MASTER THESIS COMMUNICATION SCIENCE

THE ELEMENTS OF GAME DESIGN AND GAMING ASSOCIATED WITH MENTAL WELL-BEING

A QUALITATIVE PERSPECTIVE THROUGH PLAY DIARY ANALYSIS

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Abstract

Objective: Prior research has suggested that gaming can have positive effects on the mental well-being of players. In light of this, the current study attempted to identify which parts within gaming contribute to these effects. **Methodology:** Two studies were conducted, was a survey that had a total of 99 respondents associate games they had played with the strongest sense of satisfaction of the intrinsic needs of the Self Determination Theory. Participants furthermore stated what game had the strongest positive influence on their mental well-being. Insights gained through this method were used to prepare for the second study via a list of games that were selected based on the responses in this survey. The second study was a diary study that had a total of 16 participants play a game of their choosing 7 times in total over the course of 14 days in their own time and desired location while they kept a play diary about their emotional experience with the game. Interviews were conducted afterwards based on the feedback in the diaries. **Results:** Identified themes related to well-being according to the PERMA model contained elements related to either game design or personal attitude. Important aspects of game design were the level of detail and clarity of feedback and communication in the games participants played. Furthermore, players were seen to prefer themes and narratives that focused on including aspects such as deep morality or positivity. Participants reported positive affect from striving for goals and seeing progress being reflected, games that personalized the experience, and used pacing in support of the player. Other themes concerned the headspace players were in, perspectives they had, their desire for distraction, and personal preferences they had. **Discussion:** Relevance of the found elements were explained through feelings of flow, intrinsic needs of SDT, and the PERMA model. The element of deliberate play was discovered to be of influence over the entire experience, as players became more reflective, changed attitudes on gaming, and reported higher senses of mental well-being due to the different mindset they had during the play sessions. Recommendations were made to look for

optimal combinations to potentially create guidelines for players and designers to optimize play experiences. Other interesting insights that merit future research are about differences in affect based on players' perspective on games, on top of researching parasocial relationships with game characters.

Keywords: video games, mental well-being, self determination theory, PERMA model, diary study, flow

Introduction

Concerns about mental health have risen in the last years (Hedegaard et al., 2018), even more so during the COVID-19 pandemic that started in late 2019 (Pfefferbaum & North, 2020; Kumar & Nayar, 2020; Limcaoco et al., 2020), most likely having to do with the increased amounts of isolation people are going through. For example, in the United Kingdom, reported numbers of depression have nearly doubled since the pandemic started, whereas in the United States reports of anxiety and/or depression have almost quadrupled in prevalence (Abbott, 2021). The global pandemic left people feeling isolated and unable to participate in a lot of activities. During this period inn time, people have been looking for new ways to enjoy themselves and use these positive experiences to enhance or maintain their mental health. Time spent playing digital games, also known as (video) games, especially social ones such as the life simulator game *Animal Crossing: New Horizons* (Nintendo, 2020) has increased by a lot during this pandemic (Zhu, 2021; Balhara et al., 2020; Barr & Copeland-Stewart, 2021). Games are readily available from home through online platforms, so this increase in usage can be expected when people are stuck at home. On top of this, certain games such as *Animal Crossing: New Horizons* (Nintendo, 2020) heavily focus on the aspect of social interaction with other players or on the idea of playing with multiple people at once. Playing these kinds of games seems to have several positive effects, as it appears to improve mental well-being (Santos et al., 2021) through reducing anxiety and stress (Kowal et al., 2021), and giving opportunities to socialize and be cognitively stimulating (Johannes et al., 2021; Barr & Copeland-Stewart, 2021).

In this view, gaming can be a way to keep in touch with friends, a simple solution to keep someone entertained, a means of self-reflection (Oliver & Raney, 2011) or as a coping mechanism for stress (Canale et al., 2019). Every player has their own motivation to play a game. Play motivations can be vastly different, but it is clear that games can have an influence

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on players. This is similar to other forms of entertainment media (Prestin & Nabi, 2020; Oliver & Raney, 2011) where positives like mood repair (Bowman & Tamborini, 2015) and negatives like addiction are identified (Ferguson, 2007; Che et al., 2017; Canale et al., 2019). But, similarly to other forms of entertainment media, no two games are the same, and both positive and negative effects cannot be generalized to the entire medium. The effects are seemingly derived from specific aspects and experiences, or combinations thereof, and can be vastly different when comparing two pieces of entertainment media.

It is unclear, however, which elements of gaming cause the positive effects on mental well-being to occur. One explanation could be that this happens due to the distracting nature of media and that the effects are limited to mood repair. Research shows however that selective consumption of media can provide need satisfaction with which to avoid negative mood states, even more so in the case of games (Reinecke et al., 2012). The effects could be explained through the proven links with eudaimonia, also known as personal flourishing and characterized by concepts such as self-reflection (Oliver et al., 2016; Daneels, et al., 2021a, 2021b), through the link to satisfaction of different intrinsic needs from SDT (Deci & Ryan, 2000; Ryan et al., 2006), or feelings of Flow (Csikszentmihalyi et al., 2014; Nah et al., 2014). Research shows that these links are present, and that improved mental well-being amongst other things can occur as a result of game play. While certain elements can be called upon to explain some of these effects, there is no complete overview of the emotional impact that the gaming medium can have.

In the 'Benefits of Video Games' paper, different effects are associated with various game genres (Granic et al., 2014), but the emotional effects are seemingly underrepresented in gaming related research. With the difference in games and their apparent effects, games can somehow still be an all-around effective tool to improve mental well-being, whether through external influences, playtime, or how the game is built (Halbrook et al., 2019). Aside from game design, the experience varies from person to person. A narrative can relate to a personal issue

and make it more impactful to a player, and a certain level difficulty can ruin the experience for one while strengthening it for someone else. Finding out which elements are relevant for influences on mental well-being across different types of games and experiences, can lead to a better understanding of the link between games and their emotional benefits.

Finding out why certain emotional effects happen because of game play through the current study can help in multiple areas. It can provide players a basis for elements in gaming to look out for in order to more easily regulate their own well-being through gaming, while giving game development studios aspects to pay attention to during development to more effectively build games that are satisfying for players through game design.

In this study, an effort is made to increase our current knowledge of the various emotional effects of games through having players identify what elements of gaming are associated with influences on mental well-being and why, using a qualitative approach. Experiences of various games will be discussed and analyzed, with a clear focus on important aspects that affect mental well-being. Ultimately, an overview of the various elements that are associated with a positive influence on mental well-being will be given on the basis of the current research. As such, the following research question is posed:

'What elements of gaming and game design do players associate with influences on mental well-being, and why?'

A sub question is used to identify which games are seemingly interesting enoughThis sub question is as follows: *'Which games are associated with an increased sense of mental well-being and the satisfaction of the intrinsic needs of the Self Determination Theory?'*. The purpose of this question is to identify which games are seemingly interesting enough to merit conducting further research on and will therefore precede the main research question.

To answer the sub question and main research question, two studies were performed. The sub question was to be answered through conducting a qualitative survey that attempted to

gather information by asking participants about their favorite games and their reasoning. The participants were also asked about games they associate with satisfying the various intrinsic needs of SDT. The resulting data was used to create a comprehensive list of noteworthy games that the second study used in order to answer the main research question. This was done through a diary study that ended with a short interview. The second study tried to analyze these noteworthy games from the first study and focused mainly on the emotional experiences that players had while playing their selected game. The resulting data was then analyzed through a grounded theory approach to thematic coding.

In the next chapter, the theoretical background will be discussed. In this section, what constitutes mental well-being and how it can be influenced will be discussed. Moreover, a clear link to games, how they are related to mental well-being, and a number of possible explanations will be presented.

Theoretical Framework

In order to better understand the relevant themes of the current study, a number of subjects are explained. First of all, mental well-being will be explained, what it can look like, and what contributes to it. Adding to this, how games can be an easily accessible and effective approach will be elaborated upon. Following this, the differences and effects of games that have been discovered so far will be explained. Lastly, the cause for the effects of gaming will be explained through both the Self Determination Theory, a theory that explains motivation, and a number of other mechanisms.

Mental Well-being

Mental well-being is a predictor of overall mental health (Keyes, 2002). When well-being is satisfied and there is a clear absence of mental illness, an individual is shown to be 'flourishing' (Keyes, 2002). On the other hand, when someone's needs remain unfulfilled, their well-being dips, which can have consequences such as depression, anxiety, stress and decreased resilience (Ryff et al., 2006). In sum, maintaining proper mental well-being is important for life satisfaction and can be beneficial to every individual to pursue and is something we passively engage in as human beings.

Prominent research (Seligman, 2011) shows five separate characteristics that a person is experiencing a satisfied sense of well-being and therefore likely to be flourishing: First is having positive emotions, implying that a person is experiencing feelings such as joy or relaxation. This can furthermore help individuals to become more resilient against negative emotions and even recover from them (Tugade & Fredrickson, 2004). Secondly, roughly described as getting absorbed or immersed in an activity, engagement occurs often as a result of using someone's personal strengths to their fullest (Seligman et al., 2005). Third is maintaining positive relationships, implying positive social interactions with others. Maintaining this sense has been linked to an increased sense of competence (Mertika et al., 2020) and increased physical health (Siedlecki et al., 2014). Fourth is a sense of purpose in life or a general meaning. This could be equal to one feeling as a part of something greater, or pursuing one's own interests and is closely related to a sense of life satisfaction and fewer physical health problems (Reker et al., 1987). Lastly, accomplishments or achieving one's goals is related to a sense of pride and a feeling of being competent. These 5 concepts together are known as the model called 'PERMA' (Seligman, 2011). People scoring highly on the aforementioned concepts were found to be related to increased life and job satisfaction as well (Kern et al., 2014). An individual feeling mentally well will likely experience these concepts in

some shape or form at their current point in life. But one cannot force themselves to simply have positive emotions, at least not on a large or consistent scale (Coles et al., 2019). Therefore it is important to see what exactly contributes to mental well-being to begin with, to be able to consistently and more accurately improve one's mental well-being.

Influences on Mental Well-being

"Stable well-being is when individuals have the psychological, social and physical resources they need to meet a particular psychological, social and/or physical challenge." (Dodge et al., 2012, p.230). When individuals experience an imbalance and have too many challenges or too many resources, their well-being dips (Dodge et al., 2012). In other words, a sense of mental well-being is gained through achieving a balance in needs and resources. challenges that line up in difficulty with one's resources. This definition contains similarities to the concept of Flow (Nakamura & Csikszentmihalyi, 2014). This state is reached through a similar approach, in that the corresponding activity needs to contain a difficult enough challenge that corresponds with one's skillset, meaning it has to be as engaging as possible without the challenge appearing as insurmountable (Dodge et al., 2012; Nakamura & Csikszentmihalyi, 2014). Flow can be described as "The state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it." (Csikszentmihalyi, 1990, p. 4).

Ultimately, getting engaged through personal challenges can be stimulating, and bring someone into their flow (Dodge et al., 2012; Nakamura & Csikszentmihalyi, 2014). Therefore, a perfect approach to positively influence one's mental well-being would be to find an activity, cause or something else that is sufficiently challenging on psychological, physical and social fronts, makes optimal use of their personal skillset and is of personal interest to the person. One approach can be found in gaming, as gaming provides both resources and challenges to

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players, and is often seen in research related to flow (Cowley et al., 2008; Takatalo et al., 2010; Jin, 2011; Nah et al., 2014; Michailidis et al., 2018).

Gaming for Mental well-being

To tackle personal challenges, proper resources are needed (Dodge et al., 2012). Resources that help with challenges differ per challenge, but also per individual. Every person has their own preferred approach to deal with a challenge and therefore makes use of different resources. In the same sense, while one person has trouble making friends, another person might have more issues with achieving a goal in their career. A one-size-fits-all idea to strengthen mental well-being can therefore be very hard to find or establish. Research suggests that gaming may just as well be this one-size-fits-all approach, as it seems to have a lot of positive effects on mental well-being (Granic et al., 2014; Jones et al., 2014; Kowal et al., 2021; Barr & Copeland-Stewart, 2021; Halbrook et al, 2019; Johannes et al., 2021; Prestin & Nabi, 2020; Villani et al., 2018). This notion implies that the PERMA model concepts (Seligman, 2011) can be found as a result of experiencing the gaming medium (Jones et al., 2014). Gaming results in a clear reduction of stress and it furthermore promotes feelings of enjoyment, happiness and other positive emotions in players that play for a moderate amount of time (Przybylski et al., 2009a; Bowman & Tamborini, 2012; Bowman & Tamborini, 2015; Canale et al., 2015; Hemenover & Bowman, 2018), and even improve general mood (Russoniello et al., 2009).

Engagement is also relevant, as terms like 'escapism' to signify gamers using the feeling of 'being in a different world' in a game to 'escape' real life stressful situations have been researched for longer (Calleja, 2010). Paired with the fact that the concept of Flow (Nakamura & Csikszentmihalyi, 2014) has been getting traction in research surrounding optimal game design as it seems to have a significant link with one another in various ways (Takatalo et al., 2010; Jin,

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2011; Michailidis et al., 2018; Cowley et al., 2008), games seem to be exceptionally strong at producing a sense of Flow within players as they require little investment and are designed with challenges to overcome with the resources given to the player.

Third, Positive relationships can originate in games through the online communities that some games tend to have. Jones and their colleagues (2014) point towards how players of the game '*World of Warcraft*' indicate experiencing friendships with people they met online being on par or better than those with their real-life peers. Other options also suggest that playing a game with real-life friends is effective at strengthening these bonds (Snodgrass et al., 2011; Williams et al., 2006).

Looking at Meaning as a concept, games seem to foster a sense of purpose, either through a narrative (Oliver et al., 2016) or through gameplay with other players in a teamplay oriented mode (Williams et al., 2006).

Lastly, Accomplishment seems to be satisfied as well through playing games, either through achieving goals within the game or through simply making progress within the context of the game (Jones et al., 2014).

In summary, the gaming medium can be an accessible and wide approach towards positively influencing someone's mental well-being. It is not as simple as picking a game at random and expecting to be satisfied by it however, there is a lot of variation between games. Different games can provide different kinds of challenges to potentially help with dealing with an abundance of personal resources (Dodge et al., 2012), or can be satisfying by for example providing resources that are lacking. In order to get a firmer grip on what within the gaming medium contributes to these challenges, resources and overall mental well-being, different variations of games need to be looked at. It is important to see what the differences between games are and where the strengths and weaknesses lie to be able to form a universal link to mental well-being.

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Differences within the Gaming medium

Game Variety

Games come in all shapes and sizes and no two are the same, but they all take place in a digital environment. In a lot of games, players need to overcome some kind of obstacle that is designed to be beaten. Examples of obstacles are trying to get a job and supporting your family in *The Sims* (Electronic Arts, 2014), maintaining political relations with other cultures while trying to advance yours throughout history in *Civilization* (2K Games, 2016), and defending yourself from thugs and gangsters in the streets of Tokyo in *Yakuza* (SEGA, 2018). Games can contain a lot of different types of conflicts to overcome and spend time with and are thus often categorized in genres similar to other entertainment media such as series or books.

One key difference between these forms of media is that games are interactive, albeit to different degrees. This interactivity gives games a lot of options towards entertainment. In narrative alone it can have a lot of variation. It can keep interactivity low and present a linear story, making it more akin to following a series, watching a movie or reading a book, or it can provide choices and the player can decide upon that influence the story towards a different direction. An example is the 'Visual Novel' genre, where the gameplay is focused on the player making choices about which path to follow and which narrative branches to visit. One example is the *Zero Escape* Trilogy (Aksys games, 2010) where players need to make choices in order to progress the story, that can result in different story branches and endings. On the other side of the spectrum, games can exist without a pre-written narrative and focus entirely on the actions one performs within the game. One such example of this is *Tetris* (Pajitnov, 1984), which eschews a storyline in favor of having players chase high scores.

A general positive influence from games is present (Johannes et al., 2021) although in differing magnitudes (Halbrook et al., 2019). It would make sense that a game focusing on solving jigsaw puzzles would have different effects than a game focused on shooting aliens, and

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while there is some distinction, the emotional benefits seem to be not nearly as developed as the cognitive, motivational and social ones, based on a literature review by Granic et al. (2014).

One possible explanation could be due to a lack of research on the topic and that the relevant elements of games towards well-being have not been brought to light as of yet. Another explanation is that the effect on well-being comes from one or multiple elements that are generalizable to most if not all games. Recurring social themes can already be seen in games with online communities (Jones et al., 2014; Williams et al., 2008), but similar effects are found in games played alone as well (Tyack & Wyeth, 2017), implying that the differences in gaming still provide engagement for players in a similar way. But why do different iterations of the same aspect provide similar effects?

Underlying theories for the effects of gaming

As stated earlier, gaming can play an active role in preventing negative mood states (Reinecke et al. 2012) and enhancing mental well-being (Jones et al., 2014; Granic et al., 2014). Important factors seem to involve distraction and escapism (Hemenover & Bowman, 2018) and are often major factors in motivations for people to play games. Motivation leading to increased well-being is one of the core ideas of the Self Determination Theory (SDT) (Deci & Ryan, 2000) and is therefore important to consider when trying to explain the multi-faceted answer of why gaming has a positive influence on mental well-being (Granic et al., 2014).

The Self Determination Theory

A prominent theory in the field of motivation is the Self Determination Theory (SDT) (Deci & Ryan, 2000). This theory aims to explain what motivates people to do things and the results of succeeding in their venture, and has been used more often in gaming related research (Ryan et al., 2006; Williams et al., 2008). SDT is based on the concept of psychological needs.

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Deci & Ryan (2000) originally posed the three psychological needs of Autonomy, Competence and Relatedness that require satisfaction in order to live a fulfilling life and motivates people to make decisions for the purpose of this satisfaction. The idea that people become more motivated to fulfil these needs is rooted in the fact that leaving these needs unfulfilled leads to psychological distress such as anxiety and depression. Similarly, when a person's intrinsic needs are properly satisfied, their well-being is raised (Sheldon et al., 1996). Of course, the balance between the needs varies from person to person, which is why it is important to define these needs properly in order to get a clearer understanding of what parts of gaming contributes to what need.

Autonomy

Within SDT, autonomy is reflected through actions that come from within the person themselves and not from external influences. It can be seen as being in control, being authentic, and making choices based on personal wishes (Sheldon et al., 1996; Deci & Ryan, 1987). Having little autonomy can be compared to a person having to make choices they do not want to make. An individual feeling limited in their daily life due to personal issues or circumstances will, according to SDT, be motivated to engage in activities or make decisions to try and regain that sense of control (Deci & Ryan, 2000).

Within gaming, there is a lot of potential to satisfy this desire for control: many games allow players multiple approaches to tackle an obstacle within a game or to actively participate in a simulation. This freedom to influence the game in a personal way is also known as agency in games (Frasca, 2001). Action games contain a lot of examples to this end, be it in choice of weapons or of a more tactical approach in forms such as sneaking around versus 'kicking down the front door'. Even more freedom can be found in games that have the player for example simulate a life in another world by running a farm and talk to locals in *Stardew Valley*

*(*ConcernedApe, 2016), or build an amusement park of their design in *Rollercoaster Tycoon* (Atari, 1999). Looking at narrative, this sense of agency can be achieved through giving players the option to personalize their experience by letting them make decisions that impact the overall story.

On a more general note, it would make sense that playing a game at all naturally has a positive effect on perceived autonomy, as playing a game is voluntary by nature (Ryan et al., 2006) and inherently interactive. An argument could be made that it's more like an obsession to some (Przybylski, 2009b). It is clear that there are some games that are stronger on providing feelings of autonomy compared to others.

Competence

Competence is the feeling of being all around capable or good at something specific, and stems from self-perception (Levesque et al., 2004). As such, feelings of competence are at their peak when challenged sufficiently to a point where the challenge may be hard to overcome, but not impossible (Gagné & Deci, 2005). Challenges that are relevant to competence can be seen in all parts of life, whether it be social interactions, physical survival, or having a successful career. It can follow that succeeding in hard situations can be even more satisfying when the desire for such success comes from intrinsic motivation and thus when autonomy is high.

Games can also contribute to this feeling. While games are not based in reality, the feeling of accomplishment certainly is (Granic et al., 2014). Games are designed to be beaten, and offer challenges to the player that they then can try to overcome. Challenges like this can be found in for example in building a successful video game development studio in *Game Dev Tycoon* (Greenheart Games, 2012), to beating a difficult enemy or other player by fighting them in competitive fighting games such as *Tekken* (Bandai Namco Entertainment, 1994). Goals can be met and achievements can be collected, these kinds of opportunities in games allow for a

variety of opportunities to satisfy a feeling of competence. This is further supported by earlier studies that show increased intensity or difficulty in games have larger impacts on mood repair and stress relief when succeeding at it (Bowman & Tamborini, 2012; Bowman & Tamborini, 2015).

Relatedness

Relatedness can be found within the desire to socialize and to feel connected with others (Deci & Ryan, 1991). An example is a student feeling valued by their teacher or superior (Niemiec & Ryan, 2009) or belonging to a group, getting recognized by peers, or working in a team (Beachboard & Beachboard, 2011).

As for games, examples of relatedness are present in different iterations. For starters, there are a lot of multiplayer games on the market. A lot of these offer chatrooms or even voice chat to communicate with fellow players or competitors. People can build relationships with people they have never seen through purely an online approach, that are on par or even better than real life ones in certain instances (Jones et al., 2014). It is unclear however, what kind of multiplayer experiences are the most beneficial to players, as there are games that have people work together, against one another, or a combination of the two. Socializing through gaming is not exclusive to online communities either; a lot of games exist that have players play together on the same device. Research suggests that playing these kinds of games with peers strengthens existing bonds (Snodgrass et al., 2011; Williams et al., 2006) and tells us a lot about the positive social effects that games can have.

Singleplayer games can apparently satisfy this need for relatedness as well, albeit to a lesser degree. Players do not interact with eachother in these games, but somehow still feel like being a part of a group, socialize with virtual characters, or get immersed in a certain culture (Tyack & Wyeth, 2017). This can be attributed to elements such as immersive storytelling, and

relatable or compelling characters. It should be noted that research into relatedness and singleplayer games is lacking – but the earlier mentioned elements could be a possible step in the right direction.

Meaningful experiences

On top of potentially satisfying these intrinsic needs and enhancing mental well-being, previous research has suggested that eudaimonia also has relevance with games (Oliver et al., 2016; Daneels et al,. 2021a, 2021b). Eudaimonia in the context of gaming research is characterized by appreciation through self-reflection, emotional experiences, social connectedness, personal growth, nostalgia, and mental well-being. In other research, eudaimonia is characterized as 'living life to its fullest' and as 'personal flourishing' (Deci & Ryan, 2008). Games can be simple fun and enjoyable, mostly relying on factors of autonomy and competence, but meaningful appreciation comes mostly from deeper insights and feeling connected to a game (Oliver et al., 2016). It can be argued that satisfying intrinsic needs is therefore important, but not sufficient when elevating experiences are being pursued (Oliver et al., 2016).

In the research of Raney et al., (2020), a number of studies are reviewed where eudaimonia has been linked with several concepts. Namely: Empathy, caring for others whether fictional or real; Elevation, inspiration through seeing human virtues such as selflessness; Hope, the belief things can change for the better; Awe, amazement through perceiving something visual or non-visual that exceeds someone's regular frame of reference; Meaning-making, also known as dealing with scenarios that do not fit in with general morality; and Cognitive challenge, processing moral conflicts and complex storylines. Just as these concepts can be found within for example film media (Raney et al., 2020), certain games that tend to focus a lot on a good or experimental story elicit a stronger emotional eudaimonic response than others that tend to

focus primarily on the gameplay aspect (Cole & Gillies, 2021). This is not a given however, as
well-developed gameplay among other things also tends to be a predictor of eudaimonic
experiences within games (Daneels et al., 2021a; Daneels et al., 2021b).

In general research, unrelated to games, it is suggested that satisfying all three intrinsic
needs of SDT is one method to achieve eudaimonic experiences (Ryan et al., 2008). There are
a lot of possible forms of content within games that seem to have more effects than simply
fulfilling intrinsic psychological needs. Games can even have elevating effects coming from a
combination of high quality impactful gameplay, an awe-inspiring narrative, or a world to treat as
one's own and to feel at home in. Therefore, the gaming medium can be considered as more
impactful than as a simple hobby for fun. Finding the elements, themes, or mechanics that allow
the medium to have these effects therefore warrants exploration.

The current study

Games can offer a wide variety of experiences. They have emotional impacts in differing
degrees (Halbrook et al., 2019) and sometimes have different effects altogether (Granic et al.,
2014). There are universal effects on well-being (Jones et al., 2014), and more pronounced
effects that only certain games can grant players. Some of these elements have been identified,
but a lot of research suggests that there is still a lot to be found in this regard (Granic et al.,
2014; Halbrook et al., 2019). A better understanding of what games have to offer with regards to
positively influencing mental well-being can be useful in the long-term. First is that future game
development can potentially place more emphasis on important elements that are identified.
Second, players that are looking for a reliable way to self-regulate might become more inclined
to use gaming for this purpose succesfully if provided with the proper tools. Research seems to
suggest that there is an optimal combination of elements for games to be discovered. When
applied in game design, this combination would be the optimal experience for players for the

purpose of satisfying every intrinsic need and possibly provide eudaimonic experiences (Halbrook et al., 2019).

To find the themes across different games that support the positive influences on emotional well-being and personal flourishing, two studies are conducted one after another. The first focused on gathering a number of games that seem to perform well in satisfying intrinsic needs which were used during the second study. This second study had participants experience the resulting games through a lens that concentrated on their emotions and their mental well-being. Through this method, the elements within gaming that contribute to a sense of Flow and satisfaction of the intrinsic needs of SDT that both consequentially positively influence mental well-being, were attempted to be found.

Study overview

In order to get a clearer view on the emotional impacts of gaming and the related experiences with regard to mental well-being, two studies have been conducted. Both studies were designed with the purpose of answering a different question. The first study took the form of a survey and attempted to answer the sub question: *'Which games do frequent game players associate with an increased sense of mental well-being and the satisfaction of the intrinsic needs of the Self Determination Theory?'*. The results of which were then used to make a list of games that appear to have a strong enough link with at least one of the intrinsic needs of SDT. This list of games was then used in the second study which tried to answer the main research question: *'What elements of gaming and game design do players associate with influences on mental well-being, and why?.'* Participants in the second study could choose a game from this provided list of games, which they would then play at least seven times over the course of 14 days. Along with these play sessions, participants kept a diary with which they showed their experience with the game on an emotional level. This study ended with an interview that

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focused on the things mentioned in the diary and collected statements regarding which elements in game play influenced mental well-being and why.

Study 1 - Methods

Using a survey, participant responses were used to answer the subquestion: *'Which games are associated with an increased sense of mental well-being and the satisfaction of the intrinsic needs of the Self Determination Theory?'*. With these results, a list of games that are associated with intrinsic need satisfaction was made. The creation of this list is for the purpose of the second study, where relevant games towards mental well-being were used for deeper exploration.

Design

For the first study, a survey containing 3 sets of 2 open questions, followed by 2 sets of a multiple choice and an accompanying open question, was composed. Freedom in responses is desirable for the purpose of the study, as the goal is to explore as much as possible. The first part had respondents associate at least one game per given statement, and explain why they felt this way. The given statements contained basic descriptions of the three intrinsic needs from SDT (Deci & Ryan, 2000), and connected to the context of games. The second part had the participants state their preference in associated games they had mentioned earlier in the survey, and explain why. These questions were added to attempt to get as much insight as possible on a broad scope across the medium in a short amount of time. The broad scope was necessary seeing as different games satisfy different intrinsic needs to different degrees, with some intrinsic needs even being absent in certain games (Ryan et al., 2006; Deci & Ryan, 2000), while all intrinsic needs needed to be accounted for. A qualitative nature of data

collection was chosen in order to gather as much information about as many different games as possible and to limit researcher bias as the evaluation of games was made by respondents.

Participants

A total of 99 participants were recruited through a convenience sampling method between December 10th, 2021 and January 3rd, 2022. This approach was used as a high number of respondents was preferred and only required its participants to have prior experience with games and no other characteristics. Participants were recruited in two separate approaches. The main method of gathering participants was done through the usage of the SONA-systems platform. This is a recruitment tool at the University of Twente, the Netherlands, for the purpose of providing social science students with participants for their research. The second approach for gathering participants is through the social circles of the researcher, among which was the gaming association at the University of Twente, "BlueShell E-Sports", friends of the researcher and a student housing association on the University of Twente campus "SkyBox". The participants that were gathered through the SONA-systems method all had a social science background as only those types of students are within the recruitment pool of the platform. The non-SONA respondents could not be identified by study direction.

Out of the 99 participants, 83 of them finished the complete survey, while 16 finished a part of it. The respondents from the recruitment platform were predominantly female, balancing the predominantly male respondents that were recruited through the researcher's social circles. In total, there were 30 male respondents, 50 female respondents, 2 that identified as non-binary and 1 that did not specify. The age of the participants ranged from 17 to 30 years old, with an average of 21 years old.

Procedure

Before participation, respondents were asked to sign an informed consent that included a notion that the gathered data would be anonymized. Participants were informed about the nature of the study which included a statement that every type of game, meaning from every type of device, was welcome.

The first part of the survey had participants respond three times to the question: "*What game that you have played do you associate the most with the following statement?*", and explain their reasoning. Every instance of this question had a different statement connected to it.

The statements were created by the researcher for the purpose of this study, and were as follows: "*Playing this game gives me a strong feeling of control over my decisions and/or actions*." (Autonomy), "*Playing this game gives me a strong sense of accomplishment and/or the feeling that I am good at something*" (Competence), and "*Playing this game gives me a strong feeling of belonging somewhere and being connected to real people or fictional characters*" (Relatedness).

The second segment started with a multiple-choice question that used the answers the respondent had given in the first segment: "*Out of the games you mentioned, which of the three helped you the most to improve your mental well-being? (This can possibly also happen for example after playing.)*". An explanation for this choice was required as well. To help the interpretation of the participants, a definition of mental well-being was visible at this stage of the survey, namely: "Mental well-being in this context can be defined as feeling relieved of stress, a general feeling of satisfaction, happiness and the ability to be productive."

The final question asked participants: "*Is there a game you have not mentioned yet that you feel is even better for your mental well-being?*". Participants that answered yes to this question were then asked "*What game is this and why?*". After having finished these two

segments, participants were asked for additional comments before asking a couple of

demographic related questions. They were asked for age, gender & highest completed

education.

Data Analysis

Data consisted of game titles and participants' written accounts of how a game was

related to the three SDT needs. The researcher coded the statements through a semantic

coding process using codes based on the three intrinsic needs of SDT (Deci & Ryan, 2000),

which can be found in table 1. These codes were developed by the researcher and attempted to

fully encapsulate the complete meaning in three separate codes per intrinsic need and were

developed before the coding process had begun. When a code was ascribed to a game, the

game was given 1 point for the intrinsic need related to the code. Sometimes codes were

applied multiple times on the same game since certain games were more popular than others,

but no duplicate points were awarded in this event. Through this method, the maximum score a

game could achieve was 9 while the lowest was 0, with the higher score indicating a strong

presence of satisfying all the three intrinsic needs of SDT and the lower score indicating that the

given motivations did not illustrate a link to SDT.

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Table 1: Game selection coding scheme

Construct	Code	Description
Autonomy	Voluntary	The sense that whatever someone is doing is voluntary and out of one's own volition.
	Choices	The ability to make choices and influence the gameplay or story accordingly.
	Freedom	Having the freedom to do whatever someone wants.
Competence	Efficacy	Being effective at a certain skill within the game. Also the feeling that they are getting better at it.
	Challenge	Difficulty high enough that it's not too easy, but also not too hard.
	Excelling	Being better at something than others, whether real people or fictional characters.
Relatedness	Connectedness	Feeling connected to others, whether real people or fictional characters.
	Cooperation	Working together with others, whether real people or fictional characters.
	Immersion	The game environment or its contents feeling realistic and being heavily involved and/or absorbed in it.

After coding the responses, a decision was made which games to include in the list for the second study. Two important distinctions were made in this process. The 10 games with the highest coding scores were included, on top of games that scored 3 on one of the needs. This was done as the first three questions asked for the association with one need and not all three of them. Games that had a score of 2 in a given category were also considered for the selection when the resulting list of games was not diverse enough, as participants of study 2 needed to be able to pick whichever game they felt like playing. After making this selection of games, the suitable ones within this selection were chosen. This choice was made with a couple of considerations. The game needed to be available for purchase or download at the time of this study, the gameplay needed to be free of built-in time constraints, and the game had to have the

option of playing solo. With these filters, two lists of games were created. The first list was the

main one to be used for this study and contained a total of 16 games over 4 different price

ranges, and was attempted to be as diverse as possible through different genres and supported

platforms. The price ranges were: 'Free', 'Cheap [up to €15,-]', 'Midrange pricing [up to €40,-]'

and 'High-end pricing [€41,- and up]'. The second list of games was created to be utilized as a

back-up in the case that the main list of games was not sufficient for a participant in the second

study. This list includes all of the games that made it through the aforementioned inclusion

criteria.

The main list of games can be found in Appendix 1. The back-up list of games can be

found in Appendix 2.

Study 1 – Results

Based on the scores per intrinsic need, perceived effectiveness for improving mental

well-being, and after being filtered on requirements, a total of 38 different games were found to

be relevant to be used in this study. These games can be found in Figure 1 and 2. Both

showcase the relevant games ordered by perceived popularity. Popularity is derived from the

amount of times a game was named over the course of the survey.

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Figure 1: Relevant games and perceived influence on mental well-being
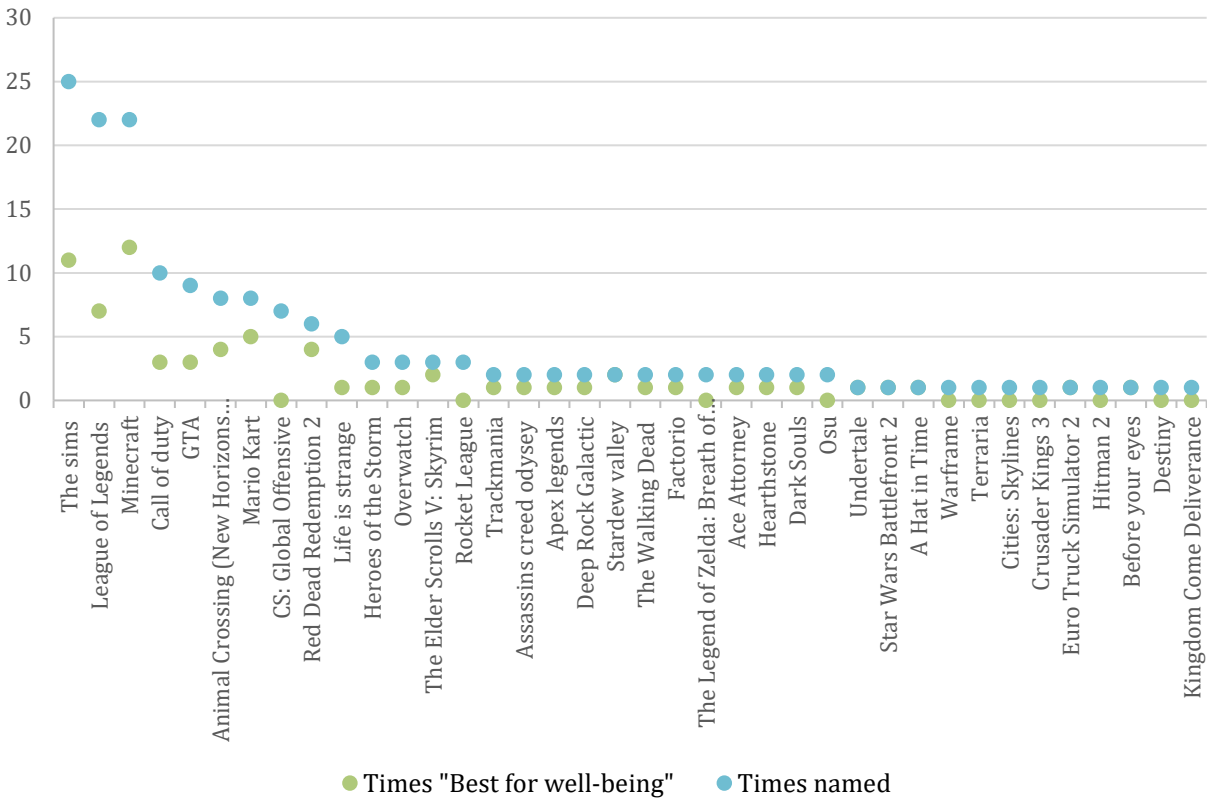
As seen in figure 1, the more popular games often are reported to be good for the mental well-being of players, especially in the cases of 'The Sims', 'Minecraft', 'Mario Kart', and 'Red Dead Redemption 2'. Figure 2 showcases the same games and how they were associated with the intrinsic needs of SDT by respondents. As seen in the data, a popular game does not necessarily require meeting satisfaction of intrinsic needs. Furthermore, less popular games are in certain cases reported to be more effective at this than more popular ones. An example can be found in Mario Kart, which was often considered to be strong at improving mental well-being with 5 mentions out of the 8 times in total. This franchise was however not associated with strong intrinsic need satisfaction aside from competence. For Mario Kart, participants often named nostalgia and "fun multiplayer" aspects to be important towards improving their well-being. A similar trend was found with games from the franchise 'Pokémon'.

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Figure 2: Intrinsic need satisfaction associated per game
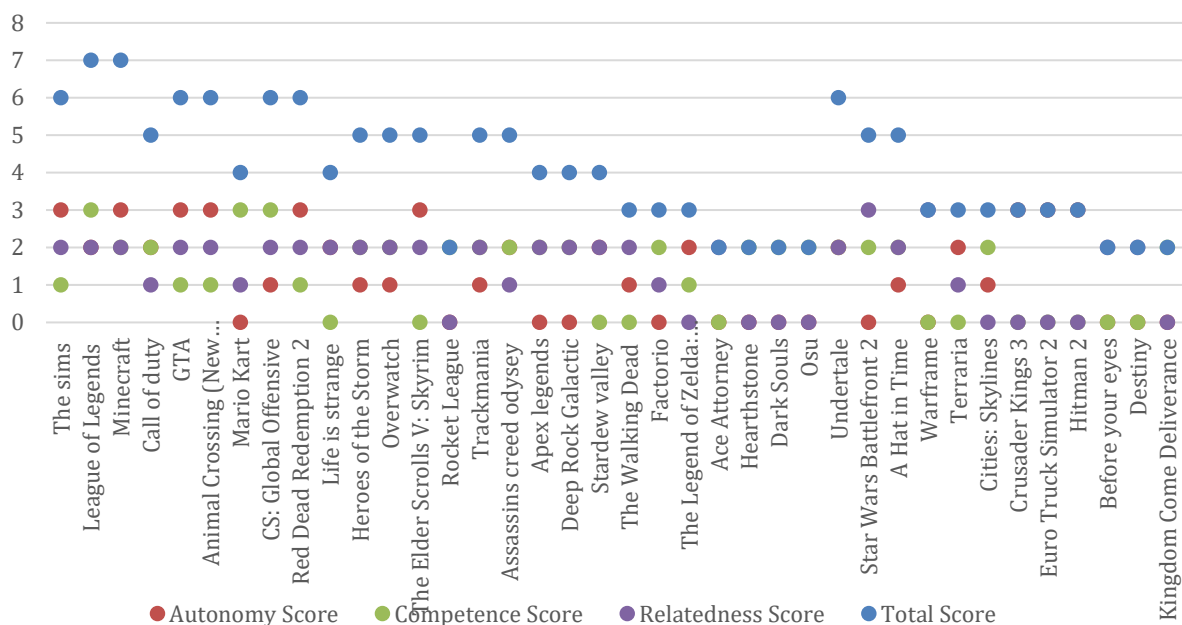
Just how limited intrinsic need satisfaction was not always predictive of a low sense of mental well-being, the same is true the other way around. Especially in the games '*Counter Strike: Global Offensive*' and '*League of Legends*,' both of which are competitive multiplayer online games, need satisfaction was reported to be relatively high, as can be seen in Figure 2. Simultaneously, a relative low number of respondents considered these games to be good for mental well-being. When these games were mentioned, a number of participants described the games as a sometimes stressful but fun distraction due to the competitive nature, which can be seen as an explanation why these games were associated less with a positive influence.

Scoring 3 out of 3 on a specific intrinsic need in general meant that that game would be included in the game list as it gave its players a strong sense of satisfaction with regard to this need. This occurrence was most common with the need for Autonomy. A total of 10 different games scored 3 out of 3 on satisfying the need for Autonomy, while for Competence this applied

to 3 different games and with Relatedness it applied to 2 different games. From the competence

codes, 'Excelling' was featured the least, which could be because it appears to mostly be

related to multiplayer experiences or improving oneself. An example of the usage of this code

was with the game '*League of Legends'* (Riot Games, 2009), a popular game that was

mentioned 22 times in total. One respondent mentioned that "*I did not feel competent per se.*

But playing well felt good. So in comparison to other players, I then felt competent." With the

need for Relatedness, 'Immersion' was the code that was featured the least. This could have to

do with the fact that it required a more distinct feeling rather than feeling connected. For

example, with the game '*Warframe*' (Digital Extremes, 2013), one participant mentioned that the

game allowed them to "*connect or feel like you belong within that fictional world..*" which seems

to be stronger than simple connection.

Additional insights

The written responses also gave additional insights into respondents' views on games

and well-being, and potentially build towards answering the main research question. Certain

comments that respondents gave already showed some signs of general, overarching themes

and elements that are present within games that makes them influential to someone's well-

being along with reasoning as to why.

Some segments specifically focused on the feeling of competence, one participant for

example said: "*It is nice to see my improvement. Even if I lose*[,] *if the game was challenging I*

still appreciate defeat." and shows that this player appreciates feedback on their performance,

even when they're on the losing end. But, another example related to competence comes from

a participant only feels competence when they "*win the game*".

Participants have also shown to connect easier over games, which shows from remarks

such as "*Engaging in a community that enjoys the same game is causing a feeling of*

connectedness and I also tend to like people quicker when I know that they enjoy the same games that I like", indicating this strengthening of bonds, both online and offline. Another respondent mentions that they "*only play with friends and I'll feel like I belong whatever I play with them."* which shows a stronger focus on pre-existing relationships. Lastly, one participant points out that *"A lot of people have prejudices against gamers, it is true we kinda lock ourselves in another world, but it is also a way for me at least, to feel connected with other people. Thanks to video games I met a lot of amazing people that are still in my life."* which shows both the building of actual relationships through gaming, and a sense of escapism.

Escapism gets mentioned more often among the comments, another example is from a participant that thought it was a "*nice feeling to be able to go elsewhere while staying at home. After a stressful time, for example, being able to just sit and play and think of something else, I guess that's why I like it and I keep playing my games"* and shows that the appeal of a different kind of environment is a welcome distraction to them.

Some of the participants focused more on the negative impacts on mental well-being and where this came from. For instance, one response focuses heavily on the monetization aspect that some games tend to have: *"Fifa exists just to make money. People who get into spending money online, often continue doing so. Almost like an addiction, they are the big sharks EA is looking for. Might also have an influence on mental well-being, even knowing about it makes the game less fun."*. According to this respondent, a focus on monetization has a negative effect on players' mental well-being, and shows how some games are guilty of predatory behavior.

Another person talks about '*League of Legends'* (Riot Games, 2009) and '*Dota 2'* (Valve, 2013) as both positive and negative: *"The multiplayer nature, and the knife's edge balancing involved in matchmaking, means that there are some very high highs, and very low lows. I play these games because sometimes you have an amazing, tense game that leaves you mentally exhausted (in a good way) after playing it. I try to play different games because at times you're*

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both losing hard & being flooded by an endless cascade of racial slurs and death threats. There's a weird love-hate relationship there, and I don't think there's anyone that likes League (or Dota) that doesn't also hate League (or Dota)". The toxicity that happens in these multiplayer modes seemingly make it very stressful to play, all the while providing a satisfying gameplay experience.

Lastly, a couple of games had a number of unique reasons as to why these had a good influence on one's mental well-being. The game '*Pokémon Go'* (Niantic, 2016) is one example. *"This game helped me connect to other people inside the game but also outside of the game. I got to know a lot of people in my neighbourhood and even made some friends thanks to Pokemon Go. It's also a great conversation starter and helps me get outside more which automatically increases the chance of meeting other people".* Aside from using it as a conversation starter, the participant mentions it helping them to get outside more often. This is also an element in the excerpt of a second participant that talked about the game *"Pokemon go might have a nice* [side-effect during play]*, because it gets you to go outside, which is in terms of mental health probably not bad."*.

Coincidentally, another game that had a lot of unique reasoning for its influence on mental well-being were the games from the general 'Pokémon' franchise. Multiple participants mentioned Pokémon games for their ability to provoke feelings of nostalgia: *"Pokémon, seems nostalgic, and actually it is. It calms me down and remembers me* [of my] *childhood."*, *"Nostalgia. I spend hundreds of hours playing different pokemon games."*. While the Pokémon franchise seems to be strong in this regard, they are not the only games that have this effect, as seen in the response of one other participant: *"I feel like the video games that increase my well-being the most are the ones with memories from my childhood attached to them. For example Animal Crossing, Pokémon, Mario Kart, Professor Layton and some Point-and-Click Adventures".* This link between nostalgia and mental well-being has been explored before (Wulf & Baldwin, 2020), and is characterized mostly about having to do with someone's childhood.

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Developing a personal connection with a game is seemingly important to multiple respondents, and can possibly indicate an important theme to take into account with regards to mental well-being.

Study 2 – Methods

As a result of the first study, a main list and a backup list with game profiles were created to be used in the second study. The games in these lists were briefly analyzed on content and reception. With this information compiled into separate profiles, participants could get a clear overview of what a game was generally about. The main list contained 20 out of all the games that were identified to be relevant enough during the first study. There were 4 categories of pricing range. In the main list, 5 games were selected per pricing category and an effort was made to be as diverse as possible with regard to genre. The backup list contained the remaining games in addition to the games from the main list. Two lists were made to try and prevent participants from being overwhelmed by the amount of choice they were given, while the backup list was made to have a higher chance of participants being able to pick a game they had not played before. The game profiles for the main list can be found in Appendix 1. The profiles for the backup list can be found in Appendix 2.

Most of the information was taken from the website "howlongtobeat.com", which is a website that offers visitors a quick look into how many hours it takes to finish a game, accompanied with a brief description. 'Reviewer Score' and 'Pricing range (official store pricing)' were the only exceptions to this. 'Reviewer Score' was taken from "Metacritic.com", a website that aggregates reviews from multiple sources to an all around average on a scale of 0 to 100. 'Pricing range (official store pricing)' took the price of purchasing the game on the associated storefront. Most often this was either 'PlayStation Store', 'Steam' or 'Google Play'. At certain

times, multiple storefronts with differing prices were applicable. In these cases, a range with the lowest to highest price possible was added instead. Sometimes, a game profile was about a franchise, as the satisfaction did not originate from a specific entry according to the participants of study 1. The pricing range category for these kinds of game profiles also used a range from lowest price to highest price based on the applicable storefronts.

Design

This study uses the list of games from the first study and elaborates on the experiences related to mental well-being that participants have while playing a game by involving a diary study. Participants played a game new to them while simultaneously keeping track of a play diary focusing on their emotional experience. A 'new' game meant that the participant had not played the game themselves, or watched someone else play the game before. This included other games in the corresponding franchise, if applicable. The goal was to capture the first times a participant is interacting with a game so factors such as prior experience and nostalgia do not play a role. This is useful as the objective is to expand the view of elements of gaming that influence one's mental well-being, therefore eliminating factors that have already been proven to have this effect (Wulf & Baldwin, 2020) should allow for a more detailed look into the other possible influences.

The diary study approach allowed participants to conduct the research in their own time and environment, simulating the situation as if the participant were to play the game out of their own volition. This decision was made as mental well-being is more likely to be influenced in everyday situations rather than laboratory settings (Bolger, DeLongis, Kessler & Schilling, 1989). Participants had to play their game of choice a minimum of 7 times during over the course of a maximum of 14 days. This allowed participants to share their vision on things such as a possible perspective change over time, something diary studies excel at (Almeida, 2005;

Cranford et al., 2006; Bolger, Davis & Rafaeli, 2003). It gave the participant the freedom to give explanations to statements they might have made regarding the study, which allows for a very open-ended data collection phase. Participants were encouraged to write about their emotional experience with the game during the moments shortly after finishing a session, but alternative options were allowed as well.

Based on data gathered in the play diaries, the researcher prepared questions to probe for more in-depth analysis by the participant to be collected during a follow-up interview. This interview was conducted in order to prevent as many blind spots as possible that occurred during the writing of the diary entries. With both the responses from the diary entries and the responses from the interview, it was expected that the emotional experience a participant had with a game was as explained as best as possible.

Participants

A total of 16 participants were recruited through a convenience sampling method. Recruitment lasted from February 8th, 2022 until March 4th, 2022. Participants were recruited separately from the first study but were allowed to join both studies. There were no pre-requisites for participating in the study. During recruitment there was a focus on getting as diverse a population as possible. The researcher attempted to get representation from different genders, both students and non-students, multiple nationalities, and differing amounts of experience with playing games. Participants were found through various channels on the University of Twente, such as the social circles of the researcher; the gaming association "BlueShell Esports" and its social channels for gaming related research, and promotion via word-of-mouth. Lastly, the recruitment platform of social sciences at the University of Twente called "SONA Systems" was utilized. The distribution consisted of 11 men and 5 women, of which 13 were a student at the time of study completion. Furthermore, the population contained

people from 7 different nationalities with a majority coming either from Germany or the

Netherlands. The participants' average age was 20 and ranged between 18 and 29.

In total, a number of 11 different games were played by 16 independent participants.

Three games specifically were chosen multiple times: '*Stardew Valley' (ConcernedApe, 2016),*

'*Osu!' (Ppy, 2007)* and *'Hearthstone' (Blizzard Entertainment, 2014)*. During the introduction,

some participants indicated a preference for a game with a relatively low price, which applies to

all three of these games. This preference can also be seen in the other choices of games. Out

of the ten chosen games, three were free of charge, four came from the 'Cheap games' price

range, one came from the 'Mid-range pricing' range and the last three can be found in the 'High-

end pricing' range. The backup list of games that would only be used in case of no suitable

games for a participant, was required once for the entire study. The participant in question had

already played all the games on the main list of games that they found interesting enough to

play. '*Ace Attorney'* was their game of choice

Participants often took the entire 14 days of alotted time to complete the study. Out of

the 16 participants, 12 filled in the diary to completion. From the 3 that did not, 1 finished the

game in three sessions. Another participant only had time for 6 sessions and stopped there. The

third participant that did not hand in a complete diary, finished 2 entries in total and indicated

that they simply forgot about it. A fourth participant did not hand in anything as they discovered

after joining the study that they would not be available after all. Only this third and fourth

participant were not invited for a closing interview at the end of their 14 day period.

The interviews lasted on average 31 minutes, ranging between 14 and 60 minutes. The

duration was wholly dependent on how much the participants tended to elaborate on their

answers, on top of the completeness of their diary entries. The researcher asked about parts in

the diary that they felt were interesting enough to merit more elaboration and exploration.

Procedure

Intake meetings were held online. Participants were informed about the procedure of the study before giving informed consent, which can be found in Appendix 3. After the explanation, participants had to pick a game they had not played before and wanted to play from the provided list coming out of the first study. If a potential participant could not select a game they wanted to play from the games available, they were not able to participate. Furthermore, participants were informed that they had to acquire a copy of the game themselves. The official price range was provided to the participants, but they were informed of possible sales to potentially incentivize them towards considering the more expensive options of games in the provided list as well.

After having picked a game, participants were introduced to the play diary in the form of either a word document or a google docs file as per their preference. This file contained a template which can be found in Appendix 4. Participants were told to use this to keep track of their emotional experience per play session with a focus on mental well-being. To ensure a participant knew what mental well-being entailed, a description was present within the play diary template. This description used the same concepts as the ones in the PERMA model (Seligman, 2011) but with a couple of additions and elaborations to try and prevent misinterpretation of the different concepts. If the participant was stuck with writing and was not able to come up with something, the writing prompt suggestions that can be found in Table 2 were available to be used as a way of inspiration. These writing suggestions were also present in the play diary template, along with a task description that participants could refer to in case they forgot about it. Participants were encouraged to write down as many thoughts they had about the session as possible while keeping a focus on mental well-being. Notable aspects participants were told to emphasize on were points of reflection, how certain story elements impacted them, how they felt afterwards, etc. After the intake, participants had to play the game

they selected a minimum of 7 times in total with each session lasting for around 30 minutes or longer. For games with an average playtime below 4 hours, participants were encouraged to adhere to the 30 minute guideline to prevent finishing the game prematurely, although this was not mandatory. Completing the sessions had to be done in 14 days. This length was chosen to give participants the option to take breaks as needed, since not everyone always has enough time or the drive to play a game for at least half an hour per day, but still keep the game fresh in one's mind.

Table 2: Play Diary Writing Suggestions

No.	Writing Suggestions
1.	What did you think about before starting to play the game today?
2.	Is there something from the last play session(s) that stuck with you? Why?
3.	What emotions and/or feelings did you have during today's play session? Why?
4.	Did something in today's play session stand out to you? Why?
5.	Did you encounter something during the play session that made you reflect on something in your daily life? What was it and why did it make you reflect?
6.	What was your favorite moment in today's play session? Why?
7.	What was your most disliked moment of today's play session? Why?
8.	Did today's play session affect your mental well-being in any way? How and why?
9.	Is there anything else that came to mind during today's play session?

Once a participant finished their 7 play sessions, they had to hand in the filled in diary. If a participant took longer than 10 days to complete the sessions, they were sent a reminder that contained their respective deadline. In some cases, participants did not find enough time or the drive to finish all 7 sessions before the 14-day period was over. If they handed in their diary with more than 4 sessions completed, they were still invited for a closing interview. In the event that

a game was too short for a participant to fill 7 sessions, this exception was ignored as the

participant experienced the entire game and were thus also invited for a final interview.

The interview had a number of general questions to get a general feel for the experience

of the participant, and a set of questions specifically designed with regard to the diary a

participant had handed in. The general questions can be found in Table 3. The diary-specific

questions were mainly about getting a more thorough explanation about a statement the

participant had made in one of their diary entries. In most cases, these questions asked the

participant how they felt about a certain segment, and if they had an idea what made them feel

this way.

The interview was conducted online in line with the Covid-19 measurements that were

present at the time, and was scheduled with both the wishes of the researcher and the

participant to ensure both individuals could take their time. The interview was recorded and

subsequently transcribed on top of being anonymized to protect the privacy of the participants.

The only possible personal identifiers were general demographic information such as age,

gender, nationality and participant number. The interview focused on the emotional effects the

game had on the daily life and mental well-being of the participant. The interview was semi-

structured as it was conducted like a conversation where the researcher had a number of

questions prepared and probed the participant when the researcher noticed an answer implied

deeper explanation towards emotional experience. This natural way of conversing was deemed

the best way to build rapport and get the participant to elaborate as much as they were

comfortable with.

Important points of discussion were based on specific diary entries that captured the

attention of the researcher along with statements made during the interview itself that seemed

to be related to an increase or decrease in mental well-being. It furthermore aimed to cover the

gaps that were present in some of the diary entries. Lastly, during the interviews discussions

were started about noteworthy moments in the played game such as a twist in an emotional

story, the death of a beloved character or a particularly difficult situation, which can be indicative

of a eudaimonic experience (Daneels et al., 2021a; Daneels et al., 2021b). These moments

were taken from the play diary entries as participants described them.

Table 3: *Interview General Questions*

No.	Interview – General Questions
1.	How did you feel about the game as a whole?
2.	Which parts of the game stood out to you and why?
3.	Did these parts affect your mental well-being in any way? Why or why not?
4.	Which of the play sessions did you like the most? And which did you like the least? Why do you feel that way?
5.	Would you continue playing this game after the research? Why or why not?
6.	Did you think about the game outside of the play sessions? If yes, what did you think about and how did you feel about it?
7.	Did you notice any lasting effects on your mental well-being after playing the game at any point? If yes, why do you think that is?
8.	If you could change something about the game that would make it have a (stronger) positive influence on your mental well-being, what would it be?
9.	Did the game make you reflect on your daily life in any way?
10.	This game was added to the study for its strength in satisfying at least one of the needs of SDT (Autonomy, Competence & Relatedness). How would you associate this game with those three intrinsic needs and why?

Data Analysis

Once the first diary study and follow-up interview were completed, data analysis started

and was conducted simultaneously while finishing data collection for all participants. Starting

out, the interview was transcribed. Transcription followed an intelligent verbatim format,

resulting in capturing everything the participant said in their words without paraphrasing and

thus keeping possible forms of subtext, while preserving readability by removing aspects like

filler words, repeated sentences, and off-topic conversations. After transcribing an interview, the thematic coding process could start. Both the diary entries and interview transcriptions were coded. From here on out, a Grounded Theory (GT) approach inspired by Glaser and Straus (1967) was applied. This was done to safeguard the inclusion of all relevant data and prevent possible tunnel vision within the data. In the case of this study, the coding system to be used was created using an open coding approach. Moreover, GT appears to be a favorable approach in studies with a focus on emotional psychology and mental well-being (Charmaz & Belgrave, 2007). Codes were formed through an iterative process that contained a couple of steps. This process started with basic coding; segments were coded based on the theme that the researcher identified through context or meaning. Although the codes were based on the data, the focus of the study was still to find elements of game design and gameplay experiences that had an impact on mental well-being. In the same sense, the three concepts of SDT (Deci & Ryan, 2000) were also part of this focus. Segments that resonated with one of the three intrinsic needs were therefore also important. Through this lens, relevant codes and categories of codes to this end were developed. The base coding was completed when all of the data was collected, transcribed, and thematically coded to completion. Once this point was reached, the 'Axial coding' process started. This process was brought about by evaluating the existing coding scheme and checking whether more specific codes could be created within existing categories.

Once the Axial coding process was finished, the reliability of the coding scheme and bias of the researcher was assessed through an inter-rater reliability check. A second researcher was called upon to use the created coding scheme to re-code one complete play diary and one interview transcription. Only the coded segments remained to ensure the second researcher only had to figure out which codes applied to a specific segment. Once this process was finished, Cohen's Kappa (Cohen, 1960) was calculated to measure reliability.

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The Coding scheme

The coding scheme was created by the researcher based on findings within the data. The total process resulted in a system which makes use of 4 separate categories of codes. The way this system works, is that every segment within the transcript gets evaluated on every separate category. Within a category, there can only be one single code associated with the segment. This resulted in any given segment having up to 4 different codes assigned to it from 4 different categories. This way, the coding system attempted to combine aspects of the game with several types of experiences that the player can have due to the game or their own situation.

Design Elements

The 'Design Elements' category can be defined as the aspects within game design that segments within the transcripts are about. In Table 4 an overview of the codes, within this category can be found, along with a description.

Table 4: Design Element Coding Category

Code name	Description
Technical Obstacles	When a segment is about experiencing obstacles with the game that are not related to game design, such as errors, online functionality and paywalls.
Audio / Visual Design	When a segment is specifically about the visual or musical design of the game.
Atmosphere	When a segment is about the vibe of a certain part of the game. Examples are a setting feeling dark or mysterious, or more upbeat. This is usually through a combination of other design aspects.
Gameplay	When a segment is about how the game is played. This is an umbrella code for when a segment is clearly about this notion, but not identifyable with one of the subcodes.
Gameplay	Feedback & Reward System	When a segment is about the game giving

	feedback to the player & how the game rewards the player for a job well done or when a player is doing poorly.
Gameplay | Difficulty	When a segment is about the level of difficulty (too high, too low or just right) of a part of the game.
Gameplay | Multiplayer	When a segment is about how a player plays together with other people.
Gameplay | Agency	When a segment is about the freedom to act as your own person within the game and impact the game in various ways through your own choices.
Narrative	When a segment is about the narrative / storytelling of the game. This is an umbrella code for when a segment is clearly about this notion, but not identifyable with one of the subcodes.
Narrative | Depth & Realism	When a segment is about the narrative, but specifically how deep the writing goes and how seamless and real (convincing) it feels to the player.
Narrative | Theming & Tone	When a segment is about the narrative, but specifically about the content of the story with theme and the general tone.

Within this category, two umbrella codes are present. These codes are 'Gameplay' and 'Narrative'. Umbrella codes were used when a segment was related, but could not be assigned to one of the subcodes. For the umbrella code 'Gameplay', the subcodes 'Feedback & Reward System', 'Difficulty', 'Multiplayer', and 'Agency' were present. As for the umbrella code 'Narrative', the subcodes are 'Theming & Tone', and 'Depth & Realism'.

External Experience

The 'External Experience' coding category was relevant when a segment had a participant indicate feelings or experiences that were related to the life of the participant that happened outside of the game. These codes can be used as a way to differentiate effects from

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the game with effects from outside influences, on top of looking at the effects as a combined

effect. The codes can be found in Table 5, along with the descriptions of said codes.

Table 5: External Experience Coding Category

Code name	Description
Escapism	When a segment indicates that the player is experiencing an escape from reality and real-life worries because of things related to the game.
External Influence	When a segment indicates that the player is experiencing real-life responsibilities / worries etc. before, during or after play and potentially influence the perception of the game.
Reflection	When a segment indicates that the player is reflecting on their own performance / life because of something that happens during the play session.

Game Experience

The 'Game Experience' category of codes specializes in the emotional experience that a

player has while playing the game. This category contained five codes, ranging from the more

general ones 'Enjoyment' and 'Displeasure', to more specific aspects that categorize emotional

experience. These more specific aspects took the form of the three needs of SDT (Deci & Ryan,

2000). The codes for these three needs did not just look at whether or not a need was satisfied,

but also if there seemed to be a distinct lack thereof. Because of this, it was important that using

this coding category on a segment would be paired with putting a priority on the codes for the

needs, as these would be more specific than a general sense of enjoyment. In a certain sense,

one could argue that the 'Enjoyment' & 'Displeasure' codes are a paired 'umbrella code', with

the three needs diversifying within both. The codes for this category can be found in Table 6,

along with their descriptions.

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Table 6: Game Experience Coding Category

Code name	Description
Autonomy	When a segment is related to the concept of Autonomy, both lacking or abundant. *Autonomy is the feeling of being in control and the freedom to make your own choices.*
Competence	When a segment is related to the concept of Competence, both lacking or abundant. *Competence is the feeling of efficacy, a feeling of being good at something (sometimes more than others) and lastly improving.*
Relatedness	When a segment is related to the concept of Relatedness, both lacking or abundant. *Relatedness is the feeling of belonging somewhere, caring about others and feeling cared for.*
Enjoyment	When a segment indicates that a moment in the play session is enjoyed by the player.
Displeasure	When a segment indicates that a moment in the play session is experienced as unenjoyable or displeasurable by the player.

Mental Well-being

As the central part of the study, the last coding category focuses on whether or not a participant shows a high or low sense of mental well-being. Segments looked at included those that contained an indication of the participant feeling better or worse overall, or whether they adhered to one of the characteristics in the comprehensive list that was also available in the play diary template. This list contained items from the PERMA model (Seligman, 2011), and related research (Baldwin et al., 2021). A decrease of mental well-being on the other hand, was characterized by the signs of ill-being such as anxiety, hopelessness, depression, increased stress and apathy (Ryff et al., 2006). While using this coding category, segments were pomptly

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evaluated on whether or not one or more of these mentioned concepts were present. The codes

and their description can be found in Table 7.

Table 7: External Experience Coding Category

Code name	Description
Increased Well-being	When a segment indicates an increased sense of mental well-being
Decreased Well-being	When a segment indicates a decreased sense of mental well-being.

Coding system reliability

　　To check the reliability of the coding system used for the purpose of detecting relevant

elements in gaming for mental well-being, an interrater-reliability test was performed with a

second, independent researcher. This anonymous researcher had no experience in gaming

related research, but does have a social science degree, making them familiar with the coding

process. The second researcher was given 10% of the gathered data. This included one

interview transcript on top of one complete diary. This data was anonymized prior to re-

evaluation and uncoded segments were excluded. In total, this amounted to 63 separate

segments to be evaluated by the second coder. In some cases, the question that prompted an

answer was provided in the segment to ensure the context was clear. Therefore, the second

researcher knew with utmost certainty that all the segments they were provided with, were

deemed as relevant by the main researcher. This path was chosen to ensure that the second

researcher would consciously and without fail consider all four categories at every given

segment. The second researcher was given an explanation of how the codes were applied,

together with a cheat sheet that contained the explanation for mental well-being found in the

Play diary template in Appendix 4.

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Once the second researcher finished re-evaluating all the segments, the interrater-reliability coefficient was calculated using cohen's kappa (Cohen, 1960). This initial calculation resulted in Cohen's κ = .34. Due to the provided data being a random interview transcript and a random play diary, there was no control on how much every code was represented, which is why some codes saw little re-evaluation and resulted in codes with a coefficient of 0, 1, or 'Not applicable'. After the coefficient was calculated, the researchers discussed the shortcomings of the codes. During this discussion, it became clear that the descriptions of the codes were not clear enough. After clearing up all miscommunications and editing the descriptions to make them less prone to misinterpretation, the second researcher was asked to evaluate their usage of the codes and replace or remove them as they saw fit. The second researcher was presented with the codes that the main researcher had used, but without informing them of the reasoning the main researcher had used. They were also told to be as critical as possible towards the presented options. After the second round of segment coding evaluation, the reliability coefficient was calculated again, the scores of which can be found in Table 8.

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Table 8: *Interrater-reliability coefficient Design Elements category*

Code name	Cohen's Kappa
Technical Obstacles	Not applicable
Audio / Visual Design	.91
Atmosphere	.77
Gameplay	.53
Gameplay | Feedback & Reward System	.63
Gameplay | Difficulty	.85
Gameplay | Multiplayer	1
Gameplay | Agency	.66
Narrative	.57
Narrative | Depth & Realism	Not applicable
Narrative | Theming & Tone	.73
Escapism	.86
External influences	.91
Reflection	.58
Autonomy	.79
Competence	.89
Relatedness	1
Enjoyment	.75
Displeasure	.52
Increased well-being	.69
Decreased well-being	1

After the second calculation, Cohen's k value was found to be .77. The codes 'Decreased well-being', 'Relatedness', and 'Multiplayer' were only applied a total of 3 times. Moreover, the codes called 'Depth & Realism' & 'Technical Obstacles' were not used once by both the researcher and second coder alike during the second round. While the 'Technical Obstacles' code was used in the first round by the second coder, they stated that this was due to misinterpreting one of the segments.

Overall, the coding system was used as a tool to aid in detecting elements within gaming that participants associated with their mental well-being. With the coding system being as broad as it is, it mainly helped with categorizing segments on multiple aspects. These were types of experiences into themes such as positive, negative, or in-depth reflection, and game design elements into the rough category without delving too much into nuance. This categorization

made it easier to find noteworthy segments, but was not able to explain anything the segments were about, actual nuance within the segments was not gained through the coding system, but rather after personally interpreting the detected segments.

After the coding process was completed, the resulting data was reviewed. A focus was put on experiences and aspects that were present in different albeit similar capacities over multiple games that seemed to have similar links to the intrinsic needs and various emotional effects. Through this manner of interpretation, specific explanations were sought as to why a player felt differently throughout the play experience. Based on these explanations, recommendations were made that can be applied to both game development and personal issues with mental well-being. Recommendations for game development contained primarily prominent aspects that a game should contain in order to enhance the positive effects. Recommendations for personal use contained for example ideas with which a player could more effectively pick their next game to play. Furthermore, games that stood out with the number of positively or negatively associated aspects were analyzed to call attention to the specific points of interest that came forward from the interpreted data.

Study 2 – Results

Throughout the study, all participants mentioned enjoying the game more as time went on. Some participants stated that they initially felt as if playing the game was a bit of a chore, something that they simply had to do for the experiment. With all of these participants however, they stated to be feeling more accepting and even enjoying the time they spent playing the games they had chosen at the start of the experiment. Some participants used the games for a moment of brief respite inbetween stressful periods of work or study, while others used it as a way to spend their free time in the evening, a form of inspiration to start the day, or as a distraction from unpleasant experiences in real life.

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On a level of mental well-being, most participants were able to state when they felt an

overall increase in mental well-being. Based on reports in the diaries and during the interviews,

more specific aspects of mental well-being were identified that were in line with the definition of

the PERMA model (Seligman, 2011). Participants showed signs of resilience through for

example clearing their head when dealing with difficult situations in real life and looking at that

situation afterwards with a new, more neutral or positive outlook. Others felt inspired by their

ability to succeed at tasks in the game, so much so that it helped them become more motivated

with their tasks in real life as well. In a different game, the player mentioned that they felt safe

and at home due to the interactions with various non-player characters. Multiple participants

reported feeling a strong sense of engagement at multiple points during the study, to the point of

ignoring their surroundings and thoroughly enjoying their time playing. Elements that contributed

to these feelings were identified and are stated below. In some instances, the effects of an

element are mostly related to an increased sense of enjoyment, which is still an important factor

to consider as multiple people stated that a game just has to be enjoyable for it to have positive

influences on mental well-being (Participant 9, *Stardew Valley;* Participant 10, *Trackmania*).

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Level of Detail

One element that seems to arise from the data is that the level of detail within a game is

important to players. This is for starters true on a narrative sense. Attention to detail in

storytelling makes the characters feel real, to the point of making a game world feel like home

and giving off a sense of safety. Participant 2 for example makes statements how the smaller

things that the in-game characters do is what makes them feel so real: "*That character also*

keeps a diary, you can read back everything that happened and what influence it had on that

person or how that person thinks about it and so on. If you then read that back and you also

think about "That's a bit how I thought about it", then yes, that does influence you […]. *It's*

memorable" (Participant 2, *Red Dead Redemption 2*). At another point they mention that *"the*

undersized elements of the conversations you can have with people, that they mention small

details about what you've done. […] *You get the sense that it matters what you've done with the*

people around you." (Participant 2, *Red Dead Redemption 2*). Details like this make it easier to

compare it to the real world, where a person is so much more than just someone with a goal.

They have their own mannerisms, way of talking, non-verbal behavior and tendencies that make

a person unique. Furthermore, in the game *Ace Attorney*, Participant 6 commented that they felt

connected to the main character through getting to know their convictions, their thoughts, their

pitfalls and their strengths. But, they also stated that the story felt lackluster due to the game not

elaborating on what happens after the core story is over, meaning the game does well in some

aspects regarding details but could do better on others such as providing closure about what

happens to the characters because of your actions (Participant 6, *Ace Attorney*). This participant

argues that this lack of closure and limited exposure was responsible for there being no effect

on mental well-being from this game, because *"the cases and character leaving pretty quickly*

once you're done. And you find it takes a lot of time to bond with characters." (Participant 6, *Ace*

Attorney). On multiple accounts, it appears that covering more aspects on a narrative level,

such as characters' personalities and details of the game world is associated with higher

connection and enjoyment with the game.

Looking at gameplay, participants are saying that the high level of detail and new things

to discover is also a clear positive for them: *"I discovered more ways of playing and unlocked*

many more cards. The variety of cards surprise me, I am excited of what I will see tomorrow."

(Participant 11, *Hearthstone*). This feeling is similar to that of participant 4, who played

Warframe: "I unlocked new parts of the game that I did not really understand how to work with,

however it was interesting and having something new made the game more exciting, which is

also why I decided to play longer than planned. I felt very curious and motivated to know more.

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After playing I felt more energetic and enthusiastic towards my daily tasks." This segment shows association between a rich gameplay experience, with lots of new things to find and use, and positive emotions. Novelty within gameplay experience is seemingly related with positive affect, which is also stated by another participant, who indicated that the intricate world they were exploring stood out to them. They appreciated "*funny details like the snail minigame or the house of the ghost, where you could listen to music are built in a game."* (Participant 13, *Undertale*). When asked for why this stood out to them, they stated that the excitement comes from the fact that "*there is always a small surprise waiting around the next corner."* (Participant 13, *Undertale*), again supporting the value of novelty in game design. Ultimately, a detail-oriented approach used in game design gives players an incentive to go around and discover things and can apply to gameplay, visuals, and narrative alike, providing tools for satisfying curiosity and in turn engagement and positive emotions.

Clarity

Clarity, or transparency seems to be a prevalent factor for the appreciation of games. This rings especially true as it is so glaring when it's not there. "*Then my player heir dies "under mysterious circumstances* […] *This feels terrible and I have no clue how I could have prevented this from happening. It honestly makes me lose interest in the game."* (Participant 12, *Crusader Kings 3*). Failing to provide proper feedback for players can result in feeling a loss of control, as failing to (perceived) random chance does not feel fair to players (Participant 12, *Crusader Kings 3*; Participant 15, *Hearthstone*). It feels like "*rolling a* [die] *2 times, and rolling a 1 twice"* (Participant 12, *Crusader Kings 3*). Allowing players to get a clear picture of what went wrong and what went right, gives them a better grip on the situation, which can possibly prevent them from jumping to the wrong conclusions and become demotivated because of them.

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The value of being transparent towards players is supported by the positive influence that proper reward systems seem to have; multiple participants mention feeling satisfied by knowing exactly what happened: "*Today is the last* [diary] *that I need to write. I am really good at drum now, I think! I got* [79.8]*% at the first to play! Omg! I am really happy, and the quote '*[practice makes] *perfect' indeed is true! If I practice more, I can play well!!*" (Participant 5, *Osu!*). The positive influence this clarity provides appears to be making players resilient against failure as well: "*And even though I wasn't skilled enough to really improve a lot, I noticed what I was doing wrong. And that's why I was so optimistic because I could now see my mistakes.*" (Participant 10, *Trackmania*). But next to the resilience, the added feedback seems to enhance positive experiences: "*My favourite moment was completing a mission and realizing my shooting accuracy had improved. The play session made me happier and starting on a task, even though it wasn't contributing to my goals of the day, helped me get started with my daily goals.*" (Participant 4, *Warframe*). The added factor of allowing a player to check their performance on a statistical level can potentially give off feelings of confidence, pride or other, but at the very least is seen as a good thing towards a sense of achievement and general enjoyment.

Clarity is not exclusive to giving feedback to players however, some games include tutorials, guides towards objectives, and provide tips at several turns. This sense of being clear in what needs to happen is sometimes a double-edged sword; some people prefer being let loose: "*I like how sandboxy it is. In this sense you can just do your own thing, but still follow a story and have quests along with the rest. But the game gives you a lot of options for you to do your own thing, and I find that very relaxing*" (Participant 1, *Stardew Valley*), while others much rather prefer a hands-on approach when it comes to knowing what to do: "*My most disliked moment in today's play session was the moment the play guide stopped, and I did not know what I had to do next. Like in real life, I hate to feel useless or unable to do something and I experienced the same emotions in the game. Stress.*" (Participant 7, *Stardew Valley*). These

two participants together show that players can be vastly different, and that while one may enjoy having to figure out their own path, other may not enjoy it as much and prefer clear directions. Not knowing what to do can, for one player, lead to frustration. They also indicate being excited for the upcoming challenges once they did figure it out however (Participant 5, *Osu!*). Giving players both options of giving tips and guidance versus leaving them to figure it out, seems to be a good approach to optimize affect towards a game within this recurring theme.

Morality & Positivity

At certain points during the interviews and diary entries, arguments concerning the ethics or morals of in-game characters start coming to light. Participants feel the connection to a character, relying on their in-game behavior, which seems to be stronger when a character acts morally good: *"It's kind of that contrast between the positive image you build of your character, because you're helping people all the time* […] *So you think 'Oh, maybe my character isn't quite as good as I thought he was'. That contrast, that might have a bit of a negative influence. It makes an impact in any case* […] *it's like 'Maybe this isn't so good after all' and you see that your character has a hard time with it later on too. That makes up for that contrast a bit. If you see that more in the character then it has less negative influence on yourself I think."* (Participant 2, *Red Dead Redemption 2*). While this participant initially found it easy to connect with their main character, a certain action deemed as unjust had a strong impact on the emotional experience the participant had. This participant showed that the morality of the actions performed by the character they had connected with, were directly associated with their own feelings. They also state how helping other characters in the game positively influenced them: "*I really saw that the 'being part of a greater whole' or something and that you're acting to help out the characters in the game. I think that was very positive for me."* (Participant 2, *Red Dead Redemption 2*). This preference towards acting morally just is also commented on by

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Participant 12: "*I do prefer to play games where you are on the right side things. Being really evil is actually not fun at all. It's not at all enjoyable because it's actually just not interesting. But here they make being pretty evil so interesting. I do have to give them that.*" (Participant 12, *Crusader Kings 3*). They state how they themselves usually prefer to act morally just, but that acting morally unjust is a good source of entertainment in this instance as well, implying that morally deep or interesting choices can be very entertaining and engaging for players.

Participants furthermore show actively caring about the convictions, actions and other types of character development of their characters, to the point of feeling actively better because of it: *"a point I liked most during this play session is that Phoenix began getting a lot more self-confident and determined to get justice, which I admired as well. As for my mental well-being, I felt like I was once again determined to do well, despite having those setbacks with the revision of testimonies."* (Participant 6, *Ace Attorney*). The active effects experienced by this participant include resilience, in line with what the character was going through during the play session. Aside from personal development, seeing 'your' character do well gives feelings of positivity *"I felt a lot of sadness whilst reflecting on the choices I made in game and in my own life, I find it hard to describe why exactly. However, seeing the main character growing and thriving made me incredibly happy."* (Participant 3, *Before Your Eyes*). These quotes showcase that participants actively care for their characters, even amongst moments of self-reflection.

It is not just about doing the right thing, a general sense of positivity or optimism is mentioned as well. Two participants talk about the tone of the narrative that is being told. They claim heavily enjoying the mix between dark and serious moments and the more lighthearted ones: "*that's the game's strong point. It throws really funny stories at you. This just makes the game a lot more, much more fun to play. If in such a game it always goes well then there is a zero challenge*" (Participant 12, *Crusader Kings 3*), "*especially like in between these kind of dark moments. It's a bit like mood enhancing, I think*" (Participant 13, *Undertale*). The contrast of serious drama with upbeat messages, can be enjoyable, memorable, and mood enhancing to

players, but these types of narratives in games can also lead to eudaimonia if combined with enough factors as seen in the game *Before your Eyes*: *"The ending reassured me that, even if that story was fake, the life we live and the things we have done can be more than enough to live a fulfilling life. It is the most emotional that a game has ever made me."* (Participant 3, *Before Your Eyes*). For this participant, the way the game was presented through storytelling and with a final positive message to take away from a saddening story, made them reflect on their entire life, showcasing a deep personal connection with the game.

Goals & Progress

During the interviews and over the course of the diary entries, participants enjoyed the tendency of games to offer certain goals in the game one can strive towards. One participant for example mentions feeling "*more energetic and enthusiastic towards my daily tasks*", and explains: *"I would say it was the progression and task fulfillment that when you do something and you feel like you can take on the world."* (Participant 4, *Warframe*). The same participant goes on to say on multiple occasions that they felt "*Happy and determined*" (Participant 4, *Warframe*) due to seeing themselves improve in the statistics the game provides. They furthermore talk about routine and that "*it was very satisfying to have something to do that you completed every day."* (Participant 4, *Warframe*). This feeling is shared by another, who claimed that *"Being productive in the game made me motivated to be productive in real life as well for example* [for university] *and so on."* (Participant 9, *Stardew Valley*). The feeling of accomplishment or productiveness does not need a large milestone either. One participant who was playing *Osu!*, a rhythm game that has players click specific points on the screen in line with the timing of the beat, states being glad with a score of 60%, referring to the percentage of correct inputs, and being very happy about it due to the improvements they made (Participant 5, *Osu!*). The player does not seem to even have to make the progress themselves, as seeing

other players perform certain feats seem to leave a positive impact as well: "*I was determined to improve and* [that's] *what i was focused on. I ended up playing online and chatting a bit with others and admiring their skills, leaving me happy and optimistic that i would be able to do this soonish too.*" (Participant 10, *Trackmania*). Just the idea that you have something to work towards, is something players appreciate: *"I always really like that about games. It doesn't necessarily have to be competitive, but it is something more. You're working towards something."* (Participant 8, *Osu!*). It could therefore be argued that having a sense of purpose or meaning, or having any semblance of progress is a positive addition within game design to motivate players. This is also seen during the interviews, where the interviewer made an effort to find out what the most important or satisfying aspect of SDT was in the context of the game. Often, participants directly stated that it was either Competence or Autonomy that made them feel good about themselves while playing. One participant that played *Stardew Valley* (Participant 9) even went on a limb to say that competence through achieving goals and making progress was more important than the freedom to do what you want, even while *Stardew Valley* is a game that provides a large amount of freedom to its players to decide what to do.

Next to a simple sense of progress, difficulty has a number of different impacts on players. Some participants experienced multiple of these. For example, one mentions being surprised but optimistic about the presented challenge and being proud of their ability that *"even if I didn't like it very much, I could press on."* (Participant 8, *Osu!*). As time went on, they could not see any big improvements so they adapted to make their own smaller goals: *"I kind of accepted that I just wasn't going to learn it as quickly as I'd hoped"* … *"So I decided on my own: 'Okay, now I'm going to set all very small goals for myself and then at least I can be happy about that'* (Participant 8, *Osu!*). During one play session however, this participant lost hope because *"I know that rhythm games have always been my specialty* […] *and then you have a moment that it really just doesn't work. Then you think to yourself 'Do I not have something that I'm really good at?'.* (Participant 8, *Osu!*). This lost hope was also mentioned with a different

game. A participant felt defeated while playing, as they changed the difficulty setting from 'Normal' to 'Expert' because of their ease with the former. But when they then lost every match, they started to reflect: *"This does set my confidence back in terms whether I could truly defeat anyone if I spend enough time thinking ,and if the cards are just unique or are some better than others? Indeed I am not an expert on the game, but how come I lost on all of them?"* (Participant 11, *Hearthstone*). Situations such as losing streaks like this, can feel overwhelming and cause hopelessness as seen with Participant 11, but can also cause an increased sense of determination when the player has a strong enough sense of resilience at that point in time, as seen with another participant who played the same game: "*Despite my bad performance I still enjoyed myself and the game overall very much. The* [losses] *got me even more inspired to continue* [than] *the wins!"* (Participant 15, *Hearthstone*). Reasoning as to why one player becomes discouraged while the other becomes more determined might have to do with perspective. As participant 11 said after losing in a similar manner as before: *"that defeat also did not impact me negatively* [emotionally] *as much because I was sort of expecting it already"* (Participant 11, *Hearthstone*). This participant also states how, over the course of the study, they became more open towards games as a hobby, and that this change in perspective made them *"better at handling defeats, I gain happiness out of the game despite the results in the end, as long as it is not a losing streak against* [Non-Player Characters] *like* [in] *day 4."* (Participant 11, *Hearthstone*). It looks like the change in perspective towards games made this participant more resilient against the downs within the game, and experience more positive emotions while chasing their personal goals.

　　Managing to succeed at more difficult goals made it all the more satisfying to some players, as multiple noted feeling better outside of the game as well on top of showing resilience when dealing with failure: "*This also somewhat affected me outside of the game, as I was studying difficult material, I was more willing to spend the time on it because the better results should be displayed eventually. It is a similar feeling as having something achieved*

academically, but this takes considerably less time and I enjoyed the gaming session regardless [of] *the defeats in a row."* (Participant 11, *Hearthstone*). The increased amount of effort required was also seen as inspiring to some: "*An eye-opening encounter I had from practicing in the game was that with a little bit of practice anything can be accomplished."* (Participant 4, *Warframe*). So, high difficulty has its ups and downs when included in game design, but the perspective of players towards the game or gaming in general is associated with the overall experience.

Personal Connection

Playing a game is a personal experience, and the more personal you can make this experience the better. As an illustration, one player states that they enjoy *"Following* [their] *own path* [in] *the game, and making* [their] *own discoveries based purely on curiosity"* (Participant 2, *Red Dead Redemption 2*). Another player mentions how much they enjoy the "Sandboxy" sense of the game, referring to sandbox games that are characterized as having a lot of freedom in playstyle. They reason that *"the game gives you a lot of options for you to do your own thing, and I find that very relaxing."* (Participant 1, *Stardew Valley*). The strong sense of agency that can be present in games, to the point of directly changing the storyline or gameplay can have large impacts on the experience of players. Participant 12, who played *Crusader Kings 3* at the time, found this ability to directly impact the story to be "*One of the more positive things about the game"* (Participant 12, *Crusader Kings 3*). Having a large amount of variety in a gameplay can be important to players, and this participant even indicated the game improved their mental state because *"You can also do the most ridiculous things. So that is nice I think"* (Participant 12, *Crusader Kings 3*). In Crusader Kings 3, the player is tasked with guiding a medieval empire through the ages, and allows for a lot of choices that result in unique narratives presented to the player.

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A personal experience can be interpreted in multiple ways. The way a story is told or shown to you can speak to someone on a personal level. One game for example gave the player some kind of home base to roam around in and come back to, which *"gave* [them] *a feeling of safety."* (Participant 2, *Red Dead Redemption 2*). It's not just the smaller aspects either, in some instances, a character can be relatable on a deep level. One player talks about *"seeing the main character growing and thriving made* [them] *incredibly happy."* and how they felt better while connecting with the character's feelings (Participant 3, *Before Your Eyes*). This kind of reflection went deeper in certain cases that seemed to have even stronger positive effects. One example of this is when a certain situation blew up in a player's face, and they mention that *"This situation showed me that I should have trusted in friendships, which I found a valuable lesson to learn."* (Participant 13, *Undertale*). When asked about this statement during the interview, they had this to say: "*You started to think that they were* [real and became emotionally] *engaged in the way they* [felt] *about your actions in the story."* (Participant 13, *Undertale*). To this participant, it was more "*emotionally engaging"* and it made the game more enjoyable. Supporting this view, another player made a summary about their experience: *"Overall, this game was an incredibly emotional ride. The music, art and atmosphere made me experience the already emotional story even more than normal. The story made me anxious, but also very happy, only to bring that all back down once I realized that it was all fake. The ending reassured me that, even if that story was fake, the life we live and the things we have done can be more than enough to live a fulfilling life. It is the most emotional that a game has ever made me."* (Participant 3, *Before Your Eyes*). The experience of this participant was as enjoyable to them because they were able to connect on a deep emotional level with the source material. While not indicative of an emotional impact, Participant 12 who played *Crusader Kings 3*, was thinking about trying a new character but *"couldn't get [themselves] to start a game as an entirely new character"* (Participant 12, *Crusader Kings 3*) and instead opted for the character

they played with all the time. Having trouble with changing to a different protagonist, as it were, shows that they connected to them, however small this connection was.

While the participants played games that were new to them, nostalgia was still relevant to some people. For instance, one thought about their situation back home. This participant was a student studying abroad, and claimed that the game made them think of a family member and how they always played games together during their childhood (Participant 5, *Osu!*). When probed, they stated that it was more about it being a game at all, as they were reminded of the time they had together playing all kinds of games and sharing these fun and bonding experiences with one another and not so much about this specific game: *"I think every game will let me think this kind of stuff"* (Participant 5, *Osu!).* On a different but similar note, one participant also thought back fondly about their own family because of the storyline in the game that was comparable to dreams they had early in life (Participant 7, *Stardew Valley*).

A final concept that is suggested in this regard of personal experience, is related to other players. Two participants go into heavy detail regarding the effects of competitive multiplayer games. One of them talks about how *"seeing the enemy* [I'm] *racing against will hopefully spark my competitiveness even more."* (Participant 10, *Trackmania*), stating how the addition of other players motivated them to try their best. However, they also mention feeling annoyed that they were performing poorly through seeing the performance of their opponents. When probed on these statements, it became clear that the comparisons they made with the others had the strongest negative influence on them, and not necessarily the failing aspect itself (Participant 10, *Trackmania*). This experience is similar to that of another participant, who mentions feeling relaxed even when failing, because "*I know that whatever happens in the game is entirely in my hands and there are no external parties that can influence my experience and attitude afterwards. The only person, I could blame if something goes wrong is me."* (Participant 16, *Osu!*). Enjoying the tendency to attritube failing within the game to themselves is not unique to this participant either. As Participant 4 mentions, *"it was like*[,] *more motivational for me to*

compete with myself, and I realized [that] *this is something I do in my daily life as well"* (Participant 4, *Warframe*), as they noticed trying to better themselves has a more positive effect rather than comparing with others. Self-improvement is a theme seen in other participants as well, such as Participants 8 and 5, both playing *Osu!*, on top of Participant 15, who played Hearthstone.

A participant also states to usually be playing more competitive multiplayer games and that they often become anxious or annoyed because other players can sometimes "*ruin the experience"* (Participant 16, *Osu!*). The same participant talks about the positives of multiplayer competitive games as it allows you to see if you are better than others, and furthermore mentions that it is a different feeling than simply seeing yourself improving: *"The fact that I can measure my level of skills compared to others and probably if I can beat them, that would make me even better."* (Participant 16, *Osu!*). Looking at games to function as a form of achievement or something to be able to improve oneself on, can therefore serve as a way of inspiration, but also annoyance, based on the situation one finds themselves in within the game.

Context of play

Another prevalent concept is the context of play. The moment a player decides to play a game. Certain participants experimented themselves with seeing how this timing impacted their experience. Using a game as a break between periods of work, had positive impacts for some: *"I returned to my other tasks of the real life with new motivation afterwards"* (Participant 1, *Stardew Valley*). This person also *"basically just used the game as a* [break]. *I was just doing something a little different."* Participant 16 did the same, using it as a break and *"*[get some] *rest from all other things and* [doing] *something that I like".* Another player felt better and more relaxed than usual, when playing the game when they had finished everything they had to as *"my exams were over and I could chill a little more, and I already read a lot of the stuff I had*

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read. I still wanted to study, but it was not that necessary anymore." (Participant 7, Stardew Valley). This participant stated that they felt better when they played in the evening than they did when playing in the morning. When probed on this statement, they argued that they "*felt like* [they are] *just wasting* [their] *time on that"*, while referring to not having done their chores for the day yet (Participant 7, *Stardew Valley*). This is not universal however, as one person actually preferred playing early in the day: *"But when it was like early in the day, I felt like that was kind of like my fun and my happy moment, and then I could continue studying, knowing that I rewarded myself already and should do something useful kind of."* (Participant 4, *Warframe*). These different outcomes from rather similar situations in regard to the timing of play while having chores or other responsibilities might have something to do with the perspectives that the different participants might have had. As an example, Participant 7 was actively feeling bad about gaming over studying, while participant 4 talked about the play session serving as a way of inspiring them to study harder later.

Both perspective and situation can have an impact for the negative on someone's enjoyment of a game. In one instance, a player was in a bad mood due to a personal argument they had shortly before, as they claim they felt "*more uneasy and easily irritated by being shot at than I have been before when playing after a neutral or happy moment"* (Participant 4, *Warframe*). This is similar to participant 8, who said that failing at the game was more impactful because *"my day was already bad, and this just came on top of it"* (Participant 8, *Osu!*). Similar effects happened when one was for example in a certain *"physical condition"* and became "*even more exhausted"* (Participant 16, *Osu!*). In other words, there is a time and place for everything, but intense and difficult games such as *Osu!* with hard challenges to overcome, can potentially feel overwhelming when experiencing a large amount of stress already.

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Game Pacing

The timing within a game that can be described as pacing or how fast for example the provided storyline is progressing, is seemingly important to some players. Pacing can have to do with giving the player the time needed to make decisions. This is seen with Participant 15, who was playing *Hearthstone*, and calls this out specifically: *"I felt calm and thoughtful getting into this game. As offline gaming does not have a time limit, I felt in control of my next moves.* [Does] *that mean I always won? Nope! But it was still relaxing".* This idea can also be seen when looking at it from the other end; one participant mentions the maximum time within an in-game day being one of the most negative and annoying aspects they stumbled across (Participant 1, *Stardew Valley*). The urgency added through time limits appears to be detrimental, at least for some people, when a relaxing experience is desired. On another note, pacing can also have to do with storytelling. Going too fast is not good if it means discarding interesting developments that can grab the player's attention: "*the game is really focused on those short sessions where you try to take that stuff down? But I would have found it a bit nicer to get a little more around the characters themselves.*" (Participant 6, *Ace Attorney*). In Ace Attorney, the player is tasked with uncovering information and debunking arguments in favor of the truth, and the game apparently focuses heavily on that aspect. In this participant's opinion, slowing down the story a bit, allowing for more focus on background narratives, would have made for a better overall experience.

Distraction

A theme that players stated to be important throughout data collection, was the ability of a game to distract. The game being able to take off some focus, being intense enough to draw attention but not too intense that it overwhelms someone. It helped a participant to deal with their issues: *"it was like my problems were non-existent when I played the game and my surroundings were irrelevant to me when I played the game, in a good way"* (Participant 4,

Warframe). This also happened when they were confronted with a problem in their personal life *"after the game, I just did not think about the unhappy situation at all. I just like, I guess, ignored the situation because I had something else to think about, which was the game and that it satisfied me"* (Participant 4, Warframe). At least for this participant, it seems that taking some time off to take part in an engaging activity was enough to solve an issue that was troubling them.

For some participants, the amount of attention a game required was deemed to be more important than actual performance within the game: *"Playing* [Osu! created] *a space for me to* […] *slow down and not* [think] *too much, only focus on the game and songs. I like it! Even though I still get rank D." (*Participant 5*, Osu!).* In the rhythm game *Osu!,* a grade is given to the player on stage completion, indicating how they performed, with rank D being the lowest one of the possible options. This shows the participant caring more so about the ability of the game to distract rather than actual performance, which is echoed by another: *"What I really liked about today's play session was that the puzzles and fights were getting more complex. Thus, I sometimes had to take my time and think about creative ways of solving the problems. This way it was easy for me to focus on the game and not think about anything else"* (Participant 13, *Undertale*). Aside from this particular instance, this participant talked on multiple occasions about how they enjoy more difficult games because of their power to distract someone.

The origin of the distracting elements can originate from multiple aspects. For starters, one participant stated it is enough for it to be an enjoyable game (Participant 10, *Trackmania*). Another participant talks about the importance of framing: "*the game is really calming and you get to unwind very easily*", and explains that this is the case because of the "*wholesomeness*" and "*cute"* factors. (Participant 1, *Stardew Valley*). Participant 9, who played the same game, instead referred to the aspects of *"realism"* from *"real life aspects"* such as *"going to the grocery story"* being critically important for them to experience distraction and escape for a bit from their daily life. Another reason comes forward in how it is *"because I was improving"* (Participant 10,

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Trackmania). Another participant talks about how it's not about performing well at all. *"It's not about winning"*, *"I was caught up in the game and if I pay attention to all the rounds, despite their results, I was feeling less stress overall."* (Participant 11, *Hearthstone*). Moreover, difficulty comes into play again, according to Participant 13, who played *Undertale*: *"Engaging in solving difficult puzzles is a playful activity which is especially demanding, and you really need to concentrate. This I think helps to* [deal with] *other stressors of everyday life. For me, this can be done by playing real-life games like for example sudoku as well as by playing computer games that are cognitively challenging"*. Having to concentrate on an activity because of intensity, whatever provides this notion, allows this participant a chance to distract themselves and escape from daily pressures.

Sometimes games do not provide ample distraction for a player when they need it. For instance, one participant had a hard time taking their focus off of some news in their personal life that they received, stating that their problems were too overwhelming: *"I really didn't have the intrinsic motivation to go for a game, and I didn't feel like a game* [was] *going to make me feel better right at* [that] *moment."* (Participant 16, *Osu!*). They were not the only player with this problem, as Participant 4 had a problem that was *"a bigger problem than the last time I said I was escaping from reality"* (Participant 4, *Warframe*). During an earlier play session they used the game to zone out after having an argument with someone. This second time, a similar situation was unable to be solved by the game.

A game can also get too intense and make it too hard to focus on as a result. The game can be *"overwhelming"* as a result of flashing lights and *"inconsistency with button presses"*. (Participant 8, *Osu!*). This sentiment was shared with another participant, as they found the combination of high difficulty and intense, flashing visuals to be overwhelming as well. (Participant 16, *Osu!*). However, when able to focus and perform well with these overwhelming visuals it was found to be *"so flashy and cool"* (Participant 8, *Osu!*).

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The distracting effect that games can have, are different per participant. While some state that it is about the presentation of the world (Participant 1, *Stardew Valley*; Participant 9, *Stardew Valley*), others talk about how having to concentrate and be cognitively put to the test is important (Participant 8, *Osu!*; Participant 13, *Undertale*; Participant 16, *Osu!*), even though this can become too much as well in certain situations. Games have unique identities, and a game such as *Osu!* or *Trackmania*, that are performance oriented, are distracting for a different reason than a game such as *Stardew Valley*, where the central point is doing whatever someone wants and to have a good time. In all cases however, players engage with the game and seemingly lose track of their surroundings, making them feel better overall and escape reality for a bit.

Deliberate Play

As a final theme, the mindset of the player comes back in varying ways. Multiple participants stated that they had never played a game before with such a strong focus on emotional experience. To illustrate, at the start of the experiment, participants were told to be watchful of things that happened during play that might impact them emotionally. For example, one participant said that *"It was interesting to have to really need to reflect on it because you are taking part in the story. So it was a special experience for me to really focus on the mental well-being effects of a game and think about the play session after playing it."* (Participant 13, *Undertale*). But they go on to say that *"If it's just for relaxing, I think most of the time it's enough to just play the game. But maybe you can also get more out of the game by thinking about it and and really reflecting on* […] *your actions"* (Participant 13, *Undertale*), indicating a change in experience when looking at a game with a different perspective. Another participant also stated that they liked this approach to playing games: *"I really enjoyed the study, because it made me explore this new game with a different mindset"* (Participant 1, *Stardew Valley*), even mentioning how it is an enjoyable alternative way to play games. Going deeper than simple enjoyment is

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another participant, stating that "*The idea of reflecting on what you have experienced is also a fun and interesting process. Because I do notice that I may indeed have a more positive view of the game, because I also reflected on what it did to me.*"(Participant 3, *Before Your Eyes*). They refer to how the actual effects from playing the game are potentially different when compared to a regular way of playing the game. Players that regarded the purpose of a game to be that of an emotional experience, saw themselves to become more open to the idea and reflect on their experiences.

Different effects from playing a game based on the kind of perspective is not exclusive to reflection either. As seen within the other recurring themes, a lot of distinctions that were found can potentially be explained by a difference in perspective. This difference in perspective can be seen in personal preference for gameplay aspects such as "*Wholesomeness*" and "*Cute*" factors (Participant 1, *Stardew Valley*) versus more realistic aspects (Participant 9, *Stardew Valley*).

Perspective can change over time, as people can come across different conclusions, reflections, and discoveries that impact their view of something. Multiple participants showed a change in perspective towards gaming in general, to the point of calling it out during the interview or at the end of their diary. For example, participant 11 argues in their final diary entry how their *"attitude towards games have subtly changed during the past week"* (Participant 11, *Hearthstone*), and changing their opinion into deciding that *"moderate gaming is quite acceptable"* and that using it to relieve yourself of stress is a good mindset, as opposed to associating it with addiction and worse academic achievement (Participant 11, *Hearthstone*). Two other participants did not see themselves as a person that routinely plays games either, and mostly experienced annoyance and stress during their first play sessions (Participant 5, *Osu!*; Participant 7, *Stardew Valley*). In both cases, their attitudes changed. One said they would include *Osu!* as a go-to method to alleviate stress (Participant 5, *Osu!*), while the other felt more productive and relaxed as a result of playing when comparing it to their usual method of spending free time (Participant 7, *Stardew Valley*). This second participant also explains that

they have come to the conclusion that a pre-requisite for actually enjoying yourself with gaming

is that *"you really have to get into it"* (Participant 7, *Stardew Valley*), referring to their own

change in perspective after multiple play sessions.

Additional insights

Aside from the recurring themes that appear to be important to mental well-being and

related to game design and gaming in general, there were a few other insights in the form of

elements that might be interesting to look at. These were present within the data, but did not

point towards specific themes or elements that can be applied to game design or gaming in

general.

For starters, some participants indicate annoyance by possibly having to pay to access

parts of the game. In one case, they were stressed about this possibility before finding out

whether or not this was even applicable. (Participant 11, *Hearthstone*). The anxiety that comes

from the prospect of possible monetization can also be seen in another participant, who played

the free version of *Trackmania*, and was met with dissatisfaction after discovering the online

part of the game which was the main draw for this participant, required them to pay money for it

(Participant 10, *Trackmania*).

Another insight is that of technical difficulties – one participant who played *Stardew*

Valley, got very frustrated because of the game crashing and failing to save the progress that

the participant had made. "*It was more like I really didn't feel like doing all those tasks again.*

After, I was just kind of frustrated […]. *And I had already played for a while*." (Participant 1,

Stardew Valley). The participant indicates a lot of frustration even though they state heavily

enjoying the game throughout their diary, even when met with more crash reports:

"*Unfortunately, the game crashed after that, and I do not want to start it again today. I had a*

busy day today and I really looked forward to paying a visit to my [happy place]. *Even if I didn't*

get much done today, it was really enjoyable and calming in a way." (Participant 1, *Stardew*

Valley). Technical difficulties as a whole can be very frustrating to players and can even be very impactful. That being said, it is not a regular part of game design or gaming, as a malfunctioning product is not something that is intentionally pursued. Nor is it considered to be a regular part of gaming. This is therefore not a theme to specifically look out for, however it is still important to keep in mind.

Discussion

This research attempted to get an overview of the various elements in gaming that have influences on mental well-being. It has become clear, looking both at previous research and the current studies, that there are both elements in the form of design choices, experiences and personal circumstances that are game specific and those that can be considered as universal to the entire medium.

Findings

Gaming as a positive influence

Over the course of the study, every participant appeared to be engaged with the game at some point. Some players were determined to achieve goals in performance-oriented games, such as beating their previous record on a rhythm game such as *Osu!* or a racing game like *Trackmania,* and showed throughout their responses that they felt engaged, experienced joy and were driven to do better. In games that focused more on delivering a story or narrative such as *Red Dead Redemption 2, Undertale,* or *Before Your Eyes*, players were quick to engage with characters and the game world. Players reported feelings of productivity or competence when helping others, shock when their protagonist did something morally unjust as compared to their usual actions, and were rooting for characters to thrive. Some participants reported reflecting or

reminiscing about their past due to the contents of the game, indicating a deep connection with the game, and reflection on their own life.

Participants showed enjoyment by engaging with the game, finding a sense of purpose in making progress towards achievements, and simulating relationships with fictional characters. From a well-being perspective, all the games that were used during this study are associated with at least one of these characteristics of mental well-being according to the PERMA model (Seligman, 2011). Games in the study were purposefully chosen to be as diverse as possible in a context of genres, and still a lot of similarities can be seen in how the participants got engaged with their game. Even when a game caused frustration in a player initially, this turned into enjoyment after getting more involved with it in the following play sessions. In other words, every participant reported to have found something in their game that had positive effects on them through engaging with the game.

Link between themes

The recurring themes found in the results showcase an assortment of elements that can be present within gaming and are associated with stimulating a positive reinforcement on mental well-being. Because the games used in the study were as diverse as possible, the themes showcase elements that can be universal to all games. These elements can be divided into two separate categories that are relevant to the gaming medium. The first category is about the design of the game in question and are objective elements that can be interpreted by players in different ways. The second category concerns personal circumstances and are defined by the player and are therefore subjective. The themes can be considered as generalizable and can vary in interpretation when comparing different games and players. The themes are relevant to fundamental pieces of a game such as the way a game is framed and not necessarily about the specific content. Examples include giving feedback to players about performance, providing depth and detail about the gaming world, and to use timing as a way to support the experience.

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The themes can therefore be considered as a framework that games can adhere to, both in design and in usage. As an example, the theme about goals being present in game design provide an insight into the fact that participants tended to be motivated by them in general, and there is possibly no specific type of goal that necessarily works better than others. The same could also be said for clarity or transparency: it did not matter whether a game used percentages, medals or pure text to convey feedback – all of these were satisfying to participants. Every person has their own preferences, and the fundamental nature of the themes support this notion. As for usage, an example is found within the theme of perspective, which provides insights that game experience is subjective, and the way a game is viewed can potentially impact the overall experience.

All the themes are associated with mental well-being according to participants of this study. It can therefore be argued that the design themes of being detail-oriented, providing feedback and transparency, tell stories that make use of morality, implement goals to achieve, allow players to personalize their way to play, and use deliberate pacing to support the game experience, can provide support to make a game become more engaging and satisfying for players. Similarly, the personal themes of picking the right time to start playing a game, finding distraction where needed, and how different perspectives can potentially change the perceived effects, provide indications towards how subjective the experience of the gaming medium is. Additionally, this universal applicability showcases how games designed with the necessary elements can all incur feelings of engagement, connection, enjoyment, meaning, and achievement in players, under the right circumstances.

Gaming to influence mental well-being

As stated before, "Stable well-being is when individuals have the psychological, social and physical resources they need to meet a particular psychological, social and/or physical challenge." (Dodge et al., 2012, p.230). Well-being is furthermore influenced by satisfaction of

the intrinsic needs of SDT and can contribute towards eudaimonic experiences (Daneels et al., 2021a; Daneels et al., 2021b). As all the themes at one point during data collection are related to at least one of the aspects of the PERMA model (Seligman, 2011) and therefore mental well-being, the themes should therefore apply to at least one of the intrinsic needs of SDT (Deci & Ryan, 2000), or contribute to a sense of Flow (Csikszentmihalyi et al., 2014).

Being in control of personal decisions, and feeling free to do whatever someone wants to do, can be applied to the entirety of gaming, in different degrees. As games are inherently interactive, the player is always in the driver's seat. A sense of autonomy can therefore be gained with any game, albeit in differing amounts, as long as it is classified as a game. More intense feelings of autonomy can occur from a strong sense of agency, characterized as the freedom to influence parts of a game (Frasca, 2001). The extent of agency can be up for debate though, as theoretically players are limited by the rules of the game world and how the game is designed (Tulloch, 2010).

Nevertheless, a number of themes contributed to increasing feelings of freedom and control in participants. The theme of timing, through giving a player plenty of time to think, and leave out urgency in their decision, provided feelings of control (Participant 15, *Hearthstone*). The theme of clarity, implying clear feedback into what happened after certain actions can potentially also promote these feelings, as the lack thereof for example left a participant feeling cheated and as if their decisions made no impact (Participant 12, *Crusader Kings 3*). Another relevant theme in participant responses that indicated contribution towards feelings of freedom and control is the personal connection a player can work towards. Personalization in games can occur due to for example picking a personal favorite song to play a rhythm game on in *Osu!*, customization of the player character in *Stardew Valley*, or deciding upon a path of choices or directions that the player preferred. All of these examples were met with feelings of control and freedom by participants in the study. Personal wishes could shine through in the actions

performed within the game, and are a prime example of the interactivity that the gaming medium can provide.

When looking for a sense of connection with others or a feeling of belonging, also known as relatedness, a common approach within the context of gaming towards satisfying this need seems to consist of gaming experiences with friends (Snodgrass et al., 2011). In the current study, no multiplayer experiences of this sort were pursued by participants. Regardless, relatedness was detected in the responses of participants. Firstly through parasocial relationships with fictional characters, present in the game. This notion is also found in other research, confirming relatedness need satisfaction from parasocial relationships with media characters (Sherrick et al., 2021). The parasocial relationships found within participant responses reveal that they found the level of detail a game can provide on its characters to be important. Details can make a character feel more like a real person and easier to connect with or feel empathy towards, even if they are fictional, as participants stated that the mannerisms and small things characters did or thought about contributed to these feelings. Furthermore, narratives or characters with complex or distinct moralities can make characters more compelling and feel like actual people in the same sense to players (Participant 6, *Ace Attorney*; Participant 2, *Red Dead Redemption 2*) Supported partly by these parasocial relationships, the world can also feel like a home to players (Participant 2, *Red Dead Redemption 2*). This homely feel was a result of how personal the world felt to the player. Games that are personal to someone can instill feelings of belonging to a world (Participant 2, *Red Dead Redemption 2*). Personalization can also occur through customization of a player character, which has previously been linked with increased helping behavior (Dolgov et al., 2014), and can imply enhancing the connection felt with parasocial relationships, through a character embodying more traits that are personal to the player. These parasocial relationships can seemingly feel very real, and provide real life benefits to the mental well-being of players, without relying on them.

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Participants that felt competent in games have stated reasons influencing this feeling
through the themes of clarity through feedback, the ability to progress towards goals, and a level
of detail that supports it. Participants stated being motivated by feedback and rewards that gave
them unbiased insights into their own performance. Rewards were furthermore described as
positive additions that induced feelings of achievement, were easy things to strive for, and were
sometimes more important than the goal itself. Some games made it easy for players to think of
their own goals to achieve, while other games provided set goals to work towards. In both
cases, feelings of being productive occurred within participants, especially when compared to
other common forms of spending free time such as keeping up with social media. Goals that
were deemed as more difficult, in turn provided stronger feelings of satisfaction in some
participants, although this backfired when it became overwhelming through the addition of
intense visuals or a lack of clear performance feedback. The ability to signify progress was to
some a reward on its own, especially when supported by a high level of detail. A specific link
was made with how good it felt to see the results of making progress, and how this was
visualized in the game environment. These themes are similar with findings of research that
looked at flow and gaming (Nah et al., 2014), mostly in their themes of 'clear goals and
feedback', and 'balance of challenge and skill', among others, that contributed towards a sense
of flow.

Flow is a result of certain aspects of quality game design combined with personal
circumstances (Nah et al., 2014) and is achieved when challenge meets skill. In the current
study, personal circumstances were important towards general well-being. The view,
perspective or attitude towards a game or gaming as a medium, was associated with how a
participant experienced the game and the resulting effects. This perspective was furthermore
linked with the timing of when to start playing a game, as attitude sometimes changed in
situations such as having a lot of work to do. Attitude was able to change over time, as
participants grew to be more accustomed or involved with their game and be more positively

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influenced by it in turn. Subjective elements are important to participants for the purpose of

positive affect, and are linked to achieving a state of Flow (Csikszentmihalyi et al., 2014; Nah et

al., 2014). Personal preference is important for similar reasons and refers to what subjects or

types of narrative someone finds to be interesting or compelling. External pressures such as

academical deadlines or current world events made participants appreciate being able to turn

towards a game, although the pressure was sometimes too much.

During the study, intrinsic need satisfaction was often associated with elements of game

design, while personal attitude and subjective thought was mostly associated with the type of

engagement and enjoyment, which can be characterized as a feeling of flow, provided the game

itself was compelling enough as well. In light of this, Flow and SDT are expected to complement

one another. Combined, these theories are expected to be the link between the identified

themes and the increase in well-being and can be found in Figure 3.

Figure 3: Relevant elements and theories towards mental well-being through gaming
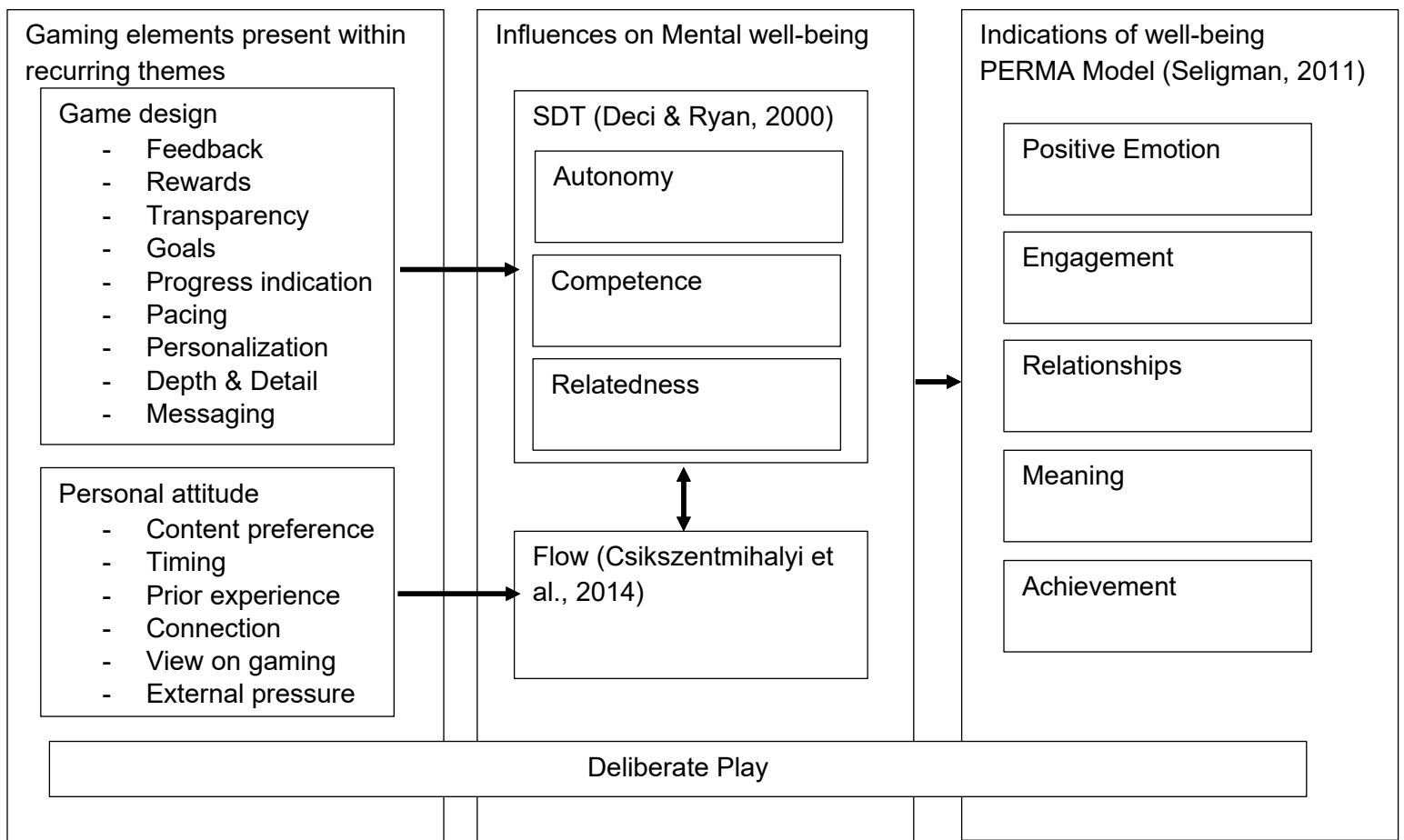
In figure 3, the elements to look out for as a designer or player are showcased. Aside from the influences that personal attitude and the design of a game have on someone's experience through either intrinsic need satisfaction or Flow, the play motivation is important to consider as well. With participants reporting new or stronger positive effects from playing a game with a different mindset or purpose of play, a different take on what in gaming influences mental well-being can be created. Experiencing Flow or intrinsic need satisfaction can occur because of a lot of things, but are seemingly unrelated to what the purpose of the play session to the player is. Because of this, Figure 3 shows an overarching influence of 'Deliberate play', as players mentioned it changed both their personal attitude and the effects of mental well-being it earned them. A few examples of deliberate play can include playing to distract, playing to enjoy and playing to reflect, and were all used by different participants over the course of the study.

The engaging nature of the gaming medium

Respondents associated flow-like experiences with escapist motivations similar to how a person can use other hobbies or responsibilities to distract from reality. Previous research also shows that inherently engaging games are optimal for escapism (Calleja, 2010). But, as seen with participants in the current study, there are more motivations to game aside from using it as a form of respite. As seen in the responses of the current study's participants, not everyone has situations they wish to distract from. Being immersed in a different environment can be attractive because a story is simply compelling or emotional to someone. Motivations also include trying to become better at something, or because it speaks to a player on a personal level. Players can play a game as a hobby with which to spend their free time, get challenged in ways they cannot in real life, play together with other people remotely, or learn something new from for example serious games (Young et al., 2012). As an example, one participant of the current study felt

good from playing a game due to being carried away by the emotional story, and at no point during the study was implied to experience a sense of escaping from situations in their real life or use the game as a break (Participant 3, *Before Your Eyes*). Instead of escaping real life, it made the participant reflect on it instead. Even though escapism is often seen as the result of an engaging game (Calleja, 2010; Hemenover & Bowman, 2018), it can have elevating effects to the point one can consider it to be a eudaimonic experience.

Personal attitudes and circumstances vary from person to person, but any game can in theory include the identified design elements and can therefore be described as inherently engaging. The variety of options the gaming medium provides ensures that an increasing amount of people can find a game that suits their preferences and needs, as evidenced by the growing usage of games (Zhu, 2021; Balhara et al., 2020; Barr & Copeland-Stewart, 2021). In every type of game, a personal connection can be formed and there is a certain influence that players can wield. Watching a movie can be entertaining, but being the movie star and being in charge of the story can feel completely different. It can be considered as a personal iteration of a character or a form of self-expression. Even in games where there is a pre-determined player character, every player has their own take on how that character behaves. In action games for example, one player's main character likes to fight barehanded while another player's main character prefers using guns. Games can therefore be considered to be a tool for an advanced level of playing pretend, to have people be more in touch with the reaches of their own fantasy and imagination, allowing players to actively indulge in what they want to do, without being bound in reality, from the comfort of their own home. In other words, the gaming medium allows players to act out fantasies, expand their imagination, broaden their horizons and actively participate in fantasies to experience a personal journey, something no other medium provides to this extent.

Theoretical Implications

Explanations why the discovered elements were relevant towards well-being were sought within satisfaction of intrinsic needs of SDT (Deci & Ryan, 2000), and succeeding at psychological, social and physical challenges in order to achieve stable well-being (Dodge et al., 2012), comparable to a sense of flow (Csikszentmihalyi et al., 2014; Nah et al., 2014). The elements of the identified themes within the data showcase that these theories cover most of the influences. However, from a design standpoint, SDT does not cover all the relevant elements. Relatedness or social interaction is an important thing to people, and some participants showed that parasocial relationships with media characters can have positive impacts. While similar, Relatedness does not explain these parasocial relationships fully. This is furthermore supported by previous research into Relatedness in singleplayer games (Tyack & Wyeth, 2017). These findings suggest that parasocial relationships with media characters are something unique provided by game design that cannot be explained with the regular definition of Relatedness. Additionally, as seen in earlier discussion, SDT is not able to account for personal preferences and perspectives a person might have, and is therefore not sufficient as a theory in order to explain emotional effects of gaming.

Next, flow and SDT are both concepts used in gaming related research. Based on the feelings that participants had, combined with the recurring themes and accompanying elements, appears to be indication of a strong link between the two. The definition of well-being being is reliant on succeeding at psychological, social or physical challenges (Dodge et al., 2012). The aforementioned theories link towards enhanced well-being, and this study therefore indicates a connection between gaming and providing these types of challenges. Examples are when players require more challenge in their life, or when players need to distract of everyday challenges that are deemed as being too much for them. Elements like morality, clarity, level of detail, pacing, personalization, cognitive load and nostalgia all make up elements of games that

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make a game more than simply satisfying and can turn it into an enlightening or eudaimonic

experience. Certain elements need to be present to prevent negative affect such as clarity,

while other elements can be used to further enhance the positive impact of a game.

Practical Implications

With the findings of the current research, it is likely that players can undertake certain

actions in order to improve emotional affect with games. An example can be to attempt to take a

different mindset or to set a specific goal while playing with regard to a game or the gaming

medium. Identifying clearly what someone's attitude is towards a game and gaming can

potentially aid them in optimizing affect and effects by for example picking optimal times to play

a game or the optimal game to match their current mood and directly engage with their own

mental well-being, similar to the workings of the Selective Exposure of Self- and Affect

Management (SESAM) model (Knobloch-Westerwick, 2015). The SESAM model focuses on

using media to regulate personal affect on a voluntary basis, but has not yet been used in the

context of gaming. The current research can be considered to be an indication that it should.

Aside from individuals, this study adds to current research into satisfying experiences

through video games. The study does not provide a framework directly and is not able to specify

statistically which elements are more important than others, but it does showcase which ones

are present overall. Participant responses however do indicate that all of these are important in

some regard, and it can therefore be a valuable approach to keep these elements in mind one

way or another while designing a game.

Strengths & Limitations

The current research attempted to get a full picture of the various elements within games

that are relevant for an emotional impact. To this end, one key strength in this approach is the

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usage of two studies. Instead of opting for simply a popular game, or a number of popular games, the first study identified a number of games that were associated with emotional impact by players. Through this, it was possible to find games that were seen as emotionally rich or important by players, even though they were not nearly as popular as some others. Next to this, a survey was also useful in getting different perspectives on intrinsic need satisfaction per game. Its open-ended questions allowed for an efficient way to gain a deeper understanding of what types of experiences players have with different games and what feelings they associate with them and why. On top of this, having as many different perspectives as possible was done to prevent possible researcher bias in reviewing different games. Additionally, the analysis of the survey responses used a thematic coding approach that focused on finding games where there was a strong association with need satisfaction. This made the analysis favored towards games that had a lot of information in the response(s), as it was more likely that the game scored on multiple codes when there was more information about the game. As a clearer picture of a game resulted in more codes being applied, this approach slightly favored games that were either popular or had passionate players, as this resulted in either more mentions or more extensive argumentation.

For both studies, the population was comprised of mostly students that were enrolled at the University of Twente. Within this student population, a large percentage came from Social studies department within this university. It could be argued that students from social sciences are more aware of emotional impacts and are therefore more valuable for the purposes of this study, but it is important to realize that this leaves out a lot of potential viewpoints from people outside of this population. Therefore, the results of the study could have been more diverse if a wider sample was found. Adding to this, it seemed that prior experience with the medium of games had an impact on how someone perceived gaming overall and that it impacted their enjoyment. While this came forward sometimes during interviews with participants as some indicated they played lots versus some that played little to none, not every participant

elaborated on this. The participants that did talk about prior gaming experience were also not prompted for the amount of experience. Therefore, categorizing participants into different amounts of prior experience was not possible.

During both studies, an effort was made to get as much data as possible from participants and respondents through open-ended methods. In the survey, participants were asked to elaborate their reasoning why they figured that certain games were relevant in the scope of emotional impacts and mental well-being. This allowed for a lot responses that had ample variety within the answers and contributed to the main research question as well. This variety only increased when considering that nearly 100 respondents filled in the survey to completion. During the diary study, the qualitative nature made sure that all possible emotional experiences that the participants might have had were detected, opposed to using quantitative measures such as standardized questionnaires or stress-measuring tools.

The full-on qualitative approach also brings with it some downsides however, as it is prone to bias on multiple accounts. The approach is fully based on self-reported behavior and experiences. Because of this, it is highly possible that a participants tended to report socially desirable behavior instead of what actually happened. This weakness was mediated through the interviews by probing the participants on certain segments within the diary entries to find possible impacts the participants had not written about. Another approach to dealing with this bias was through being highly transparent during the recruitment process. No deception was used in the study, which allowed the researcher to answer any and all questions participants might have had. The researcher also took it upon themselves to explain the purpose of the study as clearly and accurately as possible to the participants to prevent possible ruminating on the actual purpose of the study and the biased answers this might have generated. While this might have been true for some, this approach possibly made the bias worse. By telling the participants about the purpose of the study, participants that are fans of the gaming medium could have caused them to ignore possible negatives encountered during the experiment.

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Gaming can still be considered to have a stigma in certain circles (Galanis et al., 2021), so defending this personal hobby might have been a natural response.

As for the diary study data analysis, the data was analyzed through a GT approach (Charmaz & Belgrave, 2007). This approach made bias during data analysis less likely. There were no hypotheses to test and any theories present were based on what was found during the study. This allowed all data that seemed relevant to mental well-being and underlying emotional experience with games to be found during data collection and analysis. Moreover, the independent coding scheme that resulted from this approach is directly relevant to the current study. This is opposed to standardized coding schemes. Selecting a standardized one related to gaming that was more reliable could have been an option, but it would not have been based fully on the data and thus could have prevented the discovery of new insights.

To check this scheme for possible researcher bias, an interrater reliability test was conducted, which initially resulted in a kappa statistic of .34, signifying a small amount of agreement. This was later attempted to be rectified by clearing up any misinterpretations of the codes and letting the second coder evaluate their chosen codes. This second round resulted in an overarching kappa statistic of .78, indicating a substantial agreement between researcher and second coder. Unfortunately, the way the second round was conducted, induced a high probability of bias in the process. The evaluation of the codes was done with the main researcher present, as it was following the meeting about clearing up misinterpretation of codes and the editing of the code descriptions. This was performed with the main researcher asking the second coder per segment whether they wanted to change anything about their current code usage. During this process, the codes of the main researcher were visible to the second coder as well, making it more likely that they would change their mind on their choices. The reason for showing the codes was due to misinterpretation on the researcher's part. Doubts about the impact of showing these codes were mentioned during the process about this approach. The second coder was therefore asked to think very critically about their choices,

especially on segments where agreement was found initially. Even with these concerns voiced during the process, the possibility the kappa statistic being .78 is highly likely due to bias. This was not rectified with a new coder or selection of segments to be checked, due to the coding scheme only being used for the purpose of detecting interesting segments and not for the purpose of crafting the main theory of the study. It does imply a likelihood that, because of probable bias, blind spots were created within the data or irrelevant segments were considered to be relevant. Due to this, the researcher attempted to be extra critical of segments that were coded to be relevant, and check whether to consider these in data analysis.

Lastly, a focus was put on games a participant could play in their own time, which required them to pick a game they could theoretically play solo. This resulted in a lot of participants picking singleplayer games. While not a problem on its own, previous research suggests (Tyack & Wyeth, 2017) that relatedness and social interaction in singleplayer games is underexplored and hard to detect, especially when compared to games that contain a strong focus on multiplayer experiences. It is therefore likely that insights regarding social interaction and relatedness were underexplored within the current study.

Recommendations

The themes found in this research are associated with improving mental well-being through games indicate there being an optimal approach to both game design and way to play games. As mentioned by Tyack & Wyeth (2017), Relatedness in singleplayer games is still relatively lacking in research, which might be because it is hard to find. Parasocial relationships with media characters can resemble feelings of relatedness, and could be the reason why this is hard to grasp. The current research also shows that these parasocial relationships are present in story-intensive games. While these relationships might occur in other types of games, researching parasocial relationships in the context of story-intensive singleplayer games is more

likely to produce results when trying to compare it with feelings of relatedness that occur in games with a strong focus on multiplayer experiences. While some benefits of parasocial relationships have already been looked at (Sherrick et al., 2021), taking the time to identify what contributes to healthy parasocial relationships can be beneficial for for example people that have trouble connecting with real people.

As a last recommendation, the usage theme of perspective, referring to the view people have on playing games appears to have a connection with the actual effects of playing a game. For example, some people stated that they used the game as a break in between stressful periods, and therefore felt bad or guilty when partaking in playing a game before having done anything during the day, while other participants stated that they actually enjoyed the break instead. Moreover, two participants stated specifically that playing a game with a focus on the emotional impact on mental well-being, was a new experience that led to a larger amount of reflection. In light of this, a recommendation would be to perform research in the context of mindsets with gaming and the impact it has on experiences. Giving participants a game to play in their own time, combined with a specific purpose for playing, can potentially produce interesting results. Reasons to play can include using a story-intensive game to find a character to connect with through parasocial relationships, to using it specifically only when feeling stressed, or as a form of meditation. If this is thoroughly explored, possible mindfulness trainings or even new kinds of games that focus specifically on stress-relief and mental health could be developed for people that wish to attain more positive effects as a result of playing games.

Conclusion

Through two studies, a number of elements and important factors within gaming that contribute to a positive influence on mental well-being were found.

The game design elements are concepts that are present within a game and are therefore objective. These are feedback on gaming performance, reward systems, transparent communication, predetermined goals or design that allows for setting goals, aspects that reflect progress made by the player, pacing and timing in support of the desired experience, degrees of personalization, high amount of depth or detail in character and/or worldbuilding, and lastly the inclusion of messaging or a specific theme through narrative or framing. These elements apply to mostly the concepts of Competence and Autonomy from the Self Determination Theory (Deci & Ryan, 2000). Similarities to feelings of relatedness were found within participant responses as well through parasocial relationships with fictional characters, but seems to be different from SDT as it stands.

Personal attitude elements that were found to be associated with effects on well-being through gaming were subjective concepts that vary from person to person. These elements are genre or content preference, length of playing session and moment to start playing, personal connection or involvement with the game, perspective on the gaming medium, and current external pressure. Together, the attitude of a player is linked with a sense of Flow when the aforementioned design elements satisfy a certain degree of intrinsic needs. Ultimately, experiencing these concepts is associated with an increased sense of mental well-being according to the PERMA model of Seligman (2011).

The presented elements are thought to be important for mental well-being as these are building blocks that help establish the gaming medium for every possible preference. Gaming is the only form of entertainment media at this time that allows players to actively participate in activities normally not possible and directly experience fantasy. A deep amount of personal

connection only further establishes the ability of games to provide challenges that are either social, psychological or physical in nature. These vary per game, and can add a needed challenge in someone's life, distract from real-life challenges, and build towards mental well-being.

Additionally, the reason a player plays a game is seen to have influence on the entire experience. In the study, participants were told to think about their emotional experience with the game. Players became more reflective and saw an increase in emotional affect, changed personal attitude towards games, and became more appreciative of the game in question. It seems that having a specific purpose in mind to play a game, is important for the effects someone derives from it. To illustrate, a person that plays a game to not have to think about studying can potentially feel guilty due to playing, while another person who plays a game to take a well deserved break from studying can potentially feel motivated to continue their efforts again later. Ultimately, a player has control over the effects a game has on them to a certain degree, all that is needed is a reason or purpose they feel positive about.

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Appendix 1: Diary study Game list

Diary study game selection

1. Free games   P. 2

a. Apex Legends   Shooter / Battle Royale

a. Hearthstone   Card game / Strategy / Fantasy

b. League of Legends   MOBA / Competitive / Fantasy

c. Osu!   Music / Rhythm

2. Cheap games   P. 4

a. Before your Eyes (Requires webcam) Story-rich

b. Stardew Valley   Life simulator / Farming

c. Trackmania   Racing / Puzzle

d. Undertale   Adventure

3. Midrange pricing games   P. 6

a. Deep Rock Galactic   Shooter / Co-operative

b. Life is Strange   Story-rich / Graphic Adventure

c. Minecraft   Sandbox Survival

d. The Sims   Life simulator

4. High-end pricing games   P. 8

a. Crusader Kings 3   Strategy / Tactics

b. The Elder Scrolls V: Skyrim   Role-playing / Fantasy / Adventure

c. Hitman 2   Stealth / Action / Puzzle

d. Red Dead Redemption 2   Western / Shooter / Adventure

Free Games

Game name	Apex Legends
Genre(s)	FPS (First-Person Shooter), Battle Royale
Reviewer score	Metacritic: 88 / 100
Time to Beat	Story: Not applicable 100%: Not applicable Time per match: up until around 30 minutes.
Pricing range (not including sales or resellers)	Free
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch, Mobile
Brief description	Before the match, players form into two- or three-player squads, and select from pre-designed characters with distinctive abilities, known as "Legends". The game has two gameplay modes. In "Battle Royale", up to 20 three-person squads or 30 two-person duos land on an island and search for weapons and supplies before attempting to defeat all other players in combat. The available play area on the island shrinks over time, forcing players to keep moving or else find themselves outside the play area which can be fatal. The final team alive wins the round. In "Arenas", players form into three-player squads and fight against another squad in a 3v3 team deathmatch over a series of rounds to determine the winner of the match. Teams win when their team has at least 3 points and is 2 points ahead.

Game name	Hearthstone
Genre(s)	Card game, Strategy
Reviewer score	Metacritic: 90 / 100
Time to Beat	Story: Not applicable 100%: Not applicable
Pricing range (not including sales or resellers)	Free
Platform(s)	PC, Mobile
Brief description	The game is a turn-based card game between two opponents, using constructed decks of 30 cards along with a selected hero with a unique power. Players use their limited mana crystals to play abilities or summon minions to attack the opponent, with the goal of destroying the opponent's hero. Winning matches and completing quests earn in-game gold, rewards in the form of new cards, and other in-game prizes. Players can then buy packs of new cards through gold or microtransactions to customize and improve their decks. The game features several modes of play, including casual and ranked matches, drafted arena battles, and single-player adventures. New content for the game involves the addition of new card sets and gameplay, taking the form of either expansion packs or adventures that reward the player with collectible cards upon completion.

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Game name	League of Legends
Genre(s)	MOBA (Multiplayer Online Battle Arena), Action Role-Playing, Competitive, Fantasy
Reviewer score	Metacritic: 78 / 100
Time to Beat	Story: Not applicable 100%: Not applicable One match takes around 20 to 40 minutes
Pricing range (not including sales or resellers)	Free
Platform(s)	PC
Brief description	In the game, two teams of five players battle in player versus player combat, each team occupying and defending their half of the map. Each of the ten players controls a character, known as a "champion", with unique abilities and differing styles of play. During a match, champions become more powerful by collecting experience points, earning gold, and purchasing items to defeat the opposing team. In the game's main mode, Summoner's Rift, a team wins by pushing through to the enemy base and destroying their "Nexus", a large structure located within.

Game name	Osu!
Genre(s)	Music, Rhythm
Reviewer score	Metacritic: Not applicable

Time to Beat	Story: Not applicable
	100%: Not applicable
Pricing range (not including sales or resellers)	Free
Platform(s)	PC
Brief description	osu! gameplay is based on a variety of popular commercial rhythm games. While keeping some authentic elements, osu! adds huge customisation via skins/beatmaps/storyboarding, online rankings, multiplayer and boasts a community with over 500,000 active users! Play the way you want to play, with your own music, and share your creations with others. The game contains multiple modes to play. Each mode offers a variety of beatmaps, playable songs ranging from "TV sized" anime openings to "marathons" surpassing 7 minutes. In osu!standard, beatmaps consist of three items – hit circles, sliders, and spinners. These items are collectively known as "hit objects" or "Circles" and are arranged in different positions on the screen at different points of time during a song. Taiko beatmaps have drumbeats and spinners. Catch beatmaps have fruits and spinners, which are arranged in a horizontally falling manner. Mania beatmaps consist of keys (depicted as a small bar) and holds. The beatmap is then played with accompanying music, simulating a sense of rhythm as the player interacts with the objects to the beat of the music. Each beatmap is accompanied by music and a background. The game can be played using

	various peripherals: the most common setup is a graphics tablet or computer mouse to control cursor movement, paired with a keyboard or a mini keyboard with only two keys.

Cheap Games

Game name	Before your eyes
Genre(s)	First-Person, Adventure
Reviewer score	Metacritic: 77 / 100
Time to Beat	Story: 1,5 hours 100%: 3 Hours
Pricing range (not including sales or resellers)	€9,-
Platform(s)	PC
Brief description	Embark on an emotional first-person narrative adventure where you control the story—and affect its outcomes—with your real-life blinks. With this innovative technique you will fully immerse yourself in a world of memories, both joyous and heartbreaking, as your whole life flashes before your eyes. The game follows the story of the recently deceased Benjamin Brynn on his way to the afterlife. The player must interact with Brynn's memories through an eye-tracking webcam to progress, as the game reads and responds to the player's eye movement and blinking.

	CW: Before Your Eyes deals with themes of death, illness and grief

Game name	Stardew Valley
Genre(s)	Social Simulator, Life Simulator, Farming, Co-operative, Pixel Graphics, Role-Playing
Reviewer score	Metacritic: 88 / 100
Time to Beat	Story: 52,5 Hours 100%: 149 Hours
Pricing range (not including sales or resellers)	€[5 – 15],-
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch, Mobile
Brief description	You've inherited your grandfather's old farm plot in Stardew Valley. Armed with hand-me-down tools and a few coins, you set out to begin your new life. Can you learn to live off the land and turn these overgrown fields into a thriving home? It won't be easy. Ever since Joja Corporation came to town, the old ways of life have all but disappeared. The community center, once the town's most vibrant hub of activity, now lies in shambles. But the valley seems full of opportunity. With a little dedication, you might just be the one to restore Stardew Valley to greatness!

	The player assumes the role of a character who inherits their grandfather's dilapidated farm. The game is open-ended, allowing players to take on a variety of activities. These include growing crops, raising livestock, mining, foraging, selling produce, and socializing with the residents of the nearby Pelican Town, including the ability to marry and have children.

Game name	Trackmania
Genre(s)	Racing, Puzzle
Reviewer score	Differs per game; Metacritic averages at 77 / 100
Time to Beat	Story: Not applicable 100%: Not applicable
Pricing range (not including sales or resellers)	€[0 – 30],-
Platform(s)	PC, PlayStation 4, XboxOne
Brief description	TrackMania games typically have a time trial format, with medals awarded for beating set times in single-player mode, as well as the ability to submit times to online rankings. Players may choose to respawn at any time if they land upside down, leave the track or get off to a poor start. Multiplayer races operate as concurrent time trials; players' cars are visible on the same track at the same time, but cannot physically interact with one another. Instead of following the usual trend of choosing a set car and track to play the game, in TrackMania the players can create their own tracks using a "building block" process.

Game name	Undertale
Genre(s)	Role-Playing, Adventure, Fantasy

Reviewer score	Metacritic: 92 / 100
Time to Beat	Story: 6,5 hours 100%: 20,5 hours
Pricing range (not including sales or resellers)	€[10 – 15],-
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch
Brief description	The player controls a child who has fallen into the Underground: a large, secluded region under the surface of the Earth, separated by a magical barrier. The player meets various monsters during the journey back to the surface, although some monsters might engage the player in a fight. The combat system involves the player navigating through mini-bullet hell attacks by the opponent. They can opt to pacify or subdue monsters in order to spare them instead of killing them. These choices affect the game, with the dialogue, characters, and story changing based on outcomes.

Midrange-Pricing Games

Game name	Deep Rock Galactic
Genre(s)	Co-operative, FPS (First-Person Shooter), Sci-Fi, Action
Reviewer score	Metacritic: 85 / 100
Time to Beat	Story: Not applicable 100%: Not applicable One match takes around 15 to 30 minutes
Pricing range (not including sales or resellers)	€30,-
Platform(s)	PC, Playstation, Xbox
Brief description	Deep Rock Galactic is a 1-4 player cooperative first-person shooter video game in which players work together while exploring destructible procedurally generated cave systems. The game focuses on PvE combat, meaning there is no benefit to killing other players. Players take on the roles of four space dwarves assigned to various missions, which include many objectives such as mining specific minerals, stealing alien eggs, eliminating targets, or retrieving lost equipment. These are usually the main objective, required to complete the mission. It is also possible to complete a secondary objective (usually collecting other materials or items) to receive extra credits (which are used to improve

	the player's weapons and abilities of the classes) and experience points (which increase a player's level). The game takes place underground on Hoxxes IV, a dangerous planet full of minerals, biomes, and bugs. Missions take place in large caverns and tunnels, with varying terrain generation, objectives and enemies depending on the biome and mission type. Players fight insect-like aliens as they attempt to complete the mission objectives and collect materials for crafting.

Game name	Life is Strange
Genre(s)	Third-Person, Graphic Adventure
Reviewer score	Metacritic: 85 / 100
Time to Beat	Story: 14 Hours 100%: 18,5 Hours
Pricing range (not including sales or resellers)	€[0 - 20],-
Platform(s)	PC, PlayStation, Xbox, Mobile
Brief description	Life Is Strange is an episodic graphic adventure video game which follows Max Caulfield, an 18-year-old photography student who discovers that she has the ability to rewind time at any moment, leading her every choice to enact the butterfly effect. The player's actions will adjust the narrative

	as it unfolds, and reshape it once allowed to travel back in time. Fetch quests and making environmental changes represent the forms of puzzle solving in addition to using branching choices for conversation.

Game name	Minecraft
Genre(s)	Sandbox, Survival
Reviewer score	Metacritic: 93 / 100
Time to Beat	Story: 90 Hours 100%: 344 Hours
Pricing range (not including sales or resellers)	€[5 – 30],-
Platform(s)	PC, Mobile, Xbox, PlayStation, Nintendo Switch
Brief description	In Minecraft, players explore a blocky, procedurally generated 3D world with virtually infinite terrain, and may discover and extract raw materials, craft tools and items, and build structures, earthworks and simple machines. Depending on game mode, players can fight computer-controlled enemies, as well as cooperate with or compete against other players in the same world. Game modes include a survival mode, in which players must acquire resources to build the world and maintain health, and a creative mode, where players have unlimited resources and access to flight. Players can modify the game to create new gameplay mechanics, items, and assets.

Game name	The Sims
Genre(s)	Life Simulation, Social Simulation
Reviewer score	Metacritic: 70 / 100

Time to Beat	Story: Not applicable
	100%: Not applicable
Pricing range (not including sales or resellers)	€[0 – 40],-
	Dependant on version
Platform(s)	PC, Xbox, PlayStation, Mobile
Brief description	The games in the Sims series are largely sandbox games, in that they lack any defined goals (except for some later expansion packs and console versions which introduced this gameplay style). The player creates virtual people called "Sims," places them in houses, and helps direct their moods and satisfy their desires. Players can either place their Sims in pre-constructed homes or build them themselves. Each successive expansion pack and game in the series augmented what the player could do with their Sims.

High-end pricing Games

Game name	Crusader Kings 3
Genre(s)	Strategy, Tactics, Medieval, Role-Playing
Reviewer score	Metacritic: 91 / 100
Time to Beat	Story: 91 Hours 100%: 593 Hours
Pricing range (not including sales or resellers)	€50,-
Platform(s)	PC
Brief description	Love, fight, scheme, and claim greatness. Determine your noble house's legacy in the sprawling grand strategy of Crusader Kings III. Death is only the beginning as you guide your dynasty's bloodline in the rich and larger-than-life simulation of the Middle Ages.

Game name	The Elder Scrolls V: Skyrim
Genre(s)	Action, Role Playing Game, Open World, Fantasy
Reviewer score	Metacritic: 94 / 100
Time to Beat	Story: 34 Hours 100%: 231 Hours
Pricing range (not including	€[40 – 55],-

sales or resellers)	
Platform(s)	PC, PlayStation, Xbox, Nintendo Switch
Brief description	The Empire of Tamriel is on the edge. The High King of Skyrim has been murdered. Alliances form as claims to the throne are made. In the midst of this conflict, a far more dangerous, ancient evil is awakened. Dragons, long lost to the passages of the Elder Scrolls, have returned to Tamriel. The future of Skyrim, even the Empire itself, hangs in the balance as they wait for the prophesized Dragonborn to come; a hero born with the power of The Voice, and the only one who can stand amongst the dragons. The player may freely roam over the land of Skyrim—an open world environment consisting of wilderness expanses, dungeons, caves, cities, towns, fortresses, and villages.

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Game name	Hitman 2
Genre(s)	Third-Person, Action, Stealth, Puzzle
Reviewer score	Metacritic: 82 / 100
Time to Beat	Story: 10 Hours 100%: 123 Hours
Pricing range (not including sales or resellers)	€[60 – 70],-
Platform(s)	PC, PlayStation 4, Xbox One, Stadia
Brief description	The game's story continues the plot arc started in Hitman and follows genetically engineered assassin Agent 47, who is searching for the mysterious "Shadow Client" and his allies, who are trying to destroy Providence, a secretive organization that controls the world's affairs. Like the previous game in the series, Hitman 2, players can freely explore six large sandbox locations. The game also has online multiplayer modes called Sniper Assassin and Ghost mode, though the internet servers for these were shut down in August 2020. Players use variety of firearms and gadgets to eliminate their targets, and can use stealth tactics because Agent 47 is fragile in combat. The bodies of dead targets must be hidden to avoid detection. Alternatively, players can explore each location and eavesdrop on conversations to discover "missions stories", which are scripted mission sequences that help Agent

	47 identify the location and routine of targets, and uncover unconventional infiltrations or opportunities to kill. Kills can be disguised as accidental deaths. Access to some areas of the game is restricted; players must gain access by obtaining a disguise either by incapacitating non-playable characters (NPCs) or by finding it somewhere in the map.

Game name	Red Dead Redemption 2
Genre(s)	Action-Adventure, Open World, Shooter, Western, Crime
Reviewer score	Metacritic: 97 / 100
Time to Beat	Story: 49 Hours 100%: 172 Hours
Pricing range (not including sales or resellers)	€60,-
Platform(s)	PC, PlayStation 4, Xbox One, Stadia
Brief description	The story is set in 1899 and follows the exploits of outlaw Arthur Morgan, a member of the Van der Linde gang, in a fictionalized representation of the Western, Midwestern, and Southern United States. Arthur must deal with the decline of the Wild West whilst attempting to survive against government forces, rival gangs, and other adversaries. The game is presented through both first and third-person perspectives, and the player may freely roam in its interactive open world. Gameplay

	elements include shootouts, heists, hunting, horseback riding, interacting with non-player characters, and maintaining the character's honor rating through moral choices and deeds. A bounty system governs the response of law enforcement and bounty hunters to crimes committed by the player.

Appendix 2: Diary study backup list

Diary Study Game Selection

Contents

The elements of game design and gaming associated with mental well-being; A Qualitative Perspective

Free Games

Game name	Apex Legends
Genre(s)	FPS (First-Person Shooter), Battle Royale
Reviewer score	Metacritic: 88 / 100
Time to Beat	Story: Not applicable 100%: Not applicable Time per match: up until around 30 minutes.
Pricing range (not including sales or resellers)	Free
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch, Mobile
Brief description	Before the match, players form into two- or three-player squads, and select from pre-designed characters with distinctive abilities, known as "Legends". The game has two gameplay modes. In "Battle Royale", up to 20 three-person squads or 30 two-person duos land on an island and search for weapons and supplies before attempting to defeat all other players in combat. The available play area on the island shrinks over time, forcing players to keep moving or else find themselves outside the play area which can be fatal. The final team alive wins the round. In "Arenas", players form into three-player squads and fight against another squad in a 3v3 team deathmatch over a series of rounds to determine the winner of the match. Teams win when their team has at least 3 points and is 2 points ahead.

Game name	Counter Strike: Global Offensive
Genre(s)	FPS (First-person Shooter), Competitive
Reviewer score	Metacritic: 83 / 100
Time to Beat	Story: Not applicable 100%: Not applicable One match takes around 20 to 40 minutes
Pricing range (not including sales or resellers)	Free
Platform(s)	PC
Brief description	The game pits two teams, Terrorists and Counter-Terrorists, against each other in different objective-based game modes. The most common game modes involve the Terrorists planting a bomb while Counter-Terrorists attempt to stop them, or Counter-Terrorists attempting to rescue hostages that the Terrorists have captured. There are nine official game modes, all of which have distinct characteristics specific to that mode.

Game name	Destiny 2
Genre(s)	FPS (First Person Shooter), Role-Playing, Co-operative Multiplayer
Reviewer score	Metacritic: 85 / 100
Time to Beat	Story: 12 Hours 100%: 133 Hours
Pricing range (not including sales or resellers)	Free
Platform(s)	PC, PlayStation 4, Xbox One, Stadia
Brief description	Humanity's last safe city has fallen to an overwhelming invasion force, led by Ghaul, the imposing commander of the brutal Red Legion. He has stripped the city's Guardians of their power, and forced the survivors to flee. You will venture to mysterious, unexplored worlds of our solar system to discover an arsenal of weapons and devastating new combat abilities. To defeat the Red Legion and confront Ghaul, you must reunite humanity's scattered heroes, stand together, and fight back to reclaim our home.

Game name	Hearthstone
Genre(s)	Card game, Strategy
Reviewer score	Metacritic: 90 / 100
Time to Beat	Story: Not applicable 100%: Not applicable

Pricing range (not including sales or resellers)	Free
Platform(s)	PC, Mobile
Brief description	The game is a turn-based card game between two opponents, using constructed decks of 30 cards along with a selected hero with a unique power. Players use their limited mana crystals to play abilities or summon minions to attack the opponent, with the goal of destroying the opponent's hero. Winning matches and completing quests earn in-game gold, rewards in the form of new cards, and other in-game prizes. Players can then buy packs of new cards through gold or microtransactions to customize and improve their decks. The game features several modes of play, including casual and ranked matches, drafted arena battles, and single-player adventures. New content for the game involves the addition of new card sets and gameplay, taking the form of either expansion packs or adventures that reward the player with collectible cards upon completion.

Game name	Heroes of the Storm
Genre(s)	MOBA (Multiplayer Online Battle Arena), Competitive
Reviewer score	Metacritic: 86 / 100
Time to Beat	Story: Not applicable 100%: Not applicable One match takes around 20 minutes.
Pricing range (not including sales or resellers)	Free
Platform(s)	PC
Brief description	Players form into five-player teams and fight against another team in 5-versus-5 matches, with an average game duration of roughly 20 minutes. The first team to destroy opponents' main structure, known as the "King's Core", wins the match. Each themed battleground has a different metagame and secondary objectives to secure, whose completion gives your team massive advantages, typically through pushing power. Every player controls a single character, known as a "hero", with a set of distinctive abilities and differing styles of play. Heroes become more powerful over the course of a match by collecting experience points and unlocking "talents" that offer new abilities or augment existing ones, contributing to the team's overall strategy.

Game name	League of Legends

Genre(s)	MOBA (Multiplayer Online Battle Arena), Action Role-Playing, Competitive, Fantasy
Reviewer score	Metacritic: 78 / 100
Time to Beat	Story: Not applicable 100%: Not applicable One match takes around 20 to 40 minutes
Pricing range (not including sales or resellers)	Free
Platform(s)	PC
Brief description	In the game, two teams of five players battle in player versus player combat, each team occupying and defending their half of the map. Each of the ten players controls a character, known as a "champion", with unique abilities and differing styles of play. During a match, champions become more powerful by collecting experience points, earning gold, and purchasing items to defeat the opposing team. In the game's main mode, Summoner's Rift, a team wins by pushing through to the enemy base and destroying their "Nexus", a large structure located within.

Game name	Osu!
Genre(s)	Music, Rhythm
Reviewer score	Metacritic: Not applicable
Time to Beat	Story: Not applicable 100%: Not applicable
Pricing range (not including sales or resellers)	Free
Platform(s)	PC
Brief description	osu! gameplay is based on a variety of popular commercial rhythm games. While keeping some authentic elements, osu! adds huge customisation via skins/beatmaps/storyboarding, online rankings, multiplayer and boasts a community with over 500,000 active users! Play the way you want to play, with your own music, and share your creations with others. The game contains multiple modes to play. Each mode offers a variety of beatmaps, playable songs ranging from "TV sized" anime openings to "marathons" surpassing 7 minutes. In osu!standard, beatmaps consist of three items – hit circles, sliders, and spinners. These items are collectively known as "hit objects" or "Circles" and are arranged in different positions on the screen at different points of time during a song. Taiko beatmaps have drumbeats and spinners. Catch beatmaps have fruits and spinners, which are arranged in a horizontally falling manner. Mania beatmaps

	consist of keys (depicted as a small bar) and holds. The beatmap is then played with accompanying music, simulating a sense of rhythm as the player interacts with the objects to the beat of the music. Each beatmap is accompanied by music and a background. The game can be played using various peripherals: the most common setup is a graphics tablet or computer mouse to control cursor movement, paired with a keyboard or a mini keyboard with only two keys.

Game name	Rocket League
Genre(s)	Racing, Sports, Competitive Multiplayer
Reviewer score	Metacritic: 86 / 100
Time to Beat	Story: Not applicable 100%: Not applicable
Pricing range (not including sales or resellers)	Free
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch
Brief description	Described as "soccer, but with rocket-powered cars", Rocket League has up to eight players assigned to each of the two teams, using rocket-powered vehicles to hit a ball into their opponent's goal and score points over the course of a match. The game includes single-player and multiplayer modes that can be played both locally and online, including cross-platform play between all versions. Later updates for the game enabled the ability to modify core rules and added new game modes, including ones based on ice hockey and basketball.

Game name	Warframe
Genre(s)	Third-Person, Shooter, Action, Co-operative
Reviewer score	Metacritic: 72 / 100
Time to Beat	Story: Not applicable 100%: Not applicable

Pricing range (not including sales or resellers)	Free
Platform(s)	PC, PlayStation, Xbox, Nintendo Switch
Brief description	Warframe is a cooperative free-to-play third person online action game set in an evolving sci-fi world. Join your friends in player-vs-enemy raids across the solar system and master the power of the Warframes. Stand alone or fight together against enemies that threaten your world. In Warframe, players control members of the Tenno, a race of ancient warriors who have awoken from centuries of suspended animation far into Earth's future to find themselves at war in the planetary system with different factions. The Tenno use their powered Warframes along with a variety of weapons and abilities to complete missions.

Cheap games

Game name	Before your eyes
Genre(s)	First-Person, Adventure
Reviewer score	Metacritic: 77 / 100
Time to Beat	Story: 1,5 hours 100%: 3 Hours
Pricing range (not including sales or resellers)	€9,-
Platform(s)	PC
Brief description	Embark on an emotional first-person narrative adventure where you control the story—and affect its outcomes—with your real-life blinks. With this innovative technique you will fully immerse yourself in a world of memories, both joyous and heartbreaking, as your whole life flashes before your eyes. The game follows the story of the recently deceased Benjamin Brynn on his way to the afterlife. The player must interact with Brynn's memories through an eye-tracking webcam to progress, as the game reads and responds to the player's eye movement and blinking. CW: Before Your Eyes deals with themes of death, illness and grief

The elements of game design and gaming associated with mental well-being; A Qualitative Perspective

Game name	Stardew Valley
Genre(s)	Social Simulator, Life Simulator, Farming, Co-operative, Pixel Graphics, Role-Playing
Reviewer score	Metacritic: 88 / 100
Time to Beat	Story: 52,5 Hours 100%: 149 Hours
Pricing range (not including sales or resellers)	€[5 – 15],-
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch, Mobile
Brief description	You've inherited your grandfather's old farm plot in Stardew Valley. Armed with hand-me-down tools and a few coins, you set out to begin your new life. Can you learn to live off the land and turn these overgrown fields into a thriving home? It won't be easy. Ever since Joja Corporation came to town, the old ways of life have all but disappeared. The community center, once the town's most vibrant hub of activity, now lies in shambles. But the valley seems full of opportunity. With a little dedication, you might just be the one to restore Stardew Valley to greatness! The player assumes the role of a character who inherits their grandfather's dilapidated farm. The game is open-ended, allowing players to take on a variety of activities. These include growing crops, raising

	livestock, mining, foraging, selling produce, and socializing with the residents of the nearby Pelican Town, including the ability to marry and have children.

Game name	Terraria
Genre(s)	Action, Adventure, Survival, Open World, Sandbox
Reviewer score	Metacritic: 82 / 100
Time to Beat	Story: 50 Hours 100%: 194 Hours
Pricing range (not including sales or resellers)	€10,-
Platform(s)	PC, Playstation, Xbox, Mobile, Stadia, Nintendo
Brief description	Terraria is a 2D sandbox game with gameplay that revolves around exploration, building, crafting, combat, survival, and mining, playable in both single-player and multiplayer modes. Dig, fight, explore, build! Nothing is impossible in this action-packed adventure game. The world is your canvas and the ground itself is your paint.Grab your tools and go! Make weapons to fight off a variety of enemies in numerous biomes. Dig deep underground to find accessories, money, and other useful things. Gather resources to create everything you need to make the world your own. Build a house, a fort, or even a castle. People will move in to live there and perhaps even sell you different wares to assist you on your journey.But beware, there are even more challenges awaiting you... Are you up to the task?

Game name	Trackmania

Genre(s)	Racing, Puzzle
Reviewer score	Differs per game; Metacritic averages at 77 / 100
Time to Beat	Story: Not applicable 100%: Not applicable
Pricing range (not including sales or resellers)	€[0 – 30],-
Platform(s)	PC, PlayStation 4, XboxOne
Brief description	TrackMania games typically have a time trial format, with medals awarded for beating set times in single-player mode, as well as the ability to submit times to online rankings. Players may choose to respawn at any time if they land upside down, leave the track or get off to a poor start. Multiplayer races operate as concurrent time trials; players' cars are visible on the same track at the same time, but cannot physically interact with one another. Instead of following the usual trend of choosing a set car and track to play the game, in TrackMania the players can create their own tracks using a "building block" process.

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Game name	The Walking Dead
Genre(s)	Point-and-Click, Graphic Adventure, Horror, Interactive Drama
Reviewer score	Metacritic: 91 / 100
Time to Beat	Story: 12,5 Hours 100%: 14,5 Hours
Pricing range (not including sales or resellers)	€15,-
Platform(s)	PC, PlayStation, Xbox, Mobile, Nintendo
Brief description	The Walking Dead is a five-part game series set in the same universe as Robert Kirkman's award-winning comic book series. Play as Lee Everett, a convicted criminal, who has been given a second chance at life in a world devastated by the undead. With corpses returning to life and survivors stopping at nothing to maintain their own safety, protecting an orphaned girl named Clementine may offer him redemption in a world gone to hell.

Game name	Undertale
Genre(s)	Role-Playing, Adventure, Fantasy
Reviewer score	Metacritic: 92 / 100
Time to Beat	Story: 6,5 hours 100%: 20,5 hours
Pricing range (not including	€[10 – 15],-

sales or resellers)	
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch
Brief description	The player controls a child who has fallen into the Underground: a large, secluded region under the surface of the Earth, separated by a magical barrier. The player meets various monsters during the journey back to the surface, although some monsters might engage the player in a fight. The combat system involves the player navigating through mini-bullet hell attacks by the opponent. They can opt to pacify or subdue monsters in order to spare them instead of killing them. These choices affect the game, with the dialogue, characters, and story changing based on outcomes.

Midrange pricing games

Game name	Ace Attorney
Genre(s)	Adventure, Visual Novel
Reviewer score	Differs per game
Time to Beat	Differs per game
Pricing range (not including sales or resellers)	Differs per game €[30 – 40],- for the most recent ones
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo, Mobile
Brief description	The player takes the roles of various defense attorneys, including Phoenix Wright, his mentor Mia Fey, and his understudies Apollo Justice and Athena Cykes, and investigates cases and defends their clients in court; they find the truth by cross-examining witnesses and finding inconsistencies between the testimonies and the evidence they have collected. The cases all last a maximum of three days, with the judge determining the outcome based on evidence presented by the defense attorney and the prosecut

Game name	Cities: Skylines
Genre(s)	Top-down, City Building
Reviewer score	Metacritic: 82 /100
Time to Beat	Story: Not applicable 100%: Not applicable

Pricing range (not including sales or resellers)	€[28 – 40],-
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch
Brief description	Cities: Skylines is a modern take on the classic city simulation. The game introduces new game play elements to realize the thrill and hardships of creating and maintaining a real city whilst expanding on some well-established tropes of the city building experience.

Game name	Dark Souls
Genre(s)	Action Adventure, Role-playing
Reviewer score	Metacritic: 88 / 100
Time to Beat	Story: 42,5 Hours 100%: 105 Hours
Pricing range (not including sales or resellers)	€40,-
Platform(s)	PC, PlayStation, Xbox
Brief description	Live Through A Million Deaths & Earn Your Legacy. Enter a dark world filled with despair and threaded by hope where your ability to creatively strategize, learn and overcome unpredictable and unique challenges determines your fate. Dark Souls will demand your absolute

	concentration, unflinchingly punish your mistakes, but reward your ability to learn from death. Each challenge is a mind game met with endless combinations that will test your ability to creatively strategize a way to conquer unimaginable monsters and progress deeper into this bleak and forbidding environment filled with the un-dead.
Game name	Deep Rock Galactic
Genre(s)	Co-operative, FPS (First-Person Shooter), Sci-Fi, Action
Reviewer score	Metacritic: 85 / 100
Time to Beat	Story: Not applicable 100%: Not applicable One match takes around 15 to 30 minutes
Pricing range (not including sales or resellers)	€30,-
Platform(s)	PC, Playstation, Xbox
Brief description	Deep Rock Galactic is a 1-4 player cooperative first-person shooter video game in which players work together while exploring destructible procedurally generated cave systems. The game focuses on PvE combat, meaning there is no benefit to killing other players. Players take on the roles of four space dwarves assigned to various missions, which include many objectives such as mining specific minerals, stealing alien eggs, eliminating targets, or retrieving lost equipment.

	These are usually the main objective, required to complete the mission. It is also possible to complete a secondary objective (usually collecting other materials or items) to receive extra credits (which are used to improve the player's weapons and abilities of the classes) and experience points (which increase a player's level). The game takes place underground on Hoxxes IV, a dangerous planet full of minerals, biomes, and bugs. Missions take place in large caverns and tunnels, with varying terrain generation, objectives and enemies depending on the biome and mission type. Players fight insect-like aliens as they attempt to complete the mission objectives and collect materials for crafting.

Game name	Euro Truck Simulator 2
Genre(s)	Driving, Vehicle Simulator
Reviewer score	Metacritic: 79 / 100
Time to Beat	Story: 43,5 Hours 100%: 334 Hours
Pricing range (not including sales or resellers)	€20,-
Platform(s)	PC

Brief description	Travel across Europe as king of the road, a trucker who delivers important cargo across impressive distances! With dozens of cities to explore from the UK, Belgium, Germany, Italy, the Netherlands, Poland, and many more, your endurance, skill and speed will all be pushed to their limits. If you've got what it takes to be part of an elite trucking force, get behind the wheel and prove it! The basic premise of the game is that the player can drive one of a choice of articulated trucks across a condensed depiction of Europe, picking up cargo from various locations and delivering it. As the game progresses, it is possible for the player to buy more vehicles and depots, as well as hire other drivers to work for them. The game has a never-ending play style.
Game name	Factorio
Genre(s)	Action, Adventure, Base-Building, Sandbox, Strategy, Tower Defense
Reviewer score	Metacritic: 90 / 100
Time to Beat	Story: 45,5 Hours 100%: 213 Hours
Pricing range (not including sales or resellers)	€25,-
Platform(s)	PC
Brief description	The game follows an engineer who crash-lands on an alien planet and must harvest resources and create industry through expanding their automated factories to build a rocket; however, as a sandbox game,

	players can continue the game past the end of the storyline. The game features both single-player and multiplayer modes.

Game name	Grand Theft Auto V
Genre(s)	Action-Adventure, Open World, Shooter, Racing, Crime
Reviewer score	Metacritic: 97 / 100
Time to Beat	Story: 32 Hours 100%: 83 Hours
Pricing range (not including sales or resellers)	€30,-
Platform(s)	PC, PlayStation, Xbox
Brief description	The game is played from either a third-person or first-person perspective, and its world is navigated on foot and by vehicle. Players control the three lead protagonists throughout single-player and switch among them, both during and outside missions. The story is centred on the heist sequences, and many missions involve shooting and driving gameplay. A "wanted" system governs the aggression of law enforcement response to players who commit crimes. Grand Theft Auto Online, the game's online multiplayer mode, lets up to 30 players engage in a variety of different cooperative and competitive game modes.

Game name	A Hat in Time
Genre(s)	Platform, Action-Adventure
Reviewer score	Metacritic: 79 / 100
Time to Beat	Story: 9 hours 100%: 16,5 hours
Pricing range (not including sales or resellers)	€30,-
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch
Brief description	In A Hat in Time you play as a tiny space-travelling girl with a big tophat. Her adventure is halted when all her fuel, the Time Pieces, is lost and scattered across a nearby planet. Hat Kid must now jump, fight and stitch new hats to make her way into every nook and cranny of this new world in order to restore her fuel and resume her journey. On her way, she'll bump into the menacing Mafia of Cooks, the goofy birds of Dead Bird Studio, the spooky shadows of Subcon Forest, and more!

Game name	Kingdom Come: Deliverance
Genre(s)	Adventure, Open World, Role-Playing, Medieval
Reviewer score	Metacritic: 71 / 100
Time to Beat	Story: 41 Hours 100%: 127 Hours

Pricing range (not including sales or resellers)	€[30 – 40],-
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch
Brief description	Kingdom Come: Deliverance is a story-driven open-world RPG that immerses you in an epic adventure in the Holy Roman Empire. Avenge your parents' death as you battle invading forces, go on game-changing quests, and make influential choices. Explore majestic castles, deep forests, thriving villages and countless other realistic settings in medieval Bohemia!

Game name	Life is Strange
Genre(s)	Third-Person, Graphic Adventure
Reviewer score	Metacritic: 85 / 100
Time to Beat	Story: 14 Hours 100%: 18,5 Hours
Pricing range (not including sales or resellers)	€[0 - 20],-
Platform(s)	PC, PlayStation, Xbox, Mobile
Brief description	Life Is Strange is an episodic graphic adventure video game which follows Max Caulfield, an 18-year-old photography student who discovers that

	she has the ability to rewind time at any moment, leading her every choice to enact the butterfly effect. The player's actions will adjust the narrative as it unfolds, and reshape it once allowed to travel back in time. Fetch quests and making environmental changes represent the forms of puzzle solving in addition to using branching choices for conversation.

Game name	The Sims
Genre(s)	Life Simulation, Social Simulation
Reviewer score	Metacritic: 70 / 100
Time to Beat	Story: Not applicable 100%: Not applicable
Pricing range (not including sales or resellers)	€[0 – 40],- Dependant on version
Platform(s)	PC, Xbox, PlayStation, Mobile
Brief description	The games in the Sims series are largely sandbox games, in that they lack any defined goals (except for some later expansion packs and console versions which introduced this gameplay style). The player creates virtual people called "Sims," places them in houses, and helps direct their moods and satisfy their desires. Players can either place their Sims in pre-constructed homes or build them themselves. Each successive expansion pack and game in the series augmented what the player could do with their Sims.

Game name	Minecraft
Genre(s)	Sandbox, Survival
Reviewer score	Metacritic: 93 / 100
Time to Beat	Story: 90 Hours 100%: 344 Hours
Pricing range (not including sales or resellers)	€[5 – 30],-
Platform(s)	PC, Mobile, Xbox, PlayStation, Nintendo Switch
Brief description	In Minecraft, players explore a blocky, procedurally generated 3D world with virtually infinite terrain, and may discover and extract raw materials, craft tools and items, and build structures, earthworks and simple machines. Depending on game mode, players can fight computer-controlled enemies, as well as cooperate with or compete against other players in the same world. Game modes include a survival mode, in which players must acquire resources to build the world and maintain health, and a creative mode, where players have unlimited resources and access to flight. Players can modify the game to create new gameplay mechanics, items, and assets.

Game name	Star Wars Battlefront 2
Genre(s)	Shooter, Sci-Fi
Reviewer score	Metacritic: 66 / 100
Time to Beat	Story: 6 hours 100%: 56 hours
Pricing range (not including sales or resellers)	€[20 – 40],-
Platform(s)	PC, PlayStation 4, Xbox One
Brief description	The game features both single-player and multiplayer modes. The single-player campaign of the game is set between the films Return of the Jedi and The Force Awakens, and follows an original character, Iden Versio, the commander of an Imperial special ops squad, who defects to the New Republic after becoming disillusioned with the Galactic Empire's tactics. Most of the story takes place during the final year of the Galactic Civil War, before the Empire's definitive defeat at the Battle of Jakku. Star Wars Battlefront II is a third and first-person shooter, where players can partake in either ground battles, assuming the role of soldiers, or space battles, where players pilot starfighters. The game features both single-player and multiplayer game modes, and three distinct eras from the Star Wars saga: the Clone Wars, with battles taking place between the Galactic Republic and the Confederacy of Independent Systems; the

	Galactic Civil War, where battles between the Rebel Alliance and Galactic Empire take place; and the war between the Resistance and the First Order. Each faction has its own type of soldiers (e.g. clone troopers for the Republic, battle droids for the CIS, and stormtroopers for the Empire and the First Order) and starfighters. While the soldiers differ only in appearance and control identically, the starfighters feature unique abilities, offering a more varied gameplay style.

High-end pricing games

Game name	Animal Crossing
Genre(s)	Social Simulation, Peaceful Life Simulator
Reviewer score	Metacritic average: 83 / 100 Differs per game
Time to Beat	Story: Not applicable 100%: Not applicable
Pricing range (not including sales or resellers)	€[30 – 60],- Differs per game
Platform(s)	Nintendo Systems
Brief description	In the Animal Crossing games, the player assumes the role of a human character who moves into a rural village populated with anthropomorphic animals, and lives there indefinitely. Gameplay is open-ended: players have no defined objectives, but are instead encouraged to spend their time in the village performing any number of activities which include collecting items, planting plants, bug-catching, fishing, and socializing with the village's residents. Animal Crossing games are played in real time, utilizing the video game console's internal clock and calendar. Thus, passage of time in the game world reflects that in reality, as well as the current season and time of day. Some in-game events, such as holidays or the growth of a tree, occur at certain times or require some duration of time to have passed

Game name	Assassin's Creed: Odyssey
Genre(s)	Action-Adventure, Open World, Role Playing
Reviewer score	Metacritic: 85 / 100
Time to Beat	Story: 43 Hours 100%: 139 Hours
Pricing range (not including sales or resellers)	€[16 – 60],-
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch, Stadia
Brief description	The game features a large open world, and adopts many elements from the role-playing genre, putting more emphasis on combat and exploration than stealth. Naval combat from previous titles in the series also plays a prominent role in Odyssey. The game's plot is set in a fictional history of real-world events, and tells a mythological history of the Peloponnesian War between Athens and Sparta from 431 to 422 BC. Players control a male or female mercenary who fights on both sides of the war as they attempt to find their family and eliminate a mysterious organization known as the Cult of Kosmos.

Game name	Call of Duty
Genre(s)	FPS (First-Person Shooter),
Reviewer score	Differs per game
Time to Beat	Differs per installment Average story: 7 Hours Average 100%: 30 Hours
Pricing range (not including sales or resellers)	€[20 – 60],-
Platform(s)	PC, PlayStation, Xbox, Nintendo, Mobile
Brief description	Call of Duty is a first-person shooter video game franchise published by Activision. Starting out in 2003, it first focused on games set in World War II. Over time, the series has seen games set in the midst of the Cold War, futuristic worlds, and outer space.

Game name	Crusader Kings 3
Genre(s)	Strategy, Tactics, Medieval, Role-Playing
Reviewer score	Metacritic: 91 / 100
Time to Beat	Story: 91 Hours 100%: 593 Hours
Pricing range (not including	€50,-

sales or resellers)	
Platform(s)	PC
Brief description	Love, fight, scheme, and claim greatness. Determine your noble house's legacy in the sprawling grand strategy of Crusader Kings III. Death is only the beginning as you guide your dynasty's bloodline in the rich and larger-than-life simulation of the Middle Ages.

Game name	The Elder Scrolls V: Skyrim
Genre(s)	Action, Role Playing Game, Open World, Fantasy
Reviewer score	Metacritic: 94 / 100
Time to Beat	Story: 34 Hours 100%: 231 Hours
Pricing range (not including sales or resellers)	€[40 – 55],-
Platform(s)	PC, PlayStation, Xbox, Nintendo Switch
Brief description	The Empire of Tamriel is on the edge. The High King of Skyrim has been murdered. Alliances form as claims to the throne are made. In the midst of this conflict, a far more dangerous, ancient evil is awakened. Dragons, long lost to the passages of the Elder Scrolls, have returned to Tamriel. The future of Skyrim, even the Empire itself, hangs in the balance as they wait for the prophesized Dragonborn to come; a hero born with the power of The Voice, and the only one who can stand amongst the dragons. The player may freely roam over the land of Skyrim—an open world environment consisting of wilderness expanses, dungeons, caves, cities, towns, fortresses, and villages.

Game name	Hitman 2
Genre(s)	Third-Person, Action, Stealth, Puzzle

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Reviewer score	Metacritic: 82 / 100
Time to Beat	Story: 10 Hours 100%: 123 Hours
Pricing range (not including sales or resellers)	€[60 – 70],-
Platform(s)	PC, PlayStation 4, Xbox One, Stadia
Brief description	The game's story continues the plot arc started in Hitman and follows genetically engineered assassin Agent 47, who is searching for the mysterious "Shadow Client" and his allies, who are trying to destroy Providence, a secretive organization that controls the world's affairs. Like the previous game in the series, Hitman 2, players can freely explore six large sandbox locations. The game also has online multiplayer modes called Sniper Assassin and Ghost mode, though the internet servers for these were shut down in August 2020. Players use variety of firearms and gadgets to eliminate their targets, and can use stealth tactics because Agent 47 is fragile in combat. The bodies of dead targets must be hidden to avoid detection. Alternatively, players can explore each location and eavesdrop on conversations to discover "missions stories", which are scripted mission sequences that help Agent 47 identify the location and routine of targets, and uncover unconventional infiltrations or opportunities to kill. Kills can be disguised as accidental deaths. Access to some areas of the game is restricted;

	players must gain access by obtaining a disguise either by incapacitating non-playable characters (NPCs) or by finding it somewhere in the map.

Game name	The Legend of Zelda: Breath of the Wild
Genre(s)	Open World, Role-Playing, Action-Adventure
Reviewer score	Metacritic: 97 / 100
Time to Beat	Story: 50 Hours 100%: 189 Hours
Pricing range (not including sales or resellers)	€60,-
Platform(s)	Nintendo Switch, Nintendo Wii U
Brief description	The player controls Link, who awakens from a hundred-year slumber to defeat Calamity Ganon and restore the kingdom of Hyrule. Similar to the original 1986 The Legend of Zelda game, players are given little instruction and can explore the world freely. Tasks include collecting various items and gear to aid in objectives such as puzzle-solving or side quests. The world is unstructured and designed to encourage exploration and experimentation, and the main story quest can be completed in a nonlinear fashion.

Game name	Mario Kart

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Genre(s)	Racing
Reviewer score	Differs per game
Time to Beat	Differs per game
Pricing range (not including sales or resellers)	Differs per game, up to €60,-
Platform(s)	Nintendo devices, Mobile
Brief description	In the Mario Kart series, players compete in go-kart races, controlling one of a selection of characters, mainly from the Mario franchise. Up to sixteen characters can compete in each race (the exact number varies between games). Gameplay is enhanced by power-up items obtained by driving into item boxes laid out on the course. These power-ups include Mushrooms to give players a speed boost, Shells to be thrown at opponents, Banana peels, and Fake Item Boxes as hazards. The game chooses an item based on the player's current position in the race. For example, players lagging far behind may receive more powerful items, such as Bullet Bills which give the player a bigger speed boost depending on the place of the player, while the leader may only receive small defensive items, such as Shells or Bananas. Called rubber banding, this gameplay mechanism allows other racers a realistic chance to catch up to the leading racer. They can perform

	driving techniques during the race such as rocket starts, slipstreaming, drifting, and mini-turbos. Each new game has introduced new gameplay elements, such as new circuits, items, modes, and playable characters.

Game name	Overwatch
Genre(s)	First-Person, Action, Shooter, MOBA (Multiplayer Online Battle Arena), Competitive
Reviewer score	Metacritic: 91 / 100
Time to Beat	Story: Not applicable 100%: Not applicable One match takes around 15 to 25 minutes
Pricing range (not including sales or resellers)	€[20 – 60],-
Platform(s)	PC, PlayStation 4, Xbox One, Nintendo Switch
Brief description	Clash on the battlefields of tomorrow and choose your hero from a diverse cast of soldiers, scientists, adventurers, and oddities. Bend time, defy physics, and unleash an array of extraordinary powers and weapons. Engage your enemies in iconic locations from around the globe in the ultimate team-based shooter. Take your place in Overwatch. The world needs heroes. Described as a "hero shooter", Overwatch assigns players into two teams of six, with each player selecting from a large roster of characters, known as "heroes", with unique abilities. Teams work to complete map-specific objectives within a limited period of time.

Game name	Red Dead Redemption 2
Genre(s)	Action-Adventure, Open World, Shooter, Western, Crime
Reviewer score	Metacritic: 97 / 100
Time to Beat	Story: 49 Hours 100%: 172 Hours
Pricing range (not including sales or resellers)	€60,-
Platform(s)	PC, PlayStation 4, Xbox One, Stadia
Brief description	The story is set in 1899 and follows the exploits of outlaw Arthur Morgan, a member of the Van der Linde gang, in a fictionalized representation of the Western, Midwestern, and Southern United States. Arthur must deal with the decline of the Wild West whilst attempting to survive against government forces, rival gangs, and other adversaries. The game is presented through both first and third-person perspectives, and the player may freely roam in its interactive open world. Gameplay elements include shootouts, heists, hunting, horseback riding, interacting with non-player characters, and maintaining the character's honor rating through moral choices and deeds. A bounty system governs the response of law enforcement and bounty hunters to crimes committed by the player.

Appendix 3: Informed consent Diary Study

Informed consent form

The purpose of this study is to identify possible aspects within different Video games that have an impact on mental well-being, both negative and positive, and find explanations for why this is.

This part of the research tries to get results through the conductance of a diary study. When participating in this study, a list with a number of Video games will be provided to you, from which you are expected to select one that you are willing to play (You are not allowed to pick a video game that you have played before). After successfully having picked a game, a period of 7 to 12 days will start where you are asked to play this game for the desired minimum of 30 minutes per day, shorter if you finished beforehand, or longer if you choose to take a break for a few days. On top of these play sessions, it is important to think critically about how this game and your play sessions impact your mental well-being. You are given a diary that you are expected to fill out with these thoughts, feelings and other possible statements that you feel are appropriate and related to your mental well-being. There are no wrong answers to be filled in and you are not tested on in-game performance.

After the diary study period has finished, you are asked to come in for a 1-on-1 interview with the researcher in order to go over your experience with the game, to possibly identify more interesting aspects of the game that you played, this part will be audio recorded for the purpose of a more efficient and thorough transcription and analysis.

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The benefits and risks of participating in this study that has been reviewed and approved by the BMS

Ethics committee are dependent on the Video Game that you select. For clarity, all risks associated with

a specific video game are communicated to you before the selection procedure begins, so you can make

an informed decision. Benefits to participating in this study is that you potentially find a game you want

to keep playing in your free time after the study has concluded.

You are allowed to withdraw from the study at any point, without the requirement for you to give a

reason. Should this happen, you are expected to inform the researcher of your decision to do so via

mail, text or in person. Any information that you have noted down in your respective diary entries are

still allowed to hand in to the researcher, but not required.

Any personal information about you as a participant that is collected will be anonymised before being

analysed. After being anonymised, the original data with personal information and identifiers will be

erased. Only the researcher will see the collected personal data before anonymising it. Quotes that you

have given in either the interview or in the diary entries can potentially be used in the final report in an

anonymous manner.

The data will be stored for possible future research and can be requested for the purpose of research

and or simple interest. This data will not contain any personal identifiers and is anonymised so that it

cannot be traced back to any one participant. The data will be retained for three (3) years.

Consent Form for The Emotional Effect of Video games on mental well-being; a

qualitative perspective.

YOU WILL BE GIVEN A COPY OF THIS INFORMED CONSENT FORM

Please tick the appropriate boxes	Yes	No
Taking part in the study		
I have read and understood the study information dated 4-december-2021, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	O	O
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	O	O
I understand that taking part in the study involves playing a video game that I have selected, for a requested minimum of 30 minutes per day, over the course of one (1) week. Next to this, thoughts, opinions and feelings about the play sessions are to be recorded by me in a diary that will be provided to me. I am also aware that the study ends with a 1-on-1 interview with the researcher.	O	O
Use of the information in the study		
I understand that information I provide will be used for the completion of a master thesis and possible advancements in the social sciences surrounding the effects of Video games.	O	O

.

I understand that personal information collected about me that can identify me, such as my name, will not be shared beyond the study team. ○ ○

I agree that my anonymized information can be quoted in research outputs. ○ ○

I agree to joint copyright of the video game play diary data to researcher Chiel Kienhuis. ○ ○

At the end of the study, a 1-on-1 interview will be conducted with the researcher.

I agree to be audio recorded during this interview. ○ ○

Future use and reuse of the information by others

I give permission for the anonymised transcripts that I provide to be archived in the personal Google Drive of the researcher´s University account so it can be used for future research and learning. ○ ○

○ ○

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I give permission for the anonymised diary entries that I provide to be archived in the personal

Google Drive of the researcher´s University account so it can be used for future research and

learning.

Signatures

_____   _____ _____

Name of participant [printed]

                                   Signature   Date

I have accurately read out the information sheet to the potential participant and, to the best

of my ability, ensured that the participant understands to what they are freely consenting.

Chiel Kienhuis   _____   _____

Researcher name   Signature   Date

Study contact details for further information:

Chiel Kienhuis; c.kienhuis@student.utwente.nl

Contact Information for Questions about Your Rights as a Research Participant

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If you have questions about your rights as a research participant, or wish to obtain

information, ask questions, or discuss any concerns about this study with someone other than

the researcher(s), please contact the Secretary of the Ethics Committee of the Faculty of

Behavioural, Management and Social Sciences at the University of Twente by

ethicscommittee-bms@utwente.nl

Appendix 4: Play Diary Template

Thank you for participating in my study about the Impact of Video Games on Mental well-being. This introduction can serve as a

way to remind you of what is expected of you for the duration of this study.

Over the course of around one week, you will be playing a game that you have selected from the list that we went over during

our introductory meeting. You are asked to play for a total of 7 sessions during this participation period for an estimated minimum

of around 30 minutes per session, once per day. Should you have the time and motivation to play for longer, you are more than

welcome to do so. You are allowed to take breaks, so taking a little bit longer than 7 days is not a problem.

After this introduction, you will find a number of pages with empty fields to be filled in by you during and/or after a play session. I

am asking you to write down your experience with the game as honestly as possible. You can come across parts of the game

that you liked or disliked, were confused or enlightened by, or that horrified or relaxed you. The more you write down about your

experience with a play session, the better it is for the study and the more feedback I get to work with. If you thought about the

game while you weren't playing, and this made you feel a certain way, this is also relevant! If you are running out of space to

write down your thoughts, feel free to add more pages!

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This study is looking for answers as to why certain parts of video games have positive and/or negative effects on

mental well-being – it would therefore be helpful if your diary contains your thoughts related to your mental well-being.

If you don't know what this means, see the short explanation on the next page!

As you are progressing throughout the week and the respective play sessions with diary entries, it is understandable that you

can run out of inspiration for writing diary entries. If this happens, you can consult the writing suggestions below to maybe help

you out with knowing what to write about.

No.	WRITING SUGGESTIONS

1. What did you think about before starting to play the game today?

2. Is there something from the last play session(s) that stuck with you? Why?

3. What emotions and/or feelings did you have during today's play session? Why?

4. Did something in today's play session stand out to you? Why?

5. Did you encounter something during the play session that made you reflect on something in your daily life? What was it and why did it make you reflect?

6. What was your favorite moment in today's play session? Why?

7. What was your most disliked moment of today's play session? Why?

8. Did today's play session affect your mental-wellbeing in any way? How and why?

9. Is there anything else that came to mind during today's play session?

Mental well-being description

Mental wellbeing is how we respond to life's ups and downs. In this simple mental wellbeing definition

lies deeper meaning and implication for our lives. It includes how a person thinks, handles emotion

(emotional wellness), and acts.

This important part of who we are has multiple meanings. These traits—which are all actually skills we

can practice and develop—are all part of mental wellbeing:

- Self-acceptance

- Sense of self as part of something greater

- Sense of self as independent rather than dependent on others for identity or happiness

- Knowing and using our unique character strengths

- Accurate perception of reality, knowing that we can't mind-read and that our thoughts aren't always

  true

- Desire for continued growth

- Thriving in the face of adversity (emotional resilience)

- Having and pursuing interests

- Knowing and remaining true to values

- Maintaining emotionally healthy relationships

- Optimism (hope—the mindset that things can improve)

- Happiness that comes from within rather than being dependent on external conditions

- Determination

- Action (in contrast to a passive mindset and lifestyle, waiting for things to get better)

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People who develop and experience wellbeing also have what psychological researcher, Angela Duckworth, calls grit. Grit is composed of passions and perseverance and means showing up for life. It's a never-give-up attitude. Grit doesn't mean never failing, for failure is part of success and life itself. Grit means getting back up when you fall.

Together, all of this defines mental wellbeing. It's purposely moving ever forward with determination and direction.

Retrieved from: https://www.healthyplace.com/self-help/self-help-information/what-mental-wellbeing-definition-and-examples

It might happen that you do not want to continue with this study for whatever reason. As stated in your informed consent, this is allowed and you do not have to explain yourself if you do not want to. It is requested of you however to notify the researcher that you are withdrawing from the study. You can do so by either mailing me at c.kienhuis@student.utwente.nl or by sending me a message on whatsapp +31615498570. Should you withdraw during the study and still want to help out, you can still submit any feedback you have written down so far by sending it to the aforementioned e-mail.

Video game play diary

Participant no.:   #

Video Game name: Game Name

Participation start date: [DD/MM/YYYY]

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Participation end date: [DD/MM/YYYY]

Participation end date: [DD/MM/YYYY]

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Session 1

For inspiration refer to the writing suggestions

Date of play session: [DD/MM/YYYY]

Duration of play session: [hours:minutes]

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Please note how you experienced today's play session as thoroughly as possible.

Try to relate your written experiences to mental well-being

Session 2

For inspiration refer to the writing suggestions

Date of play session: [DD/MM/YYYY]

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Duration of play session: [hours:minutes]

Please note how you experienced today's play session as thoroughly as possible.

Try to relate your written experiences to mental well-being

Session 3

For inspiration refer to the writing suggestions

Date of play session: [DD/MM/YYYY]

Duration of play session: [hours:minutes]

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Please note how you experienced today's play session as thoroughly as possible.

Try to relate your written experiences to mental well-being

Session 4

For inspiration refer to the writing suggestions

Date of play session: [DD/MM/YYYY]

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Duration of play session: [hours:minutes]

Please note how you experienced today's play session as thoroughly as possible.

Try to relate your written experiences to mental well-being

Session 5

For inspiration refer to the writing suggestions

Date of play session: [DD/MM/YYYY]

Duration of play session: [hours:minutes]

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Please note how you experienced today's play session as thoroughly as possible.

Try to relate your written experiences to mental well-being

Session 6

For inspiration refer to the writing suggestions

Date of play session: [DD/MM/YYYY]

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Perspective

Duration of play session: [hours:minutes]

Please note how you experienced today's play session as thoroughly as possible.

Try to relate your written experiences to mental well-being

Session 7

For inspiration refer to the writing suggestions

Date of play session: [DD/MM/YYYY]

Duration of play session: [hours:minutes]

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Please note how you experienced today's play session as thoroughly as possible.

Try to relate your written experiences to mental well-being

Participation end

You've reached the end of the official study duration. The researcher will contact you on the 8th day since the start of your

participation to schedule a short interview with you to gather more thoughts about your experience and possibly clear up some

uncertainties regarding your play diaries (such as clarifying certain statements that may be unclear or confusing, or simply

interesting or fascinating to the researcher).

To make sure the researcher can prepare some questions ahead of time, it is requested of you to send your completed play

diary to the researcher at his email: c.kienhuis@student.utwente.nl

The data gathered from your diary and interview will be anonimized and will not be able to be traced back to you as an individual.

If you have any leftover comments or remarks you can leave them in the textbox below.

Any leftover comments?