What is the relationship between gaming behaviors and social self-efficacy, and does family support impact this relationship?

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Preface

It is all coming to an end now. Two enjoyable years in the master's program of Health Promotion and Health Psychology at the University of Bergen are completed. As we both have realized during our student years, the group we find especially interesting to work with is adolescents. Therefore, it has been a pleasure to have the opportunity to use two semesters to delve into youth's gaming habits and explore how new technological advancements do affect their social lives. This is the knowledge we undoubtedly will use in future work relations. Looking back at the process behind this thesis, it has been challenging, educating, but most of all enjoyable, which results in a feeling of melancholy now that it is all coming to an end.

Due to the Covid-19 pandemic, the two years of studying have been lonelier than expected. However, due to a class full of initiative and who always saw alternatives, we cannot complain. We would further like to thank our fellow students for always backing us and showing genuine interest in our thesis, which led to many interesting discussions and reflections in the canteen. In addition to our fellow students, we would like to thank "Helseklyngen" at Alrekstad (school facilities) for always having free coffee; this offer was used frequently and took away some of our anger towards the issue of lacking quiet group spaces to write and concentrate in. Last but not least, we would like to thank our great mentors: Ingrid Holsen, Ellen Haug, and Magnus Jørgensen. You guys have guided us with valuable feedback along the way. Further, your feedback has constantly challenged us in a way that at the time might be experienced as a bit frustrating, but now in retrospect, we feel that you did the right thing as mentors, stayed humble, and acknowledged this being our work.

We do hope you enjoy this reading!
- Simen Adrian Evensen & Ørjan Sognnes
Bergen, May 2022

Contents

List of abbreviations

GAS: Gaming Addiction Scale

SSE: Social Self-Efficacy

SE: Self-efficacy

SCH: Social Compensation Hypothesis

HRQOL: Health Related Quality of Life

HBSC: Health Behavior in School-aged Children

Abstract

Background: Gaming is a widespread activity and a social arena for many. There is an evident need for a nuanced recognition of different gaming behaviors in youth, as most research only embraces addiction. Different social health outcomes of different types of gaming behavior need highlighting from a more balanced perspective.

Objective: Examine the relationship between different GAS gaming behaviors and social self-efficacy beliefs and investigate if family support moderates these relationships.

Method: The present study uses secondary data from the Health Behavior Among School Children Survey (HBSC, 2018), a WHO study carried out in Norway by the The University of Bergen. Group and gender differences were first examined. Next, the relationship between gaming and social self-efficacy and the impact of family support was investigated through hierarchical multiple regression analysis and moderation analysis.

Results: one third of the sample had a GAS behavior, most were problematic gamers. Gaming behavior was more common in males. Social self-efficacy was significantly lower in gaming groups compared to the reference group and was lowest in the addicted group. Family support had a small direct effect on social self-efficacy but did not moderate the relationship between gaming behaviors and social self-efficacy.

Conclusion: This study has implications for more longitudinal studies on these relationships. Future research should include the digital world in the construct of social self-efficacy when looking at GAS behaviors. We encourage future research to use specific instruments of family support when investigating gaming family environments as protective factors for adverse outcomes of GAS behaviors.

Keywords: Gamer, gaming, highly engaged gamer, problem gamer, addicted gamer, GAS, social self-efficacy, social competence, family support, HBSC.

Sammendrag

Bakgrunn: Gaming en svært utbredt aktivitet, og en sosial arena for mange. Det er et åpenbart behov for en mer nyansert anerkjennelse av forskjellige spillatferder blant ungdom, da mesteparten av forskning kun omfavner avhengighet. Ulike sosiale helseutfall i ulike typer spillatferd trenger å bli belyst fra et mer balansert perspektiv.

Hensikt: Undersøke sammenhengen mellom ulike GAS spillatferder og sosial mestringstro, og utforske om familiestøtte modererer disse sammenhengene.

Metode: Denne studien bruker sekundærdata fra Helsevaner blant Skoleungdom undersøkelsen (HBSC, 2018), en WHO-studie utført i Norge av Universitetet i Bergen. Først ble gruppe- og kjønnsforskjeller undersøkt i hovedvariablene. Deretter ble forholdet mellom spillatferder og sosial mestringstro, samt virkningen av familiestøtte undersøkt gjennom hierarkisk multippel regresjonsanalyse og moderasjonsanalyse.

Resultat: En tredjedel av utvalget ble klassifisert til å ha en GAS-atferd, hvorav de fleste var problematiske spillere. Spillatferd var mer vanlig hos gutter. Sosial mestringstro var signifikant lavere i alle spillgruppene sammenlignet med referansegruppen og var lavest i den avhengige gruppen. Familiestøtte modererte ikke forholdet mellom noen av spillatferdene og sosial mestringstro, men hadde en liten, positiv direkte effekt på sosial mestringstro.

Konklusjon: Denne studien antyder et behov for flere longitudinelle studier av disse sammenhengene. Det er også et klart behov for at fremtidig forskning inkluderer den digitale verden i konstruktet til sosial mestringstro når man ser på GAS-atferd. Vi oppfordrer også videre forskning til å bruke måleinstrumenter for familiestøtte som kan knyttes mer til spillatferd når det undersøkes familiemiljøer som beskyttende faktorer for negative utfall av GAS-atferd.

Nøkkelord: Gamer, gaming, høyt engasjert spiller, problem spiller, avhengig spiller, GAS, sosial mestringstro, sosial kompetanse, familiestøtte, HBSC

1.0 Introduction and background

In this chapter, the background for this study is presented. There will be a focus on actualizing central subjects and highlighting why these are relevant to health promotion. The background starts with a broad perspective on today's context, presenting the central themes of gaming, social self-efficacy, health, and family support, followed by presenting this study's purpose.

1.1 Technological advancements

Today, youth are growing up in societies characterized by what appears to be ever-progressing advancements in technology. The primary forms of interaction and communication have moved from analog to digital. Our networked lives make it easy to hide from each other while we are tethered tighter together than ever before. Nowadays, youth may rather text than talk and be online than offline (Turkle, 2011, p. 1-2). The years of adolescence are a central time where individuals find themselves going through changes and ultimately try to find their place and belonging in this world. It is, therefore, essential to look at how these "new" digital societal standards may contribute to new psychological adaptations (Moksnes et al., 2013).

In recent years, the prevalence of gaming behavior has increased (Caroux et al., 2015; Carras et al., 2019; Medietilsynet, 2016). Today's games allow youth to have a social relationship with other gamers who might be on the other side of the planet. Social interaction has always been an essential part of gaming. In the 1970s and early 1980s, gaming took place in arcade settings, which served as a gathering point and social arena. Later gaming activity shifted to the home console in the 1980s and 1990s (Przybylski et al., 2010). Due to technological development, today's game developers can facilitate socialization without physical environments. Both players and developers can utilize tools such as online communities and internet-based technologies, such as the voice-over-IP (VoIP) program Discord and gaming-related internet forums. This enables players to socially connect with their peers online and provides a platform for cooperation and building social relationships (Przybylski et al., 2010).

1.2 Gaming behavior

During the last decade, the video game industry has boomed. With a European market size of 21,6 billion euros in 2020 (Interactive Software Federation of Europe, 2020), and a 55 percent increase in key markets since 2014, it constitutes one of the most significant cultural industries today. With this development, gaming has become more established as a socially acceptable activity in young populations (Verrastro et al., 2021). Playing video games as a leisure time activity has for youth become a more frequent phenomenon on PC, console, and mobile platforms (Caroux et al., 2015; Carras et al., 2019; Medietilsynet, 2016).

The increasing gaming behavior forms an argument that social development in this population has partly drifted to digital playgrounds and left the physical ones behind. *Play* is not a new concept. Recognized by Piaget, Vygotsky, Erikson, and Freud, play has traditionally been considered a way for people to express themselves and has therefore been complementary to youth' psychosocial development (Johnson et al., 2015, p. 77). Applying the concept of play to today's context raises questions about whether *digital* play could provide the same developmental contributions to young populations.

In the wake of this development, the field of gaming behavior has undergone investigation from several perspectives. Scientific publications have looked at associations between players and video games, emphasizing games' influence on players' behavior (Caroux et al., 2015). Some researchers have investigated the positive effects of action games on cognitive training, prosocial behavior, and academic performance (Ferguson, 2015; Bavelier et al., 2012). Others have looked at how violent video games can influence behavior (Ferguson, 2008; Gentile et al., 2014). The vast majority of research has been on the negative impacts, considering possible harm related to violent games, addiction, and depression (Granic et al., 2014). We recognize the importance of such research. However, as researchers in health promotion, we argue for a "flip of the coin" and a more balanced and nuanced perspective of gaming activity.

Examining a broad spectrum of potential correlates of video gaming is essential, mainly because of the change that has foregone in the gaming industry in the last decade, resulting in an increasingly complex, diverse, realistic, and social nature in games (Granic et al., 2014).

Empirical evidence on the effects of playing video games is mixed and cannot support claims of being only harmful, or comprising a threat to public health (Elson & Ferguson, 2014). In recent years, research has seemingly shifted its focus away from the adverse effects of games on players. Instead, it started focusing on games as psychosocial boons, contributing to mental health and well-being (Carras et al., 2019). Video games have been found to foster positive mood, happiness, and social relationships (Russoniello et al., 2009b; Valkenburg & Peter, 2011), accomplishment (Suznjevic & Matijasevic, 2010), and a sense of purpose and belonging (Jones et al., 2014). Carras and her colleagues (2019) argue that "Ultimately, anything that makes games more fun and supports interaction with health-promoting behaviors has the potential to improve health for populations, not just in the laboratory."

1.3 Health, social self-efficacy, and gaming

WHO (2009) emphasizes aspects of health-related quality of life (HRQOL) as goals for adolescent public health, including individuals' subjective perception of social, psychological, physical, and functional dimensions of health (World Health Organization, 2009). In recent years, adolescent boys and girls report increased health complaints such as stress, pain, mood problems, sleeping difficulties, school pressure, depression, and anxiety - which negatively impact HRQOL (Svedberg et al., 2013; Baroudi et al., 2019; Bakken, 2018; Østerås et al., 2016). On the other hand, adolescent self-efficacy has been found to positively impact their HRQOL (Freire & Ferreira, 2018), making implications for its role in health-promoting work.

Nutbeam (1998) defines *health promotion* as "the process of enabling people to take control over the determinants of their health and thereby improve their health" (Nutbeam, 1998, p. 1-2). Related to health promotion, Norway has agreed to the 2030-agenda, formed and decided by the UN, which aims to create sustainable development in societies' economic, social, and environmental dimensions through sustainable development goals (Meld. St.40 (2020-2021), p.5). The third goal is to "ensure good health and promote quality of life for everyone, regardless of age." Reaching this goal will demand cooperation between national parliaments, regional and local authorities, and the local communities, and innovative thinking and rigorous work from the health promotion field (Meld. St.40 (2020-2021), p.34).

Green and her colleagues (2019, p.160) state that health promotion has a threefold role, aiming to (1) influence efficacy beliefs, (2) provide competence and skills to act, and (3) remove environmental barriers that function against efficacy beliefs. Self-efficacy is one of the most applicable concepts in social psychology (Green et al., 2019, p.158). From the perspective of social cognitive theory, self-efficacy refers to the individual's belief that he or she is competent enough to undertake the actions needed to achieve desired outcomes. Self-efficacy has been found to correlate with behavioral outcomes in diverse contexts (Willemse et al., 2011; Yoo et al., 2011; Guntzviller et al., 2017), making further implications for health promotion (Green et al., 2019, p.159-162). *Social* self-efficacy is the individual's confidence in and capacity to engage in social interactions and have the acquired set of "social skills" needed to initiate and maintain interpersonal relationships (Smith & Betz, 2000). High levels of social self-efficacy and good communication skills are essential skills that affect adolescents' health and positive development (Muris et al., 2016).

For many gamers, digital platforms such as player-founded online communities, chat channels, and web forums comprise major social networks and social environments (Przybylski et al., 2010). These digital platforms have a lot in common with social aspects of real-life and face-to-face interactions. They make it possible for young gamers to form relations with their online peers through their shared interest in gaming (Williams, 2006). Gamers who show *unwanted* social behavior in these communities may be excluded (Barnett & Coulson, 2010).

For people who tend to receive limited socialization from their real-life social networks, the motivation to engage in online communities has shown to be especially strong (Chan & Cheng, 2016). In such populations, socialization is a dominant motivational dimension for engaging in gaming activity (Sherry et al., 2013). Gamers who have maintenance of relations and friendship as their central motive for engaging with video games tend to have more hours of play each week (Yee, 2007; Sherry et al., 2013). A common hypothesis is that more hours of gaming are associated with increased adverse psychosocial outcomes. This association, however, has failed to be proven in several studies (Brunborg et al., 2013).

All of this brings attention to how we can look at gaming and socialization in youth. Many hours spent on socially motivated gaming may not be an exclusively bad thing and could perhaps be understood as a way for youth to compensate for the lack of real-life socialization

(Chan & Cheng, 2016). Socially motivated gaming may also help youth to increase their social self-efficacy on digital playgrounds (Yee, 2007; Sherry et al., 2013) and may provide youth with the needed belief to strengthen their social self-efficacy in real-life settings (Williams, 2006; Barnett & Coulson, 2010; Granic et al., 2014). As today's society is becoming more and more centered around these digital playgrounds, it could be of great importance to investigate the social self-efficacy in adolescent gamers, which has yet to be investigated in a Norwegian context. As gaming behavior is established as a broad spectrum ranging from normal healthy behavior to addiction, it is also important to investigate this relationship in *different types* of gaming behavior. This could provide nuances in different types of gaming behavior and their respective social self-efficacy outcomes.

1.4 Gaming, social self-efficacy, and family support

Family support is a relevant concept in all family environments. It is a form of social support that can be defined as how family members provide adolescents with different kinds of assistance and support through their actions (Heerde et al., 2015). Family environments have been found to impact self-regulation, moral reasoning, and healthy cognitive development (Rathunde, 2001) and to have a positive relationship with self-efficacy (Piko & Hamvai, 2010; Gilman & Huebner, 2006).

Steinberg (2001) claimed that "Over the past two decades, no area of inquiry within the field of adolescent development has generated as much enduring interest as the study of the family." He reviewed research from 1985 to 2000 on adolescent development in family environments. He called for a need to best characterize normative family relations in families with adolescent children and focus on how variations in such relationships affect the adolescents' development (Steinberg, 2001). One of the main findings was that adolescents benefit greatly from the attributes of authoritative parental characteristics, such as warmth, firmness, and acceptance of their children's need for psychological autonomy. Steinberg's concluding thoughts were that it would seem beneficial to draw upon collective resources and institute an interdisciplinary public health campaign to continue this research and teach parents about adolescence (Steinberg, 2001). This makes implications for health promoters to investigate the role of the family in the lives of adolescent gamers.

The family environment created by parents may affect the child's self-efficacy (SE) in many ways, also in the social domain. Parents serve as role models, which can be positive and negative for the child's SE development. The parents bring new experiences and challenges to their children, leading to goal-setting and expectations. These expectations and perceptions of their child's capability are shown mainly through feedback and supportiveness and may contribute to shaping the child's SE (Schunk & Meece, 2006, p. 85-86). Furthermore, parental support can function as a mitigator to the impact of adolescents' relationship difficulties by enhancing a sense of competence and self-esteem (Steinberg, 2001). The family can also be an asset adolescents can draw upon when facing interpersonal challenges and provide a buffer against lower levels of social self-efficacy (DeLay et al., 2013).

Concerning gaming behavior, positive family relationships and parent-child connections are related to decreases in problematic gaming (Liau et al., 2015; Choo et al., 2015). However, the repercussions of negative family relationships may present themselves as problematic gaming through the mediating influence of less connection with beneficial relationships at school (Zhu et al., 2015). However, how family support is related to social self-efficacy in different types of gaming behavior is unclear and makes for an interesting exploration.

1.5 Purpose of the current study

Even though playing video games often is considered a socially accepted behavior for children (Verrastro et al., 2021), the forefront of scientific literature tends to present gaming as something anti-social and atypical, despite strong contradicting evidence (Carras et al., 2019). This suggests that the literature does not give the normality of youth playing video games the recognition they might deserve. Recognizing this normality underscores the need to look into gaming as a specter of behavior with possible different health outcomes.

New social interaction and behavioral norms emerge from rapid technological progress as the world moves forward. This calls for a need to incorporate social, societal, and individual contexts when researching gaming behavior (Carras et al., 2019). When facing new potential public health problems, creating supportive environments for health is essential (Green et al., 2019, p.2). Therefore, when children and adolescents partly leave the analog playgrounds

behind, health promoters should naturally reflect on these new, digital arenas and investigate *how* such digitalization can be associated with health and well-being in the young generation.

The present study will look at three categories of gaming behavior (highly engaged, problematic, and addicted), measured with the Gaming Addiction Scale (GAS; Lemmens et al., 2009). GAS and the different gaming behaviors will be further presented in chapter of central concepts (2.0). We want to investigate the relationship between the different gaming behaviors in GAS and social self-efficacy in a sample of Norwegian 8th-grade students. We further want to explore if and how family support impacts this relationship. By investigating these factors, we argue that this study can serve as a beneficial contribution to research in health promotion and health psychology directed at youth gamers.

2.0 Central concepts

The field of gaming behavior has a wide variety of terminology. Therefore, it is important to be clear on which terms are being used and the terminological characteristics. Different types of gaming behavior have different definitions, so researchers can recognize and differentiate them from other definitions when reading and assessing the literature. In this chapter, we will clarify the concepts that are central to the present study.

2.1 Gaming behavior

In the present study, *gaming behavior* will serve as an umbrella term for the behavior of playing games on either PC, console, or handheld devices. Furthermore, the term will also be used as a general term for the three main behavioral categories in the Gaming Addiction Scale (GAS) (see chapter 2.2): highly engaged, problematic, and addicted gaming behavior.

2.1.1 Gamer

When referring to individuals or samples of individuals who practice video game behavior, the present study will use "gamer." This term will further be used in combination with other terminology such as the GAS categories (e.g., "addicted gamer" and "highly engaged gamer").

2.2 GAS and the CORE-4 approach

The Gaming Addiction Scale (GAS) was constructed by Lemmens et al. (2009) to give the research field the necessary tools to reflect upon central aspects of addiction and their consequences on psychosocial outcomes. GAS comprises seven items (short version), each of them reflecting one of the following criteria for addiction in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5): Salience, tolerance, mood modification, withdrawal, relapse, conflict, and problems (Lemmens et al., 2009).

Further, building on Charlton and Danforth's (2007) work with their CORE-4 approach, where they, through factor analysis, tested the validity of addictive criteria, it has been argued that these seven criteria (items) should be separated into *peripheral and core criteria*

(Charlton, 2002; Charlton & Danforth 2007; 2010). The *peripheral criteria for video game addiction* consist of salience, tolerance, and mood modification. In comparison, those more specifically related to the core of addiction consist of withdrawal, relapse, conflict, and problems. Behavior is categorized as *highly engaged, problematic*, or *addicted* in their gaming behavior depending on which core and peripheral criteria they meet.

2.2.1 Highly engaged gamer

Highly engaged gamers refer to respondents who met all the peripheral criteria (salience, tolerance, and mood modification) but no more than one of the core criteria for addiction in GAS (Charlton & Danforth, 2007; Brunborg et al., 2015). Highly engaged gamers are defined as non-pathological (Charlton, 2002).

2.2.2 Problematic gamer

Respondents who fall into the problematic category refer to respondents who endorsed two or three of the core criteria (withdrawal, relapse, conflict, and problems) of GAS. This group will have pathological symptoms (Charlton & Danforth, 2007; Brunborg et al., 2013).

2.2.3 Addicted gamer

In the present study, the respondents who endorse all core criteria (withdrawal, relapse, conflict, and problems) of GAS are regarded as addicted gamers (Charlton & Danforth, 2007; Brunborg et al., 2013). Addicted gamers are defined as having a pathological condition (Charlton, 2002).

2.2.4 Reference group

The respondents who do not meet GAS criteria and therefore don't fall into any of the three groups (highly engaged gamer, problem gamer, or addicted gamer) will serve as the reference group. The reference group can exhibit a gaming behavior and therefore be viewed as a gamer, but only to the degree to which this gaming behavior is viewed as non-problematic/non-engaged in terms of GAS criteria (Brunborg et al., 2013).

2.3 Pathological Gaming

Pathological gaming can be described as "persistent, recurrent, and excessive involvement with computer- or video games that cannot be controlled, despite associated problems" (Griffiths, 2005; Lemmens et al., 2009 in Lemmens et al., 2015) and is associated with gaming as a clinical diagnosis. Currently, clinicians use two definitions to diagnose pathologic video game-related behavior: *Internet gaming disorder* (IGD) and *gaming disorder* (GD). These are included in different diagnostic tools to classify illnesses and disorders (DSM and ICD, respectively). The difference between the two lies in their respective *criteria* (Jo et al., 2019). These two clinical diagnoses are important to clarify because they share several characteristics with the Gaming Addiction Scale (Lemmens et al., 2009; Lemmens et al., 2015; World Health Organization, 2018).

2.3.1 Internet Gaming Disorder

IGD is found in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) 5th edition. DSM is, in many countries, the main diagnostic tool for psychologists and psychiatrists to classify psychiatric disorders (Lemmens et al., 2015). In the most recent edition, DSM-5, the American Psychiatric Association (APA) introduced IGD as a tentative disorder when changing some of the criteria and descriptions of pathological behaviors. An IGD-diagnosis is related to internet games alone, which excludes consideration of excessive use, e.g., online gambling or other internet use (American Psychiatric Association, 2013). Furthermore, IGD also addresses offline computerized games that are not played over the internet, although this category of video game behavior has been less researched (Lemmens et al., 2015).

In assessing IGD, there are nine criteria provided by the DSM-5, illustrated in the table below. The first six criteria have been adopted for assessing pathological *gambling*, including biological concepts of *withdrawal* and *tolerance* (often associated with substance use). The three last criteria are diagnostic indicators of dysfunction (Lemmens et al., 2015).

Table 1

Criteria descriptions for Internet Gaming Disorder (Lemmens et al, 2015).

INTERNET GAMING DISORDER (DSM-5)	
Criterion	Description
Preoccupation	Preoccupation relates to being all-absorbed by gaming and spending substantial amounts of time thinking or fantasizing about gaming during times of nonplay
Tolerance	Tolerance is characterized by an increasing amount of time spent on games to feel their desired effects (e.g., Excitement, satisfaction).
Withdrawal	Withdrawal refers to symptoms that emerge when unable to play or attempting to cut down or stop gaming. Symptoms typically involve feeling restless, irritated, angry, frustrated, anxious or sad.
Persistence	Persistence entails an enduring desire for gaming or unsuccessful attempts to stop, control or reduce gaming.
Escape	Escape relates to engaging in a behavior to escape from or relieve negative mood states, such as helplessness, guilt, anxiety or depression.
Problems	This criterion refers to continued gaming despite being aware of negative consequences of this behavior for central areas of life
Deception	Deception refers to individuals lying to others about, or covering up the extent of, their gaming behaviors
Displacement	The gaming behavior dominates, with a resulting diminishment of other social and recreational activities.
Conflict	This Reflects more substantial issues as a result of gaming, referring to losing, or nearly losing an important relationship or opportunity related to schooling or employment.

The DSM-5 states that the video game behavior must cause clinically significant impairment in the individual for a diagnosis (Lemmens et al., 2015). "Clinically significant impairment" means that five of the nine criteria have been met by an individual, generally within 12 months.

2.3.2 Gaming Disorder

GD is found in the *International Classification of Diseases and Related Health Problems* (World Health Organization, 2018). In the 11th final revision (ICD-11) released in 2018, WHO included GD as a diagnosis code for game addiction and stated it should be regarded as

a *behavioral* addictive disorder. In other words, the concept of diagnosis is based on pathological aspects in an impairment of practical functioning and does not include definitions related to biology. The biological concepts of *withdrawal* and *tolerance* in diagnosing GD are not included. Moreover, WHO has specified exclusion criteria when diagnosing GD in the ICD-11, e.g., bipolar disorder type I and II (Jo et al., 2019). For diagnosing GD, the ICD-11 criteria are illustrated in the table below. Here, the criteria are fewer than in IGD, but similar phrasing can be recognized in both sets of diagnostic criteria. To be diagnosed with GD, an individual must display all three symptoms, generally within 12 months.

Table 2

Criteria descriptions for Gaming Disorder (World Health Organization, 2018).

GAMING DISORDER (ICD-11)	
Criterion	Description
Impaired control over gaming	Impaired control over aspects such as frequency, intensity, duration and context of gaming.
Increasing priority	Gaming takes precedence over other life interests and daily activities, such as personal hygiene, school or occupation.
Problems	Continuation or escalation of gaming despite the occurrence of negative consequences

2.4 Psychosocial well-being

This study includes two specific constructs related to psychosocial well-being: *social self-efficacy* and *family support*. Psychosocial well-being is presented as a holistic dimension of health, with social self-efficacy and family support as important contributors.

Psychosocial well-being is a multidimensional construct composed of social, psychological, and subjective components that impact individuals' capability to reach their true potential as functional members of society (Kumar, 2020). The construct has incorporated physical, social, mental, emotional, cultural, spiritual, and economic determinants of health and includes coping with perceived stress factors of everyday living (Kumar, 2020).

2.4.1 Social self-efficacy

An underlying causal mechanism in Bandura's social-cognitive theory (SCT; Bandura, 1982) is self-efficacy, which he defines in the following terms: "Perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1982). *Self-efficacy* in the social domain can be defined as an individual's confidence in one's capacity to engage in social interactions and to have the acquired set of "social skills" needed to initiate and maintain interpersonal relationships (Smith & Betz, 2000).

2.4.2 Family support

Family support is a form of social support. Social support refers to the availability and provision of support within an individual's social network. In this regard, one can define *family support* as to how family members provide adolescents with assistance and support through their actions (Heerde et al., 2015). In the present study, family support is measured with the same instrument as the "Health Behavior in School-age Children" (HBSC) survey. These derive from subscales of the Multidimensional Scale of Perceived Social Support (MSPSS), which measure to which degree help and emotional support from family members is perceived as available (Haug et al., 2020).

3.0 Theoretical framework

In this chapter, the theoretical framework for this study is presented. This includes Bronfenbrenner's Ecological Systems Theory and the Social Compensation Hypothesis (SCH). The theoretical framework will be explained in general terms and then linked more specifically to the central themes of this study and the field of health promotion.

3.1 Ecological systems theory

The importance of placing youth development in physical and social contexts was recognized by American psychologist Urie Bronfenbrenner (1977). Bronfenbrenner was a critic of earlier developmental theories, emphasizing the poor validity of laboratory settings as research environments due to the unidirectional nature of the studies (the effect of X on Y). Instead, he recognized that rather than looking at the possible impact X could have on Y, one should look at the reciprocal relationship between X and Y and also consider the influence of potential third parties (Bronfenbrenner, 1974). His work acknowledged wider influencing factors, going beyond individual developmental factors and considering the context and ecology in which the development occurs. Based on these dynamics between environment and individual development, he suggested the "Ecological Systems Theory," containing layers of systems revolving around the individual (Bronfenbrenner, 1977).

As illustrated in figure 1, the microsystem is closest to the individual in the center, which is its immediate surroundings, such as teachers, family, and friends. These relationships are bi-directional, where the individual can influence their immediate surroundings and vice versa. Important for the present study is that joint effects and interactions between the child's microsystems (family, friends, online associations) affect each other, highlighting that events in one system may affect behavior and development in another (Bronfenbrenner, 1977).

These interactions between microsystems comprise the next level of the ecological systems theory: the *mesosystem.* The mesosystem is reciprocal relationship between influencing factors in the microsystems, where relationships can affect each other. Examples of this can be that your friend's relationships with each other can affect your relationship with your friends, or if your parents and teachers get along well, it may positively impact you getting followed up at school (Bronfenbrenner, 1977).

The next level is the exosystem and can consist of the neighborhood, services, or different kinds of communities. The exosystem incorporates social structures that do not directly contain the child but still impact them indirectly by affecting one or more microsystems. The outermost system surrounding the individual is the macrosystem. This system emphasizes the effects of geographic location, culture, ethnicity, wealth, and poverty.

3.1.1 An ecological approach to health promotion

During the development of how we view public health, there ensued an adoption of the Ottawa Charter for Health promotion in 1986, which helped build an idea that health should be promoted through an essential combination of healthy public policy and education (WHO, 2012). This approach was fed by accumulated research that found many aspects of life that were out of the individual's control could greatly determine the individual's health outcomes and level of well-being (Mittelmark, 2012, p.14). Mittelmark further argues that an ecological view of health is preferable, and that health promoters should pay attention to biopsychosocial factors on all levels of the model. The model from ecological systems theory has been developed and made relevant for work in the health promotion field today, illustrated in the model below:

Figure 1

Ecological systems model (Mittelmark, 2012, p.12)
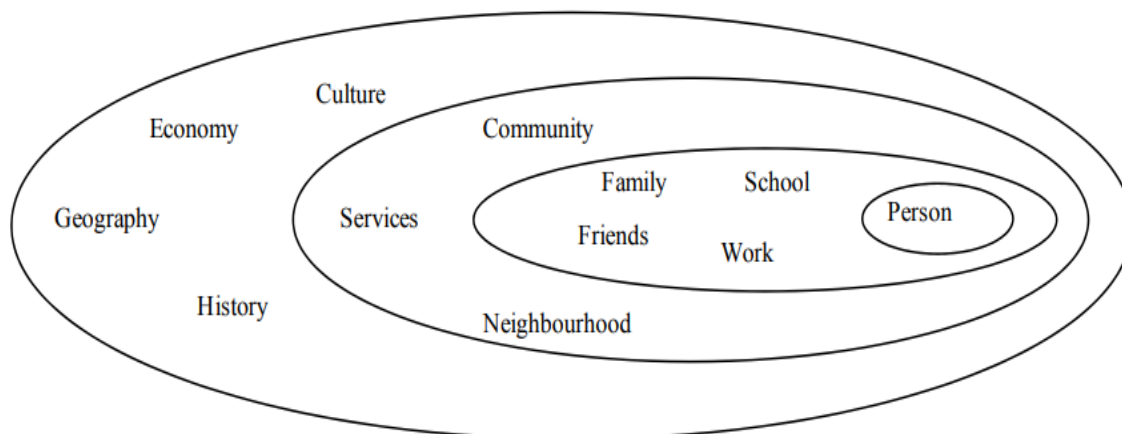
Mittelmark (2012, p. 12) advocates for using ecological models in health research rather than causal models, as models of causal processes tend to oversimplify reality. He argues that in disciplines contributing to health promotion research, one should be skeptical of simple associations. Health promoters should instead seek to identify *why* two variables correlate and shed light on the specific mechanisms that contribute to the correlation (Mittelmark, 2012, p. 12). In determining public health, models that consider social and physical environments play an important role, as they embrace intra-personal, psychosocial, and sociocultural processes that influence health behaviors (Sallis et al., 2015).

3.1.2 An ecological approach in the present study

Placing adolescent gamers in such contexts within Bronfenbrenner's theory can help illustrate how ecological systems, such as family and peers, contribute to shaping their behavior. In previous research, the family microsystem is significantly associated with several relevant concepts in the present study. Parent-child connection and positive views of the family situation are negatively associated with problem gaming (Liau et al., 2015; Choo et al., 2015). Taking part in social activities with parents has been found to be negatively associated with game addiction (Jeong & Kim, 2011).

Regarding health outcomes specifically, family support is a protective factor against the negative effects of electronic media use (Boniel-Nissim et al., 2014). It is positively associated with prosocial behavior and self-efficacy (Whitbeck, 1987). Ecological systems theory will serve as a useful reference model for discussing social self-efficacy and how it can take place in both the real world and online microsystems (Cheng et al., 2018; Yee, 2007). As lack of social support in real-world microsystems could cause more people to seek social interactions online (Young & De Abreau, 2010), implications are made for adding the Social Compensation Hypothesis to the present study's theoretical framework.

3.2 Social Compensation Hypothesis

The Social Compensation Hypothesis (SCH) emphasizes that people who perceive their real-life social networks, and friendships to be inadequate, compensate by using more time online. By spending more time online, they develop networks and friendships in the digital world

that substitute the real world's social stimulus (Valkenburg et al., 2005; Valkenburg & Peters, 2007).

In a real-world social setting, such as the classroom, it may be hard to find other classmates who share one's interests. But in the gaming space, an individual will play a game based on interest. Further, the gamer will most likely join a community with other gamers who play the same game. By doing this, they already know there is a shared interest in this group of gamers towards this specific game. This shared interest in the game may function as a "gate-opener." Since this interest in the game is present as a shared interest, it may enable gaming youth the needed confidence to further explore what other interests they might share, resulting in a head-start to a relationship (Mckenna et al., 2002).

SCH highlights that internet usage will be particularly high for introverted youth who find it hard to develop friendships in real-life settings. What makes youth socially anxious and having a hard time with real-life friendship bonding is complex. SCH argues that some of this complexity in the real-life environment is reduced online. For example, reduced visual cues (e.g., optional to show your face) when communicating may remove some of the barriers to social interaction, resulting in youth overcoming the shyness and anxiousness that they experience in real-life interactions (Mckenna et al., 2002).

In the following chapter, SCH and gaming are linked. It highlights how gaming can function as a digital platform that helps youth remove barriers between themselves and social interaction.

3.2.1 Gaming as a compensating activity

Support for this theory goes back to Bandura's social learning theory, as it allows the gamers to observe, rehearse and gain feedback on a wide variety of social strategies from the safe arena of their homes (Bowman & Tamborini, 2012). Advocates for SCH emphasize the need to acknowledge gaming as a compensatory activity rather than displacing other forms of social activities. They argue that the unique characteristics of video games (e.g., anonymity, communicative flexibility, presence of shared activity/meaning) provide a space that particularly appeals to individuals who may feel anxious in "face-to-face" social situations (Chak & Leung, 2004; Mckenna & Bargh, 2000; Peters & Malesky, 2008). From the SCH

perspective, one could argue that rather than displacing youth from social activities, video games provide an alternative (more adaptive) arena for some.

3.2.2 SCH through a health-promoting lens

This study sets its focus on the social dimension of health. Social health relates to the sense of having support available from family and friends. For instance, this could mean having someone to talk to or do activities (e.g., play video games) with (Naidoo & Wills, 2016, p. 4). The SCH was considered a relevant theoretical framework to discuss the social aspects of gaming and how this activity may provide an alternative social arena. This alternative social arena may function as compensation for young gamers who lack real-world social interaction. By acknowledging the central aspects of SCH, the present study will linger with the main thoughts on how gaming can serve as a health-promoting activity that serves as a central component for the development of the social health dimension in gaming youth.

4.0 Literature review

A literature review is a process where the researcher searches for and acquires literature related to a specific question and then comprehensively studies and interprets the findings. A literature review is a piece of research on its own and has a specific method that should be documented in full, as in any piece of research (Aveyard, 2019, p.2-3). It is important in a literature review to illustrate and document the method used. This includes how we intended to answer the question, what strategy we use for the search, the methods of selecting and including relevant articles, and a brief literature analysis (Aveyard, 2019, p.3-4).

4.1 Search strategy

Central topics that would be interesting to write about had already been identified when starting a literature review, so we used some time to discuss these topics to arrive at something more specific. We decided to first read about the general characteristics of different gaming behaviors and aspects of psychosocial well-being in youth populations, which accumulated words we could utilize in a systematic search.

To guide the systematic search, we used "PICO," a tool designed to help structure and develop research questions and critical evaluation of the literature (Folkehelseinstituttet, 2016; Aveyard, 2019, p.33). PICO breaks the research question down into distinct components (**P**opulation, **I**ntervention/Issue, **C**omparison/Context, and **O**utcome), which can be developed into broader or more narrow concepts the researcher can include in the systematic search.

The PICO-acronym is dynamic. This means that depending on the study; researchers can exclude components, e.g., in exploratory research, C (comparison) can be excluded if the researchers lack the knowledge to know the potentially relevant reference points (Aveyard, 2019, p.32). Our PICO table ended up as a PIO table, illustrated below, containing search words identified in the initial reading:

Table 3

PIO-table of search words for the systematic search.

Population	**I**ssue	**O**utcome
"Youth"	"Gaming"	"Psychosocial well-being"
"Youngsters"	"Gaming behavior"	"Psychosocial health"
"Adolescent*"	"Video game behavior"	"Mental health"
"Child*"	"Video game activity"	"Mental well-being"
"Young adults"	"Gaming disorder"	"Social health"
"School age*"	"Internet gaming disorder"	"Social well-being"
	"Engaged gaming"	"Self-efficacy"
	"Highly engaged gaming"	"Life Satisfaction"
	"Problematic gaming"	
	"Addicted gamer"	
	"Gaming addiction"	
	"Video game addiction"	

Discovered keywords for secondary searches

	"Escapism"	"Happiness"
	"Pathological gaming"	"Self-esteem"
	"Compulsive digital gaming"	"Social self-efficacy"
		"Family support"

When it comes to population, the present study examines data from the Norwegian HBSC-survey, more specifically participants in the 8th grade (13-14 year-olds), which is why the literature review discusses a young population. Closely related terms were discussed, and we eventually came up with a total of six representative words in the "Population"- column.

When investigating which gaming behaviors could be relevant in the present study, we had a few holding points from the GAS scale to categorize gaming behavior into *engaged-*, *problem-* and *addicted* gamers (Haug et al., 2020; Lemmens et al., 2009). Combined with keywords found through initial searches, we ended up with 12 words for the behavior in the "Issue"-column. Furthermore, specific aspects of psychosocial well-being worth investigating were unclear when formulating the research question. After the initial searches and wide reading, we found related terms that provided insights and contributed to further expansion of words of our now eight search words in the "Outcome"-column. When new and possibly

relevant keywords surfaced, we placed them in an extension of the PICO table to separate the original systematic search from any secondary searches.

At this point, search words were established and were combined using *Boolean Operators*, which are simple words (AND, OR, NOT) that function as conjunctions between words in a systematic search (Aveyard, 2019, p.85). This literature review used boolean operators to expand the number of returned records using "OR" and simultaneously limit the search using "AND." Searching in this manner could prove time-saving since multiple searches are combined into a single one. Keywords in the population-, Issue-, and Outcome columns were first combined within their respective columns with "OR," and then all three columns were combined with "AND" (Aveyard, 2019, p.85).

When choosing databases to perform the search in, the selection of these must be deliberate and justified (Aveyard, 2019, p.83). For this literature review, three databases were chosen, all of which were found appropriate to the research question:

- *PsychINFO / Ovid* was selected because it covers the field of psychology and related disciplines within the social and behavioral sciences (APA PsycINFO, n.d.), which is arguably "spot-on" in terms of relevance for the research question.
- *Web of Science* was selected because it is described as a multidisciplinary database containing articles on science, social sciences, arts & humanities, and emerging sources (Web of Science, n.d.), most of which could be relevant to the research question.
- *PubMed* was included since it includes medical and health professions (Aveyard, 2019, p.81.). We wanted to check if this database could provide some relevant clinical insight on gaming behavior and related psychosocial well-being.

Word combinations and boolean operators were identically used when searching in each database. The only adaptation we performed varied between searching in "titles" alone or in "title/abstracts." This was done due to too many/too few/no results and seemed to provide an adequate amount of records returned. The search using PIO yielded the following results from each database:

Table 4

Number of screening-relevant articles from the systematic search.

PsycINFO	Pubmed	Web of Science	Total
$n = 218$	$n = 130$	$n = 49$	$n = 397$

Results were then screened to narrow down the number of articles included in the literature review. A PRISMA flow diagram (Figure 2) is usually used to present the selection process in systematic reviews (Moher et al., 2009). We decided to create a modified PRISMA flow diagram as it provides a clear illustration of the literature review process from start to finish (Figure 2). This process starts with identification of relevant articles, which is the number of results from the systematic search. Next, the articles found are screened for relevance in two steps: The first step is screening titles for relevance. The abstracts of the included articles from title screening are then screened for relevance. Screening of titles and abstracts is followed by full text assessments of the articles to assess eligibility for inclusion in this study (Moher et al., 2009). A large amount of articles were excluded in the eligibility assessment. Therefore more literature had to be included through secondary searches.

Figure 2

Modified PRISMA flow diagram of the screening and inclusion process (Moher et al, 2009).
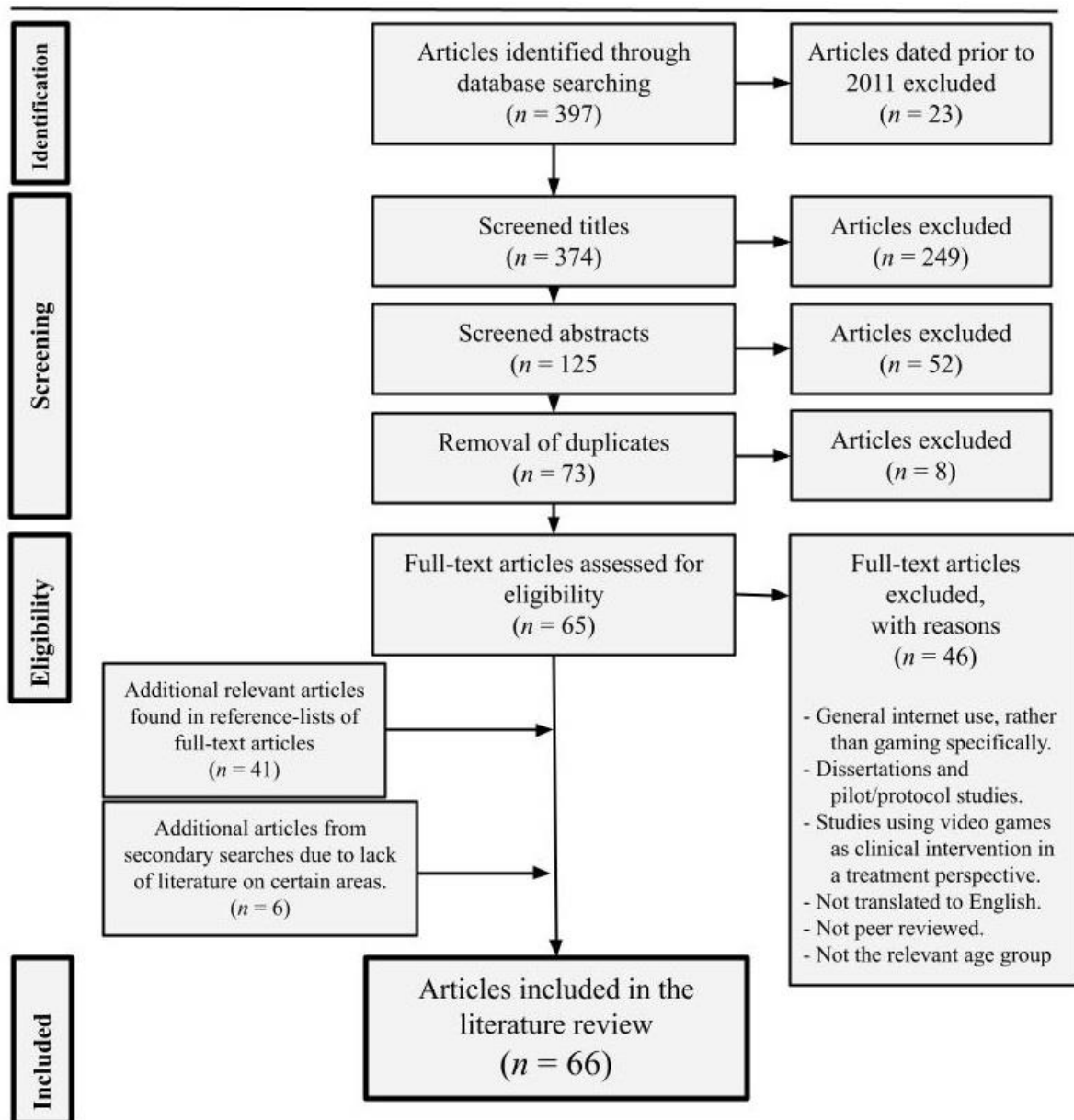
Secondary searches were performed to find more literature on "gaming and social self-efficacy", "highly engaged gaming behavior", and "Gaming and family support". There were primarily two reasons for this: (1) The systematic search provided insufficient information on the topic, or (2) the topic was given a larger role in the present study than anticipated and would therefore have to be further elaborated. These searches were not systematic and were intentionally wide in order to find research. At this point, family support was given a larger

role than anticipated, as we thought it could be interesting to explore how family support could impact the relationship we were investigating.

The systematic search resulted in the inclusion of 66 articles in total. The studies were divided into four themes:

1. Video game behavior related to aspects of psychosocial well-being where keywords in the articles were "social interaction", "self-efficacy", and social self-efficacy.
2. Psychosocial factors related to video game behavior, that were not characterized by keywords present in category 1.
3. Articles describing highly-engaged, problematic, and/or addicted gaming behavior.
4. Articles that included family factors related to gaming behavior.

4.1.1 Brief analysis of the search process

The literature broadened our understanding of the phenomenon of gaming among adolescents. It informed us of evident differences in the definition of gaming behaviors and the current scientific lack of consensus about its impact on psychosocial outcomes. Therefore, for this study, we first present a broad overview of the literature on defining gaming behavior, including the pathological diagnoses of gaming behavior, since these represent behavioral "extremes." This part focuses on what characteristics separate engagement from problems and addiction in adolescent gamers. Furthermore, the literature review will highlight psychosocial factors, social self-efficacy, prosocial behavior, and other health outcomes. Lastly, we look into how family situations play a role in the lives of gaming youth, how it is related to social self-efficacy,

4.1.2 Limitations in the search process

Due to the explorative nature of this search process, we frequently saw the need to include articles, which in turn accumulated an unanticipated amount of literature. We are aware that 66 articles could be too many to include on this academic level, which potentially can result in a too vague and imprecise presentation of the present study's central themes. However, Aveyard (2018, p.16) states that a literature review is a method used to understand the *body of the literature as a whole* in a certain research field. Therefore, we decided it would be better to include too much rather than too little to highlight more aspects of the central

concepts in this study. Furthermore, when lacking applicable literature results, we decided to include older literature than the initial ten-year frame. This could potentially present less applicable literature and comparable to today's context than more recent research.

4.2 Gaming behavior and prevalence

In Norway, reports from the national survey on children and media (Medietilsynet, 2016, p. 56) indicated that the number of 9-18-year-olds that engaged in video game activity in 2016 appeared to be exceptionally high, with a total of 86 percent, compared to 63 percent among 12-18-year-olds 12 years before (Johansson & Götestam, 2004). In 2016, there was a larger proportion of boys (96 percent) than girls (76 percent) who played video games in the ages 9-16 (Medietilsynet, 2016, p.56). Compared to the US, the number of US adolescents who engaged in video games increased from 58 percent in 2012 to 72 percent in 2018 (Caroux et al., 2015; Carras et al., 2019).

Results from the national survey on children and media use (Medietilsynet, 2016) also showed that the prevalence of gaming behavior decreased with age in the female population (88 percent of nine-year-olds played games, compared to 53 percent of the 16-year-olds), while the male population seemed to be unaffected by age. Moreover, 25 percent of boys and 18 percent of girls thought they spent too much time playing video games, whilst 65 percent and 71 percent, respectively, reported that they spent an "adequate" amount of time (Medietilsynet, 2016, p.27). Furthermore, participants reported a variety of favorite games, which were typically more creative games (e.g., Minecraft and The Sims) in the female and young male (9-11 y/o) populations, compared to more competitive online player vs. player games (e.g., Fifa, Counter-Strike, Call of Duty) progressively being more typical in the older aged male population (12-16 y/o) (Medietilsynet 2016, p.57).

When it comes to gaming behavior in a terminological sense, current literature contains a large variety of terms and different tools to assess and measure said behaviors. Since "gaming behavior" is considered an umbrella term for engaging in video game activity on any device, there is a need to point out and address the threshold where this behavior becomes problematic. The Gaming Addiction Scale (GAS) is the measuring tool for gaming behavior

in the dataset subject to analysis in the present study, and will be used as a holding point to navigate the literature (Lemmens et al., 2009).

4.3 GAS and the different categories of gaming behavior

Current literature suggests difficulties in differentiating between gaming behaviors among adolescents. Particularly, the literature seems conflicting on the threshold of distinguishing engaged gaming from addicted gaming. Central to this study is looking at the nuances of gaming behavior. To separate different types of gaming behavior, this study uses the 7-item Gaming Addiction Scale (GAS), and the literature on gaming behavior will therefore be presented with emphasis on these nuances.

The early work of Griffiths (2005) and Lemmens et al. (2009) suggested that for individuals who experienced all seven items of GAS, at least sometimes during the past six months, this would indicate a *video game addiction*. Since then, a lot of work has been done to test the validity of the scale (Brunborg et al., 2013, 2015; Wittek et al., 2015; Ferguson et al., 2011). Over time, this has resulted in the CORE-4 approach by Charlton and Danforths (2007; 2010) to make a clearer distinction between *peripheral* and *core* criteria (items) of addiction.

4.3.1 Separating engagement from addiction

This distinction has shown to be far from insignificant since the peripheral criteria seem to embrace those with high engagement in video gaming, whereas the core criteria relate to those with problematic or addictive video gaming behavior (Brunborg et al., 2013, 2015; Wittek et al., 2016). Brunborg and colleagues (2013) claim that addiction will *usually* involve high engagement but also argue that it is possible to be highly engaged without being addicted. This issue was addressed by Ferguson and his colleagues (2011) meta-analysis of game addiction prevalence. They estimated the prevalence of game addiction at 3.1 percent in what they regarded as the most precise estimate. However, there can be disparities in estimations of game addiction prevalence, which often can be owed to demographic and geographic factors (Gentile, 2009). The meta-analysis concluded that studies that exclusively focused on *core criteria* showed higher expected correlations with negative outcomes than studies using *peripheral* and *core* criteria. Based on these findings, Ferguson and his colleagues suggested future studies use the CORE-4 approach (Ferguson et al., 2011).

A notion in the field that is important to address is the clash of having two diagnoses for the same behavioral pattern. This has sparked disagreement in the scientific field and, therefore, limitations to related terminology for problematic gaming. Ferguson and Colwell (2020) investigated established consensus on pathological gaming in an online survey on a sample of scholars ($n = 214$), mainly within the disciplines of psychology (40,7%), games studies (17,3%), medicine/psychiatry (15,4%) and communication (8,4%). Results showed that 60% of the participants agreed, and 30% were skeptical that pathological gaming could be characterized as a mental health problem. However, only 50% of the scholars supported the validity of the DSM-5 criteria for diagnosing IGD, and 56% supported the ICD-11 criteria for GD. The majority of the participants were concerned about the potential over pathologizing of normal video gaming youth using the current diagnoses. Furthermore, IGD has been especially critiqued among scholars due to its application of criteria related to substance use (Bean et al., 2017, Quandt, 2017; Petry & O'Brien, 2013). Adding this to intrinsically unproblematic behavior may cause adolescents to be misclassified as pathological gamers when they, in reality, experience little to no negative functional consequences from gaming.

The launch of DSM has prompted some expressed concerns about having two systems for diagnosis. Considering that ICD is already a well-established tool for classifying illness, questions have arisen regarding why there is a need for the DSM-5. On the release of DSM-5, APA's Board of Directors was worried about the increased potential of over-pathologizing populations (Clay, 2013). Furthermore, some scholars argue that gaming disorder as a clinical diagnosis has been rushed, resulting in a diagnosis that may be incomplete. Consensus on the validity of a clinical diagnosis for gaming and which system is best for classifying this behavior has yet to be established, complicating the pathologic approach to video game behavior (Ferguson & Colwell, 2020).

The concerns about the over-pathologization of young, engaged gamers are supported by the two-wave longitudinal study of Peeters et al. (2019). They sought to investigate the stability and consistency of IGD criteria and psychosocial characteristics in a sample of 1928 adolescents (mean age = 13,3 years, 57% boys, 43% girls). They used latent class analysis (LCA), a statistical procedure to identify subgroups in populations, as a tool for assessing this in the 2016 wave(T1) and 2017 wave(T2). Results showed that the IGD scale seemed to differentiate well between three groups found in the latent class analysis: (1) recreational

gamers, (2) engaged gamers, and (3) problematic gamers. The measure was revealed to be consistent over time in adolescents (Peeters et al., 2019). In comparing IGD-criteria and the LCAs, the use of cut-off points for diagnosis in the DSM-5 criteria identified 29 boys in T1 and eight boys in T2 as having IGD. They concluded that if the groups formed from the LCAs were used, these boys would be identified as engaged gamers instead of being diagnosed with a pathological condition (Peeters et al., 2019).

The gradual increase in psychosocial difficulties in gaming youth (Brunborg et al., 2013) is supported by Snodgrass and his colleagues (2019) study. Through their cross-cultural study on Internet Gaming-related distress, they emphasize that there is a qualitative difference between engaged and addicted behaviors, showing that addiction is related to negative outcomes, whereas engagement is not. This qualitative difference between engaged and addicted gaming behaviors was not found in a Swedish cross-sectional study by André et al. (2020). In this study, GAS combined with CORE-4 was used to describe the characteristics of highly engaged-, problem-, and addicted gamers. André and her colleagues (2020) found that loneliness and considerations related to seeking treatment for psychological distress were more evident in all three groups than in the control groups. However, they found no significant difference in these variables between the groups of engaged and addicted gamers (André et al., 2020). When discussing the GAS categories for gaming behavior, it is important to look at them separately. GAS differentiates between the three behaviors through specific criteria, but to understand their respective *behavioral characteristics* and prevalence rates, the following chapter will delve into these differences.

4.3.2 Highly engaged gaming behavior

The *highly engaged gamer* can be regarded as the non-pathological category in GAS, which in theory has some distinguishable differences from addicted- and problem gamers. However, differentiating highly engaged gamers from the problem and addicted gamers has proved somewhat tricky in the research field (Brunborg et al., 2013). Due to uncertainties and differences (mainly the lack of consensus on symptoms and how to assess problematic gaming), clinicians may risk defining normal behavior as addictive (Aarseth et al., 2017). However, Brunborg and colleagues (2013) found that highly engaged gamers showed no greater risk of the assessed health complaints (feeling low, tired, nervous, exhausted, in a bad mood, irritable, afraid) compared to the non-problem/non-engaged group of respondents.

These findings suggest that it is *possible* to distinguish addicted and problem gamers with mental health complaints from highly engaged youth gamers. Furthermore, previous findings suggest that engaged gamers tend to be more emotionally stable (Charlton & Danforth, 2010) and perform better in school (Skoric et al., 2009). When accumulated evidence shows that several aspects of the two groups are different, they should be treated as such.

Furthermore, the IGD criteria "deceiving" and "relationship problems" were found to be less frequent in the engaged male gamers. In terms of psychosocial differences, problematic male gamers were more impulsive and less socially competent than the recreational and engaged gamers. Similar to Peeters and colleagues (2019), other research has found that problematic gamers often report more, and also other psychosocial problems (social anxiety, problems at school, and depression) than their engaged gamer counterparts (Van Rooij et al., 2017).

Moreover, some findings suggest that intense and overly time-consuming gaming behavior is not intrinsically negative and can instead be viewed as a positive and highly engaged behavioral pattern (Buiza-Aguado et al., 2018; Charlton & Danforth, 2007). This type of gaming pattern can have no significant clinical impairment to function if the diagnostic tool does not endorse withdrawal-relapse-conflict- and salience-criteria (Charlton & Danforth, 2007). This would create a more nuanced diagnostic approach that does not necessarily over-pathologize gaming behavior (Pontes et al., 2021).

4.3.3 Problematic gaming behavior

Problematic Video Gaming (PVG) is an umbrella term for when video games begin to involve negative consequences for the player. PVG comes in many shapes and forms, and the scientific field is overwhelmed by multiple terms, confusions, and controversies (Aarseth et al., 2017). In a recent publication by Griffiths (2016), co-authored by 28 other scholars in the field, the findings showed a major lack of consensus on what constitutes PVG. In order to describe PVG, it can be beneficial to take a closer look at the measurements, thresholds and common characteristics of behavior that falls under PVG.

During the last decade, there has been a strive to establish a common understanding of problematic gaming. An issue in establishing when and how gaming becomes a problem is that the act itself of playing video games is not inherently problematic (Lemmens et al.,

2015). What has been established, however, is that it does become problematic when it causes players to grow significantly dysfunctional in other aspects of life: When games cause harm to players' social functioning (when meaningful relationships in the "real world" are neglected to favor gaming), or when school or occupational responsibilities are forsaken because games are perceived as more important (Brunborg et al., 2013).

Brunborg and his colleagues (2013) analyzed data from the HBSC 2009/10 survey. They sought to identify the distribution of the different GAS behaviors in a sample of 1320 Norwegian eighth graders (632 boys, 688 girls) with a mean age of 13.6 (SD = 0.32). The CORE-4 approach was used to categorize gaming behavior as (1) *highly engaged gamers* (those who endorsed all three of the peripheral criteria but no more than one of the core criteria), (2) *problem gamers* (those who endorsed two or three of the core criteria), or (3) *addicted gamers* (those who endorsed all four core criteria). Lastly, there was a (4) contrast category of non-problem/non-engaged gamers that consisted of all others (Brunborg et al., 2013). Findings showed that 78 percent (1029) were in the contrast group, 4.9 percent (65) were highly engaged gamers, 12.9 percent (170) were problematic gamers, and 4.2 percent (56) were addicted gamers. Furthermore, the study evaluated several subjective health complaints and found that the groups of problematic and addicted gamers were more likely to have the risks of feeling low, feeling irritable or in a bad mood, feeling nervous, tired and exhausted, and to feeling afraid (Brunborg et al., 2013). GAS was used to assess gaming behavior in the study of Mentzoni et al. (2011) on 816 Norwegians. Results showed that 56 percent played video games regularly, whereas problematic use was reported by 4.1 percent. Game addiction was estimated to be 0.6 percent. Furthermore, being male and young was revealed as two strong predictors for problematic gaming.

4.3.4 Game addiction

The term "game addiction" is considered the most popular term to describe gaming behavior under GD/IGD. Interestingly enough, *addiction* can function as a "double-edged sword." Among players, developers, and reviewers, addicting components of a game get attributed to favorable properties, such as how fun and captivating a game is or how a game is characterized by enduring playability. However, game addiction can have destructive or pathological properties - and, as mentioned, properties related to substance use (Buiza-Aguado, 2018; Lemmens et al., 2015). There is a need for an evidence-based and critical

discussion on how video game addiction should be classified and possibilities for a common standard for assessment. Pontes (2018) argues that the only feasible way for video game addiction to exist is under a specific operational definition within a robust conceptual framework with the current evidence in mind. Video game addiction can have related harmful effects such as overall poorer psychosomatic health, lower levels of sociability, satisfaction with life and self-efficacy, decreased performance in academics, and increased levels of stress (Pontes, 2018).

Contrary to what is sometimes portrayed by the media, video game addiction as a disorder usually only affects a small proportion of gamers. Prevalence rates vary significantly from study to study (Mihara & Higuchi, 2017; Pontes, 2018). In Fam's (2018) systematic review of published studies on the prevalence of IGD among adolescents, the combined prevalence of IGD was 4.6%. Gender differences showed that the reported prevalence was higher among males (6.8%) than females (1.3%). In Mihara and Highuchi's (2017) systematic review of 37 cross-sectional and 13 longitudinal studies, the prevalence of IGD ranged from 0.7% to 27.5%. Males were found to have IGD more often than females in most studies, and younger populations rather than older showed higher prevalence in some studies. Relevant to the present study, Brunborg and his colleagues (2013) found a game addiction prevalence of 4.2 percent when using GAS in a sample of 8th-grade students using data from the HBSC survey. Prevalence of gaming addiction was higher among the boys (6.5 percent) than the girls (2.2 percent). This will make for a comparable reference point when discussing the findings in this study.

Many reasons can explain the discrepancies in game addiction between studies. For example, prevalence differences may occur from different study designs (majority is cross-sectional), type of assessment utilized (majority is self-report questionnaires), and the population assessed (gaming venues/communities have been common) (Pontes, 2018; Griffiths & Pontes, 2014). Discrepancies can manifest themselves in issues within the methodological and conceptual domains of studying video game addiction. Scientific opinions also vary on whether the best theoretical framework for this problematic behavior should be *an addiction*. Furthermore, the field disagrees on what the term of the disorder addressing this behavior should be and whether establishing a formal disorder for video game addiction is timely or not (Aarseth et al., 2017; Griffiths et al., 2017; Griffiths et al., 2016; Kuss et al., 2017).

Moreover, researchers disagree on a common approach to assessing video game addiction with enough reliability to accumulate comparative literature (Griffiths & Pontes, 2014). In a review of ($n = 63$) empirical studies on gaming addiction, the authors examined 18 different tools for psychometric assessment on 58415 participants (King et al., 2013). Results showed some issues in the comparability of the studies. King and his colleagues found (1) inconsistencies in the core indicators for addiction, (2) inconsistencies in cut-off scores when determining video game addiction, and (3) a lack of utilizing temporal dimensions (e.g., to point out change from one point in time to another) and (4) inconsistent or untested factor structure (King et al., 2013)

This study will follow the CORE-4 approach, which allows us to categorize gaming behavior in several categories, both pathological and non-pathological (Brunborg et al., 2015). This approach allows us to distinguish between severity in the pathological group, which ensures that engagement and addictive characteristics can be distinguished from each other, which ultimately can bring a more nuanced way of looking at different gaming behaviors (Charlton & Danforth, 2007, 2010).

4.4 Social self-efficacy

Social self-efficacy and related health outcomes will first be presented before highlighting literature on social self-efficacy in adolescents with gaming behavior. Selected studies also include general self-efficacy and prosocial behavior due to insufficient literature specifically on social self-efficacy related to gaming behavior.

4.4.1 Social self-efficacy as an indicator of health

Connolly (1989) investigated the relationship between social self-efficacy and mental health in three samples of adolescents. Sample 1 consisted of 87 high school students (mean age 15.81 y/o, 46% male, 54% female), sample 2 consisted of 76 high school students (mean age 15, 54% male, 46% female), and sample 3 consisted of 79 psychiatric facility residents (mean age 15.17, 63% male, 37% female). They measured social self-efficacy using the Social Self-Efficacy scale (S-EFF) and mental health using the Child Behavior Checklist (CBCL). Results showed high levels of social self-efficacy in all three samples. Across all samples, Connoly found a significant correlation between social self-efficacy and other aspects of the

self, including self-worth, feelings of competence, self-esteem, and perceived social acceptance.

Otto et al. (2017) investigated data from the longitudinal BELLA study in a sample of 1554 children and adolescents (mean age 13.9, 51% female, 49% male. They looked at the relationship between self-reported HRQOL and mental health and protective social factors on child and adolescent HRQOL at baseline and a 1-year and 2-year follow-up. The results revealed that self-efficacy, family climate, and social support positively correlated with HRQOL at baseline. In the longitudinal analysis, the 1- and 2-year follow-ups supported the baseline findings - that changes in self-efficacy correlated positively with changes in HRQOL over time (Otto et al., 2017). This finding is supported by Freire and Ferreria's study (2018), which found that self-efficacy had a direct positive impact on HRQOL.

That self-efficacy is a resource factor with a positive impact on the child's development and adolescent health aspects are supported by Muris and his colleagues' (2016) findings. They found self-efficacy, especially in the social domain, to be a protective factor against psychopathological problems and an important life skill to achieve positive development. Furthermore, self-efficacy as a *resource* for achieving health outcomes is highlighted by Green et al. (2019, p.160), who state that one's self-efficacy beliefs of performing healthy behavior will increase the likelihood of actually achieving health action goals.

4.4.2 Social self-efficacy and gaming

There seems to be limited scientific research on the relationship between *different* gaming behaviors and perceived SSE. This relationship has been examined in terms of game addiction, not including gaming behaviors equivalent to problematic and highly engaged behavior, implying a need for research to address this knowledge gap. Today, game developers make an increased effort to facilitate longer-term relationships between players by utilizing concepts of "groups," "clans," or "factions" (player founded communities), as well as internet-based technologies, such as chat channels and web forums (Przybylski et al., 2010). This social nature of today's games further underscores the need to look at the nuances in gaming behavior and include studies that look at game addiction and investigate gaming as a leisure time activity.

Williams et al. (2006) did a two-wave survey study on 347 participants investigating the social and civic impact of online gaming as a hobby. They found that for a small number of players in their study, the community members consisted of, to some degree at least, friends from real life and that gaming together in these communities played a central role in maintaining friendships. Other players, who started playing without any real-life friends in the game, highlighted how such communities made it possible to form new online friendships with people from different backgrounds through their mutual interest in the game (Williams et al., 2006). The view of these online relations is that they are as authentic as offline relations (Yee, 2007) and yield social capital in the same way as in "real world"-contexts (Williams, 2007). Social capital lies in the information, influence, and solidarity made available to the individual by his or her social relations (Adler & Kwon, 2002, p. 23). In Hussain and Griffiths' (2009) qualitative study, they interviewed 71 online gamers (19 females, 52 males), seeking to explore online gamers' attitudes, experiences, and feelings, related to gaming behavior as a leisure time activity. The findings showed how gamers used games as a tool for escaping negative feelings. The participants portrayed gaming as an alternative social platform that could provide access to fellowship and friendly relationships for people who might struggle socially in the real world (Hussain & Griffiths, 2009). Dindar & Akbulut (2015) conducted a cross-sectional study on gaming motivation in 5380 players of Massively Multiplayer Online First Person Shooter Games (MMOFPS). The vast majority (>98.5%) were males, with a mean age of 16 y/o. The results indicated that general self-efficacy predicted socialization, immersion, and achievement motivations. This could imply self-efficacy as a mediator in gamers' ability to achieve motivation for socialization through video games (Dindar & Akbulut, 2015)

More recent empirical studies provide support for these findings. Cheng and colleagues (2018) meta-analysis investigated the literature on IGD (related to game addiction) and psychosocial problems versus well-being. They found research indicating that online gamers often seek to make friends online or collaborate with other players to fulfill a group mission to gratify their needs for relatedness (Cheng et al., 2018; Yee, 2007). Furthermore, they found research showing that online games provide a platform that gamers deliberately use to connect and interact with others digitally (Lin et al., 2015). People with IGD tend to receive limited social support from their social networks in the real world and show powerful social motivations to engage in these online interactions (Chan & Cheng, 2016). Findings from Gentile et al. (2009) study showed a negative relationship between school performance and

possible reduction in social skills development in populations with pathological gaming behavior (Gentile et al., 2009).

Kaur (2018) investigated gender differences and the relationship between internet addiction (IA) and perceived SSE among adolescents. The study used an internet addiction test (IAT) and a scale of perceived social self-efficacy, which were administered to a total sample of 80 adolescents with an even gender distribution (40=males, 40=females) in the 15-19 years. Kaur's (2018) study revealed significant gender differences in the relationship. The mean value for females was higher on Internet Addiction and lowered on the reported SSE than males. Thus, the study concluded that the females were found to score higher on IA and lower on SSE for this investigated sample. The clear distinction between Kaur's (2018) study and the current study is that Kaur looks at IA, which encompasses almost all digital media usage (e.g., Facebook and Instagram), while the present study looks more specifically at different types of gaming behavior.

Festl and her colleagues (2013) did a large sample (n=4382) cross-sectional study in Germany, using the GAS instrument to measure gaming behavior. They found that high levels of gaming, especially when criteria for addiction are met, were significantly associated with weaker aspects of social self-efficacy among 580 adolescents, 1866 young adults, and 1936 old adults. Higher GAS scores predicted lower social competence, social integration, and sociability levels. This relationship was nearly equal for the different age groups, indicating that age differences do not affect (at least not significantly) the negative correlation between high GAS and low levels of self-efficacy in the social domain. Similarly, Jeong & Kim (2011) found that game addiction predicted lower levels of real-world social self-efficacy. However, they found that game addiction was associated with *higher* levels of social self-efficacy if the context was an online setting (Jeong & Kim, 2011).

4.4.3 Gaming and prosocial behavior

Several findings indicate that playing video games as a leisure time activity potentially fosters psychosocial benefits outside of the digital space, as well as facilitates a *context* for children to learn and master aspects of cooperation (Gentile et al., 2009; Russoniello et al., 2009a; Granic et al., 2014; Lobel et al., 2017). *Prosocial behavior* is a social behavior that benefits other people or society and may refer to actions such as helping and sharing

(Eisenberg & Spinrad, 2014, p. 17). Differing from traditional games, video games today hold potential for high levels of social interaction (with family, friends, or online with strangers in other countries or continents). Furthermore, video games also hold potential for *interventions* that promote well-being as a preventive tool for mental health problems in children and adolescents (Granic et al., 2014). In predicting prosocial behavior in adolescents, SSE may play a central role. For instance, an adolescent who has a high moral judgment maturity but lacks the beliefs to handle a social setting (low perceived SSE) may lack the needed confidence to act prosocially (Comunian & Gielen, 1995). Moreover, Wentzel (2014, p. 187-188) argues that SSE affects the general, emotional, and compliant aspects of prosocial behaviors. She further argues that individuals who judge themselves as capable of acting prosocially will feel empowered and confident to engage in such behaviors.

Gentile and his colleagues (2009) tested the hypothesis that playing prosocial video games would generally increase prosocial behavior. This hypothesis was tested by three different studies. The first study was a correlational study of video game habits and prosocial behaviors among Singaporean secondary school children. A total of (n = 446) with a mean age of 13 years. Since two out of six participating schools were boys' schools, the total sample consisted of 73% males. In this study, the teenager answered various surveys to map their prosocial and violent gaming activities (e.g., listing favorite games and how much they play). The results showed that prosocial gaming activity was positively correlated to prosocial behaviors and traits, consistent with the authors' hypothesis. The authors emphasize that the results support both the short-term and long-term General Learning Model as the results showed an increase in prosocial behavior by exposure to prosocial video games.

Study two was also a correlational study that consisted of two samples. Sample one consisted of 780 fifth graders (51% girls and 49% boys) with a mean age of 10.9. Sample two consisted of 1050 eighth and eleventh graders (51% boys and 49% girls) with a mean age of 13.6 (8th graders) and 16.6 (11th graders). The study demonstrates the predicted correlation between video game habits and real-world behavioral traits in adolescents. The findings show an association between prosocial gaming and prosocial behavior, supporting gaming activity as something that promotes socialization in youth. Study 2 strengthens the evidence base for the casual, long-term relationship between prosocial in-game learning to prosocial behavior in real-life settings.

Gentile et al. (2009) argue that short-term experimental studies are critical to provide evidence for causality and to highlight underlying processes that may influence long-term effects on gaming and social behavior. Study three therefore had an experimental study design and placed the participants (mean age = 19.2, 59% female & 41% male) into a prosocial video game, a violent video game, or a neutral video game (control group). Shortly after they are finished playing, the three groups are tested for the short-term effect of playing the games and their willingness to help their peers shortly after. The results showed that the gaming group with prosocial content was more helpful after playing.

Gentile and her colleagues (2009) argue that due to the complexity and realistic nature of the social contexts games today provide youth, it is reasonable to assume that the learned skills and prosocial behavior might be generalized to peer and family relationships outside the game itself (Gentile & Gentile, 2008; Gentile et al., 2009). An example of this was found in the study with a longitudinal study design that showed that children who played prosocial games at the beginning of the school year showed more helpful behaviors to their peers later that year. Gentile and his colleagues (2009) highlight that content matters more than the overall amount of time spent on gaming. Prosocial content in games increases prosocial thoughts and behaviors. However, Gentile et al. (2009) do not neglect the total effect time spent on gaming has on prosocial behaviors.

Hygen and her colleagues (2020) investigated the relationship between the quantity of time spent gaming and their social development. Their study investigated a sample of Norwegian 6-year-olds (n= 873) with a longitudinal approach, where they did a follow-up at the ages of 8, 10, and 12. Their study found that higher levels of gaming predicted lower levels of social competence in girls at age ten and lowered social competence in girls at age 12.These findings mitigate some of the concerns related to the adverse outcomes due to gaming on children's development in the social domain.

4.5 Family support

Strong family relationships have shown to function as a modifier for youth experiencing a variety of adversities and health problems (DeLay et al., 2013). The link between family support and adolescents' mental and social health has already been established in research (Favotto et al., 2019).

4.5.1 Family Support and Social Self-efficacy

Whitbeck (1987) interviewed 82 adolescents (42.7 percent males, 57.3 percent females) aged 9-15 about the effects of parental behavior on adolescent self-efficacy. Findings showed that parental support and promoting autonomy (e.g., allowing children to make choices about friendships) affected the child's SE in mainly two ways. Firstly, support and autonomy-granting gave the child a sense of worth and competence, which positively affected SE. Secondly, a positive parent-child relationship (specifically interaction variables) improved the children's concept of parenting efficacy, which ultimately could strengthen the effect of parental modeling. In addition to contributing to prosocial behavior, higher levels of self-efficacy may also improve the child's ability to refrain from antisocial behavior, behavior that may lead to engagement with deviant peers and harmful relations (Caprara et al., 2004).

Franco and Levitt (1998) studied 185 children with an even gender distribution and a mean age of 10.77 years (SD = 0.57). They investigated the relationship between support received from family and the friendship quality outside the family and if family support and friendship quality contributed uniquely to self-esteem. Results revealed family support to be a significant predictor of friendship quality. Support from non-parental adults in the family contributed only to the supportive and conflict resolution aspects of friendships, whereas parental figures contributed to all dimensions of friendship quality. Moreover, both friendship quality and family support were connected to self-esteem. This indicates that parents especially have an essential role in facilitating the child's ability to gain and maintain higher-quality friendships and increase their self-esteem (Franco & Levitt, 1998).

4.5.2 Family support and gaming

Boniel-Nissim et al. (2014) assessed the moderating effect supportive communication with parents had on adolescents' electronic media usage and life satisfaction. Their study is not specifically related to gaming activity but electronic media usage in general. However, since increased gaming and social media users have been found to have similar negative consequences and perceived aspects of well-being (Nilsson et al., 2022), it was deemed appropriate to include them. Boniel-Nissim et al. (2014) found that supportive parenting was more important than the total hours spent on the computer. It also showed that support from parents was more important than electronic media communication with friends (e.g., e-mail, chat, texting, and phone use). These findings indicate that support from parents serves as a

protective factor against the harmful effects of electronic media usage. These findings are consistent with other studies that show the quality of parental support and parent-child communication has a more significant effect on adolescents' well-being compared to the effect of friends (Helsen et al., 2000; Moreno et al., 2009).

In their longitudinal study, Zhu and colleagues (2015) findings suggest a dynamic relationship between gaming, family support, and social behavior that could make for exciting exploration. Their study sought to identify any underlying mediating mechanisms in the relationship between Internet game addiction (IGA) and the parent-adolescent relationship in 833 Chinese 7th-grade students (52% male, 48% female). The students completed questionnaires at three points between October 2012 to October 2013, where the questions revolved around IGA, deviant peer affiliations, school connectedness, and the relationship with their parents. Their findings indicated that the association between IGA and parent-adolescent relationships was non-significant.

However, low quality or negative parent-adolescent relationships indirectly predicted IGA through the mediating factors of decreased connectedness at school and increased deviant peer affiliations. The authors concluded that the lack of a significant *direct* relationship between family environments and problem gaming highlights the need to look at third-party factors. Bad family situations may affect gaming behavior through other social factors, such as lower social self-efficacy, connectedness (Zhu et al., 2015), and belonging in school (Schneider et al., 2017).

4.5.3 Problematic gaming and parent-child relationship

King & Delfabro (2017) examined how trust, communication, and alienation in the relationship of adolescents and their parents may be connected to symptoms of IGD. A total of 824 secondary school students (aged 12-17 years) evenly distributed by gender completed a survey on Internet gaming activities. The survey represented stage 2 of a large-scale cross-sectional survey project in Australia. The survey was based on the DSM-5 checklist criteria for IGD. The assessment involved the following measures and instruments: Internet Gaming Activities Survey (12-items scale to measure the frequency of internet gaming), Inventory of Parent and Peer Attachment (IPPA) (28-item scale to assess the relationship between the adolescents and their parents and close friends), and lastly, the IGD checklist (12-item to

assess problematic gaming behavior). The result showed a prevalence of IGD of 3.1 %. The results showed that adolescents with IGD reported less trust, communication, and greater anger and alienation in their family situation than adolescents without IGD. The parent and peer attachment did not predict IGD symptoms, nor did it mediate the relationship between time spent gaming and gaming problems (King & Delfabro, 2017).

Schneider et al. (2017) did a systematic review on family factors that might influence the likelihood of an adolescent becoming a problem gamer. The review included 14 studies, nine were cross-sectional survey studies, and the remaining five were longitudinal survey studies, with a follow-up at one year. Measures for gaming behavior varied from study to study (*pathological video gaming* deriving from pathological gambling measures in the DSM-IV and *internet game addiction* (IGA), and were, for the most part, conducted in South Korea and Singapore. The findings showed that, compared to regular gamers, problem gamers report less parental affection and more hostility (Kwon et al., 2011), less time engaged in social activities with parental figures (Jeong & Kim, 2011), lower quality parenting, and having worse family environments (Kim & Kim, 2015).

Jeong and Kim (2011) found in their survey of 600 South Korean adolescents engaging in social activities with parents that negative parental attitudes toward gaming were negatively associated with game addiction. Liau et al. (2015) reported in their longitudinal study of 3034 children and adolescents that parent-child connection and positive perceptions of the family situation showed a reduction in later problem gaming. These findings were similar to Choo and colleagues' (2015) longitudinal study on 2974 children and adolescents (M = 11.2 years old). They found that a greater fundamental parent-child relationship was associated with fewer symptoms of problem gaming.

4.5.4 Parents' knowledge and attitudes towards gaming

Some empirical studies investigated the association between parental knowledge and attitudes towards gaming and how parental involvement in gaming activity influenced problem gaming. Wu et al. (2016) did a cross-sectional study on 2104 Taiwanese adolescents (49.9% female, 50.1% male) who reported significant positive relationships between parental gaming (positive attitudes) and adolescent problem gaming. These findings indicate that the more parents are interested in video games, the more likely it is that their children will be problem

gamers. (Wu et al., 2016. These findings stand in contrast with other empirical evidence that found negative parental attitudes toward gaming to predict *more* symptoms of problematic gaming (Jeong & Kim, 2011)

A recent Ipsos-survey (2021) investigated gaming behavior in Norwegian youth (0-18 years old) and their parents' attitudes toward their gaming behavior. The data was collected in 2020-2021 and had a comprehensive database of (n =852) interviews in the targeted group, subtracted from a larger representative population sample (n = 2902). The study reported that 19% of the parents were worried about their child's gaming behavior. The main reasons behind the concerns from the parents were (1) too much time spent gaming, (2) concerns for possible addictive traits, and (3) their child becoming antisocial (Ipsos, 2021, p. 19). Furthermore, 43% of the parents reported that they had little to no knowledge of what they should do about their concerns about their child's gaming behavior. Parents who showed concerns about the possible harmful consequences excessive gaming may have for their child, experienced more conflict and disagreement when it came to regulation (parental supervision) of this behavior compared to the average (Ipsos, 2021, p. 20). A total of 44% of the parents reported that their child played more during the pandemic. These findings were most evident in homes where the child already played a lot (more than 4 hours every day). However, 28% reported that they believed the increased gaming during the pandemic had a positive effect on their child, while 21% reported it to have adverse effects (Ipsos, 2021, p. 27-28).

It seems reasonable to argue that in the future, more parents will play video games themselves and possibly have a more positive attitude towards gaming due to their gaming background, affecting parental modeling (Schneider et al., 2017). A Norwegian survey (Medietilsynet, 2016) assessed how much parents know about their children's video game activity, measured from "nothing" (1) to "a lot" (4). The results showed that the older the children were, the less the parents knew about their video games, as illustrated in figure 3 (Medietilsynet, 2016, p. 58). However, from 2014 to 2015, the proportion of Norwegian children reporting that their parents know "some"(3) or "a lot" (4) increased from 75 to 81 percent, and the proportion of children reporting that their parents know "little" (2) or "nothing" (1) decreased from 15 to 10 percent (Medietilsynet, 2016, p. 58).

Figure 3

Percentage of boys and girls' perception of their parents' gaming-knowledge

(Medietilsynet, 2016, p.58)
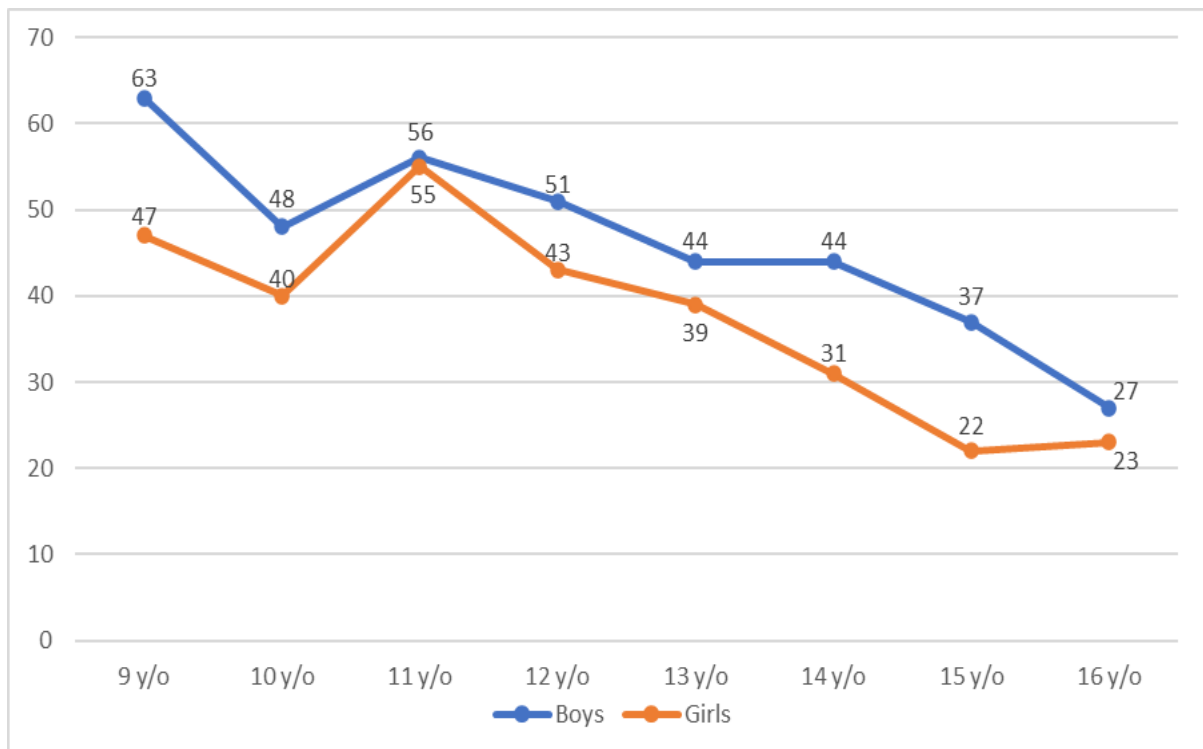
4.6 Summary of literature review

Current literature shows how popular and prevalent gaming is in today's youth (Carras et al., 2019; Medietilsynet, 2016, p.56). When it comes to gaming behavior in general, there is much variety in terms and tools to assess and measure the severity of this behavior. Relevant to the present study, several articles looked at GAS and the categories of highly engaged-, problematic-, and addicted gamers (Griffiths, 2005; Lemmens et al., 2009), some of which assessed the validity of the scale's addictive items (Brunborg et al., 2013, 2015; Wittek et al., 2015; Ferguson et al., 2011). This resulted in the inclusion of the CORE-4 approach (Charlton & Danforths, 2007; 2010) to make a more apparent distinction between engagement and addiction in gaming behavior.

The present study focuses on the psychosocial factors linked to social self-efficacy. Studies show how communities can serve a meaningful role in socialization (Barnett & Coulson, 2010; Williams et al., 2006), that the social aspect of gaming can be a central motive for

gaming behavior (Sherry et al., 2013), and that gaming itself can predict socialization (Dindar & Akbulut, 2015).

Some studies (Peeters et al., 2019; Van Rooij et al., 2017) pointed out more psychosocial challenges for the problem and addicted gamers compared to their engaged counterparts. These findings emphasize a knowledge gap in the research and the need to differentiate engaged, problematic, and addictive characteristics using the CORE-4 approach to fully understand psychosocial factors. Looking at the normality of gaming in Norway today (Medietilsynet, 2016, p 58) and the peripheral criteria of GAS (Lemmens et al., 2009), highly engaged gaming can arguably be regarded as a common behavior that is not very far from the reference group.

The included studies show uncertainties about the effect parent-child relationships have on gaming activities and that some of the reasons may lay in the complexity of measuring family situations (Schneider et al., 2017). However, doing worse socially is associated with problematic gaming (Brunborg et al., 2013). There is evidence of an association between bad parent-child relationships and problem gaming (Zhu et al., 2015; Schneider et al., 2017). This relationship is direct (Schneider et al., 2017) but also exists through the mediating impact of the child lacking social connection and obtaining harmful relations (deviant peers) (Zhu et al., 2015).

However, the possible moderating effect of family support on the association between GAS behaviors and social self-efficacy seems lacking. Based on research showing an association between solid family relationships and positive health outcomes (Delay et al., 2013; Stepanikova et al., 2020; Favotto et al., 2019), we hypothesized that gaming behaviors and perceived social self-efficacy in adolescents might be affected by family relationships. The hypothesis was exploratory and comprised that support from one's family *could* moderate this relationship and moderate it differently for each gaming behavior. Exploring such processes can be important for generating hypotheses for future research. This could benefit the development of an integrative theoretical framework that has the potential to address different third-party factors that could be related to different gaming behaviors.

4.7 Gaps and limitations of the literature review

For the first time, researchers who enter the field of gaming behavior are met with a lack of scholarly consensus on problematic gaming behavior, which naturally sparks confusion. The field is fraught with different definitions, terms, and measurement tools; therefore, the literature must be carefully navigated and interpreted when examining gaming behavior nuances.

Most of the existing studies are related to East Asian regions. A report by Lim (2012) shows that adolescents in these regions may be particularly vulnerable to problematic gaming behavior due to cultural and political structures. Lim (2012) argues that the declining birth rate and single-child family structure, especially the policy in China, might have increased the cultural and familial pressures to succeed academically. This might provide a context in which adolescents feel more lonely, stressed, and ashamed as they cannot fulfill their parents' high expectations, which again might result in a retreat to online gaming. These peculiar contextual and structural factors might contribute to the lower generalizability of these findings to other contexts (Lim, 2012).

Furthermore, the results in this literature review were lacking in recent research on highly engaged gaming and real-world SSE. This led to the inclusion of articles older than the set time frame of 10 years, lacking other alternatives. Several findings regarding the relationship between gaming and SSE present SSE in a digital world (e.g., making friends in an online community). They did not necessarily point out transferability to the real world (e.g., making friends in a classroom setting). Furthermore, the literature seemed lacking in sufficiently isolating highly engaged gaming behavior (highly engaged gamers were most of the time viewed in *the context* of problem- and addicted gamers in GAS).

Although this literature review included some longitudinal studies, most articles were cross-sectional. Correlation cannot be determined in cross-sectional studies as they only portray a snapshot in time. Either variable might precede the other, or a third unforeseen variable might be significant in explaining the relationships (Field, 2018, p.16). Especially in young populations, where most personal characteristics go through radical change (Moksnes et al., 2013), gaming behavior's development, stability, and consistency cannot necessarily be fully addressed through a cross-sectional study design that only depicts a snapshot in time. We

want to add to other literature that calls out a need for more longitudinal studies - like Peeters and his colleagues (2019) put it:

> A decline in symptoms of problematic gaming behavior, a phenomenon also known as "maturing out", could be particularly prevalent in a group of young adolescents among who engaged gaming might be part of a transient youth culture. Therefore, *evaluating stability of symptoms over time* [emphasis added] seems to be an important first step [in further research], before differences in psychosocial well-being are considered. (Peeters et al, 2019)

5.0 Research Questions

Based on our literature review, we hypothesized that social self-efficacy, when compared to the reference group, is similar in the highly engaged group, lower in the problematic group, and lowest in the addicted group. We further had an exploratory hypothesis that family support would moderate the relationship between GAS behaviors and social self-efficacy. We hypothesized that low family support would amplify the negative effects of all gaming behaviors on SSE and that high family support would mitigate the negative effects of all gaming behaviors on SSE. We also wanted to explore if family support was a greater protective factor for the addicted group than for the highly engaged group regarding SSE outcomes. Based on these hypotheses, this study will attempt to answer the following research questions

1. *How many of the participants are addicted gamers, problem gamers, highly engaged gamers, or in the control group, and are there differences in gender?*

2. *What is the relationship between the different categories of gaming behavior and reported social self-efficacy, when controlling for gender and family support?*

3. *To which degree does family support function as a moderator for social self-efficacy in the different gaming groups?*

6.0 Methodology

The methodology lies at the foundation of research and hereunder the methodological *approach* to the research. To ensure high quality in the study, it is crucial to use a reliable method (Neumann, 2014, p.26). Social science is nuanced and complex and composed of multiple approaches, each with philosophical assumptions and bearings on the best research. To simplify the discussion of which is best, Neuman (2014, p.96) identified three approaches representing the core ideas and ideal types of understanding social reality: *Positivist social science, interpretive social science,* and *critical social science*, each independently building on diverse research techniques and social theories. In practicing research, social researchers can decide to mix and match elements from each approach into their work (Neuman, 2014, p.96).

6.1 A paradigm for research

Whether positivist, interpretive or critical, an approach has many of the same properties as a scientific paradigm. The term 'paradigm' has proven difficult to give a clear and obvious definition since Thomas Kuhn first introduced it in 1962 (Kuhn, 1970). Therefore, the most common and universal one will be used: "A basic set of beliefs that guides action, whether of the everyday garden variety or action in connection with a disciplined inquiry." (Guba, 1990, p. 17). The mentioned beliefs and actions are mainly affected by three central questions, as Guba (1990, p. 18) defines like this:

1. *Ontological:* What is the nature of the "knowable" Or what is the nature of "reality"?
2. *Epistemological:* What is the nature of the relationship between the knower (the inquirer) and the known (or knowable)?
3. *Methodological:* How should the inquirer find out knowledge?

Put simply; these questions look into what the "reality" is like (ontology), how this reality is affected by its relationship to the researcher (epistemology), and what tools the researcher can use when investigating truths about reality (methodology) (Punch, 2014, p. 15). A 'paradigm' is first appropriate when a high level of professional consensus exists in a specific community of scholars relating to the mentioned central questions (Kuhn, 1970, p. 10-11). Kuhn (1970)

further emphasizes the relation of paradigms to philosophical assumptions in the following way:

Effective research scarcely begins before a scientific community thinks it has   acquired firm answers to questions like the following: What are the fundamental entities of which the universe is composed? How do these interact with each other and with the senses? What questions may be legitimately asked about such entities and what techniques employed in seeking solutions? (Kuhn, 1970, p. 4-5).

Accepting Kuhn's thoughts, one could argue that a simplification of this is that a paradigm serves as the starting point that defines what research is and how it should be practiced. Further, Kuhn highlights the interactions, where human behaviors are a central component. This makes it impossible to prove a paradigm as an absolute truth or something absolute untrue in any foundational sense since it constitutes human constructions and thus is subject to all errors and weaknesses associated with human behaviors (Guba, 1990, p. 18-19).

6.1.1 The post-positivist approach

For this thesis, the post-positivist approach will serve as the fundament for questions related to what we define as our research and how we came to practice it. The following chapters delve into the central aspects of post positivism *ontology, epistemology,* and *methodology*. More specifically, it emphasizes these three core components through the historical development from positivism to post-positivism and the following consequences on how scientific truths are discovered and presented due to this development.

Post-positivism is a critique of both the ontological and epistemological foundations of theories of knowledge. It is a range of perspectives that have in common a rejection of the positivist claims to be able to discern a single social reality and to observation as the sole technique for its discernment. (Fox, 2008)

In the late nineteenth and early twentieth century, the work of sociologist Max Weber held an early revelation of post-positivism. He acknowledged that the observer could not fully understand social reality. He developed the concept of *verstehen,* or "understanding," a process that aims to understand the subjects' views on the intentions and contexts of their

perceived social reality (Burger, 1977). This phrasing contains elements of both interpretive social science (applying people's perception of social reality to a broader understanding of social order) and a constructivist approach (recognizing that concepts, values, and norms of social reality are constructed individually or collectively).

Furthermore, these early thoughts of Weber are recognizable in critical realism as realists differentiate "realities" into the *real,* the *actual*, and the *empirical.* The *actual* events that occur in the world naturally. While the *empirical* is just a part of these actual events, we (researchers) choose to observe closely and give meaning. Behind these events lay the objects that exist and thus may be considered *real,* for example, people (physical) and families (social structures) (Manicas, 1998, p. 317; Guba, 1990, p.20). That being said, to state anything about the existence of people or their social structures, critical realists argue that their *effects* require observing, or, as Weber would put it: *Verstehen* (understanding) (Sorrell, 2018; Burger, 1977).

Post-positivism in social sciences was later linked to phenomenology, which sparked further development of a sociology of knowledge that would serve as an opposing force to the objectiveness of positivism. Thomas Kuhn was a big contributor to this development. His philosophy of science has been part of paving the way for post-positivist research by recognizing the social nature of producing scientific knowledge in both social and natural sciences (Fox, 2008).

Regarding the *ontological* question, post-positivism has moved away from the old positivist fashion, now regarded as a naive realist way of making judgments about reality, towards the way of critical realism (Guba, 1990, p.20). Core principles of this position highlight that even though a real-world, driven by natural forces, exists, we must acknowledge that it is impossible for humans to truly perceive it due to our limitations (Cook & Campbell, 1979, p. 29). By acknowledging Cook and Campbell's (1979, p. 29) arguments of human limitations, especially in the sensory and intellective mechanism, researchers need to be critical about their work in discovering the truth. Even though post-positivists accept these difficulties in discovering the ultimate truth, they still perceive this truth to be "out there," waiting to be discovered (but also interpreted), and thus realism remains the central concept (Guba, 1990, p. 20).

6.2 methodological approach and design

When it comes to the *methodological* question of how one should go about and find knowledge (Guba, 1990, p.18), one should apply an appropriate research design. Research design can be described as the chosen method for testing a hypothesis. Most of the time, this can be done in one of two ways: Observe what naturally happens through correlational/cross-sectional design or manipulate one variable and examine its effect on another through experimental design (Field, 2018, p.16).

The present study has a cross-sectional research design as it examines variables in already extracted, cross-sectional data from the HBSC-survey. With this, the *epistemological* paradigm question is addressed: the present study is observational and secondary in nature, where we examine data collected by others through an objective lens. Cross-sectional design usually aims at investigating the relationship between two variables within a snapshot in time, which will not say anything about which variable can be considered cause or effect (Cook & Cook, 2008; Field, 2018, p.16-17).

Gaming behavior is the hypothesized independent variable, and social self-efficacy is the dependent one. However, the present study only examines the *relationship* between the different gaming behaviors and social self-efficacy and will not discuss cause/effect. An important limitation in correlational research is the *tertium quid* - unidentified third elements, or confounding variables, that can impact the two observed variables. Low levels of family support or gender could for example be a thought confounding variable in the relationship between gaming behavior and youngsters' ability to develop and maintain friendships. These elements can be considered sources of error in the relationship (Field, 2018, p.17).

6.2.1 Conceptual Framework

To reduce the impact of thought confounding variables in the present study, we want to clarify the relationship we investigate in our data analysis, as well as the moderator- and control variables, presented in our conceptual framework (figure 4).

Figure 4

Conceptual framework.
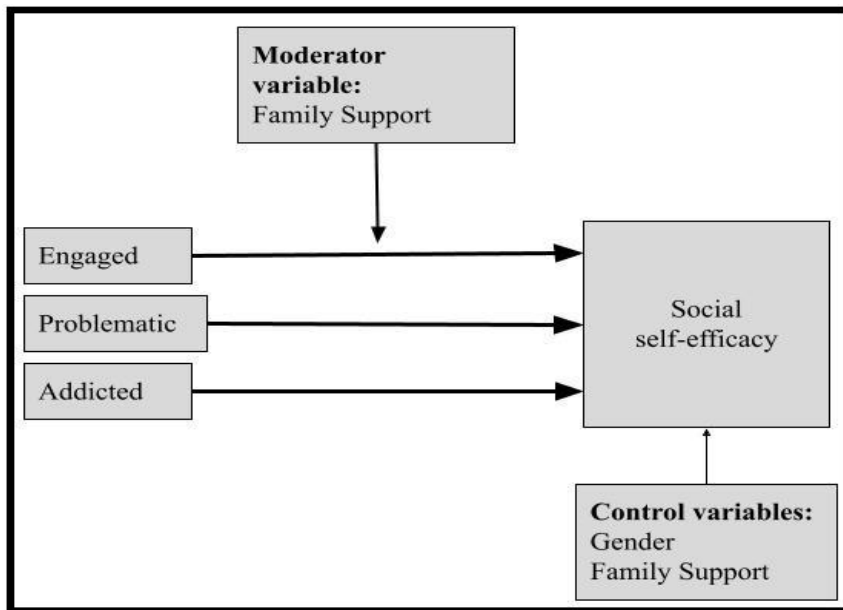
Note: Moderator variable applies to all predictors

Social self-efficacy is investigated in each group of gaming behavior separately. The relationships is further investigated after removing the effects of gender and family support. Lastly, we want to investigate the moderating impact family support could have on this relationship.

6.3 Sample

The "Health Behaviour in School-age Children"-survey (HBSC) is a WHO collaborative cross-national study seeking to examine health habits among children and youth (Haug et al., 2020, p. 2). "Researchers in the HBSC network are interested in understanding how these factors, individually and together, influence young people's health as they move from childhood into young adulthood." (HBSC, n.d.).

In Norway, the survey was conducted for the first time in 1983 and has been conducted every 4th year since 1895. Roughly 7000 students from different regions participate (UIB, 2018). For health- and education authorities, an increased base of knowledge is the main benefit that is harvested from the results of the HBSC-survey. The findings are nationally representative

and can contribute to developing policies that promote children's learning, well-being, and health (UIB, 2018).

The current study is based on secondary data from the HBSC-survey 2017/18. The survey aimed at recruiting a sample that could represent each age group, and the sample ended up consisting of 11-, 13-, 15- and 16-year-olds (6th, 8th, 10th grade, and 1st year in high school, respectively). The sample in this study only included 8th-grade students, as this group was the only one that had both GAS and SSE items as part of their survey. This resulted in the final sample consisting of 918 adolescents with an even gender distribution of 457 boys (49.8%) and 461 girls (50.2%).

6.4 Procedure

The procedure for collecting data started with requesting participation from the principals of 1246 schools. The schools that received requests were based on the targeted age groups for the study and were selected from an overview of which had students in 6th, 8th and 10th grade (Haug et al., 2020). In schools where the principal approved the request, the teacher of each class determined if they had the opportunity to prioritize students filling out questionnaires. Because there was expected high institutional refrainment, 1246 schools were contacted. 15 percent ($n = 181$) of the schools conducted the survey at the school level. Participation was 11 percent ($n = 242$) of the 2224 eligible classes at the class level. Student participation in the HBSC-survey was dependent on parental consent. Furthermore, participation was voluntary, meaning students themselves could refuse to fill out parts of the entire questionnaire despite parental consent (UIB, 2018).

The survey was conducted at school during school hours, where students filled out an electronic questionnaire. The questionnaire contained questions about various elements in the students' lives, such as well-being at school, physical activity, social support, and perceived health. Additionally, the questionnaire also sought information about parental factors, such as socioeconomic status and job activity. The questionnaire contained no identifying information about the students, and all information that could be regarded as personal was treated confidentially. When the data collection was over, the data file was reviewed to eliminate any flaws in anonymizing the participants (Haug et al., 2020).

6.5 Measuring instruments

The key to testing hypotheses and theories is measuring variables. A variable is information that can vary, such as age, gender, or location of residence (Field, 2018, p.9). Hypotheses can often be demonstrated through two variables: A suggested cause variable and a suggested outcome variable. In a hypothesized relationship between cause and outcome, the cause is regarded as independent because its existence does not depend on other variables. The outcome or consequence is the dependent variable, as its value is determined by the cause (Field, 2018, p.9-10). In this study, gaming behavior serves as the independent variable, whereas social self-efficacy serves as the dependent one. Further in this chapter, we will present the measures from the HBSC-survey that are subject to analysis in the present study, followed by a chapter presenting how we assured the *quality* of these.

6.5.1 Gaming behavior

In the HBSC survey-data, seven gaming-related items derive from the 7-item Gaming Addiction Scale (GAS) (Lemmens et al., 2009). All items are related to underlying constructs described in table 5. Each item measures one of the seven DSM criteria for addiction.

Table 5

Descriptions of underlying constructs in the Gaming Addiction Scale (Lemmens et al. 2009)

GAS (7 items criteria)	
Criterion	Description
Salience	-Playing a game becomes the most important activity in a person's life and dominates his or her thinking (preoccupation), feelings (cravings), and behavior (excessive use).
Tolerance	-The process whereby someone starts playing games more often, thereby gradually building up the amount of time spent on games.
Mood modification	-The subjective experiences that people report as a result of engagement in games. This dimension was previously labeled euphoria, referring to a "buzz" or "high" that is derived from an activity. However, mood modification may also include tranquilizing and/or relaxing feelings related to escapism.
Withdrawal	-Unpleasant emotions and/or physical effects that occur when the gameplay is suddenly reduced or discontinued. Withdrawal consists mostly of moodiness and irritability, but may also include physiological symptoms, such as shaking.
Relapse	-The tendency to repeatedly revert to earlier patterns of gameplay. Excessive playing patterns are quickly restored after periods of abstinence or control.
Conflict	-All interpersonal conflicts resulting from excessive gaming. Conflicts exist between the player and those around him/her. Conflicts may include arguments and neglect, but also lies and deception.
Problems	-Problems caused by excessive gameplay. It mainly concerns displacement problems as the object of addiction takes preference over activities, such as school, work, and socializing. Problems may also arise within the individual, such as intrapsychic conflict and subjective feelings of loss of control.

The items are formulated in this way: *"How often during the last 6 months did you..."*

1) Salience: *"... think of video games all day?"*

2) Tolerance: *"... increase the time spent on video games?"*

3) Mood modification: *"... play a video game to avoid thinking about other things?"*

4) Withdrawal *"... not listen to others who asked you to play less?"*

5) Relapse *"... feel bad when you could not play or were not allowed to play?"*

6) Conflict: *"... get in an argument with others because you played too much?"*

7) Problems: *"... neglect other activities to play video games?"*

All seven items had the same response options on a five-point Likert scale: (1) "never", (2) "almost never", (3) "sometimes", (4) "often", (5) "very often"

The Gaming Addiction Scale has cut-off scores, placing respondents in one of three groups of gaming behavior based on the CORE-4 approach (highly engaged, problematic, or addicted gamers) and an additional category of non-gamers that did not meet the GAS criteria for having a gaming behavior. The participants were placed based on meeting the following criteria:

Highly engaged gamers: Respondents that reported "sometimes" or more frequent on all three peripheral items, in addition to one or none of the core items.

Problematic gamers: Respondents that reported "sometimes" or more frequent on two or three core-items.

Addicted gamers: Respondents that reported "sometimes" or more frequent on all core items.

In the present study's dataset, these items had already been dummy coded into respective gaming groups depending on these criteria, and a reference group that did not meet the criteria for either behavior.

6.5.2 Social self-efficacy

The survey items for social self-efficacy derive from the Social Self-efficacy Scale, developed by Muris (2001) in his "Self-efficacy questionnaire for children" (SEQ-C). The construct is measured by eight items, formulated in this way: *"How well…"*

"... can you express your opinions when other classmates disagree with you?"

"... can you become friends with other children?"

"... can you have a chat with an unfamiliar person?"

"... can you work in harmony with your classmates?"

"... can you tell other children that they are doing something that you don't like?"

"... can you tell a funny event to a group of children?"

"... do you succeed in staying friends with other children?"

"... do you succeed in preventing quarrels with other children?".

The items are scaled from 1 (not at all) to 5 (very well). Item 8, "How well do you succeed in preventing quarrels with other children?" is excluded from the scale for Social self-efficacy in the present study's data analysis, as Muris (2001) found that this item did not load convincingly on its hypothesized factor.

6.5.3 Family Support

Furthermore, we want to investigate the influence of family support on our hypothesis as a moderator variable. As a measure of family support, the HBSC-survey used subscales from the Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet and his colleagues (1988). Perceived social support from family included the four items formulated as statements:

1) *"My family really tries to help me"*
2) *"I get the emotional help and support that I need from my family"*
3) *"I can talk to my family about my problems"*
4) *"My family wants to help me make decisions".*

These four items are all scored with a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The four items were transformed into a continuous group-variable called "family support".

6.5.4 Control variables

Gender and family support were included as control variables. Gender is a categorical variable, of which the related item is formulated as "Are you a boy or a girl?" to which the options of response were (1)"boy" or (2)"girl." When controlling for family support, the same continuous group variable was used.

6.6 Data analysis

This chapter will explain the statistical analyses used to answer our research questions. First, reliability tests and factor analyses will be explained before explaining the conducted descriptive analyses. Lastly, the regression analyses used will be elaborated. All data analyses were conducted using IBM SPSS Statistics v.27.

Before the primary analyses, it is essential to check the data set for errors. Brief frequency- and descriptive analyses were performed to examine the variables to check if some variable scores were out of range of possible values (Pallant, 2020, p.44).

6.6.1 Reliability tests and factor analyses

Before conducting descriptive analyses, we tested the measuring instruments' factor structure and internal consistency. Even though the instruments in the present study are validated in other studies, we sought to validate them in our sample. This was done through reliability tests (Pallant, 2020, p.102) and exploratory factor analysis (Pallant, 2020, p.188-189). To examine the instruments' internal consistency (elaborated on in subchapter 6.7), a reliability analysis was conducted to assess if Cronbach's α value was acceptable (>.7). Next, we checked the assumptions for conducting a factor analysis. For this analysis to be considered an adequate tool, the sample should ideally be big enough (>300), and the coefficients shown in the correlation matrix should be more significant than .3 (Pallant, 2020, p.190). A factor analysis examines a group of related variables and seeks to identify a small set of factors that can represent the underlying relationships. There are four assumptions for running a factor analysis. It requires (1) a sample size of at least 150, (2) variables that move in the same direction, (3) a sample that has been checked for outliers, and (4) factorability of the correlation matrix where Bartlett's test of sphericity should be significant at p<.05, and the Kaiser-Meyer-Olkin value should be >.6. Factor analysis is suitable if these assumptions are not violated (Pallant, 2020, p.193-194).

6.6.2 Descriptive analyses

Next, we performed descriptive and correlational analyses to describe the sample's characteristics and to get an overview of all the variables (Field, 2018, p.22). Pallant (2020, p.53) states that obtaining background information early is useful to describe sample characteristics in the thesis' method section. This allowed us to better understand the sample's eligibility for our planned analyses. It also provided us with fundamental skills in using the data analysis software IBM SPSS Statistics. These descriptive and correlational analyses also served to check our variables for violation of the assumptions underlying the statistical technique we used to address the research questions (Pallant, 2020, p.54). More specifically, we first looked closer at frequency distribution, which Field (2018, p.22)

describes as a useful thing to investigate once data is collected. The included descriptive statistics are values for mean, standard deviation, range of score, skewness, and kurtosis, all relevant to the testing of assumptions (Pallant, 2020, p.54). In assessing the normality in the distribution of SSE scores, a significant Kolmogorov-Smirnov value indicates a violation of the normality assumption. However, Pallant (2020, p.64) states that a significant Kolmogorov-Smirnov value is quite usual in larger samples and that the histogram is a better source to check for normality.

The prevalence and gender distribution of the different gaming behaviors were explored using a *chi-square test for independence*. The assumptions of chi-square concerning the minimum expected cell frequency was not violated, as no expected cell count was less than 5 (Pallant, 2020, p. 227). Pallant (2020, p.229) states that in a chi-square test for independence, a Cramer's V value >.29 represents a large effect size when testing variables with four categories (GAS). Next, an independent-samples t-test was used to explore whether there was a statistically significant difference in the mean SSE scores between males and females (Pallant, 2020, p.252-255).

6.6.3 Main analyses

A hierarchical multiple regression analysis was conducted to investigate the relationship between the different gaming behaviors and social self-efficacy. Regression analysis is situating data in a linear model, seeking to predict an outcome variable based on one or multiple variables. When using more than one predictor variable, the procedure is a *multiple* regression analysis (Field, 2018, p. 373). The regression allowed for a more detailed exploration of the interrelationships between the variables (Pallant, 2020, p.153). It further allowed us to compare the predictive ability of each independent gaming behavior variable (GAS) on the dependent social self-efficacy variable (SSE).

In the regression analysis, we first looked at the relationship alone before adding gender in step 2 and family support in step 3 as control variables. These control variables were added to examine the effect of GAS behaviors on SSE when the effect of sex and family support were removed. In hierarchical methods, predictors are added to the model in stages. This process can help examine the improvements in each stage as more predictors are added to the model (Field, 2018, p. 400). This was assessed by inspecting the R^2 values, which provided us with

a measure of the concrete size of the model fit. The R2 values represent how much of the variance in the outcome is accounted for by the predictors (Field, 2018, p.378 - 379). When new predictors were added in each step, the R2 in the new model was compared to the R2 in the old model to quantify the improvement of variance explained by the model (Field, 2018, p. 401).

The predicted effect of each GAS group was assessed by checking the regression coefficients (b-values). These values quantify the relationship between social self-efficacy and each predictor. In the current study, the unstandardized b-values were assessed as they are suitable for making comparisons within the regression between predictors that use the same measurement scale, which all three GAS behaviors do (Field, 2018, p.415).

The regression coefficient value can be either positive or negative. The value corresponds with the predictor's relationship with the outcome, where a positive value indicates a positive relationship. How much effect each predictor has on the outcome is represented by the size of the b-values. When predictors are added to the model in hierarchical regression, the size of the b-value takes into account that all other predictors are held constant (Field, 2018, p.414). In addition to the regression coefficients, the standard error was included to demonstrate to what extent the b-values can vary across different studies and samples (Field, 2018, p. 417). We also included 95% confidence intervals (CI) as a limit for a percentage of the sample to fall within, creating an accurate population parameter value. The 95% CI values represent the range of possible values for the population mean, with a certain level of confidence (Field, 2018, p.65). Confidence intervals can be helpful when assessing the generalizability of our findings (Field, 2018, p.416)

The impact of family support on the relationship between GAS and SSE was further investigated through a moderation analysis. Moderation analysis was conducted in PROCESS Macro v.4.1, a supplementary tool for SPSS. PROCESS Macro allowed us to examine the interaction effect between family support and each gaming behavior with social self-efficacy as an outcome variable (Field, 2018, p. 483).

6.6.4 Assumptions for statistical analyses

Before conducting the analyses, the assumptions for each analysis were tested. Assumptions are parameters that verify that what you are trying to do works as intended (Field, 2018, p. 229). Even though our measuring instruments have been proven strong in other literature, the reasoning for testing assumptions is based on Keselman and his colleagues' (1998) thoughts. They argue that researchers who routinely adopt a traditional procedure without testing or giving thought to its associated assumptions may fill the literature with non-replicable results (Keselman et al., 1998, p.351).

While testing assumptions for regression, the sample size should be big enough (Pallant, 2020, p.155). Tabachnick and Fidell (2013, p.123) showcase what they consider a good formula for calculating adequate sample size: $n > 50+8m$ (m = the number of independent variables). Our study had 918 participants, which, according to this formula, does not violate the assumption related to sample size. Next, the model itself was evaluated. The statistical significance of the model was examined to test the null hypothesis that multiple R in the sample amounts to 0 (Pallant, 2020, p.166). The ANOVA table showed that the model was statistically significant ($p < .001$), meaning that the linear model overall predicted social self-efficacy. The Durbin-Watson statistic, which ideally should be valued near 2, had a value of 2.09, indicating that adjacent residuals had a small negative correlation. If the Durbin-Watson statistic is within 1 and 3, Field (2018, p.387) states that the residuals do not correlate enough for there to be cause for concern.

Outliers (extreme values) and multicollinearity (too high a correlation between variables to obtain unique estimates from each variable) were assessed next (Pallant, 2020, p. 176). Inspection of the scatter plot detected a few outliers, indicating a slight deviation from normality. However, no outlier cases were excluded, as the maximum Cook's distance in the regression (0,08) indicated no cause for concern since there were no values greater than 1 (Field, 2018, p.383). Cook's distance is used to scan predictor variables for influential outliers that affect the model negatively, where large values (usually >1) in individual cases suggest that the case influences the estimated regression coefficients too much (Field, 2018, p.383; Boussiala, 2020). Next, we assessed tolerance- and variance inflation values (VIF). Tolerance values lower than .1 will indicate that the variables correlate too much (Pallant, 2016, p.170). The VIF-value provides information on how strong the linear relationship of

the different gaming behavior (independent) variables is (Field, 2018, p. 402). Assessment of VIF- and tolerance values showed values within the required parameters (Appendix 2).

Further preparations were done specifically for the moderation analysis. We first mean-centered the moderator variable (family support). This makes the interpretation of the intercept easier, whether the interaction is included or not (Field, 2018, p. 487-488), and will also contribute to decreasing multicollinearity in a regression model (Iacobuchi et al., 2016). Next, a linear regression was done to test the moderation assumptions. The Durbin-Watson here had a value of 2.06. When analyzing groups of cases in observational research, the outcome variable should have fairly constant residual variance at the different levels of the predictor variable. In the present study, inspecting the scatter plot in the regression analysis shows a spread in scores that were not similarly spread around the mean, indicating heteroscedasticity and therefore violating the assumption of homoscedasticity (Field, 2018, p.237-238). To reduce the effects of heteroscedasticity, we used the latest proposal of a heteroscedasticity-consistent standard error estimator, HC4, developed by Cribari-Neto (2004; Hayes & Cai, 2007), when conducting the moderator analysis. According to Hayes and Cai (2007), HC4 is appropriate if the sample exhibits a few cases with high leverage values, which our sample did (Mean = .01, maximum = .430). Examination of moderation assumptions indicated that proceeding with moderation analysis as planned was adequate.

6.7 Quality assurance

To make us confident that a measure is doing its job as intended, it is necessary to ensure this quality by determining two essential properties of the measure: *Validity* and *reliability* (Field, 2018, p.15).

Reliability is a central concept in quantitative measurements that simply addresses the consistency in the chosen measurement. For an instrument to be valid, it must first be found reliable. A simple way to do this is to measure something in the same group at two different points in time. This is called test-retest-reliability, which investigates if the two points in time produced similar results. If they did, one could consider the tool of measurement reliable (Punch, 2014, p. 237-239; Field, 2018, p.15).

Since multiple items (eight questions) are used to investigate a latent trait (social self-efficacy), it is essential to look at how these items work. This is internal consistency. By that, one should look into how consistent the items are with each other or if they all work in the same direction (Punch, 2014, p. 238).

Validity emphasizes the measurement used in a study. It can be accounted for with a simple question: "How do we know that this measuring instrument measures what we think it measures? (Punch, 2014, p. 239). Or in other words: How well does this data represent the investigated phenomenon? (Punch, 2014, p. 321). Several forms of validity are relevant in the assessment of measuring instruments.

- *Concurrent validity* is assessed through a simultaneous recording of data, where the researcher uses both a new measuring instrument and old criteria. The goal is to find out if the instrument measures what it seeks to measure through comparison to objective criteria for the construct (Field, 2018, p.15).
- *Construct validity* emphasizes how well a measure conforms to theoretical expectations (Punch, 2014, p. 240). Since all measurements exist in a theoretical context, it is expected that they will show a relationship with other constructs relevant to prediction and interpretation within a specific context. Since this study uses constructs (GAS and Social Self Efficacy Scale) that have proven to be solid in the field of research, we will do a factor analysis that confirms the construct validity.

Furthermore, one can differentiate between internal and external validity.
- *Internal validity*, in the context of quantitative studies, is defined by Punch (2014, p. 323) as: "The extent to which the relationships between the variables are correctly interpreted." Simpler put that the cause-effect relationship you are investigating cannot be explained by external factors.
- *External validity* is about generalizability: how much the findings in a study sample can be generalized to other people (Punch, 2014, p. 324).

As researchers, one must acknowledge the fact that there is an interference between indicators that we can observe (survey items) and the construct they represent, which we aim to highlight (Punch, 2014, p. 239). Put simply, validity seeks to address how reasonable this interference is when moving from indicators to construct. Validity does not examine if the

instrument itself is valid like reliability does. Instead, validity addresses the drawn conclusions based on what we observe, in conjunction with reasoning (Punch, 2014, p.239). In the following subchapter, considerations regarding validity and reliability are discussed more concretely and will be illuminated in the context of measuring instruments in the present study.

6.7.1 Previous validation of measuring instruments

This study is correlational, meaning the data is not interfered with (as in experimental studies). It is only observed. Observing a phenomenon contributes to what Field (2018, p.16) calls *ecological/external validity* - how relevant or transferable the findings are to the population. Moreover, regarding the generalizability of data, the sample includes 3217 young people (8th grade and first-year high school) - a relatively large sample with an even gender distribution. The HBSC-survey is also based on a nationally representative sample (Haug et al., 2020), p. 9-11). Together these factors contribute to a strong external validity of the study. It can be reasonably concluded that findings from surveys such as the Norwegian HBSC-survey can be generalized to the rest of the population in respective age groups (Punch, 2014, p. 324).

Furthermore, we examined the internal consistency in the items- how they are consistent with each other or at all working in the same direction (Punch, 2014, p. 238). This was tested by performing reliability analyses and assessing the Cronbach's α value, where .7 to .8 is considered acceptable, though >.8 is preferred (Pallant, 2020, p. 105). Moreover, we conducted factor analyses to evaluate the intercorrelations between the variables within each instrument and assess the values of sampling adequacy (KMO), sig. Values from Bartlett's test of sphericity and factor structure (Pallant, 2020, p.199). The current study's measuring instruments (SSE, GAS, and family support) have been validated in other studies. The Social Self-efficacy Scale is part of the SEQ-C (Muris, 2001) and has been found to function well in larger cross-national surveys among students (11-18 years) in Australia, the USA, and the UK (McKay et al., 2014). In the initial study of Muris, Cronbach's α was .85 and has in recent studies been confirmed to still be a solid measure in terms of reliability (Cronbach's α of .82) and validity (Suldo & Shaffer, 2007; Muris et al., 2016).

In Lemmens and his colleagues' (2009) attempt to develop and validate a scale for measuring game addiction, the 7-item version of the Gaming Addiction Scale(GAS) showed high reliability at the time with a Cronbach's α value of >.8. Regarding construct validity, the 7-item GAS "showed strong correlations with time spent on games, and significant moderate correlations with the psychosocial variables in the expected directions" (Lemmens et al., 2009). The valid and reliable properties of GAS have been shown to persist over time and have, in more recent years, found support in multiple studies seeking to validate GAS in several countries (Baysak et al., 2016; Lemos et al., 2016; Gaetan et al., 2014).

The measure for family support used in the HBSC-survey is a subscale that derives from the Multidimensional Scale of Social Support (MSPSS), which has proved strong internal reliability and test-retest reliability, as well as concurrent- and construct validity in student and adolescent populations (Kazarian & McCabe, 1991; Chou, 2000). The scale has also previously been used with GAS to measure perceived social support in a young gaming population (Ucur & Donmez, 2021).

6.8 Ethical considerations

Ethics, at its general core, is "the study of what is good, right or virtuous" (Punch, 2014, p 36). More specifically, research ethics revolves around how we as researchers plan, conduct, communicate and follow up on our research. Bulmer (2001, p. 45) argues that acting ethically limits the choices we can make in the pursuit of truth. His view emphasizes that while the truth is good, respect for human dignity is better. Accepting Bulmer's view, the ethical considerations in this thesis will be to look into how we can shed light on the investigated relationship between gaming behavior and social self-efficacy while ensuring human dignity and respect for the youth to the highest degree possible.

In the Norwegian HBSC-report 2020 (Haug et al., 2020), there are clear requirements to ensure the privacy regulations for individuals who are without consent competence due to their young age. Considerations for protecting children and young people are strong, and to include this group, special requirements for protection need to be fulfilled (NESH, 2016, p. 20). For participants under 16 years, parents must give explicit consent before they can participate, as stated by Norwegian law (Helseforskningsloven, 2008, § 17).

All the participants in the HBSC-survey 2017/18 were informed that their answers were anonymous and that participation depended on their own autonomous choice to participate. The HBSC-survey has also been approved by the Norwegian Center for Research Data (NSD) (Haug et al., 2020). NSD has a central role in ensuring that studies secure confidentiality and anonymity by anonymizing all the data material (NESH, 2016, p. 14-16).

7.0 Results

In this chapter, the results of the investigated relationship between different gaming behaviors and social self-efficacy, and the influence of family support on this relationship, will be presented. Results from the analyses will be presented in a manner that contributes to answering the study's three research questions in the following order:

1) *How many of the participants are addicted gamers, problem gamers, highly engaged gamers, or in the control group, and are there differences in gender?*
2) *What is the relationship between the different categories of gaming behavior and reported social self-efficacy, when controlling for gender and family support?*
3) *To which degree does family support function as a moderator for social self-efficacy in the different gaming groups?*

First, validation of the measuring instruments through factor- and reliability analyses are presented, followed by the results from the preliminary- and descriptive analyses. Next, results from the regression analysis are presented, examining the relationship between gaming behavior and SSE and the direct effects family support and gender have on SSE. Lastly, the moderating effect of family support on the relationship between gaming behavior and SSE is presented.

7.1 Validation of measuring instruments

All instruments showed suitability for factor analysis, with KMO-values >.6 and significant ($p < .001$) Bartlett's test of sphericity (Pallant, 2020, p.199). Table 6 contains values from the factor- and reliability analysis. Results showed good internal consistency with acceptable Cronbach's α values in the Social Self-efficacy Scale and preferred values in GAS- and Family Support instruments (Pallant, 2020, p.105). All instruments showed a clear break after the first component in the scree-plots, indicating one-factor solutions (Pallant, 2020, p.199). The one-factor-solutions were supported for each instrument, only having one component with eigenvalue >1. In terms of explained variance, one factor explained 56.1 percent of GAS, 44.9 percent of the SSE scale, and 74.9 percent of the Family Support scale.

Table 6

Validation of measuring instruments through reliability- and factor analysis.

Validation of constructs					
Reliability analysis			**Factor analysis**		
Construct	Cronbach's α	KMO	Bartlett's test of sphericity	Factor structure	% of variance explained
GAS	.86	.86	$p < .001$	1	56.1
Social self-efficacy (SSE)	.79	.85	$p < .001$	1	44.9
Family Support (FS)	.88	.81	$p < .001$	1	74.9

7.2 Descriptive statistics

Descriptive analysis was conducted to get an overview of sample characteristics, and to assess normality. The sample consisted of 918 grade 8 students and had an even gender distribution (49,8% male, 50,2% female). Inspection of the histogram (appendix 1) showed a negatively skewed, yet reasonably normal distribution of SSE-scores, M = 3.74*, SD* = .65. The t-test showed no significant difference in SSE-scores between males (*M* = 3.78, *SD* = .65) and females (*M* = 3.70, *SD* = .64; *t*(870) 1.82, *p* = .07, two-tailed).

A Chi-square test for independence was conducted to describe the sample and view the distribution of GAS behavior in total and by gender. Table 7 contains results from this analysis. Results showed that 31.6 percent of the total sample was classified as having one of the gaming behaviors. In the total sample and for both genders separately, the prevalence was highest in the problematic group, whereas the addicted group was the least prevalent. Results further indicated significant gender differences in gaming behavior, x^2 (3, *n* = 918) = 160.22, *p*<.001, Cramer's V = .42. More than half of the males met the criteria for either GAS group, compared to 12.4% of the females.

Table 7

Prevalence of GAS behaviors and differences in gender.

% (n)					
	Contrast group	Highly engaged	Problematic	Addicted	Total
Boy	48.8 (223)	12.7 (58)***	32.6 (149)***	5.9 (27)***	100.0 (457)
Girl	87.6 (404)***	2.6 (12)	8.0 (37)	1.7 (8)	100.0 (461)
Total	68.3 (627)	7.6 (70)	20.3 (186)	3.8 (35)	100.0 (918)

Note: Chi-square test for independence, *** $p < .001$

7.3 Hierarchical multiple regression analysis

A hierarchical multiple regression analysis was conducted to investigate to what degree the different GAS behaviors predicted social self-efficacy (compared to the non-gaming reference group) while controlling for gender and family support. Table 8 shows the results of this analysis. GAS behaviors were entered in the first step. All GAS behaviors were significant predictors of SSE ($F(3,822) = 12.136$, p <.001) and explained 4.2% of the variance. Addicted gaming behavior had the strongest estimated effect on SSE (b = -.608), whereas problematic behavior had the weakest (b = -.157). In step 2, gender was added as a control variable, explaining an additional 2.2% of the variance. All GAS behaviors remained significant when controlling for gender. Gender was further a significant predictor of SSE (b = -208). When family support was added to the model in step 3, it was revealed to have a small direct effect on SSE (b = .057), indicating a positive relationship between the reference group and SSE.

After controlling for gender and family support, problematic behavior had a slightly reduced effect estimate (b = -.193) and was still the weakest predictor of the three GAS behaviors. The highly engaged group showed a stronger estimate in step 2 (b = -.264) than in step 1 (b = -.165) and was unchanged from steps 2 to 3. The effect estimate in the addicted group was unchanged in step 3 and maintained the highest unique contribution to SSE levels (b = -.608). When both gender and family support had been added, the final model explained a total of 18.4% of the variance ($F(5,820) = 37.011$, p < .001). Confidence intervals in the regression are somewhat wide and infer uncertainties regarding the actual population value.

Table 8

Multiple Hierarchical Regression with GAS behaviors as predictors and social self-efficacy
as outcome, controlling for gender and family support.

		Social self-efficacy				
		b	S.E	95% CI	R^2	R^2 change
Step 1					.042***	
	engaged	-.165*	.081	[-.324, -.006]		
	problematic	-.157**	.056	[-.266, -.048]		
	addicted	-.608***	.112	[-.827, -.389]		
Step 2					.064***	.022***
	engaged	-.264**	.083	[-.427, -.101]		
	problematic	-.251***	.059	[-.366, -.135]		
	addicted	-.698***	.112	[-.918, -.477]		
	gender	-.208***	,047	[-.301, -.155]		
Step 3					.184***	.120***
	engaged	-.262***	.078	[-.415, -.109]		
	problematic	-.193***	.055	[-.302, -.085]		
	addicted	-.608***	.105	[-.815, -.402]		
	gender	-.165***	.044	[-.252, -.078]		
	family support	.057***	.005	[.047, .067]		

Note. *p < .05, **p < .01, ***p < .001.

7.4 Moderation analysis - testing the moderating effect of family support

The impact of family support on the relationship between GAS behaviors and SSE was
explored through a moderator analysis using PROCESS Macro in IBM SPSS Statistics 27.
Table 9 shows the results from this analysis. The moderation analysis found no significant
relationship between the interaction variables and SSE. This analysis indicates no significant
differences in the relationship between any of the three gaming behaviors and social self-
efficacy across low, medium, and high levels of family support.

Table 9

Moderation analysis with highly engaged, problematic and addicted gaming behaviors as predictors of SSE, and family support as moderator for each group.

	b	S.E (HC4)	95% CI
Constant	3.804***	.025	[3.76, 3.85]
Highly engaged group	-.183**	.074	[-.33, -.04]
Problematic group	-.117*	.051	[-.22, -.02]
Addicted group	-.492*	.158	[-.80, -.18]
family support	.056***	.008	[.04, .07]
Highly engaged group * FS	.004	.029	[-.06, .15]
Problematic group * FS	.002	.015	[-.03, .03]
Addicted group * FS	.042	.055	[-.04, .11]

Note. dependent variable: social self-efficacy. *p < .05, **p < .01, ***p < .001.

8.0 Discussion

The present study aimed to investigate the relationship between GAS behaviors and social self-efficacy and if family support impacted this relationship. The main results of this study are discussed in the order of the research questions. The findings will be discussed against previous research, Bronfenbrenner's Ecological Systems Theory and the Social Compensation Hypothesis (SCH). Finally, the chapter concludes with a discussion of the methodological strengths and limits of this study and the relevance for further work in the field of health promotion and health psychology.

8.1 Main results

The main findings in this study are that, in total, one-third of the sample had a gaming behavior, most of which were problematic gamers, followed by highly engaged and lastly addicted gamers. Males fit a category for gaming behavior three to five times as often as females. The overall sample averaged a score of 3.74 out of 5 possible on social self-efficacy. The three gaming behaviors were significant predictors of social self-efficacy, all predicting lower social self-efficacy. The relationships remained significant after controlling for gender and family support. When comparing GAS behaviors to the reference group, addicted gaming behavior was the strongest predictor of social self-efficacy, followed by highly engaged and problematic gaming behavior. Family support did not moderate the relationship between either gaming group and social self-efficacy but was a significant predictor of social self-efficacy.

8.2 Prevalence of gaming behavior

In terms of the present study's prevalence and characteristics of gaming behavior, a comparable reference point will be Brunborg and his colleagues' (2013) study. They used the same measuring instrument in separating gaming behavior (GAS and CORE-4 approach) in a slightly larger sample size of Norwegian 8th-grade students. Compared to the sample for 2013, the prevalence of students with GAS behaviors has since seen a 40 percent increase. Moreover, the prevalence of highly engaged and problematic behavior had also increased, and the prevalence of game addiction had slightly decreased (Brunborg et al., 2013). In the study of Brunborg et al. (2013), 22 percent of the sample did show characteristics that placed them into one of the three groups of GAS. More specifically, the distribution was 4.9 percent highly-engaged gamers, 12.9 percent problem gamers, and 4.2 percent addicted gamers.

Furthermore, it is important to note that even though the reference group, consisting of 627 participants in the current study, does not exhibit gaming behavior to the degree that they fall into a GAS group, they may still play or have a relationship with video games (Hamre et al., 2022).

Results from the current study may reflect the prominent increase and normality video games have undergone during the last decade. As the amount of adolescents who report engagement with video games has increased (Johansson & Götestam, 2004; Medietilsynet, 2016, p.56), it is not an unreasonable explanation for more adolescents meeting the criteria for a GAS behavior. In 8th grade students, the proportion of both highly engaged and problematic gamers has seen a 56 percent increase between the 2009/10 and 2017/18 HBSC surveys. Contrastingly, game addiction has decreased for this age group by 10 percent.

Similar to Brunborg et al.'s (2013) findings, problematic gaming still comprises the largest proportion of the GAS behaviors in the current study. Problematic gaming behavior represented more than half of the total GAS behavior in the sample and could have implications for what is the "normal" gaming behavior today. This increase in problematic gaming behavior could be explained by increased parent-child conflicts holding the potential to "push" participants from both the reference and highly engaged group into the problematic group. Firstly, there is increasing normality of gaming today, both in terms of prevalence (Medietilsynet, 2016, p. 57) and as a socially accepted leisure time activity among children (Verrastro et al., 2021). Secondly, the recent Ipsos report (2021) on children's gaming habits and parents' thoughts on these habits could provide some context for reflection on this phenomenon. The majority of parents reported that they "often" or "sometimes" are uncertain how they can approach their children's gaming. Parents who reported "often" also reported more concern for their child's gaming behavior. These concerns referred to the number of hours spent on gaming, lack of social engagement, and game addiction, where over 40 percent had little or no knowledge of how to deal with these concerns (Ipsos, 2021, p. 19-20). As parents do not know how to address what they consider excessive gaming or may not recognize gaming as a healthy or meaningful activity (Ipsos, 2021, p. 20, more conflicts could arise in the household. Such conflicts have the potential to affect the GAS scores, as problematic gaming behavior only requires two conflict-oriented GAS criteria to be met (Lemmens et al., 2009).

Furthermore, the proportion of addicted gamers in the present study does not seem to be particularly high or low. A recent meta-analysis on the prevalence of this group showed a global prevalence of 4.6 percent (Fam, 2018), which is similar to the findings in the current study. This prevalence rate can vary greatly due to demographic and geographic factors (Gentile, 2009). However, it is still an increase since Ferguson and his colleagues' meta-analysis (2011) on gaming addiction, which estimated a prevalence of 3.1 percent 11 years ago.

8.2.1 Gender differences in gaming behavior

There are significant differences in gender distribution. Similar to Brunborg and his colleagues (2013) findings, males were more than four times more frequently than females to have a GAS behavior. Within the total sample, males, compared to females, were five times more likely to be highly engaged gamers, four times more likely to be problematic gamers, and more than three times more likely to have game addiction - findings that all align with Mihara & Highuchi's (2017) systematic review on internet gaming disorder. Furthermore, the problematic group comprised the most significant proportion of GAS behaviors for both genders. Mentzoni et al. (2011) had similar findings when they investigated gaming behavior (GAS) in a larger Norwegian sample with a more significant age disparity (15-40 year olds). They found that young age and male gender were two strong predictors of problematic gaming (Mentzoni et al., 2011).

It is no surprising that young males, to a greater extent, meet GAS criteria for gaming behavior in the current study. Young males play more than young females and report that they think they play too much (Medietilsynet, 2016, p.56). Males might also use games as an alternative environment to escape real-life problems while playing games (Yee, 2006; Kuss & Griffiths, 2012). This escapism is an essential motivation for engaging with online games (Kuss & Griffiths, 2012) and using online games as an alternative social arena (Bowman & Tamborini, 2012; Cheng et al., 2018). Moreover, males and females differ in their use of digital media in adolescence, where males spend more time gaming and females spend more time on smartphones and social media (Twenge & Martin, 2020). It is reasonable to argue that when females are unsatisfied with their real-life socialization, they would instead engage with social media and texting than gaming, as girls tend to value social relationships more than boys (LaFontana & Cillessen, 2010). They may not experience the same social benefits

from gaming or be as socially motivated to engage in video game activity as males (Dindar & Akbulut, 2015).

8.3 Gaming behavior and Social Self-Efficacy

Self-efficacy in the social domain plays a central part in the present study and is an important aspect of psychosocial well-being in young populations (WHO, 2009). This has also been found to be the case in the playing of video games (Dindar & Akbulut, 2015; Przybylski et al., 2010). Festl and her colleagues (2013) found that high GAS scores predicted lower levels of social competence, social integration, and sociability, which may share similarities with SSE. The negative relationships between SSE and the GAS groups in the present study do not make implications about causality and have more than one plausible explanation.

People have a basic need to belong somewhere and often do this through establishing and maintaining beneficial and lasting relations (Baumeister & Leary, 1995). The easy access to online communication could make it seem like a psychologically and socially safer alternative to face-to-face communication, as one does not have to worry about facial expressions and body language. A sense of belonging online and meeting peers in online gaming communities can possibly satisfy needs for approval, connectedness, and social interactions (Przybylski et al., 2010), especially for children with social phobia (Sioni et al., 2017).

Overall, all the GAS groups had lower SSE levels than the reference group, bringing some concerns. Through the lens of health promotion, these concerns more specifically relate to the low impact levels of SSE have on health-related quality of life (HRQOL). As SSE has shown to function both as a protective factor of psychopathological problems and as a promoting factor to succeed socially, its impact on the positive development of today's youth is noticeable (Freire & Ferreira, 2018; Muris et al., 2016). As the numbers show, more and more youth play video games regularly (Caroux et al., 2015; Carras et al., 2019; Medietilsynet, 2016). Therefore, investigating the social nature of video games and the relationship between video games and social elements in life makes for an interesting approach to these new digital societal standards (Moksnes et al., 2013)

When comparing the GAS behaviors to the reference group, the present study hypothesized that SSE would be similar in highly engaged participants, lower in the problematic gamers, and lowest in the addicted gamers. Looking at the results, the regression predicted lower SSE scores within all GAS groups compared to their reference group, rejecting the hypothesis. The overall results of lower SSE in students with GAS behavior share some similarities with findings in a recent study investigating the relationship between social competence and gaming behavior; it was found that poorer social competence predicts more gaming behavior. Hygen and her colleagues (2020) show through their longitudinal measures that more gaming at the age of ten was associated with less social competence, but only for girls when followed up at age 12. The study also shows that greater social competence at a young age was associated with less gaming in the follow-up years for both genders (Hygen et al., 2020).

Interestingly, our hypothesis was also rejected by how social self-efficacy changed between the GAS behaviors. After controlling for gender and family support, highly engaged gaming predicted higher SSE than addicted gaming but lower SSE than problematic gaming, indicating a non-linear deterioration of social self-efficacy as the gaming behavior became more serious.

A possible explanation for this can be that the core criteria of GAS are very conflict-oriented. Highly engaged gamers are the ones who only report one or none of the core items, indicating that highly engaged gamers report less conflict in their household regarding video game activity than their addicted counterparts (Lemmens et al., 2009). This could suggest that they play adequately in the eyes of their parents or that their gaming behavior can harmonize with other parts of life. However, these lower conflict levels could also indicate that highly engaged gamers are *allowed* to play more freely by their parents. Theoretically, they could spend more hours a week on socially motivated gaming than addicted gamers. Time spent on video games is not quantified or indicative of more intense gaming behavior in GAS (Lemmens et al., 2009), nor is it necessarily associated with the negative effects of game addiction (Brunborg et al., 2013). The lower predicted levels of social self-efficacy in highly engaged gamers may reflect a flaw in using the social self-efficacy scale when investigating digital behavior, as GAS behaviors may compensate for lower real-world SSE in other social arenas.

Another perspective that could explain that highly engaged gamers have lower SSE than problematic gamers lies in the previously made argument that problematic gaming behavior may be "the new normal." SSE levels could be higher in problematic gamers than in engaged gamers because problematic gaming possibly has grown closer to the reference group than the highly engaged gaming due to the normality of gaming as an activity today.

8.3.1 Compensating and ecological approach

The Social Compensation Hypothesis (SCH) and Ecological Systems Theory bring some interesting thoughts to the possibilities that lie for socialization and possibly SSE beliefs in gamers who exhibit gaming behavior to the degree they fall into a GAS group. In terms of SCH, an 8th-grade student who receives limited social interaction through their networks in the real world could have stronger motives to engage in gaming. This activity may compensate for the lack of real-life social stimulus (Valkenburg et al., 2005; Valkenburg & Peters, 2007). These central arguments from the SCH perspective seem relevant for all the GAS groups. However, the results may indicate that the addicted gamers may have powerful social motives to engage in gaming. This group has the lowest SSE scores, which may relate to a significant lack of real-life social stimulus. Such an argument is supported By Chan and Cheng (2016). They found that people with a gaming disorder tend to receive less social support from networks in their real life and that this group had stronger motivations to compensate for this through socially motivating online interactions (Chan & Cheng, 2016).

In light of SCH, adolescents who dislike face-to-face interactions can have an easier time socializing within a gaming community than in real life. Reflecting on our findings from the perspective of SCH, students with lower levels of SSE may be more motivated to engage in gaming due to the compensating social effect the gaming arena provides. From this perspective, addicted gamers will have the strongest social motive to engage with video games, followed by highly engaged, and lastly, problematic gamers. Social motives have been found to be associated with more hours spent playing each week (Yee, 2007). However, hours spent gaming are not necessarily directly associated with negative outcomes or addiction (Brunborg et al., 2013). However, from a compensation perspective and acknowledging social motivations, our findings could mean that the addicted group is the most socially motivated group of gamers and may play more hours than their engaged and problematic peers. A lot of hours of socially motivated video game behavior each week could contribute to higher levels of social self-efficacy in digital arenas (Sherry et al., 2013; Yee,

2007; Brunborg et al., 2013). This explanation emphasizes that youngsters need to belong in a social sphere (Baumeister & Leary, 1995) and suggests that the gaming behavior could be caused by a lack of perceived social self-efficacy in the real world. These social spheres share the characteristics of microsystems in adolescents' social ecology, where real-world and online microsystems are individually selected as preferable systems to engage with (Bronfenbrenner, 1977). Of exceptional importance in health promotion is determining which social and cultural environments adolescents thrive more within and how this engagement can be best utilized to achieve healthy behaviors (Mittelmark, 2011, p.12).

As online social environments can serve as one of the many microsystems adolescents thrive socially (Sherry et al., 2013), it is important to look at the benefits of the online environments. Ecological models embrace intra-personal, psychosocial, and sociocultural processes that can help explain why and how GAS behaviors and SSE are associated, rather than being satisfied with an association that may be oversimplified (Sallis et al., 2015; Mittelmark, 2012, p.12). When discussing the specific association between GAS behaviors and social self-efficacy, lower levels of social self-efficacy in the real world could be explained by the strengths of their online microsystems. Adolescents who experience a stronger connection to their online peers may select this as their primary microsystem to lodge in (Williams et al., 2006) rather than real-world environments they may not fit as well into. Through a social-ecological approach, our findings could mean that the online microsystem is stronger for problematic and engaged gamers and especially strong for the addicted gamers compared to the microsystem of peers at school.

Moreover, the exosystem of social norms and structures may contribute to adolescents' choice of an online microsystem. Adolescents who spend more time online may feel more conformed to the social structures of an online environment (Przybylski et al., 2010) and feel they posit less social desirability in the real world due to their "gamer identity" (Harrell, 2009). As the relationship between individuals and their microsystems are bi-directional (Bronfenbrenner, 1977), adolescents may feel they can influence their online surroundings more than their real-world surroundings. The wording of the Social Self-Efficacy Scale in the HBSC-survey insinuates this is a construct measured in a classroom setting (Muris, 2001). Therefore, lower levels of social self-efficacy in adolescents with GAS behaviors may exist because they choose a social environment of online peers rather than real-life peers because they feel more bi-directionally integrated into the online microsystem.

It is, however, paramount that this environment can facilitate healthy choices (Mittelmark, 2011, p.12). This is not always the case, as young gamers with high social self-efficacy are more likely to form social relationships and get reinforcing feedback for playing, which can lead to increased attachment and even addiction (Carras et al., 2019). What remains interesting is that addicted gamers may have lower levels of social self-efficacy in a real-world setting and higher levels online (Jeong & Kim, 2011), making implications for gaming behavior as a positive contributor to adolescent online social self-efficacy.

8.3.2 An escape from reality

A central argument in SCH lies in the unique characteristics video games provide. As it gives the gamer the possibility to be anonymous (e.g., fictive character name), communicative flexibility (e.g., choose to talk on the mic or have a webcam on), and the common interest in a shared activity (the game itself). Together, all of this might provide an 8th-grade student with an alternative arena to real-world interaction, where their social inadequacy is less obvious due to less social demands (e.g., communicative flexibility), more togetherness (e.g., working in a group to succeed in a common goal) greater mastery (e.g., making friends online) (Chak & Leung, 2004; Mckenna & Bargh, 2000; Peters & Malesky, 2008). Hence, the gaming arena might provide all the GAS groups with an alternative they need to experience mastery in a social domain, which ultimately might strengthen SSE beliefs, especially in the addicted group (Chak & Leung, 2004; Mckenna & Bargh, 2000; Peters & Malesky, 2008).

The study of Hussain and Griffiths (2009) underlines some of these central concepts of gaming as an escape from reality and a compensating activity. Their study highlights how gamers use gaming to escape negative feelings and as a social platform that allows them to experience fellowship and friendly relationships, which the real world can't (Hussain & Griffiths, 2009). These assumptions of an escaping effect in gaming activity are also supported by Kuss and Griffiths (2012), who argue that children who struggle socially might turn to the game as an escape from their reality. The needed experience of mastery and feelings related to accomplishments in the social domain may justify the relationship between lower SSE scores in the GAS groups, more so for the addicted group than the engaged and problematic groups. Children who do not master expectations and requirements in real-world socializing may suffer lower confidence levels in their ability to engage in social interaction,

which may ultimately show lower self-esteem levels and more time spent online (Aydm & San, 2011).

These findings are supported by Gentile et al. (2011). They argue that even though more time spent gaming may result in fewer opportunities to practice social skills in a real-world setting, the online communication the gamer experiences through their online community might fulfill the need for social interaction. These online friendships that such communities bring are viewed as authentic and prompt social capital similar to real-world context (Yee, 2007; Williams, 2007). Gaming does allow youth to observe, rehearse, and gain feedback on different social strategies from the safe arena of their homes (Bowman & Tamborini, 2012). Cheng and colleagues (2018) found that the way games often are centered around the concept of fulfilling a group mission causes it to be a natural arena that promotes the feeling of relatedness in youth. From the SCH perspective, one could argue that the digital world and the gaming activity provide youth with group challenges that their real-world cannot. Through this, a digital sense of belonging substitutes the analog one.

Van Den Eijnden et al. (2018) found that social competence was associated with problematic gaming. Naturally, real-world socialization provides youth with more verbal and nonverbal (e.g., eye contact and body language) cues that help socialize sufficiently and demand higher social competence. The GAS groups' lower self-efficacy beliefs in creating and maintaining friendships may be due to less social competence. This may explain why the three GAS groups in the present study scored lower on perceived SSE than the reference group. These reflections represent another approach to the association between GAS behaviors and SSE related to social competence. Gamers in the GAS groups could (1) experience less competence in establishing and maintaining real-world friendships due to their gaming behavior or (2) choose online interaction over real-world interaction due to a lack of social competence. Similarly, Peeters et al. (2019) found problematic gamers to score significantly lower on aspects of social competence than their recreational and engaged counterparts. In Peeters and her colleagues' study, participants who were problematic gamers more often perceived their behavior as an addiction compared to the engaged gamers. Therefore it could be argued that GAS gamers, especially the addicted group, possibly exhibit lower levels of social competence, which ultimately may be related to their SSE.

However, another interesting finding was that a lot of time spent gaming predicted positive effects on adolescents' perceived social competence (Van Den Eijnden et al., 2018). These findings may underline the central arguments of the SCH. Since youth themselves report an increase in their social competence beliefs when they play more, this may indicate that more hours of gaming activity does have a compensating effect on socialization. This compensating effect could especially be the case in youth with low social competence and SSE due to their lack of real-life social experiences, which would include all GAS groups in this study, especially the addicted group.

All of this is interesting to reflect upon based on the complexity of establishing a truth to *when* and *how* gaming becomes problematic and brings out social problems for the 8th-grade student (Lemmens et al., 2015). Due to the complexity of the relationships between gaming and development in the social domain, gaming may affect the SSE (and vice versa) in 8th-grade students rather diversely. Separating gaming activity that positively strengthens SSE beliefs in 8th-grade students from those that function the other way around and therefore weakens the SSE beliefs is not possible in the present study. Causality in such a relationship, whether positive or negative, remains unclear in the present study and the investigated literature assessing this issue.

8.4 The role of family support in gamer social self-efficacy

Forms of family support have previously been found to directly affect adolescent well-being (Helsen et al., 2000; Moreno et al., 2009), including social self-efficacy (DeLay et al., 2013). However, when gaming behaviors are added to this equation, the relationship becomes more layered and complex, making for an interesting exploration. As support from parents has previously been found to be a protective factor against the harmful effects of electronic media use (Boniel-Nissim et al., 2014), it was thought to have similar protective factors against the harmful effects of gaming behavior. This formed an argument to investigate the moderating effect of family support on the association between GAS behavior and social self-efficacy.

In light of Ecological systems theory (Bronfenbrenner, 1977), adolescents' lives posit potential interaction from the family environment to peer- and online environments, which has further implications for exploration (Marsh et al., 2013). In this study, we hypothesized that higher levels of support from one's family would protect against the negative effects of

belonging to one of the three gaming behaviors on social self-efficacy. We further sought to explore if there were differences in moderation between the groups.

8.4.1 Family support as a moderator

No moderating effects from family support on social self-efficacy were found when a GAS behavior was present. Therefore family support did not serve as a protective factor against risk behavior in this sample, rejecting our hypothesis for moderation. This could indicate that Boniel-Nissim and colleagues (2014) findings are not comparable to the relationship investigated in the present study. Steinberg's (2001) review of 15 years of research on parental support and adolescent development concluded that adolescents benefit and more often thrive in different aspects of life when having authoritative parents in their lives. The typical attributes of these authoritative parents were warmness, firmness, and being accepting of their children's psychological autonomy needs (Steinberg, 2001). In this context, family support, as measured in the HBSC-survey, may not pick up on essential aspects of family support that are directly linked to adolescents' gaming behaviors, which could help explain the non-significant result.

However, the current study does add to the body of literature that recognizes family support as a relevant factor for adolescent social self-efficacy, as family support was found to be a significant predictor of SSE, encompassing a direct positive effect. Viewing these findings through a social-ecological lens, family support can be considered an asset for obtaining higher social self-efficacy in the real world because the family- and peer microsystems more naturally overlap (Bronfenbrenner, 1977; Whitbeck, 1987; Kia-Keating et al., 2011).

Family support as a protective factor against the negative effects of GAS behaviors can, on the other hand, be more complicated. Regardless of causation in the relationship between GAS and SSE, family support may be a factor for real-world social self-efficacy outcomes but not necessarily online. This is because social self-efficacy can not only manifest itself in real-world microsystems such as the classroom but also in online microsystems facilitated by online games (Cheng et al., 2018; Yee, 2007), which are typical for this age group in Norway (Medietilsynet, 2016, p.57). Behind the playing of games with online peers, there exist social motivations (Hussain & Griffiths, 2009; Dindar & Akbulut, 2015), giving an alternative access point for fellowship and friendly relations (Hussain & Griffiths, 2009), especially for those who receive less socialization from their real-world networks of friends and family

(Young & De Abreau, 2010; Chan & Cheng, 2016). Such socially motivated gamers tend to have more intense gaming behavior (Yee, 2007; Sherry et al., 2013), a behavior associated with lower levels of sociability and self-efficacy (Pontes, 2018).

The family microsystem may not interact as thoroughly with these online peers as with classroom peers due to parents being naturally more involved in the schooling and education of their child than in their child's gaming hobbies. Parents' knowledge about their children's video games has been found to be low in this age group, from the perspective of both parent (Ipsos, 2021, p.20) and child (Medietilsynet, 2016, p.58). This could be an important factor for less intractability between the family microsystem and the online gaming microsystem. Lacking overlap within the mesosystem holds potential for less interaction and bi-directional influence between the microsystems (Bronfenbrenner, 1977; Mittelmark, 2012, p. 12; Sallis et al., 2015). This could render the protective factors in family support less impactful against the negative effects GAS behaviors have on adolescents' social self-efficacy.

The lack of a significant moderating effect corresponds with findings in research by Choo (2015) and Liau (2015) - that parental supervision does not influence problem gaming in a significant way. As measured in the current study, family support might not interact sufficiently with the online microsystem to significantly impact social self-efficacy in adolescents with GAS behaviors. In the future, more parents will likely play video games themselves, have a greater understanding of what gaming is, and cause the family and online peer microsystems to posit greater interaction potential (Schneider et al., 2017).

Aside from the possibility that family support simply has no moderating effect on the relationship, other plausible explanations also may relate to the current study's methods. Insufficient sample size may leave moderation effects undiscovered due to not enough statistical power (Memon et al., 2019). The ideal statistical practice is also an evolving concept, causing interaction tests to frequently lack the power to find statistically significant, meaningful interactions, partly because researchers often do not know how to test these interactions (Little, 2013, p. 361-362).

8.4.2 The direct effect of family support on social self-efficacy

Keeping in mind the high prevalence of gaming as a leisure time activity in Norway (Medietilsynet, 2016, p.57), the reference group is likely to play video games, just not to the degree to meet the criteria for a GAS behavior. This argues for discussing the present study's finding of a direct positive effect of family support on social self-efficacy.

The current study corresponds with previous research that suggests that difficulties with interpersonal relationships can be mitigated by relationships of higher quality, such as family relationships (DeLay et al., 2013; Steinberg, 2001). Adolescents who find support and warmth in such relationships can experience an enhanced sense of self-esteem and competence, which they can transfer to social settings (Steinberg, 2001). In this capacity, family support functions as an asset that may be used when facing interpersonal challenges, providing a buffer against the many consequences following a lack of interactions or negative interactions (DeLay et al., 2013). The parent-adolescent relationship has further been found to provide a buffer against adolescents' emotional and behavioral outcomes that are usually associated with family conflict (Franck & Buehler, 2007).

From an ecological systems perspective, the family is part of an adolescent's immediate surroundings as a microsystem. Here family assets and protective factors can benefit behavior and development in other microsystems (Bronfenbrenner, 1977; Chang et al., 2017). In order to better understand healthy development in children and adolescents, an ecological transaction lens can make for a helpful viewpoint. This viewpoint emphasizes reciprocal interactions between family, school, social conditions, and other life events (Bronfenbrenner, 1977). Families, especially parents, often provide their young with social capital, involving resourceful interpersonal relationships that can be utilized in goal-driven activities, such as obtaining friendships (Chang et al., 2017; Franco & Levitt, 1998). These resourceful relationships can function as protective factors that counteract the repercussions of risk, acting as a buffer to disarray and inhibition and moderating the adverse outcomes of risk factors (Rutter, 1987; Kia-Keating et al., 2011).

In the current study, the direct effect of family support functions as an asset for obtaining higher levels of social self-efficacy in the reference group when the risk behavior (GAS) is not present. These assets are the strengths that exist within the whole social ecology of the

individual, predicting positive outcomes within the domains of health, mental health, and education (Sandler, 2001).

Our findings on the direct effect of family support on SSE correlate with previous research. Parental autonomy-granting and support were already, in the late 1980s, found to contribute to higher levels of perceived self-efficacy, prosocial behavior, and friendship quality in children (Whitbeck, 1987; Franco & Levitt, 1998). Negative parent-child relationships have been linked to adolescents experiencing a lack of school affiliation (Schneider et al., 2017), less school connectedness, and lower school social self-efficacy (Zhu et al., 2015). These phenomena illustrate how families provide youth with developmental assets and protective factors they can benefit from to thrive. Although assets and protective factors are two terms that are often used synonymously, protective factors require a risk factor to be present, while developmental assets do not (Kia-Keating et al., 2011).

However, family support is a general measure in the present study and does not necessarily measure support in populations with gaming behavior relevant to said behavior. The impact general family support can have on health outcomes in gaming youth seems to be more layered and complex and is therefore unclear. As online gaming and gaming culture have rapidly evolved in recent years, measures need to develop in parallel with psychological adaptations (Moksnes et al., 2013; Carras et al., 2019). Parents may not understand the experienced psychosocial benefits gaming may have for their children, causing a discrepancy in understanding gaming as a whole concept (Ipsos, 2021). In this manner, youth may receive high general support from their parents, but the parents view gaming as inadequate health behavior. This may be the reason for household conflicts, ambivalent and negative parental attitudes toward gaming, and greater anger, hostility, and alienation in the family environment (Jeong & Kim, 2011; King & Delfabro, 2017; Kwon et al., 2011; Kim & Kim, 2015).

8.5 Methodological Considerations

This chapter will express some considerations and reflections that surfaced as this study unfolded. These considerations revolve primarily around methodology and, hereunder, study design, measuring instruments, generalizability, and lastly, contributions and implications of the present study.

8.5.1 Design

This study is based on a cross-sectional design, making it difficult to state anything about the causality in the investigated relationship between different gaming behaviors and SSE (Field, 2018, p.16). As discussed, it may be the 8th-grade students who endorse GAS criteria who already had low levels of SSE, and therefore turn to the gaming arena to compensate for the lack of socialization the real world provides them. Alternatively, it may be that much time spent gaming lowers the SSE in youth due to the captivating characteristics gaming provides, which ultimately makes them displace gaming with meaningful real-world interaction. To a more considerable degree, a longitudinal design would depict a more accurate sequence of events and provide insight into the causal direction of the relationship (Granic, 2014).

The current study is further based on self-reported data, which have become more important in research. Young samples are more likely to threaten the validity of studies as they are more susceptible to response bias (Wyrick & Bond, 2011; Rosenman et al., 2011). One form of response bias is the social desirability bias, which refers to the tendency people have to give the "right" answers, and therefore present themselves as good in the eyes of others, regardless of how true that answer might relate to their experience (Rosenman et al., 2011). This could be the case for self-reporting social self-eficacy. However, the items of GAS, especially the four core criteria, are not likely viewed as socially desirable behavior. Adolescents can be unwilling to disclose sensitive information (Wyrick & Bond, 2011). They may wish to conceal personal and stigmatized behaviors from family, friends, and questionnaire sponsors, causing underreporting of data (Lessler & O'Reilly, 1997).

8.5.2 Measuring instruments and the survey data

The HBSC-survey only contains data on both GAS and SSE in 8th-grade participants, limiting our findings to one age group. Hamre and her colleagues (2022) found a lower prevalence of gaming behavior using the same data when she investigated variables available for different age groups. As the scientific fields seem lacking in studies looking at GAS-

specific gaming criteria and the relationship to the social domain, especially SSE beliefs, it would have been interesting to compare the findings of the included 8th-grade students to other ages. Festl and her colleagues' (2013) study would make interesting comparability. They found that higher GAS scores predicted lower levels of self-efficacy in the social domain and that this relationship was nearly equal for the different age groups. Not comparing age groups also has implications for family support and its relationship with SSE among the GAS behaviors. Previously, parental relationships have negatively correlated with both age and IGD symptoms (King & Delfabro, 2017). Parental knowledge of their children's video games decreases the older their children are (Medietilsynet, 2016, p.58). Our analyses could have yielded different results in different age groups, making interesting comparisons between family support and gaming behavior.

8.5.2.1 The Gaming Addiction Scale

When assessing game addiction in 8th-grade students, an interesting discussion point is whether or not the CORE-4 approach is the correct measurement tool to identify addictive traits. Brunborg et al. (2015) looked into how the GAS 7 approach and the CORE 4 showed differences in capturing addictive traits in gaming youth. Their study shows that a higher proportion of the gamers was defined in the addicted group when the CORE 4 approach was used compared to GAS 7. Building on these findings, it can be expected that the number of addicted gamers in the present study would be lower if it used monotheistic scales (e.g., GAS 7), where one has to fulfill all the criteria to be categorized as an addicted gamer. Which one of the presented measurements that identify addicted gamers the most accurately is not something this study will investigate, but it is a question that needs further investigation.

As Lemmens and his colleagues (2015) pointed out, there lies obscurity in when and how gaming becomes problematic due to the behavior's inherently unproblematic nature. At the same time, we as researchers use tools to measure and categorize behavior in a scientific field that is ridden with disagreement due to this obscurity (Bean et al., 2017, Quandt, 2017; Petry & O'Brien, 2013). If these tools are flawed tomorrow, gaming behavior that is mainly unproblematic may still be wrongly called problematic today. Acknowledging the possibility of a clinical disorder that has been rushed, we also want to add to the concerns regarding the risks of over-pathologizing normal gaming behavior (Ferguson & Colwell, 2020). This may also give gaming unreasonable negative attributes. The low social self-efficacy is *linked* to

gaming behavior but may relate to other underlying factors to which gaming serves as a coping mechanism (Yee, 2007).

8.5.2.2 Social self-efficacy

The social self-efficacy scale has some limitations in the current study. Social self-efficacy can appear in both the real world and online settings alike (Cheng et al., 2018; Yee, 2007). However, two of the items in the social self-efficacy scale mention "classmates" (Muris, 2001). Participants may take for granted that these questions are supposed to be associated with a real-life or school setting, thereby only emphasizing the real-world social connection with peers. With the technological advancements and the evident fact that youth use more and more time online, it seems reasonable to argue that efficacy beliefs in the digital world should also be included. Therefore, this study emphasizes the need for additional work to capture social self-efficacy beliefs in the digital world. This might be an important health outcome to capture in modern youth.

8.5.2.3 Family Support

Family support is a general measure in the current study, and other moderating effects could have been found if the measure was specifically related to gaming populations and gaming behavior. As the HBSC-survey is a large survey aiming to gather more general data on health behaviors (Haug et al., 2020), it may lack the specificity to grasp relationships between certain variables, such as how family support is associated with gaming behavior. Other studies have investigated parental attitudes and supervision specifically related to their children's gaming behavior (Wu et al., 2016; Jeong & Kim, 2011; Kwon et al., 2011; Liau, 2015). A general measure for family support might not have had the hypothesized interaction effect with gaming behavior when looking at social self-efficacy as a health outcome. A reflection in hindsight is that the current study could have produced different results with an instrument for measuring family support specifically related to gaming.

8.5.3 Generalizability

The HBSC-survey is based on a representative sample that ensures quality in terms of generalization. This is mainly due to the large selection this survey brings, which was necessary for this study since it investigated the association between GAS behaviors and SSE beliefs, which ultimately reduced the sample size considerably. Even though the survey tried to recruit a nationwide representative sample, there were some geographical differences. The

northern part of the country was especially underrepresented. The lack of geographical coverage was most evident in middle school. Since this study focuses on middle school students, some caution in the generalization might be needed. Further, there were high institutional drop-out rates, both in schools, where 15% completed, and at the class level, 80% of the students completed the survey (HEMIL, 2020). However, these numbers are not specifically at 8th-grade students, but they may signal a lack of motivation to complete such a survey at an institutional and individual level.

Since this survey is conducted in 40 countries every four years, it allows for comparing results across borders and over a longer time frame, as long as the same variables are included in different countries, year after year (HEMIL, 2020). As this study stresses in chapter 4.7, many studies on gaming behavior relate to East Asian regions, which may have peculiar contextual and structural factors that reduce generalizability to a Norwegian context. With its relatively large number of participating countries, the HBSC-survey can broaden the understanding of GAS behaviors in many regions (especially the European context), strengthening the generalizability for coming studies using their data if they choose to include the Gaming Addiction Scale. The time frame of new surveys every fourth year may also detect how technological advancements and a growing gaming industry might impact gaming behavior and how this may affect youth psychosocial health and well-being.

8.6 Contributions to health promotion research and work

One of the sustainable development goals in the 2030-agenda that Norway has agreed to is to "ensure good health and promote quality of life for everyone, regardless of age." Related to the work in reaching this goal, the Norwegian government prompts innovative thinking and rigorous work from the health promotion field (Meld. St.40 (2020-2021), p. 5; p. 34). For many adolescents, gaming activity can be a recreational and social leisure time activity that provides a break from the struggles and adversity of the real world while it also facilitates socialization (Sherry et al., 2013; Cheng et al., 2018; Dindar & Akbulut, 2015, Hygen et al., 2020). The social aspect of gaming promotes social self-efficacy and communication skills in an online environment. These two skills are central to enabling adolescents to achieve better health and positive development in the real world (Muris, 2016). However, higher social self-efficacy online can compromise real-world social self-efficacy in addicted populations (Jeong & Kim, 2011). To what degree can highly engaged gaming provide the same developmental

contributions to the SSE of youth compared to real-life interaction in highly engaged and problematic gamer populations? Furthermore, is it possible that increased SSE in a digital world can also increase the SSE in real-life settings? We encourage further research to address these questions.

Furthermore, the measuring instruments in the body of literature lack a universal common standard for assessment, and the inconsistencies are shown in the vastly divergent prevalence reported in different studies (King et al., 2013; Aarseth et al., 2017; Griffiths et al., 2017). Mihara and Highuchi (2017) highlight these discrepancies in their systematic review, showing prevalence differences among youth with addicted gaming behaviors ranging from 0.7 percent to 27.5 percent. Acknowledging the lack of consensus in measuring gaming behavior, health promoters should remain critical to the measuring instruments until a more universally accepted tool has developed, as the current tools hold the potential to create barriers between adolescents and their efficacy beliefs (Ferguson & Colwell, 2020; Aarseth et al., 2017). Influencing efficacy beliefs and removing potential barriers that function against efficacy beliefs (e.g., inaccurate instruments) should remain a central reference point in work and research in the health promotion field (Green et al., 2019, p.160). Moreover, this study has implications for using less general instruments and more measuring instruments relevant to gaming, specifically when exploring social health outcomes related to GAS behaviors. We encourage future research to keep this in mind. Health promoters need to keep pace with technological advancements accompanied by new measuring instruments and look to new and innovative ways to investigate health outcomes in the modern context.

We also want to add to the need for more longitudinal designs. With cross-sectional designs, we cannot know if games cause emotional, cognitional, and social functions to change or whether adolescents with specific characteristics choose a gaming behavior that complements these characteristics (Granic et al., 2014). Most gaming-related studies, including this one, depend on survey assessment and survey data, limiting our understanding of gaming behavior and health-related outcomes. Therefore, we also want to add to Granic and her colleagues' (2014) thoughts on using a more multimethod approach when researching gaming behavior. This could facilitate observations of online activity and further investigate these activities' associations with both long-term and immediate effects in their offline lives (Granic et al., 2014).

9.0 Conclusion

This study aimed to investigate the relationship between gaming behavior and social self-efficacy and whether family support impacted this relationship in a sample of Norwegian 8th-grade students. One-third of the sample had gaming behavior, most of which were in the problematic group, and boys were found to be far more likely to have gaming behavior than girls. All three gaming behaviors predicted reduced social self-efficacy, where the addicted group had the largest reduction. Family support had a small, positive direct effect on the students' social self-efficacy but did not moderate the relationship between social self-efficacy and gaming behavior.

With the rapid advancements in technology, children that grow up today are bound to experience different elements of social development than a mere decade ago, displacing physical recreation in favor of gaming as a digital recreational activity (Johnson et al., 2015, p. 109). Therefore, current screening tools may fall short in such new dynamics (Schneider et al., 2017). It is important to continue the contributions to the research base on gaming behavior to discover and establish assets that can promote health and components that can serve as protective factors against the negative effects of GAS behaviors. We, therefore, encourage future research to keep pace with technology and use instruments that can measure the social self-efficacy outcomes online in populations with GAS behavior. As gaming behavior is layered and complex with unforeseen causes and consequences, future research should continue to expand the repertoire of related health outcomes.

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Appendices

UNIVERSITETET I BERGEN
Det psykologiske fakultet

Orientering til foresatte og forespørsel om samtykke til deltakelse i undersøkelse. Helsevaner blant skoleelever. En WHO undersøkelse i flere land

Bakgrunn og formål

Formålet med denne undersøkelsen, er å kartlegge faktorene som bidrar til god utvikling i helse og livstilfredshet blant barn og unge, samt å finne frem til tiltak som kan skape en helsepositiv livsstil og økt helsebevissthet i yngre alder.

Undersøkelsen blir gjennomført i over 40 andre land, de fleste i Europa. Verdens helseorganisasjon (WHO) står bak prosjektet, og HEMIL-senteret ved Universitetet i Bergen, er ansvarlig for undersøkelsen i Norge. Tilsvarende undersøkelser har blitt gjennomført hvert fjerde år siden 1985.

Den innsamlede informasjonen vil bli benyttet til forskning og til å lage rapporter og analyser for WHO og norske helse- og utdanningsmyndigheter. WHO er interessert i å kartlegge på tvers av land, mens norske helse- og utdannings-myndigheter benytter resultatene til å utvikle politikk og tiltak som kan fremme helse og trivsel blant barn og unge.

Skolen der ditt barn er elev, er trukket ut for å bli med i undersøkelsen. Undersøkelsen blir gjennomført på skoler fra alle deler av landet blant elever på 6., 8. og 10. klassetrinn, samt blant elever på første årstrinn i videregående skole. Totalt vil cirka 7 000 elever delta.

Hva innebærer deltakelse i studien?

Vi ber om samtykke til at ditt barn kan fylle ut et elektronisk spørreskjema. Det skal fylles ut på skolen i løpet av en skoletime. Verken andre elever eller

læreren, vil få vite hva ditt barn svarer. Skjemaet inneholder blant annet spørsmål om matvaner, fysisk aktivitet, røyking, skoletrivsel og elevens helse- og trivselsopplevelse. Spørreskjemaet inneholder også et par spørsmål som gjelder foreldrene, blant annet om yrkesaktivitet og sosioøkonomisk status. Hele spørreskjemaet er tilgjengelig fra følgende nettside:
http://www.uib.no/helsevaner

Hva skjer med informasjonen om eleven?

Alle personopplysninger vil bli behandlet konfidensielt. Spørreskjemaet inneholder ingen spørsmål som identifiserer eleven direkte. Skolen er identifisert i datafilen med en kode. Så lenge datainnsamlingen pågår, vil prosjektgruppen kunne koble på skolenavn. Slik kobling vil bare bli gjort i forbindelse med purring til skolene, og skolenavn vil aldri bli lagret sammen med dataene. Prosjektgruppen ved HEMIL-senteret lagrer koblingslisten med skolekode og skolenavn på et tilgangsregulert nettverksområde. Når datainnsamlingen er ferdig sommeren 2018, vil koblingslisten bli slettet og datafilen bli gjennomgått slik at det ferdige datasettet er helt anonymt.

Frivillig deltakelse

Ditt barn kan ikke delta uten ditt samtykke. Selv om samtykke er gitt, kan barnet selv velge ikke å delta.

Studien er meldt til Personvernombudet for forskning, NSD - Norsk senter for forskningsdata AS og Regional etisk komité.

Tilbakemelding til lærer

Vi ber om at du gir ditt eventuelle samtykke ved å melde at det er OK at ditt barn kan delta i undersøkelsen til kontaktlærer. Du kan gi denne meldingen per e-post, SMS eller muntlig til kontaktlærer.

Med vennlig hilsen Oddrun Samdal Professor

1.2 Information to students

Kjære elev!

Ved å svare på disse spørsmålene, vil du hjelpe oss med å finne ut mer om barn og unges livsstil og skolemiljø. De samme spørsmålene vil bli stilt til skoleelever i 40 andre land. Svarene dine skal være hemmelige, derfor skal du ikke besvare spørsmålene mens andre ser på.

Dersom du ikke ønsker å svare, kan du la være. Hvis det er noen spørsmål du ikke ønsker å svare på, kan du gå videre til neste spørsmål.

Les hvert enkelt spørsmål, og svar så ærlig som du kan.

På forhånd takk for hjelpen!

Appendix 2: Questions in the survey

2.1 Gaming Addiction Scale

Hvor ofte i løpet av det siste halvåret......

	Aldri	**Nesten aldri**	**Av og til**	**Ofte**	**Veldig ofte**
Tenkte du på et dataspill hele dagen?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Brukte du mer og mer tid på dataspill?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Begynte du å spille et dataspill for å slippe å tenke på andre ting?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Hørte du ikke på andre som bad deg om å spille mindre?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Følte du deg dårlig når du ikke kunne spille eller ikke fikk lov til å spille?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Havnet du i krangel med andre (f.eks. foreldre, venner, eller viktige andre) fordi du spilte for mye?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Lot du være å gjøre andre aktiviteter (for eksempel (f.eks. skole, jobb, lekser, idrett, hobbyer) for å spille dataspill?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑

2.2 Social Self-efficacy

Nedenfor er noen spørsmål om dine venner og om deg selv. Klikk på det som passer best på deg fra 1 (ikke i det hele tatt) til 5 (veldig godt).

	1 = Ikke i det hele tatt	2	3	4	5 = Veldig godt
Hvor godt uttrykker du dine meninger når de andre i klassen er uenig med deg?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Hvor godt blir du venner med andre jevnaldrende?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Hvor godt kan du ta en prat med en ukjent person?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Hvor godt kan du samarbeide i overensstemmelse med de andre i klassen din?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Hvor godt kan du fortelle andre jevnaldrende at de gjør noe som du ikke liker?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Hvor godt kan du fortelle om en morsom hendelse til en gruppe jevnaldrende?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Hvor godt holder du på vennskap med andre jevnaldrende?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑
Hvor godt lykkes du med å forhindre krangler med andre barn?	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑

2.3 Family support

Vi er interessert i hva du tenker om de følgende påstandene (les hver påstand nøye og kryss av for hvor enig du er i hver påstand).

	1 Svært uenig	2	3	4	5	6	7 Svært enig
Familien min prøver virkelig å hjelpe meg	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑	(6) ❑	(7) ❑
Jeg får den følelsesmessige hjelpen og støtten jeg trenger fra familien min	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑	(6) ❑	(7) ❑
Jeg kan prate med familien min om problemene mine	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑	(6) ❑	(7) ❑
Familien min ønsker å hjelpe meg i å ta beslutninger	(1) ❑	(2) ❑	(3) ❑	(4) ❑	(5) ❑	(6) ❑	(7) ❑

Appendix 3: Histogram of SSE distribution
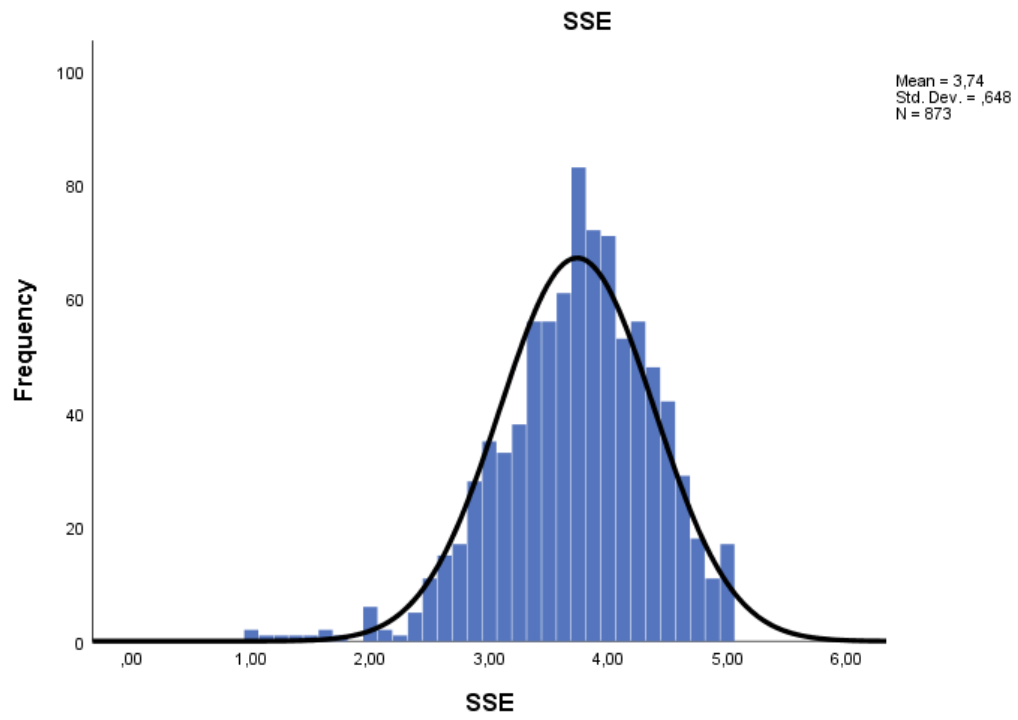
Appendix 4: Collinearity statistics

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Engaged	,887	1,128
	Problemg	,832	1,202
	Addicted	,919	1,088
	FScen	,682	1,466
	sex	,822	1,216
	mod_eng	,902	1,109
	mod_prob	,766	1,305
	mod_add	,892	1,121

a. Dependent Variable: SSE