refuse to play video games is not rooted in some of the game's characteristics, like an overly complex control setup or a crude interface, but because the individual regards himself as not capable of handling the medium. This assumed low self-efficacy towards games [Klimmt and Hartmann, 2006] could originate from not having experienced how pleasurable the effects of gaming can be. [Gandasegui, 2010] mentions the "experience of non-gamers who are not familiarised with computer games and will (...) have a hard time navigating the environment" and it seems reasonable to assume that someone who had an "unfair and punishing first experience" with a certain game [Lovato, 2015], will not be significantly motivated to pick up that specific game again. This negative experience might eventually even be transfered to the medium as a whole. As [Juul, 2010] states, unfamiliarity includes not knowing the conventions of gaming, making it hard to understand.

$\boldsymbol{\delta_{B2}}$: The unfamiliarity barrier is defined as the individual having no or very low experience with the games medium, little knowledge of the conventions of video gaming and a resulting low assumed self-efficacy towards the medium.

Aesthetics as a barrier for video game use emerged from the article by [Gandasegui, 2010]. Aesthetics can bedefined as the perception by means of the senses [Budd, 1998] and the subsequent "judgment of taste" [Zangwill, 2014] about the game.

[Hennion, 2007] states, that taste is not a property of the individual, but is an activity in itself, because the taste itself cannot be observed. It only manifests itself in physical actions, e.g. regarding video games taste is expressed by rejecting or consuming video games. As [MacLeod, 2016] elucidates, taste for games is "shaped for us through our family, culture, and environment, as well as being something we shape for ourselves in our efforts to prove who we are or to discover the person we want to be." [Gandasegui, 2010] calls it a "question of personal tastes", which decide whether someone is a gamer or non-gamer.

$\boldsymbol{\delta_{B3}}$: The aesthetics barrier is defined as specific games or the medium overall failing to meet the individual's taste due to the external appearance, which includes graphics, sound effects, music and voice acting. [DMA57361, 2011]

Supported by the discussion in [Gebauer et al., 2017] and the articles by [Smith, 2014] and [Rae, 2017] it turns out to be a necessity to differentiate between the external appearance of video games and the internal mechanics and narrative. As [Rae, 2017] states, there are games where "the narrative and gameplay elements outshine even the darkest, jerkiest, most boring visuals.", which leads to the conclusion, that narrative and gameplay elements not meeting the individuals' taste are an argument against video games use.

$\boldsymbol{\delta_{B4}}$: The theme barrier is defined as specific games or the medium overall failing to meet the individual's taste due to narrative elements or gameplay mechanics.

Morality is defined as "certain codes of conduct [...] accepted by an individual for her own behavior", codifying what the individual accepts as right or wrong. [Gert and Gert, 2016] Based on this definition and taking into account what [Lazzaro, 2004] and [Gandasegui, 2010] argue, the violation of ethical values an individual holds dear, appears to be a barrier for video game use. [Lazzaro, 2004] explicitly talks about graphic violence, while [Gandasegui, 2010] cites [Sicart, 2009] mentioning first-time gamers who "might also feel shocked by the gruesome acts he/she is compelled to play"' and in turn might eventually refuse to play. Especially violence is a widely researched topic in scientific literature, e.g. [Griffiths, 1999], [Anderson and Bushman, 2001] or [Ferguson, 2007], and has been discussed in mass media. This could potentially have lead to a sensitization and an increase of this barrier's significance.

$\boldsymbol{\delta_{B5}}$: The morality barrier is defined as the individual assessment of the gamer, that a distinct video game or the medium in general, violates or disrepects his personal ethical values.

According to [Merriam-Webster, 2017b] accessibility is defined as "the capability of being used". This leads to a double-layered perspective: (a) To use a specific video game the gamer has to have access to the necessary hardware platform, e.g. a gaming PC, game console or mobile phone [Kallio et al., 2011]; (b) The term accessibility is historically used to describe a "design that enables people with disabilities

to interact with buildings, products, services" [Henry et al., 2014]. Generalized, this means that the individual must be able to interact with the game device in a way that allows him to control it as intended. Some people need individually customized hardware [Linke, 2014, BadMouth, 2012], while others can adapt standard hardware [Kaminsky, 2016]. I will use the term inaccessibility in this paper from a resource-based perspective to describe the access to the device including the ability to interact with it. I refrain from applying this to the games themselves as they are widely available, e.g. according to [Galyonkin, 2017] the digital games platform Steam alone offered more than 17,000 titles in 2017.

$\boldsymbol{\delta_{B6}}$: The inaccessibility of game devices barrier is defined as the individual not having the capability to access and use a desired game device.

To play video games financial hurdles have to be cleared, e.g. as mentioned, investing in the necessary hardware platform, purchasing the games or paying monthly subscription fees. There are two conditions that must be met to play a distinct game: a) the consumer must be able to pay, i.e. have access to the necessary funds and b) the consumer must be willing to pay, i.e. he must assign a monetary value to the experience he expects the game to deliver and be willing to expend this amount of money. [Homburg et al., 2005, Simon et al., 2017] Additionally, video games are experience goods, that means the individual is unable to determine the total value and cost before purchasing and/or using or experiencing the good. [Nelson, 1970] Continuing to use a resource-based perspective, I propose limited financial resources as a barriers for the use of video games. This approach is supported by current literature: [Kallio et al., 2011] mentions that being inexpensive can be a condition for games being used by certain gamer mentalities. Reverting this leads to the assumption that if the costs are too high, they act as a barriers for use. Limited financial resources impeding video games use can also be found in the articles by [Klimmt and Hartmann, 2006], [Gandasegui, 2010] and [Holmes, 2017].

$\boldsymbol{\delta_{B7}}$: The costs barrier is defined as the individual either not having the necessary financial resources or being unwilling to pay for the use of video games.

Not having enough time to play games is one of the most widely listed barriers for video games use in literature. Time constraints can have different facets, e.g. the onset of job responsibilities [Lazzaro, 2004], housekeeping obligations [Holmes, 2017], having a family [Lovato, 2015] or prioritizing another hobby [Carmichael, 2011], which all induce that the potential gamer cannot allocate enough uninterrupted time slots to video games use [Juul, 2010]. This list can be extended with the arguments from [Kallio et al., 2011], who defined time as a necessary resource for video games use and [Cheese and Wong, 2011] who explained that "the same obligations that let me afford to buy games also prevent me from playing them."

$\boldsymbol{\delta_{B8}}$: The time constraints barrier is defined as the individual either not having the necessary time slots available or being unwilling to invest available time slots into video

games use.

The argument, that there are too many games available and this could be a barrier for the use of video games is based on [Iyengar and Lepper, 2000], [Chernev et al., 2014] and [Mick et al., 2004]. [Scheibehenne, 2008] stated that "an overly large number of options can indeed lead to negative consequences such as dissatisfaction, regret, disappointment, decreased motivation to make a choice, or decreased consumption rates". Discussions in the online forum at [Gebauer et al., 2017] suggested, based on anecdotal evidence, that hyperchoice is a relevant barrier for video games use.

$\boldsymbol{\delta_{B9}}$: The hyperchoice barrier is defined as the cognitive overload caused by an overly large number of available video games for use, leading to a decreased consumption rate.

Table 4 provides an overview of those barriers that could be derived from literature.

3.3 Motives and Barriers: The Effects

In the next chapters, the synthesized motives and barriers are used to postulate hypotheses about their direct effects on video games use. Therefore, motives as well as barriers are divided into two segments each, based on their underlying effective directions.

3.3.1 Extrovertive motives and their direct effects on Video Game Use

In an analogy to [Jung, 1967]'s concept of extraversion and introversion, I suggest that motives for the use of video games can be differentiated into two distinct segments or factors: extrovertive and introvertive motives.

As extroversion is defined as "the act, state, or habit of being predominantly concerned with and obtaining gratification from what is outside the self" [Merriam-Webster, 2017d], extrovertive motives are those, that deal with the use of video games to facilitate interaction with other human beings. Taking a look at the list of the motive for video games use that were synthesized from literature, only two qualify as extrovertive: sociability and competition. Sociability is the general motive to play games to interact with others, while competition is defined as using games to compete against and compare oneself to others. Both motives are clearly focussed on establishing interactions between the individual and other people by the use of video games.

Sociability is one of the basic human psychological needs. This has been established by [Maslow, 1943] and been reiterated in the gaming context by [Ryan et al., 2006] amongst others as the need for relatedness as defined in the Self Determination Theory [Deci and Ryan, 2000]. As certain video games are assessed to be able to satisfy this need, sociability is a motive for the use of video games. [Kaye and Bryce, 2012] A

Barrier	[Lazzaro, 2004]	[Ryan et al., 2006]	[Klimmt and Hartmann, 2006]	[Gan-dasegui, 2010]	[Przybylski et al., 2010]	[Kallio et al., 2011]	[Leigh, 2011]	[Carmichael, 2011]	[Cheese and Wong, 2011]	[Lovato, 2015]	[Holmes, 2017]
Complexity	-	Unintuitive Controls	Learn how to use a game; Memorize functions of keys and input devices; understand the causal connections and regulatory mechanisms in the game world	-	Learn the mechanics; Master the control interface; Learning curve	Learning curve	-	-	games are (...) sports, they require practice	Poor controls make your game hard to pick up and unpleasant to play; game is too hard to pick up;	Sharp learning curve; difficult to learn
Hyperchoice[1)]	-	-	-	-	-	-	-	-	-	-	
Unfamiliarity	-	Unintuitive Controls	Learn how to use a game; Technical difficulties; Assumed low self-efficacy regarding the system or regarding playing the game	not 'familiarised with computer games	Learning how to play;	Familiarity as condition for certain gamer mentalities	-	-	-	Poor controls make your game hard to pick up and unpleasant to play; unfair and punishing first experience	Video games are too difficult to learn
Aesthetics	Graphic representation	-	-	the aesthetic element intrinsic to the graphics; personal tastes and enjoyment		-	-	-	-	-	-
Theme	Games are meaningless	-	-	personal tastes and enjoyment		-	-	-	deep, engrossing games are gone	-	-
Moral Reasons	Moral Theme; Graphic violence	-	-	feel shocked by the gruesome acts he/she is compelled to play; ethics are not only residing in the game, but also in the player		-	-	-	-	-	-
Inaccessibility of Game Devices	-	-	Technical difficulties	Accessible Games(?)		Inaccessibility of Games and Game Devices	-	-	-	-	-
Costs	-	-	Costs	Economic resources		Being inexpensive as condition for certain gamer mentalities	-	-	-	-	Video games are too expensive
Time Constraints	Onset of job responsibilites; Raising families; Games are a waste of time	-	-	Amount of free time; Preference for other hobbies; Lack of time;		Time as a resource	Not having enough time	hard to divide our time between leisure, work, and social outings with friends and family; Distractions through other media (like video streaming)	Games are (…) too long; every minute I spend playing, more shit is piling up in my work inbox; the same obligations that let me afford to buy games also prevent me from playing them. "And	cannot afford to play for hours in a row; not all players nowadays can invest that time in a game;	Video games are too time-consuming

1)based on [Iyengar and Lepper, 2000], [Scheibehenne, 2008], [Chernev et al., 2014] and [Mick et al., 2017]

Table 4: Literature synthesis of barriers for video game use

higher degree of satisfying the need for relatedness leads to a higher degree of well-being [Leversen et al., 2012].

$\boldsymbol{H_{M1}}$ **:** The more distinct the sociability motive of the individual is, the higher the actual use of video games will be in order to achieve a higher degree of need satisfaction and the enhanced personal well-being derived from it.

Obtaining the feeling of accomplishment or achievement has been identified as a psychological need and consequently as a motivating factor, e.g. [McClelland, 1987]'s power and achievement motivations, which show that power or dominance are effective motives. Video games can be a mean to achieve the status of gaining power or dominance over others in a competitive setting.

$\boldsymbol{H_{M2}}$ **:** A higher intended fulfillment degree of the power and accomplishment needs is expressed by an increased competition motive which leads to more actual video games use.

3.3.2 Introvertive motives and their direct effects on Video Game Use

Introversion is "the state of or tendency toward being wholly or predominantly concerned with and interested in one's own mental life". [Merriam-Webster, 2017e] Correspondingly, introvertive motives are those motives, where the intended purpose of using video games predominantly concerns the user itself and not his environment or fellow human beings. I assume that the following motives are introvertive: escapism, altering emotional states, time killing, immersion, achievement, and exploration. All listed motives are focussed on fulfilling psychological needs or providing benefits for the individual that can be achieved without the need for an interaction with other people.

Video games offer the chance to avoid real life obligations and issues and blank out negative emotions, feelings or experiences. I argue, that escapism can be a motive for video games use because games are used as a means to achieve this blanked out state. Contrasted to the motive of altering emotional states, to which it could be linked, I consider escapism to be a masking of tangible or intangible issues, whereas altering emotional states tries to change the actual emotional condition.

$\boldsymbol{H_{M3}}$ **:** The more an individual wants to escape his real life, the more distinct the escapism motive will be. The more distinct the motive, the higher will the use of video games be, in order to achieve a higher degree of need satisfaction.

In line with the mood management theory [Zillmann, 1988] and the "altered states" approach by [Lazzaro, 2004], I conclude that reaching another, more positively assessed, emotional state is a desirable objective. When video games can be deployed to achieve this state, the wish to alter emotional states is a motive for video games use. In contrast to the escapism motive, to which altering emotional states could be related to, it focusses on changing the actual emotional condition of the individual.

$\boldsymbol{H_{M4}}$ **:** The greater the desire to change one's emotional state, the more distinct the motive will be. A more distinct motive will lead to an increased use of video games to increase the chance of reaching the desired emotional state.

[Cheyne et al., 2006] defines three types of boredom: being prevented from doing what someone wants to do, being forced to do something one does not want to do or being free to do what one wants but being unable to maintain interest or attention to any mental or environmental object. Video games can be used to counter all three types of boredom, which is deemed as an unpleasant feeling [Koerth-Baker, 2016]. A high degree of unpleasantness could be caused by a high frequency of boredom felt by the individual due to regular time slots without being mentally engaged. This would, therefore, result in a higher frequency of video games use.

$\boldsymbol{H_{M5}}$ **:** The higher the perceived degree of unpleasantness is, the more distinct the motive to counter boredom will be. The more distinct the motive of time killing is, the higher the actual use of video games will be.

Because Immersion is a pleasurable effect in itself [Murray, 1999], gamers are motivated to use video games, to experience this feeling of pleasure in order to increase their well-being.

$\boldsymbol{H_{M6}}$ **:** The more immersion is desired by the gamer, i.e. the more distinct his motive, the higher will his use of video games be, in order to increase the duration and intensity of experiencing pleasure and increasing personal general well-being.

As [McClelland, 1987] explains, achievement is a motivation for human actions. The feeling of accomplishment is positively connoted. As the use of video games can lead to gaining this feeling, Achievement is a motive for it, as [Lazzaro, 2004] describes in her "Hard Fun" construct.

$\boldsymbol{H_{M7}}$ **:** The greater the individual desire to satisfy the psychological need for accomplishment, the more rewarding the experience of effectively achieving it will be. The more the experience is to expected as rewarding and need satisfying, the more distinct the achievement motive will be pronounced and therefore the higher the use of video games will be.

[Maslow, 1943] postulates the psychological need or desire "to know, [...], to satisfy curiosity, [...], to understand", which enables video games to act as a means to achieve psychological need satisfaction. This need is represented in the context of video games by the exploration motive, because, as [Stewart, 2011] states, "understanding [of game mechanics, narrative, etc.] is its own reward"

$\boldsymbol{H_{M8}}$ **:** The more distinct the motive of exploration is, the higher the use of video games will be, to achieve a higher degree of psychological need satisfaction.

3.3.3 Internal Barriers and their direct effects on Video Game Use

As [Farmer, 1976] and [Ziebland et al., 1998] state, barriers can be differentiated in internal and external barriers. The first group will be identified as those barriers that are internal to the potential video game user. [Merriam-Webster, 2017c] defines the term internal as: "relating or belonging to or existing within the mind". This is approach is closely related to the introvertive motives. [Jung, 1967] All of the following barriers are based on conditions, that are most probably assessed by the subjects as based on their individual internal state of mind, their experiences, capabilities, values, and tastes. As [Rogers, 1959] states, an individual strives to reach an "ideal self", therefore internal barriers are those, which prevent achievement of this ideal state and originate from within the individual itself.

The use of video games requires, depending on the specific gaming situation, a certain cognitive and coordinative effort. I argue, that if this demand is assessed as too high compared to the potential value of the experience gained through actual games usage, the result is a barrier effect on video games use because the individual feels overtaxed. The assessment of complexity has to be assessed in relation to the subject's experience with gaming, as it was shown that the brain adapts to video gaming. [Kühn et al., 2014]

$\boldsymbol{H_{B1}}$ **:** The more the cognitive and coordinative demands are assessed by the individual as overtaxing, the lower video games use will be.

To be able to use video games, the individual has know or familiarize himself with certain conventions in order to establish a certain sense of self-efficacy towards video gaming. The absence of this is defined as unfamiliarity and induces the following hypothesis.

$\boldsymbol{H_{B2}}$ **:** The higher the degree of perceived unfamiliarity with video games in general or specific types of games, the lower video games use will be.

Unpleasing aesthetic sensations regarding a game, i.e. a misfit between actual and preferred game aesthetics, lead to the expression of taste in the form of rejection. [Zangwill, 2014]

$\boldsymbol{H_{B3}}$ **:** The wider the gap between the preferred game aesthetics and the actual game aesthetics are, the more distinct the aesthetics barrier will be perceived and the lower the use of video games will be.

Additionally, the individual judges gameplay mechanics and narrative elements on the basis of his own, subjective criteria, because those parts of a game can be differentiated from the external appearance. [Smith, 2014, Rae, 2017]

$\boldsymbol{H_{B4}}$ **:** The more apart the individual's preferences regarding gameplay and narrative elements are from the actual game, the more distinct this will it act as a barriers for video game use and consequently lower the actual use of video games.

Violating or acting against the morality or ethical values of the individual gamer means

to conduct an act that is determined as wrong by him. If a game contains elements that are evaluated as immoral or unethical this leads to a rejection of those elements or the game as a whole by the individual

$\boldsymbol{H_{B5}}$ **:** The more distinct the morality of an individual is violated by video games, the higher the barriers for video game use will be and the lower the actual use of games will turn out.

3.3.4 External Barriers and their direct effects on Video Game Use

The second barrier segment contains those barriers, hampering the individual in their use of video games, that can be assessed as external influence factors. External is defined as "arising or acting from outside". [Merriam-Webster, 2017f] These barriers are based on the availability of tangible and intangible resources, like the accessibility of game devices, time and money and the overwhelming availability of external resources resulting in a hyperchoice effect. These barriers are usually perceived as being rooted in environmental factors. [Farmer, 1976, Ziebland et al., 1998]

Regarding the inaccessibility of game devices I argue that the relationship between the difficulty of gaining access to the needed device and the actual use of games is inversely proportional. This also includes the case of having a gaming device that is not able to run the desired software, e.g. due to hardware requirements.

$\boldsymbol{H_{B6}}$ **:** A more distinct inaccessibility of game devices leads to a lower use of video games.

The costs barrier is either based on the unavailability of financial resources for the acquisition of video games or on the unwillingness to spend those resources due to the assumed quality of the experience not fulfilling the individual's requirements.

$\boldsymbol{H_{B7}}$ **:** The more distinct either the unavailability of financial resources that can be assigned to video games use or the unwillingness to pay for a specific games experience, the lower the use of video games will be.

To use video games, free time slots are a necessary resource and have be to allocated to this activity.

$\boldsymbol{H_{B8}}$ **:** The more limited the individual's available time is perceived, the less time can be allocated to gameplay, leading to a lower use of video games.

Before a game can be used, the individual has to make a choice for a distinct game. Choice and consumption can be decreased by the hyperchoice effect [Scheibehenne, 2008].

$\boldsymbol{H_{B9}}$ **:** The more the subject feels overwhelmed by the excessive supply of video games that can be potentially accessed and used, the stronger the reduction of actual games usage will be.

3.3.5 Factorizing Motives and Barriers

In the previous chapter, motives and barriers for video games have been synthesized from literature and segmented into two factors each, i.e. introvertive and extrovertive motives and internal and external barriers. Due to the similarities present in each segment, an underlying latent variable is assumed and hence aggregated independent variables can be introduced as predictors into a second conceptual model. [Gorsuch, 2003]

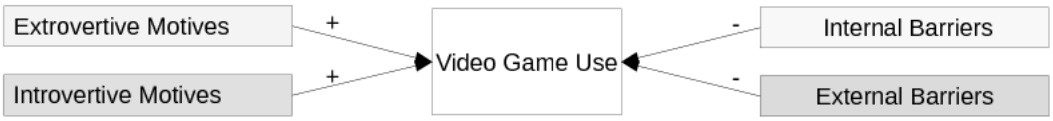

Figure 2: Model 2 - Factorized motives and barriers for video games use

This model is based on the following two aggregated hypotheses:

$\boldsymbol{H_{MOT}}$ **:** The more distinct introvertive and extrovertive motives are, the higher the actual use of video games will turn out.

$\boldsymbol{H_{BAR}}$ **:** The more distinct internal and external barriers are, the lower the actual use of video games will turn out.

4 Model Validation

4.1 Research Methodology

This section focusses on the empirical validation of the model and its underlying hypotheses that were proposed in the previous part of this thesis. Therefore the next part, section 4.1, will explain the used research methodology, while chapter 4.2 will provide a detailed description of the sample. Afterwards, the research results will be discussed in section 4.3.

4.1.1 Measuring the Dependent Variable

The DV of the model is the actual use of video games. This construct is measured on two different scales. First, a 5 point Likert scale [Likert, 1932] is used to measure three items regarding the subject's video games use, i.e. if he plays digital games often and regularly, and if he prefers to play games for longer periods at a time. The Likert type scale offered a spectrum from "I disagree" over "I partially disagree", "Indecisive", "I agree partially" to "I agree".

The second measurement also uses a 5 item scale, where the individual is asked to state his gaming frequency by choosing between 5 options: never, less than once a week, weekly, several times a week and daily. The third measurement asks for the average gaming session length in minutes.

All items that are used to measure video games use are shown in table 5.

Due to the different measurement methods and scales, the items had to be standardized in order to calculate the DV by converting them into z-scores by subtracting the mean $\overline{\boldsymbol{X}}$ from the raw score $\boldsymbol{X_i}$ and dividing it by the standard deviation $\boldsymbol{s}$ [Song et al., 2013]:

$$Z_i = \frac{X_i - \overline{X}}{s} \tag{1}$$

The value Z_i is now a representative of the raw score's distance and the mean value in units of the standard deviation. So $Z_i > 0$ means that the score is greater than the mean, while $Z_i < 0$ indicates a score below the mean value.

Item	**Text**
VGU_OFTEN	Ich spiele sehr häufig Videospiele
VGU_REGULARLY	Ich spiele Videospiele sehr regelmäßig
VGU_LONG	Ich spiele Videospiele lieber sehr lange am Stück
VGU_FREQ	Frequency of Video Games Use
VGU_SESSIONL	Average Gaming Session Length (minutes)

Table 5: Video Games Usage Scale - Items

The composite DV [Song et al., 2013] was then calculated as the mean of those z-scores following [Rosenthal, 1991]'s approach to create a single composite DV with uniform weightings:

$$\begin{aligned} \text{usage} = \text{mean}(&\text{ZVGU\_OFTEN}, \text{ZVGU\_REGULARLY}, \\ &\text{ZVGU\_LONG}, \text{ZVGU\_FREQ}, \text{ZVGU\_SESSIONL}) \end{aligned} \tag{2}$$

4.1.2 Measuring the Independent Variables

The 17 IVs representing the individual motives and barriers were each measured with three 5 point Likert items that were assessed reaching from "I disagree" over "I partially disagree", "Indecisive", "I agree partially" to "I agree". The Likert scale is designed for the measurement of attitudes and opinions [Likert, 1932] and therefore suited well for measuring the attitude of individuals towards gaming. [Bowling, 2014]

The options are assumed to be equidistant. The 5 point scale was chosen over the equally popular 7 point scale because exploratory interviews with gamers and non-gamers showed that it seemed difficult for the interviewees to differentiate between "I strongly agree/disagree" and "I agree/disagree". This argument is supported by [Marton-Williams, 1986], stating that a 5 point scale is readily comprehensible to respondents and allows them to easily express their views and [Babakus and Mangold, 1992], who suggest that the 5 point scale is less confusing, which reduces the frustration level of the respondent, and increases the response rate. [Krosnick et al., 2014] show superior data quality when using 5 point scales in com-

parison with 7 or 11 point scales. A neutral midpoint was introduced in order to avoid forcing the individual if he could not make a valid choice for either agreement or disagreement.

The scales and their items were developed in an iterative process, including the consultation of an expert in survey design and video gaming and consisted of three items each. All scales and items are shown below in table 6. The scores of the scales were calculated by computing the mean-value of the items. [Wiebe et al., 2014]

$$\text{score}(\text{scale}_i) = \text{mean}(\text{item}_{\text{i},1}, \text{item}_{\text{i},2}, \text{item}_{\text{i},3}) \tag{3}$$

Construct	α	**Item**	
Sociability	0.823	soc1	Ich nutze Videospiele, um Freundschaften zu pflegen
		soc2	Um neue Menschen kennen zu lernen, nutze ich auch Videospiele
		soc3	Ich spiele Videospiele, um mit anderen Menschen Zeit zu verbringen
Competition	0.935	cmp1	Ich spiele Videospiele, um mich mit anderen zu messen
		cmp2	Ich nutze Spiele, um mit anderen Spielern zu wetteifern
		cmp3	Ich spiele Videospiele, um gegen andere Spieler anzutreten
Escapism	0.866	esc1	Um Sorgen und Probleme zu vergessen, spiele ich manchmal Videospiele
		esc2	Ich nutze Videospiele, um mich auf andere Gedanken zu bringen
		esc3	Um den Alltag hinter mir zu lassen, spiele ich Videospiele
Hyperchoice	0.829	hyp1	Weil es so viele Spiele gibt, fühle ich mich oft bei der Auswahl überfordert
		hyp2	Die große Vielfalt an Spielen erschwert es mir oft, mich für ein Spiel zu entscheiden
		hyp3	Ich brauche oft so lange, mich zwischen den vielen erhältlichen Spielen zu entscheiden, dass mir die Lust auf Videospiele fehlt
Unfamiliarity	0.920	unf1	Ich spiele nicht so gerne Videospiele, weil ich mich damit nicht so gut auskenne
		unf2	Weil ich wenig Erfahrungen mit Spielen habe, spiele ich ungern
		unf3	Meine fehlende Erfahrung mit Videospielen, hält mich oft vom Spielen ab
Complexity	0.849	cpl1	Ich spiele Videospiele oft nicht, weil sie mir zu komplex sind
		cpl2	Videospiele zu spielen ist mir zu schwierig, deswegen spiele ich oft nicht
		cpl3	Ich vermeide Videospiele oft, weil ich mich von ihnen überfordert fühle
Altering	0.865	aes1	Ich nutze Videospiele, um meine Gefühle zu beeinflussen
Emotional		aes2	Ich spiele Videogames, um meine Stimmung zu verbessern
States		aes3	Um mich besser zu fühlen, spiele ich manchmal Videospiele
Time Killing	0.848	tki1	Ich nutze Videospiele, um Langeweile zu bekämpfen
		tki2	Um mir die Zeit zu vertreiben, spiele ich Videogames
		tki3	Um mit meiner Zeit etwas anzufangen, spiele ich Videogames
Immersion	0.814	imm1	Ich spiele Videospiele, um in fremde Welten einzutauchen
		~~imm2~~	~~Um die Welt um mich herum zu vergessen, spiele ich Videogames~~
		imm3	Ich spiele, um mich als Teil der Spielewelt zu fühlen
Costs	0.777	cst1	Wären Videospiele günstiger, würde ich mehr spielen
		cst2	Ich kaufe Videospiele oft nicht, weil mir das Geld dafür fehlt

~~Striked out~~ = items were removed

Construct	α	Item	
		cst3	Weil mir Videospiele zu teuer sind, verzichte ich darauf, sie zu nutzen
Time	0.854	~~tim1~~	~~Wenn ich mehr Zeit hätte, würde ich mehr Videospiele spielen~~
Constraints		tim2	Weil ich soviele andere Dinge zu erledigen habe, bleibt mir kaum Zeit um Videospiele zu spielen
		tim3	Ich komme oft nicht zum Videospielen, weil mir einfach die Zeit fehlt
Inaccessibility of Game	0.822	igd1	Weil meine Konsole/PC/Smartphone veraltet ist, hindert mich das oft daran, Videospiele zu spielen
Devices		igd2	Ich kann Videospiele oft nicht spielen, weil ich kein passendes Gerät zur Verfügung habe
		igd3	Wenn ich eine neuere Konsole/PC/Smartphone hätte, würde ich mehr spielen
Achievement	0.811	ach1	Ich nutze Videospiele, um meine Fähigkeiten unter Beweis zu stellen
		ach2	Um Erfolg zu erleben, spiele ich Games
		ach3	Ich spiele Videogames, um besondere Herausforderungen zu meistern
Exploration	0.894	exp1	Ich spiele Videogames, um Neuartiges zu entdecken
		exp2	Um meine Neugier zu befriedigen, spiele ich Videospiele
		exp3	Ich nutze Videospiele, um Unbekanntes zu erforschen
Morality	0.901	mor1	Ich spiele Videospiele oft nicht, weil sie nicht meinen Wertvorstellungen entsprechen
		mor2	Weil Videospiele häufig gegen meine Vorstellungen von Richtig und Falsch verstoßen, spiele ich sie oft nicht
		mor3	Ich kann Videospiele häufig nicht mit meinen persönlichen Überzeugugen vereinbaren, daher nutze ich sie kaum
Aesthetics	0.771	aest1	Ich spiele Videospiele häufig nicht, weil ich ihre technische Umsetzung nicht ästhetisch finde
		aest2	Weil Videospiele häufig nicht meiner Vorstellung von Ästhethik entsprechen, spiele ich sie oft nicht
		aest3	Die optische Darstellung von Videospielen trifft selten meinen Geschmack, deswegen spiele ich sie oft nicht
Theme	0.826	thm1	Ich spiele Videospiele oft nicht, weil mir das Thema nicht gefällt
		thm2	Weil Videospiele häufig Themen behandeln, die mir nicht liegen, spiele ich sie nicht
		thm3	Weil die Inhalte von Videospielen oft nicht meinen Geschmack treffen, spiele ich sie häufig nicht

~~Striked out~~ = items were removed

Table 6: Measuring IVs - Scales and items

4.2 Sample Description

To collect data for the empirical validation of the proposed hypotheses, the scales described in the previous chapter were compiled into an online survey hosted on the German unipark.de platform. The survey was active for a timeframe of 3 weeks and was advertised in several general purpose facebook groups, general purpose internet bulletin boards, special interest facebook groups for gamers, in a gaming focussed online forum [Gebauer et al., 2017] and via online word of mouth, e.g. Facebook, Instagram, Twitter,

WhatsApp and other messaging services. As incentive for the completion of the survey, 5 vouchers (value: € 20,00 each) for the German Amazon store were raffled.

914 persons could be recruited, 273 completed the survey (29.87%) The majority of the participants are male (74.0%). This gender ratio leads to the conclusion that any results derived in this thesis will be biased and not representative of any general population. [EntertainmentSoftwareAssociation, 2017] reported a ratio of 59% male and 41% gamers in the US. For Germany a nearly even distribution of 52% males and 48% female gamers is depicted in [ISFE, 2017] and is resembling the gender distribution in Germany. [Statistische Ämter des Bundes und der Länder, 2016]

The educational level of the participants has to be assessed as high in comparison to the German population. [Statista, 2015b, Statista, 2015a] 49.8% (German population: 15.2%) reported having graduated a university or university of applied sciences (Fachhochschule) and an additional 4.4% (German population: 1.1%) were postgraduates (e.g. Ph.D. or MBA).

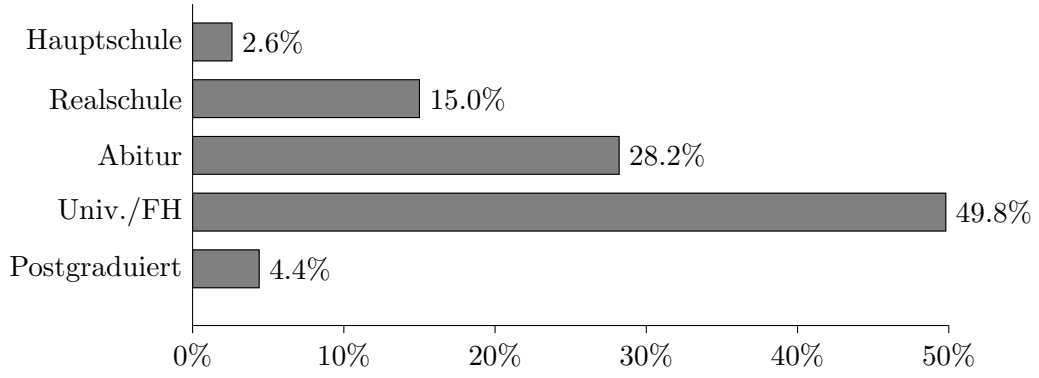

Figure 3: Sample Description - Education

The participants were asked to report how they assess themselves regarding their gamer type. The following choices were offered: Casual Gamer, Rather Casual Gamer, Indecisive, Rather Core Gamer, Core Gamer. [2]

In order to determine the gamer type, a construct called "coreness", based on the gamer-dedication-score developed by [Adams, 2002] and the works of [Juul, 2010] and [Kultima, 2009], was measured. As [Hamari and Tuunanen, 2014] highlight, it is important to acknowledge that the differentiation of gamers into just two groups is simplifying. Gamers will probably never be able to be clearly distinguished into explicit groups, but always position themselves between the extremes. [Juul, 2010] suggests treating the casual-core-positioning not as a binary either-or question. He recommends looking at it as a number of parameters that might change over time as the player changes over time. According to this, I suggest using a continuum of four dimensions

[2] In the German questionnaire the wording "casual gamer" was not used to avoid framing effects, because the term is relatively common, but there seems to be no generally used definition. The same applies to the term "core gamer". In the questionnaire the wordings "Gelegenheitsspieler", roughly translated as occasional gamer, and "Intensivspieler", i.e. frequent gamer, were applied.

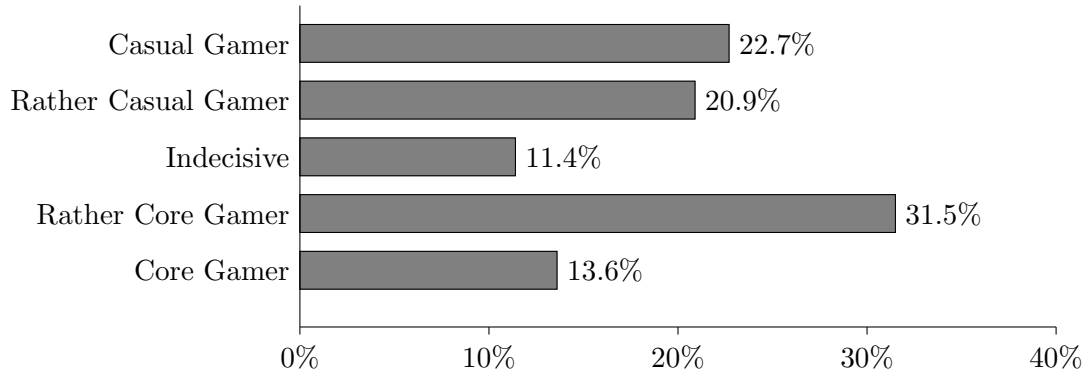

Figure 4: Sample Description - Self-assessed Gamer Types

to identify player types resulting in the coreness construct mathematically defined as:

$$\text{COR} = \frac{3 * \text{DEV} + 2 * \text{GIN} + 2 * \text{NGP} + \text{VAL} + 2 * \text{GCP}}{10} \tag{4}$$

Table 7 shows the scales which make up the coreness construct, the weightings and the Cronbach's α values, to demonstrate the reliability of the subscales as well as the construct's reliability. [Cronbach, 1951] Table 7 also demonstrates, that the sample supports the concept of the coreness construct. The scale items are listed in table 8.

Scale	**Weight.**	**Description**	$\boldsymbol{\alpha}$	**Core Gamers (median)**	**Casual Gamers (median)**
DEV	3	Having up to date gaming devices	0.720	3.667	1.667
GIN	2	Consumption of gaming related information	0.918	3.808	1.000
NGP	2	Self-assessed experience in gaming	0.887	4.000	1.333
VAL	1	Preference for a negative valence in games	0.695	3.667	1.333
GCP	2	Self-assessed gaming competence	0.914	3.333	2.667
COR		The coreness construct	0.884		

Core Gamers $c \geqslant 2.5$

Casual Gamers $c < 2.5$

N = 273

Table 7: The coreness construct - Weighting of the components

The weightings used are based on the weightings suggested by [Adams, 2002] and on a principal component analysis. To determine the number of factors to extract I performed a parallel analysis according to [Horn, 1965] which identified one component. The factor loadings of all constructs were high, i.e. $\geqslant 0.850$ except for valence (0.473). Therefore I assumed a smaller effect size of the valence construct on the individual's coreness, resulting in a small weighting.

I suggest accepting a coreness value of $c \geqslant 2.5$ as an indicator for a core oriented gamer mentality and a coreness value of $c < 2.5$ as an indicator for a more casually oriented gamer mentality. This division is arbitrary and serves primarily to examine two different mentalities by providing a method to split the sample and evaluate the self-assessment of the individuals' gamer types. For more detailed information on the two used gamer mentalities please refer to appendix A. [3]

Item	Text
DEV1	Es ist mir wichtig, immer auf dem aktuellen Stand der Spielehardware (Konsole, Gaming PC o.ä) zu sein
DEV2	Mir reichen mein Smartphone oder Office PC zum Spielen aus
DEV3	Ich besitze eine große Sammlung an verschiedenen Spielegeräten (Konsolen, Gaming-PCs, Handhelds)
GIN1	Ich informiere mich regelmäßig über Neuerscheinungen und Trends im Spielebereich
GIN2	Wenn es um Spiele geht, bin ich immer auf dem neuesten Stand
GIN3	Ich konsumiere regelmäßig Medien, bwps. Magazine, Podcasts, Blogs, zu Spiele-Themen
NGP1	Ich habe eine sehr umfangreiche Spielesammlung
NGP2	Im Vergleich mit meinen Freunden habe ich sehr viele Videospiele gespielt
NGP3	Ich schätze mich als sehr erfahrenen Videogamer ein
GCP1	Ich schätze mich als sehr guten Videospieler ein
GCP2	ich spiele besser als viele Leute in meinem Umfeld
GCP3	ich bin sehr kompetent wenn es um Videospiele geht
VAL1	Ich spiele gerne Spiele mit einem düsteren Thema
VAL2	Meine bevorzugten Spiele sind eher bunt als düster
VAL3	Ich spiele überwiegend Spiele mit einer friedlichen Atmosphäre

VAL1 was inverted due to its negative coding.

The VAL construct was inverted, because it reflected preference for a positive valence in its original coding.

Table 8: The coreness construct - Items

Comparing the coreness values with the self-assessment regarding the individual's gamer type reveals that the average participant is very self-reflected, as roughly $\frac{3}{4}$ assessed

[3] Another option would be to perform a median split according to the coreness value. But this would mean, that whether an individual is more casually or more core oriented, depends on the sample composition and his relative coreness in comparison to the sample composition and not on the individual's absolute score along the coreness scale.

their gamer type correctly, while only 15% under- or overestimated their gamer type. (see figure 5)

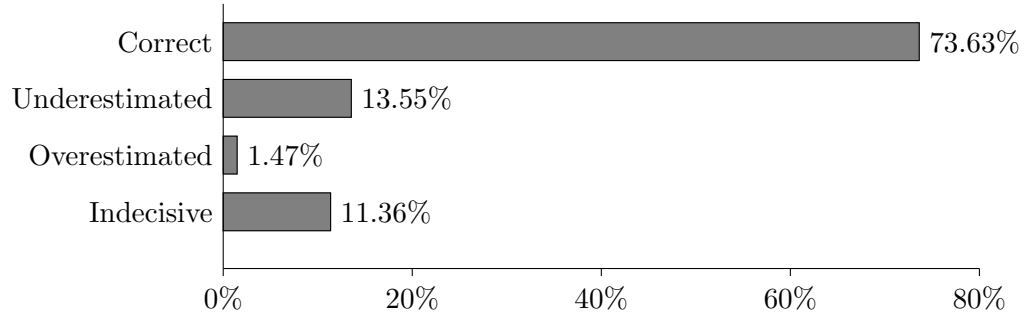

Figure 5: Sample Description - Self-assessment Tendencies

The sample is not only biased regarding the participant's gender, but it seems to include more gamers aligned to the core side than there are in the general population. Applying the $c \geqslant 2.5$ criterion to identify core gamers, results in a core to casual ratio of 66.3% : 33.7%. Gaming frequencies are shown in table 6. More than 50% report that they use video games multiple times a week or more, while 8.4% stated that they never play. These numbers confirm the assumed bias towards a more intensive gamer type, as percentage of people playing video games more than once a week in the general German public is reported by [Statista, 2017b] as 7.78%.

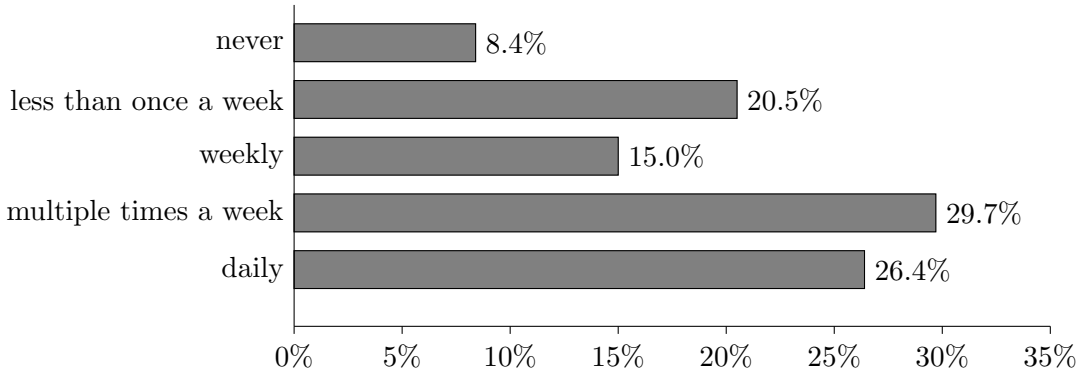

Figure 6: Sample Description - Gaming Frequency

4.3 Results

4.3.1 Reliability and Unidimensionality of Scales

The reliability, or internal consistency, of the DV-scale calculated from the z-scores of five items, was examined by calculating Cronbach's α according to [Cronbach, 1951]. Coefficient α is a way to express the interrelatedness of the scale items and following the recommendations of [Nunnally, 1967] and [Streiner, 2003] should be at least 0.70 for the early phases of research, 0.80 for basic research tools and 0.90 or higher for clinical purposes. For the video games usage scale with the sample as described in chapter 4.2

the reliability analysis provided $\alpha = 0.890$, demonstrating a high reliability of the scale in this context.

Following this argumentation, I examined the reliability of the scales for the IVs by calculating their respective coefficient α. The results are presented in table 6. All scales prove to be reliable when used with the provided sample, as all α values are greater than 0.70, qualifying for early stages of research, most are exceeding a value of 0.80 and are therefore highly reliable. [Nunnally, 1967, Streiner, 2003] Additionally, coefficient α was calculated for the coreness scale. An $\alpha = 0.884$ confirmed the construct's reliability on an acceptable level.

To evaluate the unidimensionality of the scales, a principal component analysis (PCA) was conducted on each scale. The results are shown in table 9 below and confirm the desired unidimensionality of the scales. The application of the Kaiser criterion [Kaiser, 1970, Kaiser and Rice, 1974] to determine the number of factors to be extracted, i.e. eigenvalue > 1, resulted in exactly one component in each scale, with the desired high factor loadings of all items on this component, with two exceptions requiring changes to the respective scales.

			Component Matrix		
Scale	**KMO**	**TVE [%]**	**Item 1**	**Item 2**	**Item 3**
Sociability	0.667	74.053	0.911	0.787	0.879
Competition	0.764	88.512	0.946	0.947	0.930
Escapism	0.731	79.096	0.868	0.893	0.907
Altering Emotional States	0.723	78.795	0.864	0.886	0.913
Time Killing	0.713	76.664	0.901	0.884	0.840
Immersion	0.680	71.523	0.883	0.783	0.868
Achievement	0.703	72.644	0.881	0.829	0.845
Exploration	0.719	82.692	0.930	0.864	0.932
Hyperchoice	0.704	74.578	0.879	0.889	0.821
Unfamilarity	0.763	86.279	0.928	0.928	0.930
Complexity	0.729	77.707	0.863	0.886	0.895
Costs	0.680	69.179	0.849	0.866	0.778
Time Constraints	0.596	67.291	0.651	0.880	0.905
Inaccessibility of Game Devices	0.711	74.081	0.887	0.847	0.848
Morality	0.748	83.649	0.898	0.924	0.921
Aesthetics	0.696	68.785	0.837	0.845	0.805
Theme	0.706	74.235	0.875	0.822	0.886

Extraction Method: Principal Component Analysis

Extraction Criterion: Eigenvalue > 1 [Kaiser, 1970, Kaiser and Rice, 1974]

TVE = Total Variance Explained

N = 273

Table 9: Princpical Components Analysis results - Undidemsionality

The PCA of the immersion scale showed that one item of the immersion scale was not expressing the construct of immersion correctly. Inspecting it, revealed that it resembled the escapism construct. (Item imm2: "Um die Welt um mich herum zu vergessen, spiele ich Videogames") An additional exploratory factor analysis (EFA), extracting

two factors, showed high factor loadings of imm1 and imm3 on one component, while imm2 had a high loading on the second component and explained ca. 15% of the overall variance. Therefore, this item was removed from the scale, which changed its Cronbach's α from 0.800 to 0.814. In a similar way, I proceeded regarding the time constraints scale. I removed the item tim1 ("Wenn ich mehr Zeit hätte, würde ich mehr Videospiele spielen"), changing Cronbach's α from 0.745 to 0.854, as an EFA revealed two factors.

4.3.2 Testing of the Conceptual Model and its Hypotheses

Under the assumption of a linear and additive relationship between the IVs and the DV I establish the following mathematical model as regression equation:

$$\begin{aligned}\text{usage}_i = B_0 &+ B_1 * \text{Sociability}_i + B_2 * \text{Competition}_i \\ &+ B_3 * \text{Escapism}_i + B_4 * \text{Altering\_Emot.\_States}_i \\ &+ B_5 * \text{Time\_Killing}_i + B_6 * \text{Immersion}_i \\ &+ B_7 * \text{Achievement}_i + B_8 * \text{Exploration}_i \\ &+ B_9 * \text{Hyperchoice}_i + B_{10} * \text{Unfamiliarity}_i \\ &+ B_{11} * \text{Complexity}_i + B_{12} * \text{Costs}_i \\ &+ B_{13} * \text{Time\_Constraints}_i + B_{14} * \text{Inacces.\_of\_Game\_Dev.}_i \\ &+ B_{15} * \text{Morality}_i + B_{16} * \text{Aesthetics}_i + B_{17} * \text{Theme}_i \\ &+ B_{18} * \text{Gender}_\text{i} \\ &+ \epsilon_i\end{aligned} \tag{5}$$

Table 10 shows the result of the conducted multiple linear regression analysis using the Ordinary Least Squares (OLS) approach. The R^2 value of 0.714, respectively the R^2 adjusted at 0.694, and the F-statistic are indicating, that the conceptual model is satisfactorily explaining the effects of motives and barriers on video games according to the conceptual model. Multicollinearity does not seem to be an issue, as all variance inflation factors (VIF) are $\leqslant 3$ and therefore below the threshold of 10 as recommended in [Hair et al., 1998, Bowerman and O'Connell, 1990] as well as $\leqslant 5$ adhering to the stricter criterion found in [Rogerson, 2001].

To check for the independency of errors a Durbin-Watson test was performed and resulted in a Durbin-Watson coefficient of $d = 2.065$, approximating 2 and well in the acceptable range between 1.5 and 2.5 [Gujarati, 2009], showing that the possibility of serial correlation of the residuals can be disregarded. [Durbin and Watson, 1951]

Hypothesis H_{M1} is not supported by the regression results. Sociability ($\beta = 0.027, t = 0.631, p > 0.05$) exerts a positive, but non-significant effect on video games use.

The results for the competition motive provide support for hypothesis H_{M2} with a significance level of $p < 0.05$. ($\beta = 0.110, t = 2.242, p < 0.05$). The effect is positive

	B	β	t-statistic	p-Value	VIF
Intercept	-1.123		-6.020	**0.000**	
Sociability	0.020	0.027	0.631	0.529	1.668
Competition	0.073	0.110	2.242	**0.026**	2.152
Escapism	0.037	0.052	1.059	0.290	2.174
Altering Emotional States	0.088	0.120	2.095	**0.037**	2.917
Time Killing	0.121	0.167	3.552	**0.000**	1.958
Immersion	0.084	0.133	2.379	**0.018**	2.755
Achievement	-0.022	-0.030	-0.544	0.587	2.725
Exploration	0.170	0.245	4.393	**0.000**	2.772
Hyperchoice	0.021	0.027	0.722	0.471	1.234
Unfamiliarity	-0.170	-0.190	-3.270	**0.001**	2.987
Complexity	-0.015	-0.015	-0.306	0.760	2.209
Costs	0.042	0.053	1.357	0.176	1.366
Time Constraints	-0.121	-0.180	-5.030	**0.000**	1.138
Inaccessibility of Game Devices	-0.031	-0.038	-0.955	0.341	1.409
Morality	-0.057	-0.071	-1.370	0.172	2.384
Aesthetics	0.049	0.052	1.011	0.313	2.305
Theme	-0.037	-0.050	-0.903	0.368	2.716
Gender	0.151	0.080	1.929	0.055	1.515
R^2	0.714				
R^2 adjusted	0.694				
F-statistic	35.227				
Prob. (F-statistic)	0.000				
Durbin-Watson	2.065				

DV: Video Games Usage

N = 273

Table 10: Model 1 - Multiple Linear Regression Results

and showing that the more competitively motivated a gamer is, the more extensive is his video games use.

Hypothesis H_{M3}, that escapism is a driver of video games use, is not supported. ($\beta = 0.052, t = 1.059, p < 0.05$)

The hypothesis, that the motive to alter one's emotional state H_{M4}, i.e. to feel better through playing video games, is supported at a significant level. ($\beta = 0.120, t = 2.095, p < 0.05$) The effect is positive and confirms, that the more distinct the individual's desire to shift his emotional state, the more video games can be observed.

Equally supported and significant is the exerted effect of the time killing motive according to hypothesis H_{M35}. ($\beta = 0.167, t = 3.552, p < 0.01$) This positive effect demonstrates, that a higher urge to fill available time slots, results in a more extensive video games use.

The effect of the immersion motive, H_{M6}, is significant and positive. ($\beta = 0.133, t = 2.379, p < 0.05$) Therefore it can be deduced, that an increased desire to immerse oneself in the game space, results in a minor increase of games usage.

Non-significance can be attributed to the achievement motive from hypothesis H_{M7}.

$(\beta = -0.030, t = -0.544, p > 0.05)$

Exploration as the last motive for video games use and the according hypothesis H_{M8} is strongly supported by the results of the regression analysis. It has a significant and strong positive effect on video games use. $(\beta = 0.245, t = 4.393, p < 0.01)$ This confirms, that the more the individual is motivated to acquire knowledge of formerly unknown information, the more video games will be used.

Investigating the barriers, negative but non-nsignificant influence on video games use can be attributed to complexity $(\beta = -0.015, t = -0.306, p > 0.05)$, rejecting hypothesis H_{B1}.

Hypothesis H_{B2}, regarding the unfamiliarity barrier, is strongly supported. $(\beta = -0.190, t = -3.270, p < 0.01)$ Unfamiliarity exerts a relatively large, negative effect on video games use. This means, that the more the individual feels unfamiliar with video games, the lower his video games use will turn out.

The three hypotheses H_{B3}, H_{B4}, H_{B5}, dealing with the indivual tastes and values of the respondent regarding aesthetics $(\beta = 0.052, t = 1.011, p > 0.05)$, theme $(\beta = -0.050, t = -0.903, p > 0.05)$ and morality $(\beta = -0.071, t = -1.370, p > 0.05)$, do not receive support from the regression results.

Investigating the external barriers, i.e. those based on environmental influence factors, the regression analysis does not provide support for hypothesis H_{B6}. The effect of the inaccessibility of game devices barrier is small and non-significant. $(\beta = -0.038, t = -0.955, p > 0.05)$ The same applies for hypothesis H_{B7}. The resulting coefficient and p-value of the costs barrier show a positive and non-significanct small effect, therefore H_{B7} is rejected. $(\beta = 0.053, t = 1.357, p > 0.05)$

Hypothesis H_{B8} regarding the time constraints barriers for the use of video games is strongly supported, attributing a negative, significant effect to this barrier. $(\beta = -0.180, t = -5.030, p < 0.01)$ Its effect size is off the same magnitude as unfamiliarity and means, that the lower the amount of the individual's free time slots is, the less video games will be played.

The last hypothesis, H_{B9}, dealing with the hyperchoice barrier, is not supported. $(\beta = 0.027, t = 0.722, p > 0.05)$

Table 11 provides an overview on the hypotheses.

Gender has been included as a discrete dichotomous control variable in the multiple regression analysis in order to control for its effect. (female = 0, male = 1) A positive, but non-significant effect of this control variable can be observed. $(\beta = 0.080, t = 1.929, p > 0.05)$ This indicates, that there will no difference in video games use because of the participant's gender.

	Supported		Supported
H_{M1}	No	H_{B1}	No
H_{M2}	Yes	H_{B2}	Yes
H_{M3}	No	H_{B3}	No
H_{M4}	Yes	H_{B4}	No
H_{M5}	Yes	H_{B5}	No
H_{M6}	No	H_{B6}	No
H_{M7}	No	H_{B7}	No
H_{M8}	Yes	H_{B8}	Yes
		H_{B9}	No

Table 11: Model 1 - Hypotheses Overview

4.3.3 Testing the Factorized Model

In order to evaluate the factorized model of motives and barriers for video games, I performed an EFA to determine if aggregating motives and barriers into two distinct factors each was a correct assumption. But first I had to evaluate if the sample was adequate for an EFA. This was done by assessing the Kaiser-Meyer-Olkin (KMO) measure, that represents the ratio of the squared correlation between variables to the squared partial correlation between variables and varies between 0 and 1. A KMO close to 1 means the correlation patterns are relatively compact and a factor analysis should be appropriate. [Kaiser, 1970, Kaiser and Rice, 1974] The KMO for the present sample is 0.807, which according to [Hutcheson and Sofroniou, 1999] is "meritorious", so the sample size is adequate for a factor analysis.

To determine the numbers of factors to extract a parallel analysis according to [Horn, 1965] was performed with the SPSS script provided by [O'Connor, 2000]. In a parallel analysis the actual eigenvalues are compared with the random data eigenvalues. The number of factors to extract depends on the number of actual eigenvalues being greater than the corresponding 95th percentile random data eigenvalues. [Franklin et al., 1995] Computing 5000 permutations of the raw data sets revealed four components to be extracted via the EFA as shown in table 12.

The EFA was now performed by extracting those four components using the principal component analysis with an orthogonal (varimax) rotation, because the components should be independent according to the conceptual model. The four components explain a cumulative variance of 62.757%.

The rotated component matrix, as seen in table 13, confirms the conceptual model in so far, as the motive and barrier segments are represented in the four components as expected with two additions: (a) Achievement loads high on component 1, which resembles the introvertive motives (see table 14), as assumed, but shows an even higher factor loading on component 3 (extrovertive motives). This could be rooted in the consideration that feeling accomplishment and success not only happens on the introvertive side but is also experienced intensively by gaining power over others and showing dominance. [McClelland, 1987] This overlaps partly with the theoretical un-

Component	Eigenvalue	Means	95th perc.
1	**5.16**	1.46	**1.55**
2	**2.82**	1.36	**1.43**
3	**1.37**	1.29	**1.34**
4	**1.31**	1.23	**1.28**
5	0.94	1.17	1.22
6	0.89	1.12	1.16
7	0.74	1.07	1.11
8	0.59	1.03	1.06
9	0.57	9.98	1.02
10	0.50	0.94	0.97
11	0.46	0.90	0.93
12	0.42	0.85	0.89
13	0.36	0.81	0.85
14	0.26	0.77	0.81
15	0.22	0.72	0.76
16	0.20	0.67	0.72
17	0.18	0.62	0.67

Table 12: Parallel Analysis

derpinning of the competition motive and should have been expected. (b) The barrier of unfamiliarity (component 2 - internal barriers) has a high negative cross-loading on component 1 (introvertive motives). This could be an indicator that unfamiliarity as a barrier might have a highly significant influence because it seems to be interlinked with the introvertive motives.

The conceptual model assumes a linear and additive relationship between the IVs and the DV, hence a multiple linear regression using the OLS method was performed in order to validate the hypotheses. The regression analysis was computed using the factor scores of the four factors extracted in the EFA, in order to confirm the aggregated model with two factors each on the barrier and motive side. [DiStefano et al., 2009] The results are reported in table 15.

The results of the regression analysis provide strong support for the conceptual model and show that it is able to explain the effects of motives and barriers on video games to a satisfactory degree, as $R^2 = 0.677$, respectively $R^2\text{adjusted} = 0.671$, and the F-statistic reflect. The VIFs are all nearly equal to 1 as a result of the extraction and rotation of the components during the EFA, so multicollinearity is no issue. [Hair et al., 1998, Bowerman and O'Connell, 1990, Rogerson, 2001]. The small level of multicollinearity is based on the inclusion of the gender control variable.

A Durbin-Watson coefficient of $d = 1.807$ is close enough to 2 and in the acceptable range between 1.5 and 2.5 [Gujarati, 2009], so that the assumption of independent errors can be made. [Durbin and Watson, 1951]

H_{MOT} is strongly supported by the results. Introvertive motives exert a significant ($p < 0.01$) positive ($\beta = 0.672, t = 18.816$) effect on video games use. The same applies

	Component			
	1	**2**	**3**	**4**
Sociability	0.299	-0.033	**0.745**	-0.040
Competition	0.060	-0.168	**0.884**	0.086
Escapism	**0.773**	-0.084	0.024	0.073
Altering Emotional States	**0.835**	-0.036	0.130	0.015
Time Killing	**0.740**	-0.055	0.138	0.117
Immersion	**0.776**	-0.186	0.173	-0.025
Achievement	**0.538**	-0.127	**0.620**	-0.015
Exploration	**0.729**	-0.218	0.264	-0.006
Hyperchoice	0.303	0.140	-0.150	0.488
Unfamiliarity	-0.412	**0.556**	-0.092	0.452
Complexity	-0.131	**0.577**	-0.137	0.430
Costs	0.138	0.196	0.120	**0.571**
Time Constraints	-0.120	-0.095	-0.057	**0.574**
Inaccessibility of Game Devices	0.062	0.087	0.125	**0.747**
Morality	-0.279	**0.795**	-0.053	-0.036
Aesthetics	-0.009	**0.828**	-0.062	0.130
Theme	-0.058	**0.869**	-0.102	0.011

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 6 iterations.

N = 273

Table 13: Exploratory Factor Analysis - Rotated Component Matrix

Component	**Underlying theoretical construct**
1	Introvertive Motives
2	Internal Barriers
3	Extrovertive Motives
4	External Barriers

Table 14: Exploratory Factor Analysis - Components

for the extrovertive motives ($\beta = 0.254, t = 7.219, p < 0.01$).

The support for H_{BAR} is equally strong: Internal barriers provide a significant negative effect ($\beta = -0.240, t = -6.430, p < 0.01$) on video games use. Their external counterpart exerts a less pronounced, but nevertheless significant and, as expected, negative ($\beta = -0.138, t = 3.932, p < 0.05$) effect.

I conclude, that the multiple regression analysis confirmed the conceptual model based on the hypotheses H_{MOT} and H_{BAR}.

The influence of the dichotomous control variable gender is significant and positve ($\beta = 0.124, t = 3.206, p < 0.01$), which means that men will have a higher video games use compared to women.

	B	β	t-statistic	p-Value	VIF
Intercept	-0.174		-2.830	**0.005**	
Introvertive Motives	0.560	0.672	18.816	**0.000**	1.055
Extrovertive Motives	0.212	0.254	7.219	**0.000**	1.023
Internal Barriers	-0.200	-0.240	-6.430	**0.000**	1.148
External Barriers	-0.115	-0.138	-3.932	**0.045**	1.015
Gender	0.236	0.124	3.206	**0.002**	1.241
R^2	0.677				
R^2 adjusted	0.671				
F-statistic	111.761				
Prob. (F-statistic)	0.000				
Durbin-Watson	1.807				

DV: Video Games Usage

N = 273

Table 15: Model 2 - Multiple Linear Regression Results

4.3.4 Post-hoc analysis - Gamer type as moderator?

Does the gamer type influence motives and barriers for video games use? Are core gamers differently motivated than casual gamers?

That different types of gamers are distinguishable from another by looking at the drivers and restraints that shape their use of video games seems obvious. But, as [Scharkow et al., 2015] point out, the "motives of casual gamers have been largely neglected in previous studies" which concentrated on the core gamer mentalities. For those, who make their living from selling games, it is clear, that gamers with a casual mindset are differently motivated and that games designed for those players, therefore have to adhere to special criteria. [IGDA, 2006, IGDA, 2009, Kultima, 2009, Trefry, 2010, Juul, 2010] If one assumes, that the motives and barriers for video games use, introduced in the conceptual model, are generally valid for all gamer types, could there be an effect of the gamer's coreness on the strength of the direct effects which motives and barriers exert on video games use?

To find evidence for this idea, a post-hoc analysis was conducted by investigating if the gamer type, in the model, represented via the "coreness"-construct, does have moderating effects on motives and barriers for video game use. The conceptual model as presented in figure 2 was extended with another predictor variable leading to model 3 as shown in figure 7.

Working under the assumption of a linear and additive relationship between IVs and DV

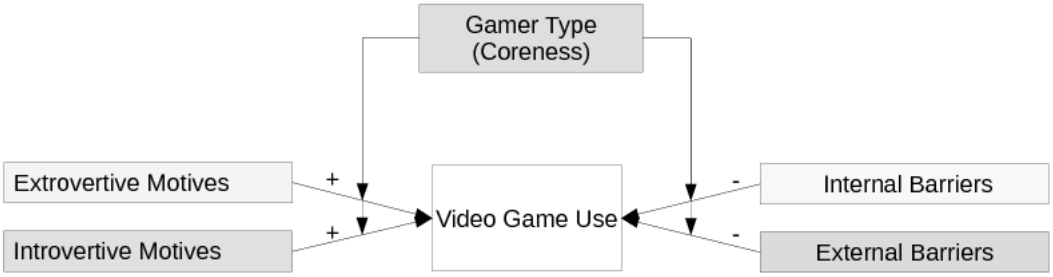

Figure 7: Model 3 - Motives and barriers for video games use with moderator variable

exists, the following mathematical model is proposed as basis for a regression analysis:

$$\begin{aligned} \text{usage}_i = B_0 &+ B_1 * \text{Introvertive\_Motives}_i + B_2 * \text{Extrovertive\_Motives}_i \\ &+ B_3 * \text{Internal\_Barriers}_i + B_4 * \text{Internal\_Barriers}_i \\ &+ B_5 * \text{Coreness}_i \\ &+ B_6 * (\text{Coreness}_i * \text{Introvertive\_Motives}_i) \\ &+ B_7 * (\text{Coreness}_i * \text{Extrovertive\_Motives}_i) \\ &+ B_8 * (\text{Coreness}_i * \text{Internal\_Barriers}_i) \\ &+ B_9 * (\text{Coreness}_i * \text{External\_Barriers}_i) \\ &+ \epsilon_i \end{aligned} \tag{6}$$

The results of the analysis can be found in table 16 below.

	B	$\boldsymbol{\beta}$	**t-statistic**	**p-Value**	**VIF**
Intercept	0.007		0.098	0.922	
Introvertive Motives	0.373	0.447	9.601	**0.000**	2.026
Extrovertive Motives	0.124	0.149	4.030	**0.000**	1.348
Internal Barriers	-0.121	-0.145	-3.465	**0.001**	1.763
External Barriers	-0.085	-0.102	-2.736	**0.007**	1.291
Coreness	0.298	0.357	6.477	**0.000**	2.584
IA Coren. Introv. Motives	-0.087	-0.099	-2.769	**0.006**	1.195
IA Coren. Extrov. Motives	-0.015	-0.018	-0.532	0.595	1.128
IA Coren. Intern. Barriers	-0.022	-0.026	-0.722	0.471	1.283
IA Coren. Extern. Barriers	-0.036	-0.044	-1.268	0.206	1.217
Gender	0.044	0.023	0.597	0.551	1.217
R^2	0.734				
R^2 adjusted	0.724				
F-statistic	72.268				
Prob. (F-statistic)	0.000				
Durbin-Watson	1.962				

DV: Video Games Usage

N = 273

Table 16: Model 3 - Multiple Linear Regression Results

R^2 increased by 0.057, so the explained variance increased by 5.7%. The inclusion of the coreness construct and the interaction term introduced some multicollinearity as

was to be expected. Nevertheless, it is still on a very low level as demonstrated by all $\text{VIF}_{\text{Interactions}} < 3$. A more significant increase of the VIF happened due to the inclusion of the coreness construct. Apparently, this introduced some multicollinearity between the introvertive motives and the gamer's coreness. This seems reasonable as the attitude towards the use of video games can be considered to be an introvertive characteristic. Nevertheless, all VIFs are below the recommended thresholds.

There are some salient changes caused by the inclusion of the coreness construct and the interaction terms in the regression. Introvertive ($\beta = 0.447, t = 9.601, p < 0.01$) and extrovertive ($\beta = 0.149, t = 4.030, p < 0.01$) motives experience a decrease of their coefficients, but maintain their significance. The same applies for the internal ($\beta = -0.145, t = -3.465, p < 0.01$) and external ($\beta = -0.102, t = -2.736, p < 0.01$) barriers. This means, that their respective effects are not as strong as in model 2.

The introduced coreness construct ($\beta = 0.357, t = 6.477, p < 0.01$) is significant and exerts a strong positive effect on the same level as the introvertive motives.

The interaction coefficients all have a negative sign, which means, that individuals with a lower level of coreness will experience a more distinct rise in video games use if either introvertive or extrovertive motives increase. Equally, individuals with a high coreness level will experience a slightly lower relative decrease of video games use if barriers are raised.

The only statistically significant interaction is the one between introvertive motives and the coreness construct ($\beta = -0.099, t = -2.769, p < 0.01$). This supports the hypothesis of a moderator effect of coreness on video games use. The effect of this interaction is, that the more the individual tends to a core gamer mentality, the weaker the positive effect of a raise in introvertive motives will be on video games use.

The gender control variable is non-significant ($\beta = 0.044, t = 0.597, p > 0.05$), indicating no difference in video games based on gender.

5 Conclusion

5.1 Discussion of Results

Testing the factorized conceptual model of barriers and motives showed that the model is supported by the gathered data. The effective directions of motives and barriers are confirmed and they prove to be significant. The effect sizes, however, are obviously diverging. The main driver for gaming is the introvertive motives factor ($\beta = 0.672$). This implies, that gaming is something that is mainly done for self-centered reasons, to satisfy psychological needs and increase personal well-being. The effect size of the extrovertive motives ($\beta = 0.254$) is 2.6 times smaller and of the same magnitude as the negative effect of the internal barriers. ($\beta = -0.240$) External barriers seem to be a minor impediment for video gaming, with a relatively small effect size. ($\beta = -0.138$)

In the factorized model, a significant effect on video games use has to attributed to the gender control variable, confirming the stereotype of the dominantly male gamer [Selwyn, 2007], that actually has been disproved more than once. [Yee et al., 2008, Williams et al., 2009, Juul, 2010] This could be rooted in the biased sample composition.

The findings obtained from testing the conceptual model (Model 1, without factor scores) by performing a multiple linear regression analysis, provided some interesting insights.

The biased sample composition, i.e. the predominance of male and more core gamer oriented respondents, seems to be responsible for the non-significance of most proposed barriers. As described in section 4.3, only unfamiliarity and time constraints are supported by the gathered data. Chapter 4.2 showed the ratio of core to casual oriented gamers as 66.3% : 33.7%. As core gamers seem to prefer games with a negative valence [Lane et al., 1999, Adams, 2002, Juul, 2010, Hilgard et al., 2013] this fosters the assumption, that this preference is responsible for the non-significance of the morality barrier and its small regression coefficient.

The same argument can be applied to the non-significance of the barrier inaccessibility of game devices. Core gamers rely on and are equipped with gaming devices adhering to "higher standards". [Williams, 2002, Adams, 2002, Hilgard et al., 2013] As they make up a high percentage of the sample, this barrier is rendered non-significant. On the other hand, Casual gamers might play on "incidental platforms" [Hilgard et al., 2013] or general purpose hardware [Juul, 2010]. If they assessed those devices as performant enough for their desired gaming experiences, there would be no need for "better" gaming devices, therefore rendering the barrier mute for the remaining respondents and confirming the overall tendency caused by the predominance of core gamers.

It seems rational to argue, that the high significance of unfamiliarity in contrast to the non-significance of complexity, can be explained as follows: If an individual is unfamiliar with gaming or specific games, he will refrain from using video games, in that case, to reduce his cognitive load. But if the individual is already familiar with either games in general or specific games, depending on the situation, then complexity is only a relatively minor impediment. This theory is backed up by comparing the standardized regression coefficients: $\beta_{Unfamiliarity} = -0.190 : \beta_{Complexity} = -0.015$ and the high percentage of core gamers which have a greater comprehension of "the general trends, patterns, implicit rules and other elements in the background of understanding for digital games". [Adams, 2002] So I assume, that once the initial hurdle of overcoming unfamiliarity is cleared, cognitive or coordinative reasons only play a minor role as a barriers for the use of video games.

The strong negative effect of time constraints on video games use is supported by the data as hypothesized and modelled.

One approach, to explain the small coefficient and non-significance of hyperchoice, is

based on the buyer decision process model according to [Engel et al., 1973]. The barrier has to be placed in the phases "information search" over "evaluation of alternatives" up to the "purchase decision", while the actual use of video games takes place after the purchase decision is made. Hyperchoice could potentially exert an impeding effect, only if a video gamer had too many games at hand, possibly leading to a "decreased consumption rate". [Scheibehenne, 2008] This phenomenon is known as "the pile of shame" [Kelly, 2014, Levy, 2014, Bishop, 2015], but does not seem to apply for the current sample. Therefore, the barrier hyperchoice is not relevant for the actual use of video games as measured in this model, but it should be effective in a model including the purchase decision.

The byuer decision model [Engel et al., 1973] and its phases is also able to explain the non-significance of the costs barrier, along the lines of the argumentation regarding hyperchoice. Costs are relevant during the evaluation of alternatives and purchase decision phases, but generally not in the actual consumption or usage phase. Hence, the barrer costs is not significant in the presented model.

The non-significance of the assumed barrier aesthetics, an expression of the individual's taste, seems hard to explain at first. But when putting it into the context of the buyer decision process [Engel et al., 1973] it can be placed in the same phases as hyperchoice and costs. Due to the digitization, access to the internet is now a commodity, enabling consumers to conduct parts of or the complete customer journey online. Regarding the process of acquiring video games, the amount of information offered online, via specialized gaming websites or digital word of mouth, e.g. customer reviews on retailers platforms, microblogs and other social media [Hennig-Thurau et al., 2016, Hennig-Thurau et al., 2017, Bartschat, 2017] is nearly endless. Hence I assume that games which are not corresponding to the individual's personal taste regarding their aesthetics, will not be included in the evoked set of games. [Narayana and Marking, 1975] Therefore those games that are accessible for use, i.e. those that have been purchased, will meet the individual's taste, leading to a non-significance of aesthetics as barrier for video games use.

Theme as barrier for video games use turned out to be non-significant as well. The root for this can also be explained with the dominance of the internet as global information source, leading to the customer being well-informed after the early phases of [Engel et al., 1973]'s buyer decision process. It is rational to assume, that an individuals generally acquires games, that meet his preferences regarding game mechanics and narrative and therefore, theme is not signifant in the present model.

Taking a look at the motive hypotheses, the main drivers for video games use are exploration, time killing, immersion, altering emotional states and competition. The non-significance of the achievement motive may be explained by its overlap with competition. As already pointed out in their respective definitions, both are based on the power and achievement construct introduced by [McClelland, 1987]. This overlap was also visible in the factor loadings (see table 13) obtained from the explorative factor

analysis. The motive had high factor loadings on two components, i.e. introvertive and extrovertive motives. This could be interpreted in a way that the psychological needs used as a foundation for the achievement motive, are already covered adequately by competition and the remaining introvertive motives.

The tendency of respondents for social desirablity, i.e. to choose those answers which they assume to be socially more acceptable, could be the cause of the non-significance of escapism as motive for video games use. [Worcester and Burns, 1975] The term escapism is often carrying a "negative connotation, suggesting that escapists are unhappy, with an inability or unwillingness to connect meaningfully with the world and to take necessary action" [Baggett et al., 2008]. Even though the items for the escapism scale were constructed without using the term escapism, their wording is relatively unambiguous and not obfuscating the underlying construct. Therefore a tendency to answer these questions in a way, that the respondent does not appear as an escapist, seems rational to accept.

The hypothesis, that sociability is a motive for the use of video games was not supported by the data. The reason for this might be that core gamers, which make up the major part of the sample (66.3%), are mainly motivated to interact with other people on a competitive level. This idea is supported by a snapshot of player data, published on the analytics platform SteamSpy. [Galyonkin, 2017] During a two-week period more than 90% of gamers who played one of the top 10 games according to their playtime played competitive multiplayer games, e.g. Player Unknown's Battlegrounds, DOTA2 or Counterstrike: Global Offensive. (see appendix B - table 19) Therefore, it seems apt to argue, that the psychological needs for social interaction are covered by competition and this leads to the non-significance of the sociability motive.

The post-hoc analysis of a possible interaction effect between the gamer type and motives and barriers for video games use could only find support for one interaction, namely a moderation effect between the coreness construct and the introvertive motives. This effect is significant ($p = 0.006$). The size of the moderation effect is of the same magnitude ($\beta = -0.099$) as the external barriers ($\beta = -0.102$). As the coefficient's sign is negative, the positive influence of introvertive motives on video games use is getting weaker with an increasing coreness, that means, gamers with a more core mentality see a lower increase of video games use when their introvertive motives are raised than gamers with a more casual mentality. (see appendix B - figure 10)

The last major point to be emphasized, is the influence of gender on the use of video games. The regression analysis of the factorized conceptual model returned a highly significant positive effect of gender on video games use. ($\beta = 0.124, t = 3.206, p < 0.01$) In the regression analysis of the conceptual model containing all motive and barrier constructs as IV, gender was marginally significant with a p-value of 0.055. Only the factorized model did not attribute a significant effect to the respondent's gender. ($\beta = 0.023, t = 0.597, p > 0.05$) This leads to the deduction, that there has to be a certain correlation between being male and being a core gamer. Table 18

shows a correlation coefficient of 0.488 between gender and coreness at the 0.01-level. The sample composition also confirms this assumption. Applying the coreness $\geqslant 2.5$ criterion as described before, to split the sample into core and casual gamers, reveals that there is a balanced ratio of 50% male and 50% female gamers in the casual segment, while the core segment is dominated by 87% males and only contains 13% females.

The sample composition and the ratio of core vs. casual gamers support the results of [Lucas and Sherry, 2004], who explain the finding with the conformance to social norms and sex-role expectations. [Lucas and Sherry, 2004] found "statistically significant lower means for all the video game use motivations by the young women" leading to less video games use. This explanation still holds more than two decades after [Kiesler et al., 1985] argued that "the world of computing seems to be more consistent with male adolescent culture than with feminine values and goals", as the present sample shows a significantly lower use of games by women (median of video games usage $= -0.780$) compared to men (0.321), which is a reconfirmation of [Greenberg et al., 2010], who found out that males use video games at twice the weekly average compared to females. It looks like the ratio between male and female gamers is getting more and more balanced as seen in [EntertainmentSoftwareAssociation, 2017] and [ISFE, 2017], but that the extent of gaming still differs between the genders. I agree with [Liebl, 2014], who demands a look beyond the general statistics and suggests to concentrate on the source of profit in the gaming industry. According to [EntertainmentSoftwareAssociation, 2017], the gender ratio of the most frequent game purchaser is 63% males and only 37% females, this explains why most video games are still targeted at male consumers, which in turn influences how they are perceived by society and contribute to social norms and stereotypes. These norms and stereotypes could be one of the reasons, why the female share of respondents makes up only 26%. Involvment in video games is not conform with common female gender-roles, which could have made potential female respondents to refuse participitation in the survey, because they do not assess themselves as either gamers or competent enough regarding video games to take part in the survey.

Another reason for the under-representation of female respondents in the present sample might be found within the definition of a "proper" video game. The question might be, if women perceive the games they play as "proper" video games [**?**] and if not, if that discouraged them to see themselves as appropriate respondents.

Comparing the three models (see table 17), demonstrates, that all three are well supported by the gathered data. The R^2 value is slightly lower in model 2 (factorized) than in model 1. The lower explained variance is based on the aggregation of the constructs into the factor scores. The rise in R^2 in model 3 (with interaction terms) is rooted in the inclusion of the coreness construct and the interaction terms, making model 3 the one with the highest explained variance. The Durbin-Watson coefficients attest the indepency of errors for all three models. The F-statistics attribute statistical significance to all models. To conclude the discussion of results, all models describe the effects of

	Model 1	Model 2 (Factorized)	Model 3 (Interactions)
R^2	0.714	0.677	0.734
R^2 adjusted	0.694	0.671	0.724
F-statistic	35.227	111.761	72.268
Prob. (F-statistic)	0.000	0.000	0.000
Durbin-Watson	2.065	1.807	1.962
Std. Error of the Estimate	0.461	0.478	0.438
		Std. Coefficients (β)	
Introvertive Motives		0.672	0.447
Extrovertive Motives		0.254	0.149
Internal Barriers		-0.240	-0.145
External Barriers		-0.138	-0.102
Coreness			0.357
Coreness * Intro. Mot.			-0.099
Coreness * Extro. Mot.			n.s.
Coreness * Int. Bar.			n.s.
Coreness * Ext. Bar.			n.s.

DV: Video Games Usage

n.s.: non-significant

N = 273

Table 17: Model comparison

motives and barriers for video games use on a satisfactory level.

The direct comparison of models 2 and 3 shows, how strong the positive effect of the coreness construct is ($\beta = 0.357$). Its inclusion causes the effects of motives and barriers to decrease in size, because a significant part of the variance is now explained by the coreness construct and its interaction terms.

5.2 Implications

In this thesis, a conceptual model was developed based on current scientific literature, to explore how motives and barriers drive and impede the use of video games. The model was tested empirically with a sample of 273 participants and revealed interesting findings. Especially for video game developers and publishers, some important implications can be drawn. The main barriers for the use of video games have been identified as time constraints and unfamiliarity with distinct video games and the medium overall. Several actions can be performed on the game design level in order to lower those barriers. To deal with the time constraints, that account for a significant amount of not using games ($\beta = -0.180$), video games should be designed so that they can be used in a very flexible way. [Juul, 2010] calls this "interruptibility", which allows "both playing in short bursts with little time investment and playing with large time investments". By implementing game mechanisms which support this concept, time constraints may be circumvented and enable free time slots of variable lengths to be used for gaming. This implementation includes informing the player about the game session's length in

advance, using automated save games, allowing the user to interrupt the game without losing significant progress and provide breaks in the game's flow, which make the player feel, that it is appropriate to leave the game. [Juul, 2010]

Countering the unfamiliarity barrier is a task, that can be tackled by the game developers as well as by the publishers. During the development, the game designers should pay attention towards accessibility and simplicity. [Kultima, 2009] Especially the initial phase of a game should be as accessible and simple as possible, to decrease the height of the barrier and to flatten the incline of the learning curve. Nevertheless, this should not lead to an oversimplification and an unnecessary low difficulty of the game. [Kultima, 2009, Juul, 2010] The publisher should be aware of these items, and market the game accordingly, i.e. communicate how easy it is, to get into the game.

Attractive games, triggering the core motives identified in this thesis, also have to provide a deeply immersive experience. Immersion depends on the feelings of spatial presence in the game space and flow. the sensation of being involved in the gaming action. [Weibel and Wissmath, 2011] This is coherent to the studies of [Klimmt and Hartmann, 2006] regarding effectance and self-efficacy in gaming situations and lead to the deduction, that an immersive game has to provide well-crafted continuous feedback-loops and a fine-tuned control scheme.

The psychological need for competence, i.e. the need for the acquisition of new skills and knowledge [Ryan et al., 2006, Przybylski et al., 2010], which is expressed via the exploration motive, has to be satisfied with the provision of constantly fresh mental inputs for the gamer, as well with narratives and new, innovative game mechanics. To balance this requirement with the consideration of the unfamiliarity barrier is a challenging task the developers.

A high degree of psychological need satisfaction increases personal well-being. [Ryan and Deci, 2000, Deci and Ryan, 2000] Therefore I conclude, that in order to adress the gamer's motive of altering emotional states, a game should be able to create emotions inside the player. [Lazzaro, 2004] recommends to "stimulate the player's senses and smarts with emotion from compelling interaction" to adress this motive. [Klimmt and Hartmann, 2006] stress the importance of making the player see himself as the central cause of observable change in the gaming environment, because this results in pleasurable emotions, e.g. to achieve the state of catharsis [Boyle et al., 2012, Ferguson et al., 2014, Vaughn, 2015], the player should be able to see himself as central, causal agent. As the concept of efficacy or agency appears to be interlinked with the emotional state of the player, this leads to the recommendation, to focus on the player's impact on the gaming environment to foster the altering emotional states motive. It seems also rational, to communicate this during the marketing phase of the game.

The post-hoc analysis supports the hypothesis, that coreness, a representation of the gamer type, exerts a moderator effect via motives and barriers on video games use.

This could only be supported for the interaction between coreness and the introvertive motives. This offers an angle of attack for the monetization of games targeting casually oriented individuals. The interaction predicts a larger increase in video games use for a certain rise of introvertive motivation than for a core oriented gamer. Therefore it seems possible to target a game title at casual gamers, design to satisfy the introvertive motives respectively their underlying psychological needs, e.g. by providing a relaxing [Lazzaro, 2004, Kuittinen et al., 2007, Reinecke, 2009, Boyle et al., 2012], sensational [Lazzaro, 2004, Stewart, 2011, Zeigler-Hill and Monica, 2015] or cathartic [Boyle et al., 2012, Ferguson et al., 2014, Vaughn, 2015] experience, catering to the altering emotional states motive, making the game super accessible and highly interruptible as discussed above, and thereby suited for killing even the slightest looming of boredom [Cheyne et al., 2006, Juul, 2010], the time spent in-game could be increased significantly. The business model of "freemium" or "free2play" games [Emilio and Gayo, 2009, Hennig-Thurau and Marchand, 2013], where the game is given away for free in order to earn profits on IAP (in-app purchases) of digital goods, depends on the conversion of non-spending players to premium players [Sifa et al., 2015], in order to massively increase the customer lifetime value of the premium player, so that it covers the user acquisition costs for all game users and additionally generates sufficient profits. [Sifa et al., 2015] found out, that total playtime is a driver of success for this process. Playtime is a component of the construct video games use, as presented in this thesis. Hence, this leads to the deduction, that an increase in the satisfaction of introvertive motives will result in a higher playtime, which in turn causes a higher customer lifetime value. Due to the moderation effect, that was elaborated in model 3, targeting casual gamers promises a bigger return on investment. This is demonstrated by the finnish game making company Supercell [Supercell, 2017]. It generated over 2.1 billion of revenues in 2017, with an EBITDA of 917 million , by focussing on freemium games targeted at casual gamers. [Forsell and Rosendahl, 2017]

5.3 Limitations and Future Research

The findings of the present thesis provide useful insights for the gaming industry, i.e. game developers and game publishers, and for the interested marketing scholar. Nevertheless, there are some limitations that have to be considered.

The first limitation originates from the design phase of the questionnaire. Although it was created in a structured and iterative process and proved to be compiled from reliable and unidimensional scales, it would have been preferable to have an initial pilot phase, after which all items and scales could have been reassessed and adjusted by evaluating feedback from the first respondents. This could possibly have lead to a more compact survey design, resulting in a higher completion rate and a potentially more balanced sample composition. Another improvement regarding the survey design could have been the inclusion of female scholars to avoid any bias in the item construction by only considering the male perspective.

The sample composition limits the generalization of the thesis results. It seems reasonable to assume, that the non-representative high ratio of males and core gamers distorted the results to a certain degree. To reconfirm the findings, I suggest repeating the study with a sample that is representative of the German population.

As the post-hoc analysis confirmed an interaction between the gamer type and motives and barriers, it should prove valuable to a) deepen the insights by re-assessing the coreness construct and b) to evaluate if different types of games, i.e. casual games or core games, have distinct effects on video games use. As [Klimmt and Hartmann, 2006] state, "After each session of play, players' ideas of what they experience during a certain type of action (computer game play) are expanded, modified, and completed". So a preference for a certain genre might be based on a distinct combination of motives and barriers, but also could exert an effect on the composition of those motives and barriers as well.

A re-assessment of the coreness construct should investigate whether the proposed construct is exhaustive enough or if any items are missing. How someone becomes a gamer at first, and which factors influence the mentality development, i.e. core or casual, is an interesting question in the context of the coreness construct. Another approach could be to investigate in depth, how the traits of an individuals personality influence the attitude towards gaming. This has been done by scholars like [Stewart, 2011], [Graham and Gosling, 2013], [Zeigler-Hill and Monica, 2015], [Braun et al., 2016] or [Baumann et al., 2016], who focussed on motives for video games ues, but maybe investigating the link between personality traits and barriers could lead to insights on how games can be developed in way that they target distinct market segments consisting of gamers with specific personality traits and mentalities. Regarding this research direction, I suggest paying attention to the prevailing discussion about the similarities between gambling and certain game mechanics [Grifftiths and King, 2015, Perks, 2016, Ore, 2017, Hood, 2017], e.g. loot boxes or player cards, which are responsible for continuously growing revenues. [Handrahan, 2016] Scientific research could be of significant value in this discussion, as managers in the games industry should not only be aware of their economical but as well of their social responsibilities.

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Appendices

A The Gamer Types

A.1 The Core Gamer

Figure 8: Gamer Type Continuum - The Core Gamer

In accordance with the suggested coreness construct the Core Gamer is aligned in the continuum of Gamer Types as follows:

- As Core Gamers "expect superior performance and have generally higher standards" [Williams, 2002] it is very likely that "will acquire the latest console platforms and/or PC hardware in order to keep up-to-date with the most recent trends. Furthermore, they are more likely to own, or have owned, a wide variety of older games platforms." [Adams, 2002, Hilgard et al., 2013]
- As [Adams, 2002] proposes in his paper, the Core Gamer Type is hungry for gaming related information, which he actively seeks out. This high interest makes him highly familiar with gaming conventions [Juul, 2010] and establishes him as gaming literate. [Bateman et al., 2011]
- Following Iwata San's statement that a core gamer is someone "who enthusiastically plays many types of games" [Nintendo, 2011], I assume, that a Core Gamer has played in higher total number of games than a Casual Gamer and has relatively more experience with the medium overall.
- As [Bateman et al., 2011] reports, players who identified themselves as either Core or Casual player assessed their gaming skills as good or very good. I follow their argument, that the self identification as one of those two groups is doubtful or that Casual gamers are more skilled than assumed. Nevertheless, Core Gamers will perceive their own gaming competence as high or very high.
- [Adams, 2002] and [Hilgard et al., 2013] suggest that Core Gamers prefer violent/action games. Paraphrased, I assume, that there is a tendency towards games

with a negative valence in the Core Gamer Type. [Lane et al., 1999, Juul, 2010]

A.2 The Casual Gamer

Figure 9: Gamer Type Continuum - The Casual Gamer

In accordance with the suggested dimensions of the coreness construct the Casual Gamer is aligned in the continuum of Gamer Types as follows:

- A Casual Gamer is more likely to play games on an incidental platform [Hilgard et al., 2013], like a smartphone or other general purpose devices like personal computers [Juul, 2010], that can be used to run games, as opposed to a dedicated gaming device.
- As the Casual Gamer does not see gaming as his main hobby, like the Core Gamer does [Nacke et al., 2014], it seems reasonable to assume a relatively low interest in gaming-related information. [Adams, 2002]
- Contrasting the argument of [Nintendo, 2011], I assume, that a Casual Gamer has played a significantly lower total number of games than a Core Gamer and has a lower amount of experience with the medium overall.
- As [Bateman et al., 2011] reports, players who identified themselves as either Core or Casual player assessed their gaming skills as good or very good. I follow their argument, that the self identification as one of those two groups is doubtful or that Casual gamers are more skilled than assumed. I propose that, if not asked to classify themselves as either Core or Casual Gamers, the Casual Gamer will report lower gaming skills than the Core Gamer.
- According to [Juul, 2010, Kultima, 2009] Casual Gamers have a strong preference for games with a positive valence. [Lane et al., 1999]

B Additional Data

		VGU	Gender	COR	SOC	CMP	ESC	AES	TKI	IMM	ACH	EXP	HYP	UNF	CPL	CST	TIM	IGD	MOR	AEST	THM
VGU	P. Corr.	1																			
	Sig. (2-t.)																				
Gender	P. Corr.	.398**	1																		
	Sig. (2-t.)	0.000																			
COR	P. Corr.	.776**	.488**	1																	
	Sig. (2-t.)	0.000	0.000																		
SOC	P. Corr.	.421**	.202**	.441**	1																
	Sig. (2-t.)	0.000	0.001	0.000																	
CMP	P. Corr.	.334**	.228**	.325**	.544**	1															
	Sig. (2-t.)	0.000	0.000	0.000	0.000																
ESC	P. Corr.	.518**	.144*	.400**	.265**	.174**	1														
	Sig. (2-t.)	0.000	0.017	0.000	0.000	0.004															
AES	P. Corr.	.579**	.142*	.478**	.321**	.182**	.687**	1													
	Sig. (2-t.)	0.000	0.019	0.000	0.000	0.003	0.000														
TKI	P. Corr.	.575**	.133*	.467**	.337**	.206**	.539**	.549**	1												
	Sig. (2-t.)	0.000	0.028	0.000	0.000	0.001	0.000	0.000													
IMM	P. Corr.	.649**	.314**	.622**	.363**	.194**	.485**	.606**	.485**	1											
	Sig. (2-t.)	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000												
ACH	P. Corr.	.528**	.176**	.480**	.454**	.564**	.368**	.563**	.444**	.526**	1										
	Sig. (2-t.)	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
EXP	P. Corr.	.684**	.332**	.666**	.376**	.280**	.463**	.547**	.453**	.735**	.595**	1									
	Sig. (2-t.)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
HYP	P. Corr.	0.084	0.004	0.043	0.057	-0.033	.141*	.124*	.237**	0.115	0.068	.150*	1								
	Sig. (2-t.)	0.166	0.951	0.48	0.348	0.585	0.02	0.041	0.000	0.059	0.26	0.013									
UNF	P. Corr.	-.574**	-.418**	-.638**	-.229**	-.157**	-.273**	-.308**	-.302**	-.429**	-.328**	-.427**	.163**	1							
	Sig. (2-t.)	0.000	0.000	0.000	0.000	0.01	0.000	0.000	0.000	0.000	0.000	0.000	0.007								
CPL	P. Corr.	-.348**	-.210**	-.458**	-.130*	-.181**	-0.085	-.135*	-0.083	-.246**	-.198**	-.249**	.247**	.683**	1						
	Sig. (2-t.)	0.000	0.000	0.000	0.031	0.003	0.164	0.025	0.172	0.000	0.001	0.000	0.000	0.000							
CST	P. Corr.	0.059	-.131*	-0.036	0.054	0.077	.123*	0.077	.218**	0.029	0.054	0.089	.180**	.213**	.194**	1					
	Sig. (2-t.)	0.329	0.031	0.552	0.378	0.203	0.042	0.204	0.000	0.631	0.375	0.141	0.003	0.000	0.001						
TIM	P. Corr.	-.254**	-0.031	-.161**	-0.103	0.017	-0.036	-0.032	-0.097	-0.023	-0.028	-0.027	.125*	.189**	.135*	0.057	1				
	Sig. (2-t.)	0.000	0.608	0.008	0.088	0.783	0.55	0.595	0.111	0.703	0.641	0.657	0.039	0.002	0.026	0.35					
IGD	P. Corr.	-0.052	-.127*	-.156**	0.054	0.102	0.078	0.102	0.117	0.087	0.05	0.027	.213**	.253**	.215**	.411**	.246**	1			
	Sig. (2-t.)	0.394	0.036	0.01	0.372	0.094	0.197	0.092	0.053	0.152	0.41	0.654	0.000	0.000	0.000	0.000	0.000				
MOR	P. Corr.	-.462**	-.422**	-.454**	-.185**	-.232**	-.282**	-.251**	-.288**	-.335**	-.249**	-.366**	0.012	.518**	.369**	0.117	0.014	0.069	1		
	Sig. (2-t.)	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.841	0.000	0.000	0.052	0.816	0.253			
AEST	P. Corr.	-.248**	-.191**	-.304**	-0.098	-.162**	-0.111	-0.039	-0.1	-.162**	-.172**	-.189**	.172**	.432**	.440**	.195**	0.107	.183**	.548**	1	
	Sig. (2-t.)	0.000	0.002	0.000	0.108	0.007	0.068	0.525	0.1	0.007	0.004	0.002	0.004	0.000	0.000	0.001	0.079	0.002	0.000		
THM	P. Corr.	-.326**	-.340**	-.376**	-.156**	-.212**	-.142*	-.149*	-0.088	-.201**	-.216**	-.235**	0.102	.424**	.425**	.142*	0.064	0.109	.662**	.697**	1
	Sig. (2-t.)	0.000	0.000	0.000	0.01	0.000	0.019	0.014	0.145	0.001	0.000	0.000	0.092	0.000	0.000	0.019	0.291	0.073	0.000	0.000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

N = 273.

VGU = Video Games Use; COR = Coreness; SOC = Sociability; CMP = Competition; ESC = Escapism; AES = Altering Emotional States; TKI = Time Killing; IMM = Immersion; ACH = Achievement; EXP = Exploration. HYP = Hyperchoice; UFN = Unfamiliarity; CPL = Complexity; CST = Costs; TIM = Time Constraints; IGD = Inaccessibility of Games Devices; MOR = Morality; AEST = Aesthetics; THM = Theme.

Table 18: Pearson Correlations

#	Game	Release Date	Price	Owners	Players	Playtime (Median)
1	PlayerUnkown's Battlegrounds	03/23/2017	29.99	22426724	16908168	29:37 (21:08)
2	Dota 2	07/09/2013	Free	117891357	9282482	18:54 (10:13)
3	Counter-Strike: Global Offensive	08/21/2012	10.04	37079044	9633261	11:43 (04:34)
4	Team Fortress 2	10/10/2007	Free	43941474	1756351	11:03 (06:16)
5	Tom Clancy's Rainbow Six Siege	12/01/2015	7.49	3671253	1525285	11:10 (05:08)
6	Grand Theft Auto V	04/13/2015	29.99	8771678	1631969	08:07 (02:37)
7	Warframe	0325/2013	Free	19734554	1089454	16:59 (03:23)
8	Rocket League	07/07/2015	9.99	6594490	1357639	07:40 (03:02)
9	PAYDAY 2	08/13/2013	N/A	16123280	926478	15:57 (08:29)
10	Garry's Mod	11/29/2006	4.99	14555223	1089454	08:41 (02:10)

Table 19: Top 10 Steam Games (Week 48/2017) - Source: [Galyonkin, 2017]

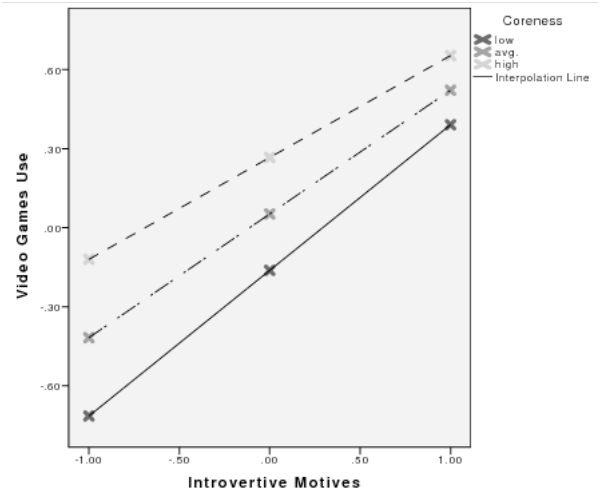

Figure 10: Interaction effect - Coreness/Introvertive Motives

Declaration of Academic Integrity

I certify that this master's thesis

" Video Games - Motives and Barriers "

is entirely my own work, except where I have stated full references to the work of others, and that the material contained in this master's thesis has not previously been submitted for assessment in any other course of study.

Ich erkläre hiermit, dass ich meine Masterarbeit mit dem Titel

" Video Games - Motives and Barriers "

selbstständig und ohne fremde Hilfe angefertigt habe, und dass ich alle von anderen Autoren wörtliche übernommenen Stellen wie auch die sich an die Gedankengänge anderer Autoren eng anlehnenden Ausführungen meiner Arbeit besonders gekennzeichnet und die Quellen zitiert habe.

Münster, den 07.12.2017