Review

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Video Games as a Part of Intervention Programs Based on Self-Determination Theory

Öz Belirleme Kuramı Temelinde Bir Müdahale Aracı Olarak Video Oyunları

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ABSTRACT

The current study aims to evaluate the existing literature on the characteristics and the usage of video games within the framework of Self-Determination Theory (SDT). In the first part of the article, the essential characteristics of SDT and video games were presented. In the second part, video games were examined based on basic psychological needs and motivational processes. Research shows that the content and mechanics of video games play a significant role in the satisfaction of basic psychological needs. Moreover, video games affect psychological well-being, quality of life, and intrinsic motivation via the satisfaction of basic psychological needs. The options and feedback provided in a game promote autonomy; success achieved in the face of difficulties promotes competence; and playing video games with other people in pairs or groups satisfies the need for relatedness. This satisfaction increases motivation and psychological well-being. On the contrary, the frustration of psychological needs in video games can harm these areas. IIt is emphasized that video games can be used within various intervention programs, and they are successful in acquiring and changing behavior and can support treatment process, especially in the fields of health and education.

Keywords: Self-determination theory, video games, motivation, intervention programs

ÖZ

Bu çalışmanın amacı video oyunlarının özelliklerini ve kullanım alanlarını Öz Belirleme Kuramı (ÖBK) çerçevesinde inceleyen mevcut çalışmaları değerlendirmektir. Makalenin ilk kısımlarında ÖBK ve video oyunlarının temel özellikleri tanıtılmıştır. İkinci kısımda video oyunları temel psikolojik ihtiyaçlar ve motivasyonel süreçler kapsamında irdelenmiştir. Araştırmalar, video oyunlarının içeriğinin ve mekaniğinin temel psikolojik ihtiyaçların doyumunda önemli bir rol üstlendiğini göstermektedir. Dahası, video oyunları temel psikolojik ihtiyaçların doyumu aracılığıyla psikolojik iyi oluş, yaşam kalitesi ve içsel motivasyon seviyesini etkilemektedir. Oyun içerisinde sağlanan seçenekler ve geribildirimler özerklik ihtiyacını, zorluklar karşısında elde edilen başarılar yetkinlik ihtiyacını, başka kişilerle çift ya da gruplarla oyun oynamak ilişkili olma ihtiyacını doyurmaktadır. Bu doyum motivasyonu ve psikolojik iyilik halini arttırmaktadır. Diğer taraftan, video oyunları içerisinde temel psikolojik ihtiyaçların engellenmesi bu alanlarda düşüşe sebep olmaktadır. Makalede video oyunlarının birçok farklı alanda ne şekilde birer müdahale aracı olarak kullanıldığı açıklanmıştır. Özel olarak, video oyunlarının sağlık ve eğitim alanlarında davranış edinimi ve değişimini sağlamak amacıyla kullanıldığı ve bu anlamda başarılı olduğu, fiziksel ve psikolojik hastalıkların tedavisine katkı sağladığı görülmüştür.

Anahtar sözcükler: Öz belirleme kuramı, video oyunları, motivasyon, müdahale programları

Introduction

In today's world, video games serve a large audience and bring people together on common ground. These platforms, which are expanding day by day, provide many different purposes in a spectrum of entertainment and education. In recent years, the tendency to play video games has become quite widespread, especially among young people (Lenhart et al. 2008, Willoughby 2008). In parallel, current literature has focused both on the motivational sources in video games and their positive and negative consequences. This study aims to examine video games as an intervention tool for various purposes within the framework of psychological needs and motivational processes.

The number of people playing video games in America has increased by 32 million since 2018. In other words, three out of every four people play video games and about 30% of them qualify as heavy gamers, playing video games for more than 15 hours per week (NPD Group 2020). In addition, it has been observed that 97% of the youth play video games, and the ratio of women to men in this number is close to each other (Lenhart

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et al. 2008). Taken together, it is not surprising that the amount spent on video games represents a significant percentage of national budgets, and this has increased rapidly over the years (UKIE 2019).

In the beginning, the literature on video games focused on the negative consequences of these platforms, mainly emphasizing the relationship between video game playing and aggression (Anderson et al. 2008, Cooper and Mackie 1986, Griffiths 1999, Sherry 2001). In other studies, it was argued that these games reduce academic performance, empathy, and the tendency to behave prosocially and harm attention and executive functions (Prot et al. 2014). The negative aspects of video games was also emphasized in the 5th version of the Diagnostic Criteria Reference Book (DSM-5) by adding a new psychological disorder called "digital game addiction". This disorder was characterized by an intense and persistent desire and tendency to play digital games despite their negative effects on one's performance in various areas (APA 2013).

On the other hand, recent studies emphasize any positive impact of video games (DeShazo et al. 2010, Ferguson et al. 2013, Lu et al. 2013, Zinicola 2021). This trend in the literature has gained momentum with theories and so the research on human motivation. In this sense, one of the relevant psychology theories, the Self-Determination Theory (SDT), has had a significant impact. According to the SDT, people have three innate psychological needs: autonomy, competence, and relatedness. The extent to which these needs are satisfied determines the individual's intrinsic motivation, psychological development, and integration into society, independent of one's culture (Ryan and Deci 2017). Studies based on the SDT have shown that video games increase intrinsic motivation by meeting these three basic psychological needs. With this awareness, researchers have started to use video games as an intervention tool in many different areas such as education and health (Altınpulluk 2021, Baranowski et al. 2008). In related studies, it has been emphasized that video games can make education fun and facilitate the transmission of perplexing subjects and the education of atypical groups (Alshammari et al. 2015, Rodríguez Jiménez et al. 2015). In addition, video games have been used to increase the acquisition and sustainability of health behaviors and improve the treatments of physical and psychological disorders (Russoniello et al. 2009, Deshazo et al. 2010a, Deshazo et al. 2010b).

Despite the increasing popularity of video games, we are not aware of any recent and comprehensive review paper on video games within the scope of the SDT. The present literature either focus on specific age groups (Adachi and Willoughby 2017) or summarize the general characteristics of video games in terms of the SDT (Uysal and Yıldırım 2016, Ryan and Deci 2017). In the light of this information, the first aim of this study is to bring together current studies examining video games within the scope of SDT and, unveil and understand the depth of this subject in the literature. As a second aim, we will examine the use of video games as an intervention tool in different areas. Finally, based on the strengths and weaknesses of the literature, we will discuss methodological implications for further studies. Each purpose can help us understand what kind of intervention programs can be developed for behavior acquisition and change in different areas, especially psychology. Given these three aims, the present study can make an important contribution to literature.

Overview of the Self-Determination Theory

According to the SDT developed by Deci and Ryan, human beings interact with their environment as active agents (Deci and Ryan 1985, Ryan and Deci 2000). A person has to satisfy three basic psychological needs, namely autonomy, competence, and relatedness, to be able to integrate with society, maintain one's well-being, and improve oneself. *Autonomy* refers to a behavior that is entirely dependent on one's own will (Deci 1975). In other words, an autonomous behavior can appear in the absence of any suppressive and controlling external factors (i.e., reward or punishment) which can decrease its meaning and importance (Ryan and Deci 2020). Even one shows interest in and attributes personal value to the behavior in the presence of autonomy (Ryan and Deci 2020). *Competence* is feeling capable and effective in an area of interest. In other words, competent people believe that they have the ability to make a change in their social environment and this belief can lead to progress and success over time (Harter 1978). According to Ryan and Deci (2000), people who perceive themselves as competent need a struggle to unveil their abilities. A struggle can inform them about their abilities and level of psychological growth. The level of *relatedness* is determined by the quality of social bonds and the perception of belongingness in one's relationships (Baumeister and Leary 1995). People have needs for acceptance, approval, attention and importance and they can satisfy these via their social bonds (Bowlby 1979, Ryan and Deci 2000). As a result, these three basic psychological needs must be satisfied for a healthy psychological development (Ryan and Deci 2000, Deci and Ryan 2002, Ryan and Deci 2020). On the other hand, the inhibition or insufficient satisfaction of basic psychological needs has a negative effect on people's social relations, performance and psychological well-being (Lopez et al. 2012, Lundqvist and Raglin 2015, Ryan and Deci 2017).

The satisfaction of the basic psychological needs affect one's development and well-being in primary life areas (e.g., education, health, work, sports) (Cate et al. 2011, Brenning and Soenens 2017, Halvari et al. 2017, Rigby and Ryan 2018, Slemp et al. 2018, Standage and Ryan 2020). For instance, the satisfaction of these needs increases students' academic performance, probability of attending school, intrinsic motivation, psychological well-being and their tendency to learn and apply what they have learned (Tian et al. 2014, Van den Berghe et al. 2016, Patall et al. 2019). In addition, positive feedback from athletes' coaches, autonomy and assertiveness support provided in their relationship, and an empathetic environment rather than in an oppressive environment, increase athletes intrinsic motivation, performance, success, and psychological well-being (Bartholomew et al. 2011, Isoard-Gautheur et al. 2012, Curran et al. 2013, Sheldon et al. 2013). Similar findings in health (Halvari et al. 2017) and work-life (Manganelli et al. 2018) support the

view that basic psychological needs are natural nutrients that are necessary for a person's development, integration with society, and well-being, independent of demographic factors (Ryan and Deci 2017).

Motivation in the Self-Determination Theory

Motivation refers to the power, energy, or motive force required to regulate behavior (Ryan and Deci 2000). The SDT is one of the most comprehensive theories on motivational processes in psychology (Cate et al. 2011). In previous years, the concept of motivation for human behavior was interpreted only through external sources and reinforcers under the influence of behaviorism. Fortunately, the SDT which focuses on people's psychological needs and development revealed the importance of internal resources in motivation (Deci and Ryan 2002). According to the SDT, a psychology-based theory, people attempt to integrate with the social environment on the one hand and develop themselves on the other by using their internal and external resources (Ryan and Deci 2000). According to Deci and Ryan (1985), there are essentially two types of motivation as intrinsic and extrinsic. In intrinsic motivation, the state of willingness that emerges with high pleasure and interest activates a person (White 1959). Whereas, in extrinsic motivation, the person feels motivated to win a reward or avoid punishment. These two types are assessed on a scale with autonomy at one end and control at the other. While intrinsic motivation is autonomous, extrinsic motivation can be autonomous and controlled (Ryan and Deci 2017).

According to the SDT, motivation is a six-stage dynamic process that begins with (a) motivation and progresses to intrinsic motivation (Figure 1) (Ryan and Deci 2000a). This process starts with the absence of behavioral regulation (amotivation) and terminates with internal regulation (intrinsic motivation). *Amotivation* refers to a feeling of inadequate, uninterested, and unconcerned in initiating a behavior. Thus, a person cannot set behavioral regulation in motion. In *external regulation*, the reason for the emergence of behavior is dependent on purely external reinforcements or pressures such as rewards and punishments. In *introjected regulation*, a behavior is regulated dependent on not only external factors but also self-related processes. Such that, at this stage, the need for acceptance and approval from other people or self-involvement (ego-involvement) can lead to behavior change. In *identified regulation*, a behavior is considered to be significant and necessary to achieve one's goals. With this type of motivation, volunteerism and autonomy begin to appear in behavior regulation. However, *integrated regulation* has the highest score in autonomy among all types of extrinsic motivation. In *internal regulation*, a behavior is resulted from one's free will, interest, and relevance rather than any external factors. As a result, when the processes between amotivation and intrinsic motivation are considered, autonomy on people's behavior and intrinsic motivation are closely related. In internal regulation, behavior results from individuals' free will, interest, and relevance rather than any external factor. As a result, when the processes between amotivation and intrinsic motivation are considered, autonomy on people's behavior and their level of intrinsic motivation are closely related. In the following sections, motivational processes and behavior change within the scope of video games will be evaluated.

Overview of Video Games

In the literature, different approaches provide different definitions for 'game'. Juul (2011) states that a game can reflect the abilities of people depending on their individual efforts while Salen et al. (2004) define it as an interactive platform where people can make their free choices. Similarly, Huizinga (2010) states that a game encompasses behaviors that get involved autonomously for a sense of purpose, and those behaviors take place depending on people's wishes. With the development of technology, this concept has also become digital, and so, people have started to play games using phones, tablets, computers, virtual reality glasses, or game consoles. Here, we need to differentiate two related concepts: gamification and video games. Video games are games that are accomplished within the framework of a determined scenario and purpose, and they are used for the acquisition and development of behavior (Bokyeong et al. 2009, Pivec and Dziabenko 2004). Gamification, on the other hand, aims to teach the player problem-solving practices or

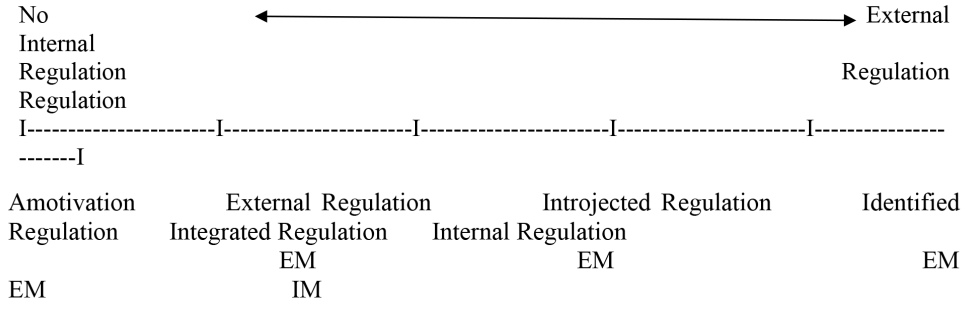

Figure 1. Six Types of Motivation According to the SDT

various behaviors via game mechanics added to a system that is not a game (Dey and Eden 2016). Generally, companies attempt to improve their employees' occupational abilities by applying gamification (Peryer et al. 2016). For example, Starbucks, Nike, and Turkcell have implemented gamification to increase their employees' intrinsic motivation and performance. The main goal of gamification is to shape the determined behaviors through the content and mechanics offered by video games and to increase the job satisfaction and performance of the employee (Bozkurt and Genç-Kumtepe 2014). This study will focus on video games, but not gamification.

According to Lewis (2003), the video game industry that produces video games with various contents continues to grow. This content-rich industry includes war games, sci-fi games, strategy games, action-adventure games, racing games, and even real-time games. The users can play these games both alone and with other users simultaneously. This advanced and complex world led scientists to examine the game industry to understand and explain human behavior further.Previous studies emphasize the negative aspects of video games, mainly from the perspective of aggression (Dominick 1984, Cooper and Mackie 1986, Lin and Lepper 1987, Rushbrook 1987). The basic assumption was that games with a violent content increase the tendency for aggression. The findings were mainly explained within the scope of Social Learning Theory (Bandura 1969, Bandura and McClelland 1977) and Catharsis Theory (Feshbach and Singer 1971). According to Social Learning Theory (Bandura 1994), people can adopt aggressive behavior through imitation and modeling. Similarly, many studies have shown that exposure to violent content increases the tendency to behave aggressively (Dominick 1984, Griffiths 1999, Anderson et al. 2008). According to the Catharsis Theory, one needs to release the accumulated intrinsic energy via aggressive behavior otherwise it can lead to psychological and physical problems. Once released, one does not need to behave aggressively again (Feshbach and Singer 1971).

The negative aspects of video games are also studied via virtual reality applications. Virtual reality creates a simulation of the actual world in a computer environment, and in that model, it provides users with a sense of reality and an opportunity to communicate (Bayraktar and Kaleli 2007). In this regard, in their study Drummond et al. (2021) evaluated two versions of virtual reality games with and without violent content. The findings show that these two versions triggered neither aggressive cognition and behavior nor emotion. Similarly, Tamborini et al. (2004) examined games with various contents using virtual reality and questioned the way these contents trigger aggression. The results demonstrate that playing violent video games compared to playing non-violent video games, increases aggressive thoughts but not aggressive behaviors. Other studies (e.g., Arriaga et al. 2008, Ferguson et al. 2022) supported these results implying that virtual reality used in video games does not predict aggression-related behaviors. Along with the relationship between video games and aggression, the relationship between motivation and video games have also been extensively studied. Malone (1981) and Csikszentmihalyi (1975) were among the first researchers to consider motivational processes within the context of video games. Together with the perspective of the SDT, studies have started to examine the contents of video games within the framework of intrinsic and extrinsic motivation, and basic psychological needs (Wang et al. 2008, Johnson and Gardner 2010, Tamborini et al. 2010, Peng et al. 2012, Burgers et al. 2015, Keeney et al. 2019, Tyack et al. 2020). Over time, it has been observed that video games can help to regulate and maintain specific behaviors via intrinsic motivation (Biddiss and Irwin 2010, Lu et al. 2012, Kauhanen et al. 2014, Moller et al. 2014). Today, some mechanics (e.g., rewards and punishments, progress bars, achievements, ranks, levels) and content in video games help people acquire new skills and improve their existing skills and motivations in education, sports, health, and business life. Briefly, video games have become the intervention tools for various purposes (Biddiss and Irwin 2010, Kurt and Savaşer 2013, Kauhanen et al. 2014, Swanson and Whittinghill 2015, Demir and Manolya 2018, Altınpulluk 2021).

Studies based on virtual reality have also examined the positive aspects of video games. In particular, according to Emmelkamp (2005), scholars' control over the created virtual environment can increase the positive effect of video games within a virtual reality environment. For instance, in their review Garcia-Bravo et al. (2021) state that virtual reality and video games positively affected people with heart disease at rehabilitation programs as complementary tools. They helped them regulate their heart rate, increase their physical activity, and reduce the pain they reported (Cacau et al. 2013, Ruivo et al. 2017). In education, Vidal et al. (2021) found that the use of virtual reality with instructional video games increased the motivation and interest of students. Moreover, such a method in the field of education was perceived by students as innovative and creative. Similarly, Sousa et al. (2021) emphasized that virtual reality has a significant role in improving cognitive health.

In conclusion, video games with and without virtual reality have both positive and negative effects. In the following sections, we will explain the functions and effects of video games based on the SDT and assess the use of video games as an intervention tool in various areas.

Video Games and the Self-Determination Theory

The reason behind video games' popularity has been assessed by several studies in the literature (Van Rooij et al. 2017.). While some studies focused on the addictive aspect of video games (Griffiths and Meredith 2009, Skoric et al. 2009), others assessed their motivational aspect (Wang et al. 2011, Granic et al. 2014, Peters et al. 2018). Still, all were related to the satisfaction of basic psychological needs. The main objective of video games is to provide an enjoyable gaming experience to the users by using several game mechanics and finally to satisfy their basic psychological needs (Bowman 2018).

Ryan, et al. (2006) conducted the first research on the satisfaction

of basic psychological needs through video games. They examined various video games with the participation of university students and found that different psychological needs were satisfied depending on the content of the game. For example, in games like Massively Multiplayer Online Role-Playing Game or Multiplayer Online Battle Arenathe, the challenge with actual or virtual teammates and the use of voice or text communication can satisfy the need for *relatedness*. On the other hand, the possibility to exhibit specific abilities and receive feedback on them can satisfy the need for *competence* in a competitive environment. Lastly, the freedom to select the desired character, develop it autonomously, and make personal decisions can satisfy the need for *autonomy*.

Video Games and the Need for Autonomy

The concept of autonomy in the SDT refers to the level of willingness and freedom in a behavior (Ryan and Deci 2000). The level of willingness is positively correlated with the level of intrinsic motivation, and increases the likelihood of the behavior in the future. In this regard, video games satisfy the need for autonomy by providing a platform where people can feel free and make their own choices without any pressure (Rigby and Ryan 2011). This autonomy that is provided by video games implicitly or explicitly predicts both game related behaviors and the psychological well-being of the players (Ryan and Deci 2000b, Granic et al. 2014, Manganelli et al. 2018, Peters et al. 2018).

A context that supports autonomy increases people's intrinsic motivation as in the case of sports, education, health, business life and many other fields (Adie et al. 2008, Lee et al. 2019, Neufeld and Malin 2020, Slemp et al. 2021). Autonomy supported environments in video games also motivate the users to play again. Peng et al. (2012) conducted a study where they randomly divided 160 students into two groups. In the supported autonomy condition, the participants determined what task they would do, how their game character would appear in terms of gender, skin color, hairstyle etc., and what abilities the game character would use. In the control condition, participants were provided with a standardized content. The findings showed that the players whose autonomy was supported were more satisfied with the game and more motivated to play the game again in the future than their counterparts. Other studies show that high levels of autonomy and competence in a game increase the likelihood to play again (Przybylski et al. 2010). The effect of autonomy in video games has been explained in different ways. For example, Tamborini et al. (2010) focused on the relationship between basic psychological needs satisfaction and enjoyment in video games. In the study, they attempted to manipulate the autonomy and competence perceptions of 129 university students via different game controllers. The findings demonstrated that the level of perceived autonomy is positively related to the level of pleasure taken from the game. This enjoyment can even evolve into passion. Przybylski et al. (2009), recruited 1324 volunteers that had played their favorite game for at least one month before their participation in the study. Findings revealed that the players who perceived themselves as autonomous developed a more harmonious game passion, a passion that emerges through their wishes. The rest of the players who do not perceive themselves as autonomous developed a more obsessive passion, a passion that emerges with pressure and coercion, for gaming.

According to Uysal and Yıldırım (2016), if a game provides meaningful and sufficient options and provides clear and unambiguous feedback, the satisfaction of autonomy during the game increases., The type of feedback can also affect the sense of autonomy. In this context, Burgers and his colleagues (2015) gave the players feedback on their mental performance at regular intervals during the game called Concentration. Their feedback differed in terms of type (i.e., descriptive, evaluative, and comparative) and value (i.e., positive and negative). Results showed that positive feedback increased the sense of autonomy and led to a high level of intrinsic motivation. In other words, the feedback received in video games not only predicts the level of autonomy perceived during the game, but also the possibility to play the game in the future.

A large body of research shows that the need for autonomy satisfied by video games also increases the level of psychological well-being among the players. A study conducted by Ryan et al. in 2006 revealed that participants who perceived themselves as more competent and autonomous while playing games reported higher psychological well-being than their counterparts. In addition, the satisfaction of autonomy need was positively correlated with the level of life satisfaction and mental health among the players (Przybylski et al. 2009). The satisfaction of psychological needs not only increases the players' psychological well-being but also determines their playing behavior. In their study with 1004 adolescents, Przybylski and Weinstein (2019) found that the higher players' psychological needs (e.g., the need for autonomy) were frustrated, the more inconsistent their playing behavior patterns were.

Some researchers have argued that the level of autonomy is also related to aggressive and violent behavior tendencies as it is related to psychological well-being and motivation. While violent games (i.e., Mortal Kombat, Grand Theft Auto) can give players a sense of autonomy and competence through their mechanics, the level of violence in these games can turn into one of the sources of motivation for the players (Przybylski et al. 2009).The feelings of heroism originating from victories gained in violent games can strengthen this motivation (Zillman 1998). In their study with university students, Przybylski et al. (2009) found that the ones who played violent games did not differ from those who played non-violent games in terms of their perceptions of autonomy and competence. In other words, the level of violence in a game is not related to the players' sense of autonomy and competence. It is the level of freedom, the sufficient number of choices, precise, clear, and positive feedback provided in the games that determine the sense of autonomy and the level of intrinsic motivation among players.

As a result, with the developing technology, it is possible to satisfy or thwart basic psychological needs of people through video games. In particular, the flexibility to customize interfaces and freedom to choose and develop one's characters in video

games increase players' intrinsic motivation and psychological well-being. In this respect, the findings obtained from studies on autonomy within the scope of video games are in parallel to those obtained from studies on autonomy in the areas of sports, education, health or business life.

Video Games and the Need for Relatedness

As a social being, one of the basic needs of humans is to connect with other people and to be accepted and approved in their relationships (Baumeister and Leary 1995). The SDT emphasizes that relatedness is an important ingredient of a healthy psychological growth and development (Ryan and Deci 2017). The satisfaction of relatedness need is closely related to the satisfaction level in relationships, the quality of social interactions, and the level of psychological well-being. In this digital age, relatedness can be satisfied through virtual contexts and video games are one of them. In various video game genres, people can simultaneously talk to or chat with each other, and they attempt to cooperate for a common purpose (Fuster et al. 2013). Therefore, people can establish and develop new social relationships through video games (Yee 2006a, Kuss et al. 2012). In this regard, it is worth examining video games based on the need for relatedness.

In general, people positively evaluate the relationships established within video games and find the ones with social interactions as more attractive. Cole and Griffiths (2007) examined the quality of social interactions in a video game and its reflections on real-life experiences. 912 participants from 45 different countries participated in this study. The results showed that male players had better relationships in the game whereas female players were more likely to meet their playmates in real life than their counterparts. Although the gender of the player affected the quality of the interaction, the participants generally evaluated the friendships established in video games as good and positive. In the 2000s, two different studies were conducted to determine the willingness of the players to form a group and to interact within a video game (Griffiths et al. 2003, Griffiths et al. 2004). In 2003, out of 11,457 people, 26% preferred to play alone vs. 23% who preferred to play with a group in a social interaction. In 2004, 35% of 540 people preferred to play in interaction with other people compared to 5% who did not. As a result, positive interpersonal interactions in video games make them more attractive.

Satisfaction of the need for relatedness through video games increases game enjoyment and psychological well-being. Tamborini et al. examined the relationship between interaction type, the need for relatedness, and game enjoyment in an experimental design in 2010. They formed two groups from the participants and asked one group to play the game alone and the other to play together with another player. It was observed that playing with a partner satisfied the need for relatedness more than playing alone and increased game enjoyment by meeting this need. Vella et al. (2013) conducted an online study to reveal factors affecting players' psychological well-being during video games. 429 people reported how much time they spent on the game, the type of game they played (i.e., action-adventure, role-playing, board game, MMORPG, sports and simulation game, real-time strategy game), type of interaction they experienced (i.e., alone, with other known players, with other unknown players), and the level of their psychological well-being. The results showed that "the need for relatedness", but not other basic psychological needs, and the interaction with other known players were related to psychological well-being of the players. In brief, video games can meet the need for relatedness and consequently make the players feel good. Nonetheless, not all interactions can succeed this, people prefer to relate with the known others.

The satisfaction of basic psychological needs predicts the level of psychological well-being among the players (Standage and Ryan 2020). However, the need-density theory emphasizes that the level of satisfaction of those needs in the virtual world is different from the one in the actual world . In other words, a video game player's need for relatedness in the virtual world might be satisfied, but in the actual world that similar need might not (Rigby and Ryan 2011). In this regard, Allen and Anderson (2018) conducted a study that examined to what extent the satisfaction of basic psychological needs in the actual vs. virtual world predicts psychological well-being (Allen and Anderson 2018). They had 315 university students who completed scales on video game experiences, psychological well-being and satisfaction of basic psychological needs. The findings demonstrated a significant positive relationship between the satisfaction of the need for relatedness and psychological well-being. However, the satisfaction of this need in the actual world affected psychological well-being of the participants more than the one in the virtual world did. Similarly, the frustration of this need in the real world affected their psychological well-being more negatively than the one in video games did.

In sum, nowadays, people interact and collaborate with other people, and give and receive social support through video games. Therefore, they can satisfy their need for relatedness, one of the three basic psychological needs, via video games. This satisfaction makes games more enjoyable therefore players demand more games with interactions. Although satisfying the need for relatedness through video games increases one's psychological well-being, this interaction cannot always be generalized to the real world. The effect of the virtual world on the satisfaction of basic psychological needs should be assessed separately from the effects of the real world.

Video Games and the Need for Competence

According to the SDT, competence refers to one's evaluations of himself in terms of the level of competence and expertise on his behavior (Ryan and Deci 2020). One's own evaluations and the feedback received from his social environment shape this perception. According to Keshtidar and Behzadnia (2017), one must experience a challenge and receive feedback on his performance to be able to perceive himself as competent. Video games also shape players' perception of competence through

these mechanics, and consequently increase their performance, intrinsic motivation and game enjoyment. (Klint and Weiss 1987, Rigby and Ryan 2011, Ghorbani et al. 2020, Lemoyne et al. 2021).

The feeling of competence provided by video games increases game enjoyment and motivates the players to play a game again. Tamborini et al. (2010) conducted a study that examined the need for competence by manipulating the type of game controllers. The findings revealed that participants using customized gamepads reported feeling more competent compared to participants using standard gamepads. Moreover, high levels of this feeling increased their enjoyment of the game. Similarly, in a study by Peng et al. (2012), participants' perception of competence was manipulated by a dynamic mechanism on task difficulty and feedbacks on success. Firstly, the participants were exposed to optimal challenge content so they could demonstrate their abilities. The game became more difficult as the player showed high challenge and performance. During this process, participants were presented with a performance indicator about their challenge level and received feedback on their success and courage. The findings showed that in the presence of these dynamics that support competence, the players made more effort during the game and had more fun. In addition, they evaluated the game more positively; they reported that they were more likely to play that game in the future and recommend it to others.

The difficulty level of video games has an important effect on players' motivation to play and evaluations on their competency level. In 2014, Neys and colleagues investigated why gamers continue to play video games even in the absence of sufficient rewards or reinforcements. 7,252 players reported their basic psychological needs, motivational regulations, the strength of player identity (i.e., extreme hard gamers, hard gamers, standard players), game enjoyment, and persistence in playing a game online. Results showed that the more the player identity was associated with *liking the challenge*, the stronger the relationship between competence, game enjoyment, and persistence was. They concluded that as the level of challenge in game and its difficulty level increases, the need for competence is satisfied more; and the satisfaction of basic psychological needs consequently raises game enjoyment. Therefore, a video game evaluated as an enjoyable activity positively affects players' intrinsic motivation, and this evaluation leads them to continue playing the game under all conditions. Likewise, research shows that the probability of repeating pleasurable activities that are free from any expectations or reinforcements is high (Malone 1981; Ryan and Deci 2000a, 2000b, Wang et al. 2008, Swanson and Whittinghill 2015).

As in other basic psychological needs (Chen and Jang 2010, Vansteenkiste and Ryan 2013, Bidee et al. 2016, Costa et al. 2016), the frustration of the need for competence has negative consequences. Przybylski et al. (2014) tested the relationship between aggression tendency and game motivation by manipulating the version of games and the level of violence in and difficulty level of the games. According to the findings, low levels of perceived competence or frustration of this need increases the likelihood of aggression-related emotions, thoughts, and behaviors. Furthermore, people with a high sense of competence reported more motivation to play the game and a lower tendency for aggression. Importantly, the frustration of a basic psychological need rather than the violent content of the video game resulted in negative consequences. Similarly, a study by Tyack et al. (2020) found that video games can pacify tension or negative states. They gave positive feedback after an easy task to the participants in the control group and negative feedback after a relatively challenging task to the participants in the experimental group. After this manipulation, the participants were asked to play a game called Mark of the Ninja which contains tips and commands that may support competence as content. As expected, the participants in the experimental condition reported that their need for competence was more satisfied after playing that game than those in the control group. In other words, the findings demonstrated that playing a game that supports competence may increase players' positive affect and vitality level while reducing their negative affect. To sum up, when the need for competence is frustrated, negative emotions and even the tendency to be violent may arise, whereas, video games that support competence may support psychological well-being and protect people against negative influences.

To sum up, video games can meet or frustrate players' sense of competence in different ways. The need for competence that is satisfied or frustrated in a video game is closely related to the level of players' game enjoyment, motivation to play again, and positive and negative emotions. According to the frustration-aggression theory, depriving people of having a purpose they are interested in or frustrating a person's efforts to attain their goal may lead to aggression (Dollard et al. 1939). Similarly, depriving people of their goals, who desire to complete a task or move to the next level in a game may trigger aggression among them and result in violence.

As seen, three basic psychological needs can be satisfied through video games, and this satisfaction increases the level of psychological well-being and intrinsic motivation. According to Nakamura and Csikszentmihalyi (2014), these effects of video games can be explained by *flow psychology*. Flow psychology refers to focusing one's attention only on his action and enjoyment of it (According to (Csikzentmihalyi 1990). According to Nakamura and Csikzentmihalyi (2005), a person needs intrinsic motivation to be in the flow. Considering that video games increase intrinsic motivation, people can be more and more in the flow through video games (Csikszentmihalyi 1990). Thus, this leads to an increase in psychological well-being. Fortunately, Sweetser and Wyeth (2005) introduced a model called the GameFlow that assesses games based on flow theory. According to this model, the flow experience in a game consists of 8 main components: *concentration, challenge, skills, control, clear goals, feedback, immersion, and social interaction*. The concept of challenge, ability, and feedback described in the model show similarity with the need for competence. Also, social interaction is similar to the need for relatedness while control is similar to the need for autonomy. Therefore we can conclude that the content and mechanics used

in video games create a state of flow by satisfying three basic psychological needs.

Use of Video Games as an Intervention Tool

Today, video games are evaluated beyond a tool of entertainment. They can both help people learn and develop some behavioral patterns and can explicitly or implicitly meet their basic psychological needs. A review by Altınpulluk (2021) shows that video games are widely used in education and positively affect students' motivational, cognitive, social, and motor skills. Apart from education, video games have positive influences on other areas such as sportive activities, mental and physical health, quality of life and behavior change (Kurt and Savaşer 2013, Demir and Manolya 2018).

The scenarios and visuals used in video games can have a significant impact on the development of a behavior. Here, researchers benefit from two essential theories: the social learning theory which emphasizes the importance of imitation and modeling in learning, and the SDT which focuses on psychological needs as the main components of motivation (Patrick and Canevello 2011). Yet, the observation of the characters in the game can make people acquire new behaviors or change their existing behaviors (Gee 2005). On the other hand, video games can lead to behavior acquisition and change by meeting three basic psychological needs. In this section, we will focus on the existing literature on video games and assess them as an intervention tool based on the SDT.

The selection and use of a specific video game depending on target behavior is an effective and substantial method for behavior change (Kurt and Savaşer 2013). In the literature, video games are used as an intervention tool in two main areas, namely health and education. In the field of health, video games are mainly used to guide people to acquire and maintain health related behaviors, to inform patients about their diseases, and to increase their motivation for treatment. In one study, adolescents with and without cancer played a video game called Re-Mission, in the aim of informing patients about the disease. The players were asked to activate various bacteria to eliminate the cancerous cells in a computerized body (Kurt and Savaşer 2013). Both autonomy- and competence-supporting features of the game significantly increased the quality of life among cancer patients from the first month on, but the effect was not observed in the control group. In addition, the group with cancer reported a higher motivation and autonomy for behavior change than others. In particular, the majority of the patient group (70.9%) were highly decisive in changing the way they manage cancer treatment. Later in 2014, Williams et al. conducted a study where they used the virtual version of The Look AHEAD application for patients with Type 2 diabetes. In this research based on SDT, the aim was to change health-related behavior and maintain desired behaviors. Through a virtual doctor application, the participants were asked to report information about their quality of life and motivation every month and four times in total. Results showed that the virtual doctor application could satisfy the basic psychological needs of the patients and motivate the ones who want to lose weight. Similarly, Baranowski et al. (2008) stated that video games can increase the quality of life and psychological well-being of the users by activating health-related behaviors. Also, the use of video games and virtual reality together can improve physical and mental health. The motivating effect of video games in combination with virtual reality can significantly help people suffering from heart disease by changing their health-related behaviors. For example, Garcia-Bravo et al. (2021) showed that they positively affect health-related behaviors especially in the field of rehabilitation. According to this study, the application of video games on health-related behaviors in the context of virtual reality increases physical activity and mental health and regulates heartbeat. In general, such practices are found to be motivating (Viera et al. 2017). In summary, all these findings support that video games and their applications can contribute to the treatment of various diseases.

Video games are also used in psychology as an intervention tool (Ceranoglu 2010, Shah et al. 2018, Tran 2019, Zayeni et al. 2020). They are used in many areas from mood disorders to anxiety disorders, from coping with stress to socio-psychological development, from processes related to executive functions to developmental disorders (Ferguson 2011, Radkowski et al. 2011, Gotay 2013, Li et al. 2014, Wrzesien et al. 2014, Göbl et al. 2015, Zielhorst et al. 2015, Carrasco 2016, Johnson 2016, Weerdmeester et al. 2016, Koivula et al. 2017, Rahani et al. 2018, Shapi'i et al. 2018). According to Washburn and Gulledge (1995), video games provide a platform where people can perform various virtual activities as they want without encountering any problems or consequences as they would have in real life. The content of video games can be customized and implemented based on the target psychiatric disorder. For instance, Shapi'i et al. (2018) designed a game that aims to improve the hand-eye coordination of individuals with an autism spectrum disorder. According to these researchers, traditional rehabilitation practices lack motivation. From this perspective, researchers included a user-centered game design based on the SDT in their research. In the development of this game, the aim was to determine the root of the problem, to develop a game design using video game mechanics, to test this game design, and finally to try it practically. Researchers diversified the game content to increase interest and motivation, and they considered instructive and constructive rules, external rewards, and clarity of goals. Finally, video games can be included in the treatment process as a part of therapy or can be used as a therapy method by itself (Coyle et al. 2011, Griffiths et al. 2013, Parisod et al. 2014, Sajjad et al. 2014, Yusof and Rias 2014, David et al. 2018, 2017).

Apart from health, video games are also used in education as an intervention tool. Eroğlu (2019) argued that the educational version of the Minecraft game (Minecraft Education Edition) could be used in chemistry and coding education. In this regard, the Minecraft game is designed to involve various applications and information within the scope of the chemistry course, to improve the creativity and performance of the students in several fields while having a pleasant time. Eroğlu (2019) suggests that

this video game which does not have an active application yet, may be useful for students to learn and develop some skills in the future. Another study conducted by Demir and Manolya (2018) focused on behavior change in physical education. The specific purpose of the application was to develop dynamic balance characteristics among children. In the study, there were three different study groups, namely the moving floor wobble board, the Wii Fit game, and the control group, and the participants continued the balance development program for eight weeks. The results showed that the Wii Fit game has a positive effect on the development of dynamic balance. According to the researchers, the entertainment elements in a game increases intrinsic motivation which increases the applicability of the tool to all ages. Lastly, Vardarlı (2020) trained secondary school children in forty different skills through virtual reality applications. The findings showed that these applications are effective in acquiring a variety of skills. All these studies demonstrate that video games are an effective method that can be used to teach, regulate or maintain any behavior related to education. In summary, self-report and practice-based studies support the effectiveness of video games as an intervention tool. Video games can be used as a motivating and instructive tool both in health and education.

Discussion

The SDT basically tries to explain the motivational processes underlying the behavior (Ryan and Deci 2000). According to the theory, there are two types of motivation, intrinsic and extrinsic, that allow for behavioral adjustments. While the regulations within the scope of extrinsic motivation are shaped by extrinsic reinforcements and pressures; the regulations within the scope of intrinsic motivation are shaped by people's willingness and autonomy. In order to nurture intrinsic motivation, three basic psychological needs (i.e., autonomy, relatedness, and competence) must be satisfied. This satisfaction not only increases intrinsic motivation, but also enables people to achieve psychological growth and integration. Studies show that satisfaction of basic psychological needs has a positive effect on psychological well-being, success, performance, persistence in a behavior, quality of life and intrinsic motivation (Tamborini et al. 2010, Tamborini et al. 2011, Peng et al. 2012, Sheldon et al. 2013, Chang et al. 2015, Peters et al. 2018). On the other hand, thwarting basic psychological needs increases negative emotions such as stress, anxiety, burnout, and aggression tendencies (Allen and Anderson 2018, Mills et al. 2018, Tyack et al. 2020). Studies in the literature provide similar findings in the fields of education, sports, parenting, work life, close relationships and health regardless of culture, gender and biological age therefore the basic components of the SDT are highly generalizable (Ryan and Deci 2017). Today, because of a growing widespread use of video games and their popularity among very different groups, it becomes necessary and valuable to examine their dynamics on the basis of basic psychological needs and from a holistic perspective. In this review, the effects of video games and their use for different purposes were evaluated within the framework of both motivational processes and psychological needs.

While the first studies on video games drew attention to the negative aspects of video games, the SDT provided another perspective by examining them based on motivational processes. The SDT argues that video games increase intrinsic motivation by meeting three basic psychological needs, implicitly or explicitly. Specifically, meeting the autonomy, relatedness and competence needs during video games increases players' enjoyment of the game, motivation to play the game again, life satisfaction and psychological well-being. When this satisfaction is achieved, the game experience and the interaction with other players are evaluated positively; group games are preferred more; negative states such as negative affect and aggression tendencies among the players decrease. On the other hand, the frustration of these three basic needs in video games leads to negative consequences such as aggression and irregular game playing tendencies, and need satisfaction in real life and in the virtual world does not always look alike.

It is seen that video games are mainly used as an intervention tool in two areas of life. In the field of health, the main goals are to acquire and maintain health behaviors in general, inform the patients about their disorders and motivate them for treatment. In the field of psychological health, video games are used as an intervention tool to support psychological development and treatment; it helps patients learn certain behavioral patterns (DeSmet et al. 2014, Shapi'i et al. 2018). In the field of education, video games are used to transfer knowledge, acquire and change behavior in different branches of education. In particular, the presentation of video games in the context of virtual reality to teach and develop behavior has a significant impact on target groups (e.g., students, patients, clients, participants, etc.). Depending on the current literature, we can conclude that video games successfully achieve the above mentioned goals in these areas by offering entertaining content to the players.

Conclusion

In terms of different branches of psychology, video games can be used as a measurement tool in psychology research. For example, in social psychology, video games can be used to measure helping behavior, self-processes, group dynamics and processes, attitudes and attitude change, emotions and emotion regulation, social roles, leadership or communication. Depending on the subject, the researcher can change the content of the games or select the game that best represents the target behavior. For example, group processes, intergroup feelings, intergroup bias can be addressed through various video games involving sporting events. At the individual level, it is possible to focus on self-related processes within the scope of a video game where performance or success is more prominent.

The literature on video games clearly exhibits the change of concepts and methods used. With the influence of technological developments and the enrichment in the content of video games, the transition between research topics is obvious. This literature focuses on the negative aspects of video games in the beginning and then on the motivation underlying human behavior in the

1970s and 1980s. From the beginning of the 2000s, video games have been evaluated on the basis of SDT. Currently, studies focus on the positive effects of video games and try to shape and improve people's behavior. Therefore, the new focus of future studies can be how to develop various intervention methods. People struggle to understand how to change and improve behavior in environmental, social, educational or health-related issues both in the national and international arena. In this direction, it may be beneficial to develop specific video games or applications for related fields to answer this call.

Another benefit of technological development is virtual reality applications. Virtual reality glasses are one of the tools used in these applications that make people feel like they are in a real context by deceiving the senses (Tepe et al. 2016). The use of virtual reality glasses in education, therapy, sports and video games has become quite common (Helsel 1992, Mantovani et al. 2003, Hoffman 2004, Yates et al. 2016). In this context, future studies may examine the satisfaction or frustration of basic psychological needs by using video game contents with virtual reality glasses. In addition, the content of virtual reality applications and how they are presented can affect behaviors, thoughts and emotions in different ways. Even though virtual reality is not related to aggressive behavior, behavior acquisition or change aimed in health or education-related fields can be succeeded with the help of virtual reality. Therefore, future research should first determine the behavior to be taught or changed and then design the video game context specific to that behavior to increase the effectiveness of the application. In general, research on the satisfaction of the basic psychological needs through video games has used self-report methods. However, recent studies suggest that application-based research (e.g., performance measurement) in which one can customize video games for the user and change in-game settings, contents and mechanics is also possible. Therefore, future research should include more experimental manipulations and performance-oriented research.

As a result, many studies based on the SDT show that video games can increase intrinsic motivation by meeting three basic psychological needs. Because of this function, video games have become increasingly popular in recent years. Moreover, these games are used to make significant contributions in behavior acquisition and change in many areas and the treatment of many diseases, as an intervention tool. However, the literature reveals that we couldn't have benefited from video games enough. The use of video games in different fields and with different methods in future studies will enrich the literature.

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