

Bachelor's thesis presented to the Department of Psychology of the University of Basel for
the degree of Bachelor of Science in Psychology

Challenge as a Mediator – From Experiencing Negative Emotions to a Positive Player Experience

Author: Memeti Zgjim

Immatriculation number: 17-050-709

Correspondence email: zgjim.memeti@unibas.ch

Examiner: M.Sc. Aeschbach Lena

Supervisor: Prof. Dr. Opwis Klaus

General Psychology and Methodology of the Faculty of Psychology, University of Basel

Submission 15.04.21

Declaration of Scientific Integrity

The author hereby declares that he has read and fully adhered the [Code of Academic Integrity and Good Practice in the Conduct of Research](#) of the University of Basel.

Abstract

Emotions, challenge, and enjoyment are central to the player experience (PX) of video games and have been researched in Game User Research (GUR). However, negative emotional experiences and the role of challenge within player experience have been neglected. Negative emotional experiences have been researched less than positive emotional experiences because they are associated with bad experiences. In addition, the role of challenge in relation to the player experience lacks definitions. To address these aspects, the goal of this thesis is to answer the question, whether challenge can serve as a mediator from negative emotional experiences to positive player experiences. Consequently, creating more clarity to the role of challenge within the player experience and supporting the idea that negative emotional experiences can lead to a positive player experience. For this purpose, I propose a model called Challenge-Mediation-Model (CMM) that illustrates the possibility of challenge serving as a mediator from negative emotional experiences to a positive player experience.

Keywords: challenge, functional challenge, emotional challenge, enjoyment, appreciation, emotions, negative emotional experience, Challenge-Mediation-Model

Contents

Introduction.....	5
Search Strategy	7
Theoretical Background.....	8
Negative Emotional Experience.....	8
<i>Meta-Emotions</i>	9
<i>Frustration in Video Games</i>	9
<i>The Four Fun Keys – Hard Fun</i>	10
Challenge.....	11
<i>Functional Challenge</i>	12
<i>Emotional Challenge</i>	13
Enjoyment	14
<i>Paradigmatic Shift – A Dichotomy of Enjoyment</i>	15
<i>Appreciation</i>	16
<i>The Theory of Flow</i>	16
Discussion	18
Challenge-Mediation-Model	18
<i>CMM – Component: Negative Emotions</i>	19
<i>CMM – Component: Challenge</i>	19
<i>CMM – Component: Positive Player Experience</i>	20
<i>CMM – Path: Hedonic-Challenge-Mediation-Path (HCMP)</i>	20
<i>CMM – Path: Eudaimonic-Challenge-Mediation-Path (ECMP)</i>	23
Limitations and future research.....	24
Conclusion.....	26
References.....	27

Introduction

Game User Research (GUR) is a field in Human-Computer Interaction (HCI) focusing on understanding the player experience (PX; Abeelee, Spiel, Nacke, Johnson, & Gerling, 2020). *Player experience* has been conceptualized as “the individual, personal experience held by the player during and immediately after the playing of the game” (Abeelee et al., 2020, p.1). The Game User Research field therefore aims to comprehend the components contributing to a positive player experience (Marsh & Costello, 2012). These components are hardly separable, indicating the complex interactions between the different components within player experience (Wiemeyer, Nacke, Moser, & Mueller, 2016).

Emotions, both positive and negative, are key components of the player experience in video games (Birk, Iacovides, Johnson, & Mandryk, 2015; Bopp, Mekler, & Opwis, 2016). In addition, emotions are considered to be relevant to the enjoyment and the challenge factor of the play process in which the goal is to feel positive emotional experiences (Birk et al., 2015; Lazzaro, 2009). Even though emotions are essential for the player experience (Birk et al., 2015; Bopp et al., 2016), negative emotional player experiences have been less researched than positive emotional player experiences (Birk et al., 2015; Bopp et al., 2016; Marsh & Costello, 2012). This might be due to the assumption that the “negative” denotation implies bad experiences which are apparently not compatible with positive experiences (Bopp et al., 2016; Marsh & Costello, 2012; Mekler, Rank, Steinemann, Birk, & Iacovides, 2016). The consequence is that designing for negative emotional experiences is seemingly not desirable for the player experience (Bopp et al., 2016; Marsh & Costello, 2012).

Challenge is a key component of the player experience (Cole, Cairns, & Gillies, 2015; Denisova, Guckelsberger, & Zendle, 2017) and “arguably the most important experience that players seek” in video games (Denisova et al., 2017, p. 2511). Malone (1981, 1982) suggests

challenge as a major feature that makes video games enjoyable. Despite the fact that challenge is apparently the most important experience the players seek, little research has been done on the role of challenge, that is, how challenge affects the player experience, how it is created and what challenge consists of (Denisova et al., 2017). Denisova et al. (2017) justified this with the lacking definitions of challenge within the player experience.

Enjoyment is another key component of the player experience (Mekler, Bopp, Tuch, & Opwis, 2014). For a long time, the view on a positive experience in media entertainment has been coined as enjoyment, a sole positive and pleasurable experience (Oliver, Bowman, Woolley, Rogers, Sherrick, & Chung, 2015; Vorderer, Klimmt, & Ritterfeld, 2004; Vorderer & Reinecke, 2015). This view has taken a turn with the introduction of appreciation, a wider set of emotional experiences including negative emotional experiences, to complement enjoyment and extended the idea of a positive experience (Oliver & Bartsch, 2010; Vorderer & Reinecke, 2015).

Although all three components are central to the player experience, there is currently no explicit model based on the interactions of negative emotions, challenge, and the positive player experience. The research on these interactions is of importance for two reasons. First, the research supports the conception that negative emotional experiences can lead to positive player experiences. Second, due to further elucidation of these interactions, more clarity can be created of the role of challenge within the player experiences.

The goal of this thesis is therefore to provide an answer to the question, whether challenge can serve as a mediator from negative emotional experiences to a positive player experience. Hence, I propose a model called Challenge-Mediation-Model to provide an answer to this question and consequently to depict the relations between negative emotions, challenge, and the positive player experience.

Search Strategy

For this thesis, the literature search began by choosing a paper as a starting point to execute the follow up research. The paper is called “Negative Emotion, Positive Experience? Emotionally Moving Moments in Digital Games” by Bopp et al. (2016). This paper has been chosen because it comprises topics concerning the player experience and negative emotional experiences. The data collection has been carried out around three databases to find the corresponding literature. These databases were the [ACM Digital Library](#), [Google Scholar](#), and [APA PsycNet](#). The research fields were “emotions” and “video games”. Within these fields, the following keywords have been searched as stand-alone or in combination according to used terms in the first paper: “enjoyment”, “appreciation”, “positive emotions”, “negative emotions”, “emotional experience”, “player experience”, and “challenge”. Additional literature has been found in the references of the already found articles. To determine the literature included in this thesis, the abstracts, the discussions, and the conclusions of the found readings have been screened. For a better overview of the used literature, the library-program called Zotero has been used.

Theoretical Background

Emotions, challenge, and enjoyment are complex components of the player experience that interact with each other and are hardly separable (Wiemeyer et al., 2016). The theoretical approaches and examples presented in this section can therefore not always be assigned to only one specific component. To provide a coherent structure throughout this section, the theoretical approaches and examples have been assigned to the most suitable components. Additionally, not all aspects of emotions will be elucidated due to the lack of universal consensus on the definition of emotions (Hemenover & Bowman, 2018). The focused aspect of emotions in this thesis is on negative emotional experiences.

Negative Emotional Experience

Considering that positive and negative emotions are key components of the player experience, experiencing negative emotions have been at odds with an overall positive player experience (Birk et al., 2015; Bopp et al., 2016; Marsh & Costello, 2012). Due to the association of the term “negative” with bad experiences, research on negative emotional experiences for the player experience has shown to be less desirable to research for (Birk et al., 2015; Bopp et al., 2016; Marsh & Costello, 2012). However, the relevance of negative emotional experiences is illustrated by different publications.

For instance, Allison, Carter, & Gibbs (2015) did a survey on “the Paradoxical Pleasure of Fearing Death in DayZ”. DayZ is a video game where negative emotional experiences are evoked by the permanent death of the players character with the loss of all the advancement in the game. In this case, negative emotional experiences refer to frustration, sadness, fear, tension, or anxiety. Nevertheless, most of the surveyed players felt that these negative emotional experiences are necessary for an enjoyable experience of the video game.

Another example demonstrating the relevance of negative emotional experiences comes from Bopp et al. (2016). Bopp et al. (2016) analyzed how their participants perceived

emotionally moving video game experiences. Emotionally moving experiences refer to the feeling of being moved. Bartsch, Kalch, & Oliver (2014) denoted in their article “Moved to Think” that being moved is comprised of negative and mixed emotional experiences. Mixed emotional experiences are positive and negative experiences such as feeling happy and sad at the same time (Larsen, McGraw, & Cacioppo, 2001). Moreover, Bopp et al. (2016) found that sadness was a predictor for the enjoyment and the appreciation of the player. Hence, they conclude that negative emotional experiences can contribute to positive player experiences.

Meta-Emotions

In media psychology, Oliver (1993) researched the “Paradox of the Enjoyment of Sad Films”. More precisely, she researched the reason for why people do enjoy sad entertainment media such as tragedies. As an explanation, she proposed *meta-emotions*. In accordance with the theory of the meta-experience of mood by Mayer & Gaschke (1988), emotions can be experienced at a direct level and at a reflective level (Mayer & Gaschke, 1988; Oliver, 1993). At a direct level, emotions refer to basic emotions such as happiness, anger, fear, sadness, and surprise (Mayer & Gaschke, 1988). The reflective level consists of the feelings and impressions about the emotion itself, a meta-experience of the emotion, thus called meta-emotion (Mayer & Gaschke, 1988; Oliver, 1993). Oliver (1993) applied the idea of meta-emotions to the enjoyment of sad films and found that that the viewers might enjoy sad films because experiencing sadness itself was perceived as gratifying. Hence, entertainment media evoking deep and profound feelings of sadness can be experienced as enjoyable among many but not all viewers (Oliver, 1993).

Frustration in Video Games

Frustration in video games arises from the interruption of the goal achieving progress (Gilleade & Dix, 2004). It is a negative emotion which is sometimes necessary to heighten

the overall experience of the video game (Gilleade & Dix, 2004). Gilleade & Dix (2004) distinguished two dimensions of frustration called at-game and in game frustration.

At-game frustration refers to physical failures. These physical failures result from failing to press the appropriate command sequences on the input device like a controller or keyboard. Such a sequence demands a fast input response with appropriate skills and can look like this: “→→←→+P (Punch Button)”. Translating this sequence into words means that the player needs to press right, right, left, right, and the punch button to execute the command in success. Such commands are important for better and faster progress but can be very frustrating if the execution attempts fail.

In-game frustration refers to mental failures. These mental failures result from the lack of knowledge and understanding of how the challenge needs to be completed to advance to another challenge. Sometimes a goal, such as finding a key to a goal relevant door, can be lost to the player and the player experiences frustration because he cannot proceed within a reasonable time frame. Consequently, players do neither recognize nor remember hints for the correct solution of the objective or the means to resolve the task lacks.

The Four Fun Keys – Hard Fun

The Four Fun Keys is a model of four key processes of how video games elicit different emotions in the player (Lazzaro, 2008, 2009). Each process creates a different set of emotional experiences for a more enjoyable and emotional player experience (Lazzaro, 2008, 2009). These four processes called “Fun Keys” are “Hard Fun”, “Serious Fun”, “People Fun”, and “Easy Fun” (Lazzaro, 2008, 2009).

Lazzaro (2008, 2009) describes *Hard Fun* as a goal-oriented rewarding process for the player with at least one major obstacle needed to overcome and providing the opportunity for challenge, mastery, and strategies. In addition, the central emotional experiences of Hard Fun are frustration, boredom, fiero (the personal triumph over adversity), and relief.

Lazzaro (2008, 2009) assumes that people's boredom is on the one hand the starting point to play a video game and on the other hand the emotion that elicits the start of a cycle she calls *Chain of Hard Fun Emotions*. Throughout a challenge in the video game, player experience first frustration due to (failed) attempts to overcome an obstacle. Frustration builds up to more focus and concentration until the player overcomes the challenge and achieves the goal. This generates a peak, here *fiero*, of a rewarding feeling of accomplishment and mastery. This peak fades away with the feeling of relief, and if challenges are available, this cycle repeats. This Chain of Hard Fun Emotions increases the enjoyment of a player. Only Hard Fun of the Four Fun Keys has been elucidated due to the interaction between frustration and challenge. For a detailed explanation on the untouched Fun Keys see Lazzaro (2008, 2009).

Concluding this section on negative emotional experiences, Allison et al. (2015) as well as Bopp et al. (2016) illustrated the possibility of a positive emotional experience through negative experienced emotions. Oliver (1993) offered meta-emotions as a theoretical explanation for the enjoyable experience of sad films. With the concept of in-game and at-game frustration Gilleade & Dix (2004) showed that frustration as a negative emotion can be necessary to heighten the overall player experience. Lastly, Lazzaro (2008, 2009) demonstrated with Hard Fun that different emotional experiences such as frustration and *fiero* can lead to an enjoyable experience.

Challenge

The relevance of challenge as a key component of the player experience cannot be denied in spite of the lack of definitions of the role of challenge in regard to the player experience (Denisova et al., 2017).

In accordance with Malone (1981, 1982) challenge can be defined as a goal-oriented activity with an uncertain outcome. Uncertain outcomes can be provided by variable

difficulty levels, hidden information, randomness, or by simultaneously displaying multiple level goals, such as scorekeeping or (fast) time responses. If the uncertain outcomes are not given, the activities will not be challenging. It is necessary to have a clearly defined or easily generated goal with performance feedback to evaluate how close the player is to the goal. Cole et al. (2015) first proposed a differentiation of challenge into functional and emotional challenges as complementing antagonists.

Functional Challenge

To be confronted with a functional challenge means trying to answer the question “What can I do?” (Cole et al., 2015, p. 122). At the core of functional challenges are the physical skills and the cognitive abilities to overcome the challenges (Cole et al., 2015). Moreover, the enjoyable experience is derived from how powerful the player feels and from Hard Fun (Bopp, Opwis, & Mekler, 2018; Cole et al., 2015; Lazzaro, 2008, 2009). In accordance with the necessity of the physical skills and cognitive abilities, functional challenge has been further distinguished into two dimensions called physical and cognitive challenge (Cole et al., 2015; Denisova et al., 2017).

Physical challenges demand players skills such as (reaction-) speed, accuracy, coordination, and dexterity for the game device input to keep up with the challenge (Cole et al., 2015; Denisova et al., 2017). Video games representing this type of challenge are for example combat games (Cole et al., 2015).

Cognitive challenges address mental abilities such as memory use, problem-solving capacities, observation, planning, strategizing, or reasonable decision making, while investing cognitive effort for predictions of further consequences of actions (Cole et al., 2015; Denisova et al., 2017). Video games representing this type of challenge are for example puzzle games (Cole et al., 2015).

In more recent literature on challenge, functional challenge has been used as a synonym to refer to conventional challenge (Peng, Huang, Denisova, Chen, Tian, & Wang, 2020). Conventional means that this type of challenge has received more attention in the research literature and that is also how most challenges are represented in video games (Bopp et al., 2018; Cole et al., 2015; Peng et al., 2020). The yet less prominent type of challenge, which has received little empirical attention so far, is emotional challenge (Bopp et al., 2018; Denisova et al., 2017).

Emotional Challenge

Players experience emotional challenges in contrast to functional challenges by answering the question “How do I feel?” (Cole et al., 2015, p. 123). The core idea of emotional challenge is to confront the players with “emotionally salient material, to use strong characters, and to provide a captivating story” (Denisova et al., 2017, p. 2513). Emotional challenges can therefore not be overcome with skills as in functional challenges, but rather by resolving suspense within the narrative, by identifying with the characters, or by the “emotional exploration of ambiguities within the diegesis” (Bopp et al., 2018; Cole et al., 2015, p. 123).

In comparison to functional challenges, emotional challenges are confronted with a wider spectrum of emotional experiences (Bopp et al., 2018; Cole et al., 2015; Peng et al., 2020). Emotional challenges evoke more reflective feelings for the player (Bopp et al., 2015; Cole et al., 2015) and more appreciated negative emotions such as sadness, fear, tension, and anger (Bopp et al., 2018). Furthermore, Bopp et al. (2018) found that “emotional challenge manifested itself in different ways, by confronting players with difficult themes or decisions as well as having them deal with intense emotions” (p. 1).

Endress, Mekler, & Opwis (2016) identified in their interviews on frightening game experiences that emotional challenges can derive from frightening play experiences that are

fundamental to players enjoyment of horror games. The interviewed participants reported that the experienced thrill of negative and unpleasant emotions such as fright, fear, or anger can evoke emotionally challenging situations. Participants enjoyed and appreciated these situations because of the opportunity to confront and overcome them, leading to an enjoyable player experience.

To summarize this section on challenge, whereas Malone (1981, 1982) proposed a definition of challenge, Cole et al. (2015) differentiated challenge into functional and emotional challenge. Both providing different sets of negative emotional experiences. Functional challenge is concerned with Hard Fun, while emotional challenge is concerned with a wider range of negative emotions such as sadness, fear, tension, anger, or fright (Bopp et al., 2018; Cole et al., 2015; Endress et al., 2016; Peng et al., 2020).

Enjoyment

In their systematic review on the enjoyment of video games, Mekler et al. (2014) denoted that enjoyment is a key component of the player experience. They researched a variety of approaches on how enjoyment has been described in the literature around video games and media entertainment. Furthermore, Mekler et al. (2014) proposed a working definition of *game enjoyment* as “the positive cognitive and affective appraisal of the game experience [that] (...) may in part be associated with the support of player needs and values” (p. 927). In addition, they found that challenge is a necessary determinant of player enjoyment. A relevant approach on enjoyment they have researched stems from Vorderer et al. (2004).

In media entertainment experiences, where playing video games is a part of, enjoyment has been at the heart of the entertainment experience (Vorderer et al., 2004). Vorderer et al. (2004) identified enjoyment in media entertainment as a pleasant experiential state that refers to a complex, dynamic, and multifaceted model consisting of physiological,

affective, and cognitive dimensions for pleasurable experiences. Furthermore, they denoted that enjoyment may not only derive from positive emotions but negative emotions as well. The multiple facets of enjoyment are manifested in emotional responses such as laughter, exhilaration, suspense, achievement, relief, sadness, thrill, fear, and thoughtfulness (a selection of manifestations; for more cf. Vorderer et al., 2004).

Paradigmatic Shift – A Dichotomy of Enjoyment

Research in media entertainment has explored the conception of hedonic versus eudaimonic entertainment experiences (Bartsch, 2012; Oliver & Bartsch, 2010; Possler, Kümpel, & Unkel, 2020; Vorderer & Reinecke, 2015; Wirth, Hofer, & Schramm, 2012). This conception is important to the topic because hedonic and eudaimonic experiences are outcomes of playing video games (Possler et al., 2020).

For a long time, the entertainment experience was solely defined in hedonic terms, either as a form of a pleasurable experience (Oliver et al., 2015; Vorderer & Reinecke, 2015) or as enjoyment to describe a “positive reaction towards the media and its contents” (Vorderer et al., 2004, p. 388; Vorderer & Reinecke, 2015). Hedonic concerns therefore refer to positive denotations such as pleasure and fun experiences (Oliver & Raney, 2011). Moreover, according to Cole & Gillies (2019), hedonic entertainment intends to maximize the enjoyment for the viewers. In short, the viewers are pleasure-seeking. The hedonic view on an enjoyable experience in entertainment media has undergone a paradigmatic shift where the traditional concept of enjoyment as hedonic pleasure has been complemented with the eudaimonic idea of the entertainment experience (Vorderer & Reinecke, 2015).

Eudaimonic experiences are concerned with experiences beyond the hedonic notion of enjoyment, that is, by more mixed and profound emotional experiences, such as being moved or reflection is at the core of its experience (Oliver & Raney, 2011; Possler et al., 2020). Tan (2008) proposed that it would be more appropriate to refer to this additional, more

emotionally negative connoted perspective of the enjoyment experiences as “appreciation”. Cole & Gillies (2019) refer to the eudaimonic entertainment experience as meaning-seeking, which aims “to evoke a strong sense of ‘appreciation’ in the viewer” (Cole & Gillies, 2019, p. 5). Moreover, Oliver & Bartsch, (2010) were the ones who actually proposed appreciation as eudaimonic complementation to the hedonic enjoyment perspective of media enjoyment.

Appreciation

Oliver & Bartsch (2010) defined *appreciation* as “an experiential state that is characterized by the perception of deeper meaning, the feeling of being moved, and the motivation to elaborate on thoughts and feelings inspired by the experience” (p. 76). Oliver & Bartsch (2011) denoted that appreciation in contrast to enjoyment is associated with meaningful and reflecting entertainment experiences. The appreciative experience is often thought to be closely related to sad affect due to the elicited emotions like fear or sadness. Additionally, Oliver & Bartsch (2010) introduced appreciation as an explanation for why people are drawn towards “sad media” (Bopp et al., 2015).

The Theory of Flow

In his research on what is needed for an enjoyable experience, Csikszentmihalyi (1990, 1993) proposed flow, the optimal experience for enjoyment. *Flow* is the peak experience of an activity through which an individual engages in a state of absolute absorption. In this state, people lose awareness of time and of oneself because of the strong focus and concentration during their activity. This activity provides clear goals and offers direct feedback. Moreover, during flow, the activity can be approached with ease and the people in flow have the capability to exercise a sense of control over their actions in the given situation. Reaching the state of flow provides a sense of deep and rewarding enjoyment.

According to Nakamura & Csikszentmihalyi (2014) the state of flow is rather an active than a passive state. First, a person needs to provide the needed skills to handle a

challenge. Second the opportunity for a challenge needs to occur where one can execute these skills. Flow is therefore achieved by an equilibrium between challenges and skills. In addition, they reported that boredom results from high skills making a challenge too easy to overcome. Anxiety results from the lack of skills to overcome the challenge. By containing this equilibrium, a balance between anxiety and boredom takes place simultaneously for an increase in enjoyment (Nakamura & Csikszentmihalyi, 2014).

To sum up, this section on enjoyment showed that enjoyment is a relevant concept not only to the overall media entertainment experience (Vorderer et al., 2004) but also to the specific entertainment experience of video games (Mekler et al., 2014). Moreover, the flow theory is a theory of enjoyment for an optimal experience which incorporates the idea of an equilibrium between challenges and skills (Csikszentmihalyi, 1990). Enjoyment had a paradigmatic shift and received a complement to its hedonic nature (Vorderer & Reinecke, 2015). Oliver & Bartsch (2010) added the idea of appreciation as a eudaimonic complementation and thus extending the notion of a positive experience.

Discussion

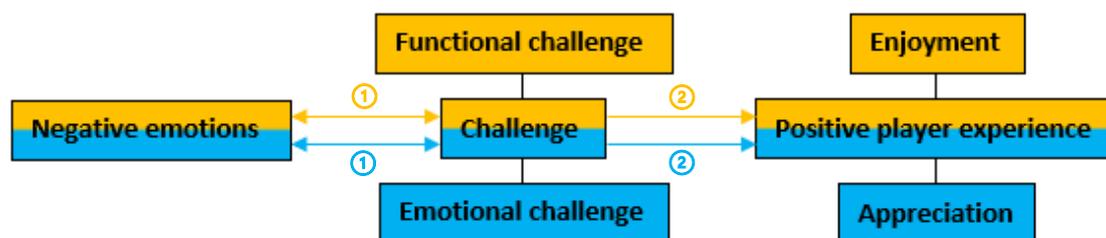
Based on the theoretical background, I will answer the question, whether challenge can serve as a mediator from negative emotional experiences to a positive player experience. To do so, a model called Challenge-Mediation-Model will be elaborated. This proposed model is not exhaustive and needs to be taken with a grain of salt.

Challenge-Mediation-Model

The *Challenge-Mediation-Model* (CMM) is a model of how challenge mediates from negative emotional experiences to a positive player experience (see Figure 1). It consists of three components called negative emotions, challenge, enjoyment. Moreover, for this model, two paths will be elaborated in which challenge mediates from negative emotions to a positive player experience. These paths are called Hedonic-Challenge-Mediation-Path (HCMP) and Eudaimonic-Challenge-Mediation-Path (ECMP). Both, the components, and the paths, will be further elucidated below.

Figure 1

Challenge-Mediation-Model



Note. This Figure demonstrates the Challenge-Mediation-Model (CMM) that is composed of three components. Negative emotions as the starting point, challenge as a mediator, and positive player experience as the final experience of the mediation. Challenge in the center mediates from negative emotions to positive player experience. The dichroism refers to the Hedonic-Challenge-Mediation-Path (HCMP) in orange and the Eudaimonic-Challenge-Mediation-Path (ECMP) in blue. The numbers represent the processes within each path.

Whereas the first process in the HCMP is called Orange 1, the second process is called Orange 2. Similarly, with the ECMP as well. The first process of the ECMP is called Blue 1 while the second one is called Blue 2.

CMM – Component: Negative Emotions

Negative emotions are the starting point of the CMM. The assumption that negative experiences are researched less because they are seemingly not compatible with positive experiences (Bopp et al., 2016; Marsh & Costello, 2012) led to the development of this first component. This component is comprised of the negative emotional experiences reported in the theoretical background that already have been found to contribute to a positive (player) experience such as enjoyment and appreciation. The evidence on specific negative emotions such as frustration (cf. Allison et al., 2015; Gilleade & Dix, 2004; Lazzaro, 2008, 2009), sadness (cf. Allison et al., 2015; Bopp et al., 2018, 2016; Oliver, 1993), or fear (cf. Allison et al., 2015; Bopp et al., 2018; Endress et al., 2016), have supported the idea that negative emotional experiences can lead to a positive (player) experience.

CMM – Component: Challenge

Challenge is the mediating component of the CMM. The role of challenge is to serve as a mediator from negative emotions to positive player experiences. The interactions in which challenge is involved, adds to additional understanding of the role of challenge within the player experience. Challenge is at the center of this model and has been already defined in the theoretical background as a goal-oriented activity with an uncertain outcome (Malone, 1981, 1982). Challenge is responsible for the mediation from negative emotions to a positive player experience. The subdivision into functional and emotional challenge proposed by Cole et al. (2015) is of relevance to this component. Whereas in functional challenges the player is confronted with the demand for physical and cognitive skills, emotional challenges can be overcome by the identification with the characters, by resolving suspense within the

narrative, or by exploring the ambiguities within the plot (Cole et al., 2015) These are the two subcomponents that form the challenge component in this model. They are both equivalent and complement each other.

CMM – Component: Positive Player Experience

Positive player experience is the final component in the CMM. The two subcomponents enjoyment and appreciation constitute the positive player experience. They are both necessary for an overall positive player experience and complement each other.

Enjoyment as a subcomponent in this model refers to a positive cognitive and emotional experience (Mekler et al., 2014). Moreover, enjoyment in entertainment media has been characterized as a hedonic experience due to the pleasurable and fun sensations it refers to (Oliver et al., 2015; Oliver & Raney, 2011; Vorderer & Reinecke, 2015). Therefore, enjoyment in this model will represent the idea of a hedonic experience.

Appreciation is referred to as the eudaimonic complementation to the hedonic perspective enjoyment (Oliver & Bartsch, 2010). It is the complementing subcomponent of enjoyment in this model for the positive player experience. Appreciation is characterized as an eudaimonic experience referring to deeper, meaningful, and reflecting experience (Oliver & Bartsch, 2010, 2011). Moreover, appreciation refers to sadness and the feeling of being moved (Oliver & Bartsch, 2010, 2011).

The interactions that negative emotions, challenge, and positive player experience provide are necessary to reason that challenge mediates from negative emotions to a positive player experience. Thus, these interactions incorporated within two paths of the CMM.

CMM – Path: Hedonic-Challenge-Mediation-Path (HCMP)

Functional challenge will be engaged in a path serving to mediate from negative emotions to enjoyment called Hedonic-Challenge Mediation-Path (HCMP). This is the first path providing the interactions between negative emotions, challenge, and positive player

experience. It is called hedonic because of the incorporation of enjoyment. In Figure 1, the HCMP is represented in orange. Orange 1 and Orange 2 refer to the two processes in the HCMP (see Figure 1). The central negative emotional experience in the HCMP will be frustration which has been shown to be a relevant negative emotional experience in relation to challenge (cf. Gilleade & Dix, 2004; Lazzaro, 2008, 2009). Not only that, but the described theories and examples provided in the theoretical background tend to focus on frustration. This will be subject to the limitations.

Orange 1: The first process in HCMP is an interaction between negative emotions, hence frustration, and challenge, thus functional challenge. This interaction is reciprocal. The idea to this interaction predominantly stems from the theories and examples provided by Cole et al. (2015), Gilleade & Dix (2004), & Lazzaro (2008, 2009).

Gilleade & Dix (2004) presented that frustration is a negative emotion capable of ultimately heightening the overall player experience. He proposed at-game frustration and in-game frustration. These two types of frustration resembles the subdivision of functional challenge into physical and cognitive challenge that Cole et al. (2015) proposed.

According to Gilleade & Dix (2004), at-game frustration refers to physical failures resulting from the incapability to appropriately press the command sequence on the input device. This incapability is due to the failed input responses and lack of skills to do so. Failing at the attempts lets the player feel frustrated. The felt frustration is a response to physical challenges and the needed skills such as speed, accuracy, or coordination (Cole et al., 2015; Gilleade & Dix, 2004).

In-game frustration refers to mental failures resulting from the lack of knowledge and understanding to solve a given challenge (Gilleade & Dix, 2004). Not remembering hints or bad memory to solve a challenge lets the player feel frustrated (Gilleade & Dix, 2004). The

felt frustration is a response cognitive challenges that address the same mental abilities such as problem-solving capacity or memory use (Cole et al., 2015; Gilleade & Dix, 2004).

Concluding from this, the first process of the HCMP provides the idea that frustration builds up if the necessary skills, whether physical or mental, are not sufficient. Attempting to overcome the challenge but failing leads to more frustration (Lazzaro, 2008, 2009). In addition, anxiety might result from the lack of skills to confront the challenge (Nakamura & Csikszentmihalyi, 2014), which has also been denoted as a negative emotional experience capable of eliciting ultimately positive player experiences (Allison et al., 2015). This interaction between frustration and functional challenge repeats until the second process of the HCMP elicits, thus the challenge can be overcome.

Orange 2: The second process in HCMP is an interaction between challenge, hence functional challenge, and positive player experience, thus enjoyment. This interaction is unidirectional from functional challenge to enjoyment. The idea to this interaction predominantly stems from the theories and examples provided by Cole et al. (2015), Gilleade & Dix (2004), Lazzaro (2008, 2009), Malone (1981, 1982), & Nakamura & Csikszentmihalyi (2014).

Gilleade & Dix (2004) proposed that, if the process to achieve a goal is interrupted, frustration will arise. Malone (1981, 1982) denoted that a challenge is goal-oriented activity. Hard Fun, proposed by Lazzaro (2008, 2009), also has been described as a goal-oriented process. The key element for the interaction between functional challenge and the enjoyment seems to be the need for a goal. This goal is the motivation to overcome the steady interaction between challenge and frustration. By honing the players skills and multiple attempts, the player might overcome a challenge, the feeling of fiero, an enjoyable experience arises (Lazzaro, 2008, 2009). In accordance with Nakamura & Csikszentmihalyi (2014), flow,

which provides a sense of rewarding enjoyment, will not occur if the player does not adequately achieve a balance between his own skills and the given challenge.

In conclusion, the HCMP is a collocation of theories and examples concerning frustration and challenge. This path shows that challenge can mediate from negative emotions to positive player experience. Moreover, the role of challenge as a mediator has been to some extent clarified, and the notion that negative emotional experiences can lead to a positive player experience via challenge has been showed as possible with frustration.

CMM – Path: Eudaimonic-Challenge-Mediation-Path (ECMP)

Emotional challenge will be engaged in a path serving to mediate from negative emotions to enjoyment called Eudaimonic-Challenge Mediation-Path (ECMP). This is the second path providing the interactions between negative emotions, challenge, and positive player experience. It is called eudaimonic because of the incorporation of appreciation. In Figure 1 the ECMP is represented in blue. Blue 1 and Blue 2 refer to the two processes in the ECMP (see Figure 1).

Blue 1: The first process in ECMP is an interaction between negative emotions and challenge, thus emotional challenge. This interaction is reciprocal. The idea to this interaction stems from the theories and examples provided by Bopp et al. (2018, 2015), Cole et al. (2015), & Endress et al. (2016).

The interaction between negative emotions and emotional challenge provides the answer to the question “How do I feel?” (Cole et al., 2015, p. 123). They evoke reflective feelings, and negative emotions such as sadness and fear (Bopp et al., 2015, 2018; Cole et al., 2015). Emotional challenge therefore confronts the player with difficult themes and profound emotional material that elicits these emotions (Bopp et al., 2018; Denisova et al., 2017). Moreover, Endress et al. (2016) identified that unpleasant emotions such as fright and fear

itself do evoke emotional challenge according to the situation. This interaction is followed by Blue 2.

Blue 2: The second interaction in ECMP takes place between challenge, hence emotional challenge, and positive player experience, thus appreciation. This connection is unidirectional from emotional challenge to appreciation. The idea to this connection stems from the theories and examples provided by Cole et al. (2015), Oliver (1993), Oliver & Bartsch (2010, 2011), & Vorderer & Reinecke (2015).

To finally elicit appreciation of the emotional challenging experience, the player of an emotional challenging video game needs to resolve the suspense within the narrative or explore the ambiguities within the plot (Bopp et al., 2018; Cole et al., 2015). Appreciation itself is already denoted as an experience closely related to sadness and has been already used as an explanation for why people are drawn towards sad media (Oliver & Bartsch, 2010, 2011). Therefore, emotional challenge as a concept itself does elicit appreciation.

In brief, emotional challenges are more complex than functional challenges and need to be further researched, but the elucidation of the ECMP has showed that emotional challenges can mediate from negative emotions to a positive player experience.

Coming to an end, is challenge capable of playing a mediating role from negative emotional experiences to positive player experiences? Both the reviewed literature and the consequently constructed model to answer this question provide evidence that challenge is capable of being a mediator from negative emotions to a positive player experience. This thesis thereby contributes to not only a more positive perspective on negative emotions but also to the role of challenge and its definitions.

Limitations and future research

This thesis is subject to several limitations. First, within the CMM, only few negative emotions such as frustration or sadness have been addressed. Hence, a wider spectrum of

negative emotions such as guilt, disappointment, or grief has been neglected. Even though the CMM provides that challenge, both functional and emotional, can serve as a mediator, the evidence found and provided for this thesis is more of a hedonic rather than an eudaimonic nature. Moreover, frustration as a negative emotional experience is predominantly represented. Thus, misleading the reader to perception that hedonic enjoyment is more relevant than eudaimonic appreciation or that only frustration is capable of eliciting enjoyment via challenge. Consequently, further research is recommended with focus on appreciation in relation to emotional challenge.

Second, the CMM lacks substance. The number of theories and examples mentioned in this paper are reduced to a minimum to fit within the boundaries of this thesis. For more an in-depth analysis on the topic, I recommend following theories to consider. Of relevance could be the Uses and Gratification's Theory (Ruggiero, 2000) with the extension of the Gratification Theories (Bartsch, 2012). The Self-Determination Theory and Intrinsic Motivation (Ryan & Deci, 2000, 2020) with Need Satisfaction (Tamborini, Grizzard, Bowman, Reinecke, Lewis, & Eden, 2011) could be helpful as well. It would be best to conduct an empirical research on perceived (negative) emotions mediated by challenges (focus on emotional challenges) to indicate the perceived positive experience with the help of the recently developed CORGIS, the Challenge Originating from Recent Gameplay Interaction Scale (Denisova, Cairns, Guckelsberger, & Zendle, 2020).

Finally, other relevant factors such as demographic differences like gender, age, or the role of language have been completely neglected.

In addition to the limitations, I propose an idea for future research. Even though meta-emotions are relevant, especially as an explanation for the positive experienced negative emotions (Oliver, 1993), implementing meta-emotions within the CMM was out of reach. Therefore I propose the following: Vorderer & Reinecke (2015) denoted the paradigmatic

shift from the hedonic perspective of the entertainment experience as enjoyment to the eudaimonic perspective referred to as appreciation (Oliver, 1993). Oliver (1993) proposed to explain the enjoyment of sad entertainment media with the theory of meta-emotions more than 20 years prior to the paradigmatic shift. If the concept of appreciation had already been established in 1993, would Oliver more likely tend to explain the appreciation of sad entertainment media? Due to the multiple findings of sadness related to appreciation and appreciation being a complementation of enjoyment, appreciation seems to be to some extent a positive meta-experience of negative emotional experiences. The reason for this assumption is that the emotions such as sadness have been experienced on a reflective level as explained in (Bopp et al., 2015; Oliver & Bartsch, 2011). Hence, emotional challenge would not only evoke appreciation but might evoke a meta-emotional experience as well.

Conclusion

The goal of this thesis was to find out, if challenge can serve as a mediator from negative emotional experiences to a positive player experience. This thesis provided a model to depict the mediating role of challenge and to show that negative emotions are necessary and desirable elements to the player experience. In consideration of the proposed Challenge-Mediation-Model and its limitations, the conclusion is that challenge can serve as a mediator from negative emotional experiences to a positive player experience.

References

- Abeelee, V. V., Spiel, K., Nacke, L., Johnson, D., & Gerling, K. (2020). Development and validation of the player experience inventory: A scale to measure player experiences at the level of functional and psychosocial consequences. *International Journal of Human-Computer Studies*, *135*, 102370. <https://doi.org/10.1016/j.ijhcs.2019.102370>
- Allison, F., Carter, M., & Gibbs, M. (2015). Good Frustrations: The Paradoxical Pleasure of Fearing Death in DayZ. In *Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction*, 119–123. <https://doi.org/10.1145/2838739.2838810>
- Bartsch, A. (2012). Emotional Gratification in Entertainment Experience. Why Viewers of Movies and Television Series Find it Rewarding to Experience Emotions. *Media Psychology*, *15*(3), 267–302. <https://doi.org/10.1080/15213269.2012.693811>
- Bartsch, A., Kalch, A., & Beth Oliver, M. (2014). Moved to Think: The Role of Emotional Media Experiences in Stimulating Reflective Thoughts. *Journal of Media Psychology*, *26*(3), 125–140. <https://doi.org/10.1027/1864-1105/a000118>
- Birk, M. V., Iacovides, I., Johnson, D., & Mandryk, R. L. (2015). The False Dichotomy between Positive and Negative Affect in Game Play. *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play* (pp. 799–804). <https://doi.org/10.1145/2793107.2810258>
- Bopp, J. A., Mekler, E. D., & Opwis, K. (2015). „It Was Sad But Still Good“: Gratifications of Emotionally Moving Game Experiences. In *Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems* (pp. 1193–1198). <https://doi.org/10.1145/2702613.2732852>
- Bopp, J. A., Mekler, E. D., & Opwis, K. (2016). Negative Emotion, Positive Experience?: Emotionally Moving Moments in Digital Games. In *Proceedings of the 2016 CHI*

Conference on Human Factors in Computing Systems (pp. 2996–3006).

<https://doi.org/10.1145/2858036.2858227>

Bopp, J. A., Opwis, K., & Mekler, E. D. (2018). “An Odd Kind of Pleasure”: Differentiating Emotional Challenge in Digital Games. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (pp. 1–12)

<https://doi.org/10.1145/3173574.3173615>

Cole, T., Cairns, P., & Gillies, M. (2015). Emotional and Functional Challenge in Core and Avant-garde Games. In *Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play* (121–126). <https://doi.org/10.1145/2793107.2793147>

Cole, T., & Gillies, M. (2019). Thinking and Doing: Challenge, Agency, and the Eudaimonic Experience in Video Games. *Games and Culture*, 155541201988153.

<https://doi.org/10.1177/1555412019881536>

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience* (Vol. 1990). *New York: Harper & Row.*

Csikszentmihalyi, M. (1993). *The evolving self: A psychology for the third millennium* (1st ed). HarperCollins Publishers.

Denisova, A., Cairns, P., Guckelsberger, C., & Zendle, D. (2020). Measuring perceived challenge in digital games: Development & validation of the challenge originating from recent gameplay interaction scale (CORGIS). *International Journal of Human-Computer Studies*, 137, 102383. <https://doi.org/10.1016/j.ijhcs.2019.102383>

Denisova, A., Guckelsberger, C., & Zendle, D. (2017). Challenge in Digital Games: Towards Developing a Measurement Tool. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems* (pp. 2511–2519).

<https://doi.org/10.1145/3027063.3053209>

- Endress, S. I., Mekler, E. D., & Opwis, K. (2016). „It’s Like I Would Die as Well“: Gratifications of Fearful Game Experience. In *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts*, (pp. 149–155). <https://doi.org/10.1145/2968120.2987716>
- Gilleade, K. M., & Dix, A. (2004). Using frustration in the design of adaptive videogames. *Proceedings of the 2004 ACM SIGCHI International Conference on Advances in Computer Entertainment Technology* (228–232). <https://doi.org/10.1145/1067343.1067372>
- Hemenover, S. H., & Bowman, N. D. (2018). Video games, emotion, and emotion regulation: Expanding the scope. *Annals of the International Communication Association*, 42(2), 125–143. <https://doi.org/10.1080/23808985.2018.1442239>
- Larsen, J. T., McGraw, A. P., & Cacioppo, J. T. (2001). Can people feel happy and sad at the same time? *Journal of Personality and Social Psychology*, 81(4), 684–696. <https://doi.org/10.1037/0022-3514.81.4.684>
- Lazzaro, N. (2008). *The four fun keys. Game Usability: Advancing the Player Experience* (K. Isbister and N. Schaffer, Eds.). Burlington: Elsevier.
- Lazzaro, N. (Hrsg.). (2009). *Why We Play. In The human-computer interaction handbook: Fundamentals, evolving technologies, and emerging applications. 2012* (3rd ed). CRC Press.
- Malone, T. W. (1981). Toward a Theory of Intrinsically Motivating Instruction. *Cognitive Science*, 5(4), 333–369. https://doi.org/10.1207/s15516709cog0504_2
- Malone, T. W. (1982). Heuristics for designing enjoyable user interfaces: Lessons from computer games. In *Proceedings of the 1982 Conference on Human Factors in Computing Systems* (pp. 63–68). <https://doi.org/10.1145/800049.801756>

- Marsh, T., & Costello, B. (2012). Experience in Serious Games: Between Positive and Serious Experience. In M. Ma, M. F. Oliveira, J. B. Hauge, H. Duin, & K.-D. Thoben (Hrsg.), *Serious Games Development and Applications* (Bd. 7528, S. 255–267). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-33687-4_22
- Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of Personality and Social Psychology*, 55(1), 102–111. <https://doi.org/10.1037/0022-3514.55.1.102>
- Mekler, E. D., Bopp, J. A., Tuch, A. N., & Opwis, K. (2014). A systematic review of quantitative studies on the enjoyment of digital entertainment games. In *Proceedings of the 32nd Annual ACM Conference on Human Factors in Computing Systems* (pp. 927–936). <https://doi.org/10.1145/2556288.2557078>
- Mekler, E. D., Rank, S., Steinemann, S. T., Birk, M. V., & Iacovides, I. (2016). Designing for Emotional Complexity in Games: The Interplay of Positive and Negative Affect. In *Proceedings of the 2016 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts* (pp. 367–371). <https://doi.org/10.1145/2968120.2968126>
- Nakamura, J., & Csikszentmihalyi, M. (2014). The Concept of Flow. In *Flow and the Foundations of Positive Psychology* (S. 239–263). Springer, Dordrecht. https://doi.org/10.1007/978-94-017-9088-8_16
- Oliver, M. B. (1993). Exploring the Paradox of the Enjoyment of Sad Films. *Human Communication Research*, 19(3), 315–342. <https://doi.org/10.1111/j.1468-2958.1993.tb00304.x>
- Oliver, M. B., & Bartsch, A. (2010). Appreciation as Audience Response: Exploring Entertainment Gratifications Beyond Hedonism. *Human Communication Research*, 36(1), 53–81. <https://doi.org/10.1111/j.1468-2958.2009.01368.x>

- Oliver, M. B., & Bartsch, A. (2011). Appreciation of Entertainment: The Importance of Meaningfulness via Virtue and Wisdom. *Journal of Media Psychology*, 23(1), 29–33. <https://doi.org/10.1027/1864-1105/a000029>
- Oliver, M. B., Bowman, N. D., Woolley, J. K., Rogers, R., Sherrick, B. I., & Chung, M.-Y. (2015). Video games as meaningful entertainment experiences. *Psychology of Popular Media Culture*, 5(4), 390–405. <https://doi.org/10.1037/ppm0000066>
- Oliver, M. B., & Raney, A. A. (2011). Entertainment as Pleasurable and Meaningful: Identifying Hedonic and Eudaimonic Motivations for Entertainment Consumption. *Journal of Communication*, 61(5), 984–1004. <https://doi.org/10.1111/j.1460-2466.2011.01585.x>
- Peng, X., Huang, J., Denisova, A., Chen, H., Tian, F., & Wang, H. (2020). A Palette of Deepened Emotions: Exploring Emotional Challenge in Virtual Reality Games. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, (pp. 1–13). <https://doi.org/10.1145/3313831.3376221>
- Possler, D., Kümpel, A. S., & Unkel, J. (2020). Entertainment Motivations and Gaming-Specific Gratifications as Antecedents of Digital Game Enjoyment and Appreciation. *Psychology of Popular Media*, 9(4), 541–552. <https://doi.org/10.1037/ppm0000248>
- Ruggiero, T. E. (2000). Uses and Gratifications Theory in the 21st Century. *Mass Communication and Society*, 3(1), 3–37. https://doi.org/10.1207/S15327825MCS0301_02
- Ryan, R. M., & Deci, E. L. (2000). Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *American Psychologist*, 55(1), 68.
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions.

Contemporary Educational Psychology, 61, 101860.

<https://doi.org/10.1016/j.cedpsych.2020.101860>

Tamborini, R., Grizzard, M., David Bowman, N., Reinecke, L., Lewis, R. J., & Eden, A. (2011). Media Enjoyment as Need Satisfaction: The Contribution of Hedonic and Nonhedonic Needs. *Journal of Communication*, 61(6), 1025–1042.

<https://doi.org/10.1111/j.1460-2466.2011.01593.x>

Tan, E. S.-H. (2008). Entertainment is Emotion: The Functional Architecture of the Entertainment Experience. *Media Psychology*, 11(1), 28–51.

<https://doi.org/10.1080/15213260701853161>

Vorderer, P., Klimmt, C., & Ritterfeld, U. (2004). Enjoyment: At the Heart of Media Entertainment. *Communication Theory*, 14(4), 388–408.

<https://doi.org/10.1111/j.1468-2885.2004.tb00321.x>

Vorderer, P., & Reinecke, L. (2015). From Mood to Meaning: The Changing Model of the User in Entertainment Research: From Mood to Meaning. *Communication Theory*, 25(4), 447–453. <https://doi.org/10.1111/comt.12082>

Wiemeyer, J., Nacke, L., Moser, C., & Mueller, F. (2016). *Player Experience*. In *Serious Games: Foundations, Concepts and Practice*. 243-271. https://doi.org/10.1007/978-3-319-40612-1_9

Wirth, W., Hofer, M., & Schramm, H. (2012). Beyond Pleasure: Exploring the Eudaimonic Entertainment Experience. *Human Communication Research*, 38(4), 406–428.

<https://doi.org/10.1111/j.1468-2958.2012.01434.x>