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Extramural activities, different types of gaming and the effect on Norwegian teenagers' English language proficiency

Master's thesis in English with Teacher Education

Supervisor: Anne Dahl

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Abstract

This master's thesis is an exploratory quantitative study investigating how spending time playing video games and other extramural activities provide opportunities for exposure to authentic English input, and how spending time on these activities affect English language proficiency as measured by a vocabulary size test. The study was conducted on 97 Norwegian fifteen-year-old students attending their final year of obligatory education (10th grade), and it was structured as a cross-sectional quasi-experiment, where the participants first filled out a questionnaire about their extramural habits followed by completing a Vocabulary Size Test to measure their receptive vocabulary size which, in turn, serves as proxy for general language proficiency. The gathered data was analyzed using an ordinary least squares regression analysis and bivariate analyses. Overall, the results of this study are in line with a lot of previous research on that exposure to extramural English input affects vocabulary size. However, the overall effect within this study was found to be slightly smaller than the effect found in many other studies. As opposed to a lot of previous studies, gaming in general was not found to have a significant effect on language proficiency in this study. Presumably, gaming is not best described as one monolithic extramural activity as it encompasses so many unique video games and ways of playing. Investigating ways of interacting while playing video games, such as 'spending time writing in English while gaming', 'speaking in English while gaming', and 'watching gaming related content' led to some interesting and significant findings. For one, the regression analysis shows that spending time writing in English while playing video games is the activity which had the strongest positive effect on English language proficiency within the group of participants (n=93). Secondly, within this group, speaking in English while gaming and watching gaming related content have significant negative effects on their vocabulary size. Additionally, the study found that there is a connection between the nature of specific games in terms of whether they provide opportunities for input and interaction and vocabulary size. Out of the games that the participants reported that they played most often, Minecraft was the only video game that had a significant relationship with vocabulary size. Finally, the study found that further research is required to provide a more nuanced look on levels of interaction in games, specific types of interaction and their possible benefit to language proficiency, and how specific video games themselves can affect language proficiency.

Sammendrag

Denne masteroppgaven er en utforskende kvantitativ studie som undersøker hvordan tid brukt på å spille videospill og andre ekstramurale aktiviteter legger til rette for eksponering for autentisk engelsk input, og hvordan bruken av tid på disse aktivitetene påvirker engelske språkferdigheter målt av en test som måler størrelsen på ordforråd. Studien ble gjennomført ved hjelp av 97 norske femtenåringer som går på 10. trinn. Oppgaven er basert på tverrsnittsundersøkelser og kvasi-eksperiment. Deltakerne ble først bedt om å svare på en spørreundersøkelse relatert til deres ekstramurale vaner, deretter gjennomførte de en vokabulartest for å måle reseptivt ordforråd, som ofte blir brukt som et proxy for samlede språkferdigheter. Dataene ble analysert ved bruk av en regresjonsanalyse og bivariate analyser. Samlet sett, er resultatene fra denne studien i tråd med tidligere forskning av eksponering for ekstramurale aktiviteter og dens betydning for engelske språkferdigheter, men den samlede effekten av disse aktivitetene var av mindre betydning enn det som har blitt funnet i tidligere studier. I motsetning til tidligere forskning, ble det ikke funnet et signifikant forhold mellom gaming og gode språkferdigheter. Sannsynligvis er dette fordi gaming ikke burde beskrives som en monolittisk ekstramural aktiviteter siden denne aktiviteten inneholder mange unike videospill og måter å spille på. Undersøkelsen av samhandlingen mellom gamere, slik som å bruke tid på å 'skrive på engelsk mens man spiller', 'snakke på engelsk mens man spiller' og 'å se på gaming-relaterte videoer', ledet til noen interessante og signifikante funn. For det første, viste det seg at 'å skrive på engelsk mens man spiller' var den aktiviteten som hadde størst positiv effekt på det reseptive ordforrådet til deltakerne. For det andre, så viste det seg at 'å snakke på engelsk mens man spiller' og 'å se på gaming-relaterte videoer' hadde signifikante negative effekter. I tillegg, ble det i denne studien oppdaget at det er en sammenheng mellom individuelle spill sin natur, med tanke på hvordan de tilrettelegger for input og interaksjon, samt reseptivt ordforråd. Minecraft viste seg å være det eneste av de mest populære spillene blant deltakerne som hadde et signifikant forhold med reseptivt ordforråd. Til slutt argumenterer denne studien at videre forskning er nødvendig for et mer nyansert bilde av hvordan nivåer av interaksjon i spill, spesifikke måtere å interagere på i spill og deres mulige påvirkning av språkferdigheter, og hvordan individuelle spill kan påvirke språkferdigheter.

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1 Introduction

Gaming has grown to be one of the largest entertainment industries in the world. In 2015, Hogan (2016) estimated that nearly one third of all Americans (115 million) are playing video games, and he predicted that the popularity would increase. To paint the picture, Hogan (2016) explains that there are at least two gamers in each household in the United States and that 80% of all households own at least one device on which video games can be played. The percentages in Norway are close to those in the US. In 2020, the Norwegian Media Authority released a report which showed that 86% of Norwegian youth between the ages 9-18 play video games (Norwegian Media Authority, 2020). Based on the continuous increase in popularity, the effects of gaming have grown to be a heavily debated topic, and the attitudes towards gaming are quite polarized. Taking into account how common gaming is, it is time that we start to accept that gaming will be part of our culture and daily lives for a long time ahead. Whether you like or dislike that people spend time on playing video games, there is scientific evidence that input from extramural activities, such as gaming, have many positive effects on abilities tied directly to English language proficiency.

In this study, I wish to investigate how gaming and other extramural activities are related to the development of Norwegians' English language proficiency. My approach is to examine the effects that extramural activities such as reading, watching TV, using social media, and playing video games have on Norwegian 15-year-olds' language development. The focus is on the effects of gaming, but other activities are compared in order to paint a fuller picture. The study is structured as a quantitative quasi-experiment including the participation of 97 Norwegian tenth grade students. The students that participated were asked to complete a questionnaire asking about their habits related to English extramural activities, and afterwards they completed a vocabulary size test which, in this context, serves as a proxy for general language proficiency. The results were later analyzed using descriptive statistics, an ordinary least square regression analysis and a bivariate analysis. From these estimates the study presents a general overview of how much time the students spend on specific extramural activities and how they performed on the vocabulary size test. This is followed by a discussion on whether the findings can be used to illustrate if time spent on extramural activities can predict English language proficiency, and if playing specific games correlate with a large English vocabulary size.

The current thesis first presents relevant literature and theories related to English in Norway, second language acquisition, the importance of input, output and interaction in language acquisition, the term *Extramural English* (EE), and the activities that can provide good extramural English input, with a special focus on gaming. Based on the results from previous studies on the effects of extramural activities, the theory chapter

ends with a presentation of a research gap, which leads to the research focus in this study. There are specifically four research questions that I want to address:

- *How much time is spent on gaming compared to other extramural activities in this participant group, and are there gender differences?*
- *Which extramural activities are the best predictors of English language proficiency as measured by a vocabulary test?*
- *What types of video games are most commonly played by the participants?*
- *Does the nature of specific games played in terms of whether they provide opportunities for input and interaction affect English language proficiency as measured by a vocabulary test?*

Following the theory chapter, the methods of the study are described, focusing on the participants, the questionnaire and the Vocabulary Size Test (VST). The results chapter will show the results from several statistical analyses, which will be discussed in more detail and in line with the research questions in the discussion chapter. Finally, a conclusion will be drawn based on all these findings.

2 Theory

2.1 English in Norway

In modern-day Norway, the English language is present virtually everywhere. The popular culture in Norway has been progressively influenced by contact with the UK and the US over the past century. Additionally, since Norwegian is a small language in a global context, dubbing or translating English media to Norwegian is not a common practice, and very often English media, such as video games, are not translated to Norwegian at all. Many of the films, television series, music, and video games that Norwegians enjoy are in English (Rindal, 2014). Among the Norwegian adolescents, popular culture has become the main source of English language input, according to Rindal (2014). English language in television, films, gaming, traveling to foreign countries, and participation in social media have given Norwegian foreign language learners extensive access to a variety of linguistic resources (Rindal, 2014). The English language has also had a steady foothold within the Norwegian education system. Being introduced to the national curriculum in 1936, it has been part of Norwegian education for almost a century. In 1969, English became a mandatory subject for all students in Norway (Simensen, 2014). Together with the development within popular culture, English in Norwegian education has had a steady growth. After the education reform in 1997, English as a foreign language was introduced from 1st grade in primary school. It is now a compulsory subject throughout primary and lower secondary education, and it continues in upper secondary education. A report presented by EF Education First (2021) shows that Norwegians in general have a very high proficiency in second language (L2) English. The report shows that Norway is among the top-five countries out of the 112 countries and regions tested (Education First, 2021).

A country report published by the Norwegian Ministry of Education and Research (2004), said that the importance accorded to English is partly explained by the fact that Norway and its small language community is dependent on foreign language skills to uphold contact and interaction with other people, in a global as well as a European perspective. English is a major world language and represents the language area with which Norwegians have closest links in terms of geography, culture and language history (Norwegian Ministry of Education and Research, 2004). In addition, English often serves as the default language in international diplomacy, and it plays an official or working role in the affairs of most major political gatherings, such as the United Nations and the European Union (Galloway & Rose, 2015). This means that being able to understand and express oneself in English is a useful tool for Norwegians to take part in our continuously globalizing world. According to Rindal (2014), the increased exposure to authentic English through education, media and popular culture has influenced the attitudes towards English

in Norway. The familiarity with linguistic and social registers can encourage the development of L2 confidence and ownership, and further lead to increased language proficiency (Rindal, 2014). Travelers who arrive in Norway, will discover that most Norwegians speak English with confidence and fluency (Bonnet, 2004).

2.2 Second language acquisition

While L1 learners develop their language naturally and generally have no need to be taught necessary knowledge and skills to use it, this is rarely the case with L2 acquisition (Meisel, 2011). Interestingly, bilingual children have proven that effortless acquisition is not limited to one language, and one could therefore assume that it is the age of the language learner that is the determining factor (Meisel, 2011). L2 learners are generally older than L1 learners, this makes a difference because young children's brains are found to be immensely receptive to learning all sorts of things, even language (Patterson, 2020). In the time period, often referred to as *the critical period*, many studies within neuroscience have found that children find themselves in a period of heightened plasticity, where their brains easily can make neural connections in response to all sorts of information (Patterson, 2020). Additionally, L2 learners have a different *initial state* than L1 learners. According to VanPatten & Benati (2015) the initial state is what L2 learners bring with them to the task of acquiring another language. Although SLA researchers have yet to find common ground on the exact definition of what the concept of initial state entails, under no scenario do any theories or frameworks suggest that L2 learners come to the task of acquiring a new language with a "blank slate" (VanPatten & Benati, 2015). Regardless of the initial state, VanPatten & Benati (2015) argue that successful L2 acquisition is heavily reliant on factors such as individual learners' aptitude, motivation and the learning styles and strategies they are exposed to. Additionally, Ellis (1985) argues that there must be two prerequisites for second language acquisition to take place. First, there must be L2 input available to the learners, and secondly, the learners need a set of internal mechanisms to account for how L2 data are processed (Ellis, 1985). Ellis' (1985) first prerequisite will be of special concern in this study.

The scope of second language acquisition (SLA), as with first language (L1) acquisition, includes formal and informal language learning (Saville-Troike, 2017). According to Saville-Troike (2017), formal L2 learning takes place in classrooms while informal L2 learning takes place in naturalistic environments. As an example, Saville-Troike (2017) argues that informal L2 learning can happen when a child moves from Poland to Norway and "picks up" Norwegian without any specialized language instructions while playing and attending school with Norwegian-speaking children. In Norway however, most L2 learners of English are not exposed to English the same way the Polish child from the

example is exposed to Norwegian. Norwegians generally rely on exposure to authentic English input from other sources, some of which will be discussed further in this chapter. The following sections will mainly focus on how L2 learners are exposed to authentic English input, and the effect this input has on language proficiency.

2.2.1 Vocabulary and language proficiency

Vocabulary in an L2 is learned by exposure to new words, in some cases through direct vocabulary instructions (Nation, 2013), in other cases through incidental or systematic exposure to the target language (Busby, 2021). New words generally need to be encountered multiple times before they are learned (Horst, Cobb & Meara, 1998; Saragi, Nation & Meister, 1978), and being exposed to words in different contexts improves depth of knowledge of the word (Nation, 2015). Additionally, Sundqvist (2019) found that frequency of exposure is a significant predictor of vocabulary size. Since there is a finite number of classroom hours intended for language learning, extramural activities (activities outside school) are crucial in terms of frequency of exposure. Previous studies have found extramural activities such as that reading for pleasure (Day, Omura & Hiramatsu, 1991; Nation, 2015), playing video games (Coxhead & Bytheway, 2015; Sundqvist & Wikström, 2015, Sylvén & Sundqvist, 2012), and exposure to media (Peters, 2018), might be essential in acquiring a larger vocabulary. In fact, Peters (2018) discovered that extramural activities were a better predictor of vocabulary knowledge than hours of foreign language lessons among Belgian L2 learners.

Vocabulary knowledge is an essential part of language proficiency. In a paper discussing linguistics in language teaching, Wilkins (1972, p. 111) stated that "without grammar very little can be conveyed, without vocabulary nothing can be conveyed." There is no doubt that a complete indication of a language learner's English proficiency would require more than a sample of vocabulary knowledge, but vocabulary is still vitally important for most language use and vocabulary acquisition is also regarded as one of the most challenging aspects of second language acquisition (Schmitt, 2008). In previous studies vocabulary size is acknowledged as one of the best predictors of reading ability (Laufer, 1992, Qian, 1999; Schmitt, Jiang & Grabe, 2011), listening ability (Vafaei & Suzuki, 2019), and reading comprehension (Laufer & Ravenhorst-Kalovski, 2010). As a result, vocabulary size works as a well-suited proxy for language proficiency (Rodgers, 2013). Vocabulary knowledge can be discussed in terms of size, depth and fluency. However, in most quantitative research on recognition and understanding, like this study, vocabulary size is in focus (Harrington, 2018; Busby, 2021).

Although vocabulary size is a good predictor of language proficiency, it can be challenging to measure accurately (Busby, 2021). According to Busby (2021), this is partly because individual words vary in how frequently they occur in a language. To measure

vocabulary size, word frequency is often discussed in terms of groups (or levels) of 1000 words, with the most frequently appearing 1000 words accounting for almost 78% of the words in written text, whereas the 10th group of 1000 words, known as the 10 000 word level, account for less than 1% (Nation, 2006). When testing vocabulary at different levels, researchers often select a cut-off point beyond which a language learner is said to have 'mastered' the level, rather than expecting every word to be known. This mastery indicates that learners do not have significant gaps in their vocabulary at certain levels and it implies that they would know higher frequency words than those being tested (Schmitt et al., 2001). To illustrate, Hirsch and Nation (1992) proposed that readers need to understand at least 98% of the words in a text they read to enjoy reading it. They further calculated that this meant that readers would need a vocabulary of around 5000 word families. Word families are defined as the base form of a word plus its inflected forms, including word endings, comparative *-er*, plural *-s*, and superlative *-est*, and derived forms which are made using affixes such as *-ish* and *-ism* and so on (Hirsch & Nation, 1992). According to Hirsch & Nation (1992), simplified novels often used in education tend to be designed to be read by someone with a vocabulary of around 2000 word families, so to progress from these to unsimplified texts would require a massive increase in vocabulary. In the present study, a slightly modified version of the Vocabulary Size Test (VST) designed by Paul Nation and David Beglar (2007) was used to determine the participants vocabulary size. Chapter 3.5 will provide a detailed description of the VST.

2.2.2 Input, output and interaction in SLA

The language data that the learner receives is in general terms called input. Although there are many factors affecting second language acquisition, input, undeniably, has crucial role in the process of acquiring language. Gass & Mackey (2006) argue that the importance of input is recognized in all theories of language acquisition. Because of this, several theories and hypotheses on the role of input in language acquisition have sprung out from SLA research. One of these is Krashen's (1985) *Monitor Model*, which consists of five hypotheses on how humans acquire a second language. The hypothesis of special concern for this study is called *the input hypothesis*. The input hypothesis proposed by Krashen (1985) suggests that SLA takes place when the learner understands input that contains grammatical forms that are a little more advanced than the current state of the learner's interlanguage. Krashen (1985) suggests that the right level of input is obtained automatically when people who are talking succeed in making themselves understood in communication (Krashen, 1985). According to this hypothesis, being exposed to a high frequency of comprehensible data is necessary to acquire a second language successfully (Krashen, 1985). Most research agree with the need to challenge learners with input

slightly above their level. However, what this would entail, will most likely vary from instance to instance (White, 1987; Brown, 2000).

Muñoz (2006) argues that interaction with- and exposure to authentic input of good quality is most essential. Based on this notion, it is worth mentioning Gass' (2003) dividing of input into positive and negative evidence. Positive evidence is defined as input of well-formed sentences that learners are exposed to. This type of exposure can come from interaction with speakers of the target language, or through different forms of media such as books, music, films, or video games. From these types of input, learners can form appropriate linguistic hypotheses. On the other hand, negative evidence refers to input that provide learners with information of incorrect utterances. Negative evidence can preemptively or reactively imprint on learners' understanding of the target language. In preemptive contexts, it refers to input before errors occur, usually through faulty formal or informal instructions. Reactive negative evidence refers to the learners' being exposed to errors that have already happened (Gass, 2003, p. 225). According to Gass (2003), positive evidence is the most essential requirement for language learning, and it is vital for successful L2 acquisition.

Michael Long's (1983, 1996) interaction *hypothesis* suggest that language learning happens through a complex process of input, output and interaction. Further, the hypothesis claims that engaging in oral interaction with other people in which communication problems arise and are negotiated can facilitate language acquisition. According to Gass & Selinker (2001), this type of interaction refers to exchanges in which there is some indication that an utterance has not been entirely understood and participants need to interrupt the flow of the conversation in order for both parties to understand what the conversation is about. This process creates conditions that foster internal processes responsible for interlanguage development (Ellis, 1999). The interaction hypothesis, thus, addresses how incidental acquisition takes place, arguing that acquisition occurs without awareness when learners are concerned with trying to communicate. An assumption of the hypothesis is that acquisition is primarily incidental rather than intentional (Ellis, 1999). Krashen (1982, 1998) has consistently argued that interaction can serve as a good source of comprehensible input, however, he argues that it is neither necessary nor especially privileged (Krashen, 1982, 1998; Ellis, 1999). Long (1980, 1983) agreed that comprehensible input was necessary for acquisition, but he saw interactionally modified input as especially beneficial since it could supply learners with information relating to linguistic forms that were problematic to them. In relation to Long's hypothesis, most extramural activities do not typically allow participants to engage in interpersonal communication, but this type of communication happens often when playing multiplayer video games.

It has been argued by some researchers that comprehensible output as well as comprehensible input may be required for learners to achieve high levels of L2 competence (Swain, 1985). Swain's Output Hypothesis (Swain, 1985, 2005) claims that the act of producing language (speaking or writing) constitutes part of the process of second language learning. Generally, *output* refers to the outcome, or product, of language acquisition. However, Swain (2005) argued that output is part of the *process* of learning, not simply a product of it. Additionally, the process involved in producing language is undeniably quite different than comprehending language (Clark & Clark, 1977). Swain (1995) presented three functions of output related to second language learning. First, producing language helps learners to notice problems, this is called the noticing/triggering function. Second, language production allows learners to test hypotheses about L2, for example, in the form of modified output that learners produce after receiving negative feedback. This is the hypothesis-testing function. Third, output allows learners to reflect consciously about L2 forms, also called the metalinguistic (reflective) function (Swain, 1995, 2005). In addition to these functions, output is regarded as a useful tool to achieve greater fluency by increasing control over forms that are already partially acquired (Ellis, 1999). According to De Bot (1996), this is the most likely way output aids acquisition. He argues that production helps learners to increase automaticity of processing and this allows them to devote more attention to higher-level processes involved in message generation (De Bot, 1996). Humans learn language if they focus on communication and the message (Krashen, 1985). To sum up, as argued by Zhang (2009), it is commonly acknowledged that a combination of language input, output and interaction is essential when acquiring a target language.

2.2.3 Extramural input

Typically, foreign language education would have been associated with learning in formal settings, but over the last decades informal learning in out-of-school contexts have become increasingly more common (Sundqvist, 2009; Sylvén & Sundqvist, 2012; Sundqvist & Wikström, 2015). Much thanks to multimodality afforded by technology, we are provided with massive amounts of opportunities for language learning outside school, in the form of extramural activities (Sundqvist & Wikström, 2015). In Norway, we are mostly exposed to extramural English. *Extramural English* (EE) is a term coined in 2009 by Pia Sundqvist. The term *extramural* is an adjectival compound of Latin origin where the prefix and stem combined translate to 'outside the walls.' Extramural English (EE) will therefore mean 'English outside the walls.' More specifically it has been defined as a term for the English input that learners come in contact with outside the walls of the classroom (Sundqvist, 2009). In the present study, extramural English input is an umbrella term for

all sorts of language input that Norwegians are exposed to outside of formal English L2 education.

Extramural English is clearly linked to incidental or naturalistic learning of English (Sundqvist & Wikström, 2015). *Incidental language learning* has been defined by Laufer & Hulstijn (2001) as “the learning without an intent to learn, or as the learning of one thing, e.g., vocabulary, when the learner’s primary objective is to do something else” (Laufer & Hulstijn, 2001). Sundqvist & Wikström (2015) continue on this notion when arguing that vocabulary acquisition is a by-product of a desire to understand the game or to communicate with others when playing video games. By some researchers, for example Benson (2011), the term *naturalistic language learning* is used for this type of learning, and when it is set outside of school, Benson (2011) suggests to call it *out-of-school learning*. Sundqvist and Wikström (2015) use *extramural English* and *out-of-school learning of English* interchangeably in their paper.

Personal interests are important in language acquisition. Research from neuroscience studies show that learning happens more quickly when it is done in context. It can be difficult to remember random words one learns from a textbook if the content does not mean much to the person (Lewis, 2020). A study conducted by Brevik (2018) shows that general interests and L2 proficiency are strongly intertwined. Furthermore, results from several studies on extramural input agree that this form of language input has a huge influence specifically on language learners’ vocabulary. In 2021, Busby investigated variation in receptive L2 English vocabulary among Norwegian university students in relation to their field of study and exposure to English. She considered effects from exposure within formal education and extramural activities. Making use of methods similar to this study (Vocabulary Levels Test and questions about sources of language acquisition), she found in her results that vocabulary knowledge varied between students whose courses required different amounts of English reading. Additionally, she found that extramural exposure was found to be a stronger predictor of vocabulary scores than formal English education. Seeing that vocabulary knowledge is an important predictor of reading comprehension, Busby’s (2021) discovery of considerable variation in English vocabulary knowledge was quite substantial seeing how it could affect academic outcomes.

Another interesting study in relation to extramural input was conducted by Brevik (2018). She identified a group of outliers who scored higher on English L2 reading tests than Norwegian L1 tests. The study addressed the outliers’ characteristics as good L2 readers but poor L1 readers. With a combined use of quantitative and qualitative data Brevik (2018) managed to identify dimensions of individual language use in both L1 Norwegian and L2 English. The outliers explained their English proficiency by the role of interest and extensive use of English technology and tools outside school. By conducting an in-depth analysis, she identified three specific profiles among the outliers: first, the

Gamer, who could spend up to 8 hours daily playing online games while using mainly English; secondly, the Surfer, who spends hours on the internet searching for things which happened to lead to authentic language situations; and thirdly, the Social Media User, who both produced and consumed information in English through social media (Brevik, 2018). All in all, Brevik (2018) demonstrated that there is an intertwined relationship between personal interest in extramural activities and L2 proficiency.

Lastly, it is well known that parents' educational level and the children's socioeconomic background impacts the children's language proficiency (Hecht, Burgess, Torgesen, Wagner & Rashotte, 2000; Lindgren & Muñoz, 2013). However, Sunqvist (2009) found that exposure to extramural English input is a possible path to progress in English for any learner, regardless of his or her socioeconomic background.

2.2.3.1 Different types of extramural activities and their effect on language proficiency

Typical extramural activities, as listed by Sundqvist (2009), are reading books, watching TV/films/series, surfing the internet/social media, listening to music and playing video games. Numerous studies have found that reading for pleasure in general has a positive effect on vocabulary acquisition and that reading does lead to incidental word learning (Day, Omura & Hiramatsu, 1991; Nation, 2015). In fact, most studies on incidental language learning have focused on exposure to written input (Peters & Webb, 2018). Watching audiovisual media has been found to be especially beneficial for vocabulary acquisition since one is more often exposed to low-frequency words in a short time frame (Cobb, 2007; Webb & Rodgers, 2009; Rodgers & Webb, 2011). Additionally, Webb (2015) argues that watching English audiovisual media can serve as an excellent opportunity for exposure to large amounts of authentic English, which contributes to the development of vocabulary size and listening comprehension, as well as other areas of L2 learning.

Although most extramural activities seem to benefit the development of language proficiency to some degree, Sundqvist (2009) found that extramural English activities which require learners to be active/productive and rely on their language skills, such as playing video games, surfing the internet, reading books, have a greater impact on learners' oral proficiency and vocabulary than activities where learners can remain fairly passive/receptive, such as listening to music or watching TV (Sundqvist, 2009). It can be argued that if there is a slight language barrier it would probably be easier to enjoy and make sense out of audiovisual narratives than purely textual ones, since it has been argued that 98% of words should be understood to enjoy reading (Hirsch & Nation, 1992). Additionally, many have a habit of averting their attention to other things while watching TV, this is not possible while reading since it is an activity that requires full attention. In such cases, spending time reading could arguably be more productive in terms of exposure

to authentic English input than watching TV. This idea can be supported by Nordnes' (2021) findings. He found, within his group of participants, that reading, playing multiplayer video games and watching audiovisual media with English subtitles or without subtitles were the most positive predictors of language proficiency in that specific order.

Finally, Sundqvist (2009) found that boys tend to spend more time on active/productive EE activities than girls, which suggests that extramural English should have a greater impact on boys' oral proficiency and vocabulary, than it has on girls (Sundqvist, 2009). This gender effect was also found by Nordnes (2021), the male participants generally scored higher on the vocabulary size test, and they were more exposed to most of the listed extramural activities.

2.2.4 Gaming and video games

In a report released by the Norwegian Media Authority (2020), it was discovered that 96% of boys and 76% of girls between the ages of 9-18 were regularly playing video games. Furthermore, they explained that the number of girls who play video games have gradually increased by almost 10% since 2018. The report also discovered that 4 out of 10 within this group personally claimed that they spent a lot of time playing video games (the Norwegian Media Authority, 2020). Being a subjective claim, these numbers can be both overstated and understated. Some might argue that playing video games for 2 hours every day is not much, while others might argue otherwise. Objectively speaking, playing video games is often very time consuming, especially compared to other forms of entertainment media. This is confirmed by Hogan (2016) who explains that some specific video game genres, especially online-based video games, can require a considerable time investment. Very often, games are measured by how much time it takes to complete them. Some games can take five hours to complete, others require over a hundred hours, and some are not meant to be completed at all.

Required time investment is not the only difference between games. Gaming can be compared to sports, there are many unique types of games and genres, and there are many ways to play. The latter distinguishes gaming from other types of extramural input, such as reading or watching TV. Gamers can, for example, use their mobile phone, a controller, a keyboard, VR-goggles or motion controllers to play games. Additionally, in relation to Long's hypothesis, most extramural activities do not typically allow participants to engage in interpersonal communication, but this type of communication happens often when playing multiplayer video games. Although there are some common denominators for gaming, it has been difficult to categorize digital games according to genre, and when internet access became widely accessible it has afforded even more diversification of game types and genres (Reinhardt & Thorne, 2016, p. 417; Sundqvist, 2019). Especially in

English language learning studies, the lack of comparable categories of games has been an issue.

In 2013, Sundqvist introduced a model for digital game categorization called the Scale of Social Interaction (SSI) Model. In this model, the potential for L2 English learning is hypothesized to be greater as video games place themselves higher on the scale of in-game social interaction. In short, the model suggests that MMOs (massive multiplayer video games) are more beneficial for learning English than regular multiplayer games which, in turn, are more beneficial than singleplayer games (Sundqvist, 2013). In a later quantitative study conducted by Sundqvist (2019) she found, using a multiple regression analysis, that types of games were not significant predictor variables when vocabulary size was the outcome variable. On the other hand, "time spent playing" was a well-suited predictor variable with significant results. Overall, the findings from Sundqvist's (2019) study confirmed that spending time playing video games matters for L2 learner vocabulary. Interestingly, Nordnes (2021) found a significant curved linear relationship between multiplayer gaming and vocabulary size. His findings showed that multiplayer gaming had a positive effect in terms of vocabulary size up until a certain point, where it started to decline (Nordnes, 2021). This means that his findings somewhat contradict previous assumptions on the correlation between time spent on gaming and vocabulary size.

Games seem to gain popularity based on current trends, much like music and fashionable clothing. According to the report from the Norwegian Media Authority (2020), the most popular games are mostly online-based games. Toth, Conroy & Campbell (2021) conducted a study on amateur gamers at a gaming conference in Boston to categorize their preferences of video game types and genres. The amateur gamers listed some specific criteria for games they valued as entertaining. The results showed that the most important criteria for video games were competitive gameplay, social gameplay/teamwork and strategy making. Video game genres which fit under these criteria are First-person Shooter- (FPS), Multiplayer Online Battle Arena- (MOBA) and Real-time Strategy (RTS) games (Toth, Conroy & Campbell, 2021). Especially FPS- and MOBA games have become extremely popular in the esports (electronic sports) scene.

FPS games are often played in the Norwegian esports scene, and out of these games, Counter-Strike (CS) is one of the most popular. According to Sunde (2017) the Norwegian Counter-Strike community created a new and unfamiliar discourse domain where English is a crucial part of communication. She investigated social and structural aspects in language contact between English and Norwegian in this community. She gathered data from written and oral sources within the community and found that English is expressed in the Norwegian language in the form of a frequent language mix at a word level. She found that the English feature in Norwegian have roots in an international

standard terminology, and that the use of English is primarily motivated by practical reasons in-game. Additionally, she argues that the use of English can be part of a wish to identify as part of the global Counter-Strike community, with whom the Norwegian community have strong ties with (Sunde, 2017).

2.2.4.1 Gaming, motivation, and learning

A commonly held theory is that many students learn a language in school just to 'tick a box' needed for them to graduate. If this is the case, then a lot of students might only be motivated to study just enough to pass (McGuirk, 2019). However, for many gamers the motivation behind learning a language might be more complex. Dörnyei & Muir (2013) introduced a concept called "directed motivational currents". This concept implies that, for some students, motivation might be driven entirely by their personal view of what success is (McGuirk, 2019; Dörnyei & Muir, 2013). In a lot of games, being able to communicate effectively is key to performing well. Especially in massive multiplayer online role-playing games (MMORPGs) such as World of Warcraft and Final Fantasy XIV, players are often required to communicate in real-time with spontaneous speech or writing. In such scenarios, spontaneous speech or writing in L2 English may lead to learning gains that can be transferred to the classroom. Additionally, L2 learners might view success in the language classroom as future success in gaming spaces, and this might boost the student's motivation and interest in language learning even further (McGuirk, 2019). This might explain the fact that seven out of ten Norwegians between the age 9-18 claim that gaming improves their English (the Norwegian Media Authority, 2020).

Sylvén & Sundqvist (2012) found that certain types of games provide L2 learners with rich exposure to L2 input and interaction, especially games such as MMORPGs are found to be particularly good for language learning because they can expose learners to environments that are linguistically rich and cognitively challenging (Sylvén & Sundqvist, 2012). In addition to in-context learning, playing video games can make room for other types of exposure essential in language learning (Lewis, 2020). For example, gamers are often exposed to a lot of repetition of words and concepts, which is essential for remembering them in the long term. In addition, gamers are often required to master the skills listening, speaking, reading, and writing. Playing video games can be a social experience, where gamers can spend a lot of time speaking or chatting (writing) in a target language while playing (Lewis, 2020). The amount of beneficial input or opportunities for social interaction vary based on the type of game and genre.

Although some studies have found that certain types of video games are especially beneficial for language acquisition, this field of SLA research is generally understudied. As argued by Nordnes (2021), few studies address that there is a distinction between

singleplayer games and multiplayer games, as researchers tend to group all types of video games together in one, or largely grouped categories. Additionally, few studies mention that there is a massive difference between specific games, which consoles are used and how they facilitate the opportunity for social interaction, input, and output. Although certain types of games, such as MMORPGs, are found to provide rich exposure to L2 input and interaction (Sylvén & Sundqvist, 2012), few studies address the language learning potential found specifically in the most popular games among young English L2 learners. Several studies have found that there is a linear relationship between spending time playing video games and language proficiency (see for example Sundqvist, 2019), while others have found more complex curved linear relationship (see Nordnes, 2021). Either way, one cannot deny that the relationship between gaming and English language proficiency is not a simple and straightforward one, and that there is a need to continue the research.

3 Method

3.1 The current study

The current study investigates extramural gaming through a narrow scope and compares it to other popular extramural activities in light of how they individually affect Norwegian fifteen-year-olds' language proficiency. The extramural activities are reading in English, watching English movies and TV shows, playing video games with English language and the use of social media with English as the main language. Additionally, the study investigates the effects of spending time writing in English while gaming, talking in English while gaming and watching gaming related content, and the potential effects of playing specific games. The goal is to determine how much time the participants spend on each of these activities and to discover if certain activities and certain ways playing video games are more linguistically rewarding than others. Specifically, the current study addresses the research questions:

- *How much time is spent on gaming compared to other extramural activities in this participant group, and are there gender differences?*
- *Which extramural activities are the best predictors of English language proficiency as measured by a vocabulary test?*
- *What types of video games are most commonly played by the participants?*
- *Does the nature of specific games played in terms of whether they provide opportunities for input and interaction affect English language proficiency as measured by a vocabulary test?*

3.2 Participants

The participants were chosen by a convenience sampling. Two English teachers for year ten classes (15-year-olds) of two separate local schools were approached with an inquiry for their classes to participate in this research project. These teachers were recommended by personal contacts. Eventually, I was able to collect data from five different classes, where three of them were from one school while two others were from another school. This led to a total of 103 participants. Some participants were, however, excluded in the analysis to ensure greater validity. They were excluded for reasons that could affect their English proficiency or the reliability of the study. First, one student was removed because the student reported having English as a mother tongue. This student also had the highest score on the vocabulary test. Secondly, three students were removed because they reported having one or more native English speaking parents. Thirdly, one student was removed because he/she reported not being born in Norway and being more than six years

of age before moving to Norway. These five students were removed from the analysis to ensure that all students had as close to an identical educational background as possible. Lastly, one student was removed because he did not answer the vocabulary test to his best ability. This became obvious because the student only answered alternative (a) to every question and finished the whole survey in seven minutes. On average the students used 29,5 minutes to finish the survey. In summary, 6 students were excluded from the analysis because they did not fit the sample. This means that we were left with 97 participants, 47 boys, 46 girls and 4 other/not specified.

3.3. Materials and procedure

Both the materials and procedures used in this study are greatly influenced by Nordnes' (2021) master thesis in order to obtain results that could be compared to his. This study was conducted as a quantitative quasi-experiment, where the experiments were carried out with five separate groups on five occasions. The students who participated in this study used their computers to complete a form at school during their English lesson. This experiment was done using www.nettskjema.no, a software intended for digital surveys developed by the University of Oslo. The form that the participants were asked to complete consisted of a questionnaire and the vocabulary size test used to determine their English proficiency. Inspired by Nordnes (2021), the chosen vocabulary test was the Vocabulary Size Test (VST) created by Nation & Beglar (2007). Before the final data sampling, I made sure to pilot-test the survey on some of my fellow students. They gave me great feedback on both the questionnaire and the vocabulary test. The results from the pilot-tests were deleted and not part of the final sample.

3.4 Questionnaire

Before the vocabulary test, the participants were asked to complete a questionnaire (presented in appendix 1) about daily habits that involve exposure to authentic English input. English exposure from watching TV, reading, playing video games and social media use were primarily used as independent variables in this study. The questionnaire was based on that of Nordnes (2021), but there were made some adjustments to benefit the research focus of this study. The main differences in the questionnaire were the specific focus on gaming habits.

The questionnaire was designed to be easy to understand and answer for 15-year-olds. The questions about their habits were mostly in the form of closed ended questions with multiple scaled options. The intention behind this design was to create questions that did not feel exhausting to complete, encouraging genuine and reliable participation, and to ensure that the responses were suited for qualitative analyses. The questions were in

Norwegian and in simple language to avoid any form of doubt. Even though the questions were designed based on simplicity, the ambition was to make them complex enough for them to yield accurate results.

The design would lead to easily quantifiable data, but it could also lead to some specific problems. The questions would ask, for example, how much time the participants usually spend on specific extramural activities. It could be difficult for the participants to come up with precise answers to such questions, because the time they spent on such activities might vary a lot from week to week, or they might not be aware of how much time they actually spend on the activities.

The questions that were used as independent variables were structured as shown in (1), see also appendix 1. In the following examples the questions have been translated to English for the reader's convenience.

- (1) Approximately how often do you play English video games? (mobile games, computer games and/or games on console - e.g. Playstation or Xbox).
- (a) Never
 - (b) Sometimes, but not every week
 - (c) At least once a week
 - (d) Several times a week
 - (e) Almost every day
 - (f) Every day

If the participants picked one of the options (c), (d), (e) or (f) in (1), they automatically triggered another question in the format of (2).

- (2) During a regular day when you are playing video games, how much do you play English videogames?
- (a) Less than 1 hour
 - (b) 1-2 hours
 - (c) 2-3 hours
 - (d) 3-4 hours
 - (e) 4-5 hours
 - (f) More than 5 hours

The results from these questions were converted into *scale variables* so that the data could be analyzed statistically. Using scale variables made it easier to present the elaborate information within the data material, and statistical analyses would be deemed more reliable than if other types of variables were used.

Additionally, there were questions intended to gather necessary data to control for other variables that might have impacted the results on the vocabulary test. Some questions focused especially on the students' language background. The intention behind these questions was to detect which participants were eligible to partake in the study. The results from this process were explained in greater detail in section 3.2. Other questions were open-ended so that the participants could present additional information that could be used to substantiate and give a clearer understanding of the data from other questions. The most useful open-ended questions for this study asked what type of singleplayer and multiplayer games the participants spent most time playing. These questions made it possible to investigate whether some specific games could be a better source of good quality English input than other games.

3.5 Testing proficiency – the vocabulary test

Although language proficiency consists of many essential components, such as grammar knowledge or writing proficiency, average written receptive vocabulary knowledge was chosen as the proxy for general language proficiency. As Schmitt (2008) argued, vocabulary is one of the most important as well as one of the most challenging aspects of learning a second language (Schmitt, 2008), and therefore it might serve as a good indication of general language competence. In addition, the limited scope of this quantitative study made vocabulary size very accessible compared to other ways of determining language proficiency.

I decided to use a slightly modified vocabulary size test (VST) designed by Paul Nation and David Beglar (2007). The Vocabulary Size Test is designed to measure first language and second language learners' written receptive vocabulary in English (Nation, 2012). More specifically, the test measures the learners' receptive vocabulary size of the 1st thousand word-families up to the 14th thousand word-families in English. This can be measured when participants are presented with ten words from each of the 14 levels of word-families. In other words, the participants are presented with 140 words which they are asked to define. Referring to initial studies using the VST, Nation (2012) argues that non-native PhD students in Europe usually have a vocabulary of around 9,000 word-families (2012). Because it would most unlikely that Norwegian 15-year-olds would score higher on the VST than non-native PhD students, the VST of this current study was shortened from 140 to 100 words, cutting out the last 4000-word families (10000-14000). The VST used within this study was therefore modified exactly like Norndes' (2021), allowing results to be directly comparable.

Shortening the vocabulary test was mainly intended as a strategy to minimize fatigue among the participants and to allow all of them to finish during the allotted time (60 minutes). Even with the shortened test, there were indications that the length of the test and the test design of increasingly difficult words caused fatigue for some students. Most participants, however, seemed to take the test seriously and found it motivating.

The modified VST created two apparent risks. First, it could have created a ceiling effect, where there would be no way of differentiating between participants with a higher than 10-thousand-word vocabulary, but this did not happen. Secondly, as a result of shortening the VST the estimated vocabulary size might have been slightly affected. The participants would most likely have been able to answer correctly on some of the discarded words, and as a result they might have gotten a slightly lower score than they would on a traditional VST with 140 words. However, the alteration did not discard the results, because the participants' vocabulary size scores were only used to investigate differences between participants within chosen the group/sample.

All words presented to the participants within the VST are accompanied by a sentence using the target word and five alternatives. Only one alternative is correct because it matches the word in the context it is presented, and one alternative lets the participants answer, 'I don't know.' However, in this study there was no 'I don't know' option and the students were asked to answer every question regardless of whether they knew the answer or not. The intention behind this was to encourage students to use partial knowledge and context to complete the text. (3) is an example of how the VST was designed in this study, see also appendix 3.

- (3) DROWN - *People have **drowned** here*
- (a) died under water
 - (b) cut down trees
 - (c) eaten outside
 - (d) dug deep into the ground

The participants were instructed to read the sample words, the example sentence and study the alternatives to pick the alternative they believed to be correct. After every student (n=97) had completed the test, the results were analyzed, and each correct answer was counted. When scoring the VST, the participants' scores on the 140 items need to be multiplied by 100 to find the participants' total vocabulary size. For example, if one participant scores 54 on the VST it means that his/hers vocabulary size is 5400 word families (Nation, 2012).

As a final remark, Nation (2012) argues that the VST, if used as intended, is a relatively low-stakes test for participants. However, one of the unfortunate consequences

of using this method is that some participants who are not motivated to perform to their best ability can end up substantially underestimated in terms of actual vocabulary size (Nation, 2012). Although this study excluded obvious illegitimate submissions, there is no way to guarantee if all remaining participants answered the questionnaire honestly and took the vocabulary size test seriously.

3.6 Ethical considerations

Ethical considerations were essential in this study. First, the study was submitted to and cleared by NSD - Norwegian center for research data. Secondly, all participants were informed about their rights as participants in the study, both in written text in the form of a consent form and orally before they were asked to partake in study. The participants were told about the study, what it was about and how their potential partaking would contribute to the study. They were also informed that all data from the study would be handled with confidentiality and that there would be no way of identifying any individuals in the final thesis, and they were told that participation was voluntary. The students that did not want to participate, were given the opportunity to do optional work prepared by their teacher. At any given time during participation, the participants were given the opportunity to quit and have their submission deleted.

4 Results

This chapter will present the findings of the study. First, a general comparison on average time spent on extramural activities will be presented. The comparison is based on descriptive statistics and results from an ordinary least squares regression analysis. The regression analysis will be a tool to measure the extent to which certain independent variables can predict scores in the dependent variable. The second chapter will focus on gaming specifically. This chapter will consist of results from descriptive statistics and bivariate analyses, with the aim of investigating if there are linear relationships between sets of data. More specifically, the intention of section 4.2 is to determine if there is a relationship between the 10 most popular games and vocabulary size. Section 4.3 will present additional observations concerning the effects of gaming and how students interact while playing videogames.

4.1 Time spent on extramural activities and its effect on vocabulary size

4.1.1 Descriptive statistics

Table 1 show the participants' answers to the question 11 from the questionnaire (see appendix 1). All questions from the questionnaire that are brought up in the results chapter are translated to English for the convenience of the reader. The translation of question 11 is: "*Where do you feel that you have learned more English?*".

Table 1

Responses to the question "where do you feel that you have learned more English?"

Location	N	Percent
School	22	22.4
Outside school	75	76.5
Total	97	100

As shown in the table, most participants responded that they felt that they learned more English outside of formal education. When they were asked how they learned English outside school (question 12, appendix 1), most of them listed extramural activities.

Table 2 presents descriptive statistics from the dependent variable "vocabulary size" in addition to the independent variables "reading in English", "watching TV with English or no subtitles", "watching videos with English language on social media", "playing

video games” and “general motivation for learning English.” The dependent variable “vocabulary size”, was constructed based on the score from the vocabulary size test. Each of the independent variables, except for “general motivation for learning English”, were created by combining the results from two separate questions within the questionnaire. The first question asked for how often they engage in the activity and the second question asked about the number of hours they spent on this activity on a typical day. The second questions were triggered if the students first answered that they engaged in this activity several times a week, almost every day or every day. To create the independent variables used in table 2, the two parts of each variable were combined and converted into what Nordnes’ (2021) called an *exposure score*, a continuous variable between 0-10, see appendix 4 for a detailed explanation. The variable concerning motivation was constructed based on a single question, a continuous variable between 0-5. All the mentioned variables are labelled as scale variables.

Table 2

Descriptive statistics – total

Variables - total	N	Mean	Std. Dev.	Min	Max
Vocabulary size	97	65.77	14.890	22	87
Reading	97	3.12	1.938	0	8
Watching TV	97	5.58	2.111	0	10
Social media	97	6.85	1.616	0	10
Gaming	97	3.84	2.953	0	10
Motivation	97	2.98	0.854	1	5

The results from the vocabulary size test (VST) show that the participants (n=97) had a mean score of 65.77, meaning that the participants had an average written receptive vocabulary knowledge of the 6577 most common word-families in English.

The most common daily activity for the participants is watching videos on social media with a mean exposure score of 6.85 (out of 10), and the least common activity is reading in English. For the variables concerning reading, watching TV and gaming, the maximum exposure score for these three variables was 10, which means that some participants are exposed to this activity every day for more than 5 hours each day. However, for each of the activities, some students reported that they never engage in them, resulting in a minimum score of 0 in the dataset. Still, all participants reported that

engage in extramural activities in some form or the other. The last variable "general motivation for learning English" scored 2.98. The minimum score for this variable was 1 = strongly disagree and the maximum was 5 = strongly agree with the assertion "I am motivated to learn English." The mean score 2.98 (rounded up to 3) therefore means that the participants on average neither agree nor disagree with the assertion.

In addition to the presentation of the total scores for the dependent and independent variables in table 2, a general comparison between the genders and how they scored on the different variables is highlighted in table 3, 4 and 5. Table 3 consists of the same variables as table 2 but consists only of the participants who reported their gender as *boys*.

Table 3

Descriptive statistics – boys

Variables - Boys	N	Mean	Std. Dev.	Min	Max
Vocabulary size	47	67.36	15.342	22	87
Reading	47	3.00	1.681	0	7
Watching TV	47	5.85	2.000	1	10
Social media	47	7.26	1.276	3	10
Gaming	47	5.91	2.052	0	9
Motivation	47	2.85	0.884	1	5

Table 3 shows that mean vocabulary size test score was close to the mean of the total sample, but it was a little higher. Their responses for most of the other variables were also close to the total mean, except for time spent on gaming, where the mean score was much higher than the total.

Table 4 presents the participants who reported their gender as girls

Table 4*Descriptive statistics - girls*

Variables - Girls	N	Mean	Std. Dev.	Min	Max
Vocabulary size	46	63.39	14.438	24	85
Reading	46	3.11	2.163	0	8
Watching TV	46	5.17	2.224	0	9
Social media	46	6.43	1.870	0	10
Gaming	46	1.52	1.629	0	6
Motivation	46	3.13	0.749	1	3

Table 3 and 4 show that the number of participants within each group were close (boys - n=47, girls n=46), providing the opportunity for a reliable comparison. Like Nordnes' (2021) results, the boys scored on average higher than the girls on the vocabulary test, with a mean score of 67.36 for the boys and 63.39 for the girls. This means that the male participants had an average receptive vocabulary size of around 400 more words than the female participants. Additionally, the exposure scores from the independent variables show that boys generally engage more in extramural activities than the girls, although the scores were close for most of the activities. The only extramural activity that had a substantial gender difference was spending time playing video games, boys had a much higher mean exposure score than girls. Finally, the girls were on average more motivated to learn English than the boys.

Table 5*Descriptive statistics - other/not specified*

Variables - O. / NS.	N	Mean	Std. Dev.	Min.	Max.
Vocabulary size	4	74.50	11.446	59	86
Reading	4	4.75	1.708	3	7
Watching TV	4	7.00	0.816	6	8
Social media	4	6.75	0.957	6	8
Gaming	4	6.00	4.320	0	10
Motivation	4	2.75	1.500	1	4

Table 5 show the results for the participants who reported their gender as other (n=1), something else than the socially constructed genders we presently have (n=2), and one who did not specify by skipping the question (n=1). Even though this group of participants scored higher on the vocabulary test, the number of participants within this group (n=4) was remarkably lower than the two other groups, so one cannot draw a reliable conclusion based on a comparison between this group and the others. In later gender comparisons, the only genders that will be compared are those who reported their gender as boys or girls because of the close number of participants within these groups.

4.1.2 Linear regression model

The variables presented above (excluding motivation) and the variables "writing in English while gaming", "talking in English while gaming" and "watching gaming related videos or streams" were analyzed using a multiple linear regression model shown in table 6. The new variables, related to gaming, were based on single questions and they were continuous variables between 0-5 (question 30, 31 and 32 in appendix 1). In these variables, 0 = never and 5 = every day.

Table 6 shows the effect that the independent variables have on the dependent variable (vocabulary size) in a multivariate analysis. Combined, the independent variables determine the model's explanatory power with the multiple correlation coefficient (adjusted R²) which measures the degree to which changes in the dependent variables can be explained by changes in the independent variables (Harel, 2009). As shown in table 3, the adjusted R² score of 0.212 means that the independent variables are responsible for 21.2% of the changes in the dependent variable. The B-coefficient (for example 1.463 for reading) tells us that for every point of increase in the exposure score the vocabulary

score will increase by the number of points shown in *B*, but we can only conclude this if the result is statistically significant. The result is statistically significant if $p < 0.05$ (p value is shown in *Sig.t*). In table 6, statistically significant results are marked by an asterisk (*).

Table 6

Ordinary least squares regression analysis

	B	SE	T	Sig.t
Gender (Male and NS = 1, female = 0)	1.289	4.371	0.294	0.769
Reading	1.463	0.746	1.990	0.049*
Watching TV	-1.244	0.675	-1.844	0.069
Social media	-0.535	0.918	-0.583	0.562
Gaming	1.705	1.151	1.481	0.142
Writing while gaming	5.133	1.480	3.468	<0.001**
Talking while gaming	-2.607	1.310	-1.991	0.050*
Watching guides and streamers	-4.321	1.312	-3.294	0.001**
Constant	66.157	6.816	9.706	<0.001
N	93			
Adjusted R ²	0.212			

** $p < 0.01$, * $p < 0.05$

As shown in table 6, the best indicator of a large vocabulary size is writing in English while playing video games, which had the highest *B* and was statistically significant ($p = 0.001$). The B-coefficient for this variable shows that for every point raised in its score, the vocabulary size is raised by 5.133, which is a great amount. Interestingly, watching videos and streams related to gaming and talking while gaming had a negative *B*, indicating that time spent on these activities predicted lower vocabulary scores. The last significant result shown in table 3 is that spending time reading English books is a good predictor of language competence.

Another interesting finding from this analysis is that being male raises the predicted vocabulary size by 1.289. Even though the result is not statistically significant ($p = 0.769$), in connection with the results from tables 3 and 4, this result is likely. Gaming, watching TV and using social media all had non-significant p-values, so one cannot determine if there is a trend in the data.

4.2 Time spent on gaming and the effect of specific games

4.2.1 Descriptive statistics

Table 7 is structured like table 2, which is the one that present results from all gender groups. It presents data from the variables "playing video games", "playing singleplayer video games", "playing multiplayer video games", "writing in English while gaming", "talking in English while gaming" and "watching gaming related content in the form of videos or streams." The independent variables "playing singleplayer video games" and "playing multiplayer video games" were created in the same procedure as the variables described in section 4.1.1, and therefore, they have the same exposure score setup as the independent variable "playing video games."

Table 6

Descriptive statistics - gaming - total

Variables - gaming - total	N	Mean	Std. Dev.	Min	Max
Gaming	97	3.84	2.953	0	10
Singleplayer video games	97	2.67	2.760	0	10
Multiplayer video games	97	3.11	3.027	0	10
Writing while gaming	97	1.87	1.829	0	5
Talking while gaming	97	1.48	1.798	0	5
Watching videos and streamers (tied to gaming)	97	1.46	1.601	0	5

Table 7 shows that playing multiplayer video games is more popular than playing singleplayer video games. However, there was a notable issue with these two variables because many participants seem to have misunderstood the difference between singleplayer games and multiplayer games, or they have their own definitions of them. When asked which singleplayer and multiplayer video games they most often play

(questions 25 and 29, see appendix 1), the participants very often listed the same games for each category. This inaccurate categorization made it impossible for detailed comparison of the effects of spending time playing singleplayer and multiplayer video games. Out of the two ways of interacting socially while playing multiplayer video games, the participants reported that they write in English slightly more than they talk in English while gaming. For a detailed comparison between genders and how much they play videogames in general see appendix 5.

Table 8 shows a list of the ten most popular games within this data sample. There were 89 games registered in total, which means outside of the ten most popular games there were 79 other games that were registered at least 1, 2 or 3 times. *N* shows how many participants reported playing that specific game. The *mean* shows the average vocabulary scores of those participants who reported playing the specific game. Because of the large variation in *n*, it might be more interesting to compare *min* and *max* scores on the vocabulary size test.

Table 7

Descriptive statistics – most popular games and players of these games’ vocabulary scores

<i>Variables - most popular games</i>	N	Mean	Std. Dev.	Min	Max
Fortnite	21	69.90	12.421	34	86
Minecraft	20	72.90	9.662	54	87
Fifa	16	70.25	9.342	52	82
Call of Duty	14	67.93	12.300	41	82
Apex	12	65.17	17.842	22	83
Grand Theft Auto	12	63.75	14.341	34	86
Rocket league	9	62.33	14.098	34	80
Valorant	8	64.13	15.338	34	85
Overwatch	5	67.40	8.325	55	77
Red Dead Redemption 2	4	77.25	6.946	69	83

A notable observation from table 8 is that those who reported playing Minecraft, Fifa, Overwatch and Red Dead Redemption 2 had a much higher minimum score on the

vocabulary size test and a lower standard deviation than the rest, but because of the small numbers in participants who reported that they play these games it is difficult to draw firm conclusions based on this. An interesting finding from these results was the large variation in games. Out of the 80 participants that reported that they played video games, it was reported that 89 separate games were played regularly.

4.2.2 Bivariate analysis

In table 9, five bivariate analyses that considered the variables “vocabulary size” and “playing a specific game” are listed. Because of the limited number of participants who reported playing each specific game, only the five most popular games were included. The vocabulary size variable is identical to how it was previously described, the variables for playing specific games are structured as nominal variables, which means that the participants are categorized within this variable on whether they are playing the specific game or not. By studying Kendall’s correlation coefficient, also called *Kendall’s tau* (τ), one can measure the linear relationship between two sets of data. The correlation is measured between a scale from -1 (negatively linear relationship) to 1 (positive linear relationship). If the correlation is close to 0, however, it means that there is no linear relationship between the two sets of data. Similarly, to the regression analysis above, this analysis also relies on significance. Significance is measured in sig. (2-tailed).

Table 8

Bivariate Analysis – the correlation between vocabulary size and playing specific games

5 most popular games		Fortnite	Minecraft	Fifa	COD	APEX
Vocabulary size	<i>Kendall’s Tau</i>	0.118	0.201*	0.091	0.042	0.018
	Sig. (2-tailed)	0.162	0.017	0.283	0.622	0.835
	N	97	97	97	97	97

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

The bivariate analysis in table 9 shows that there is a significant correlation between vocabulary size and playing Minecraft. The size of the correlation between vocabulary size and playing Minecraft, can however be labelled as negligible since *Kendall’s tau* is lower than 0.3 (which can be labelled a weak positive correlation). There was no significant correlation between any other of the top 5 most played games. A correlation is considered significant when sig. (2-tailed) is less than 0.05.

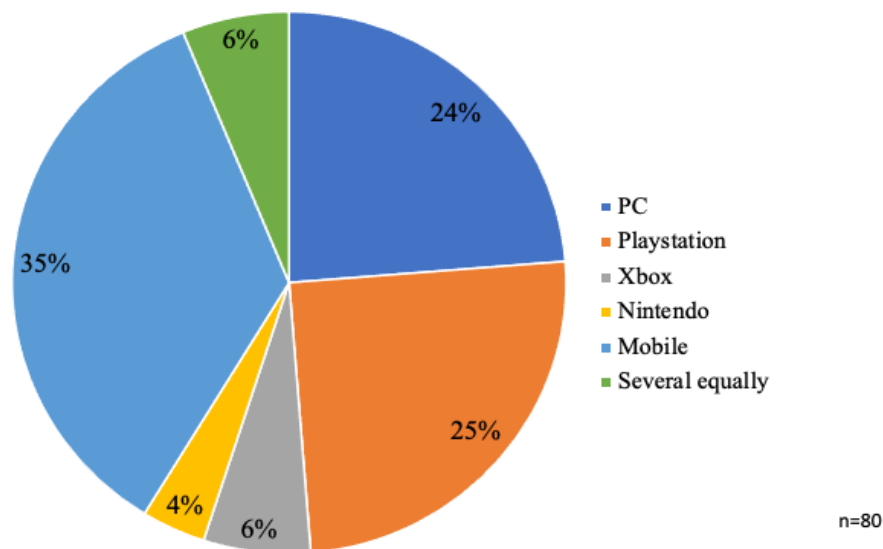
4.2.3 Additional observations

Without any statistical analyses, this section highlights some additional findings from the dataset. The following figures illustrate how the participants interact in various ways while playing video games, and table 10 shows what the participants reported to have learned from playing video games (apart from language learning).

Figure 1 shows the participants' preferred consoles/way of playing.

Figure 1

The participants' preferred consoles

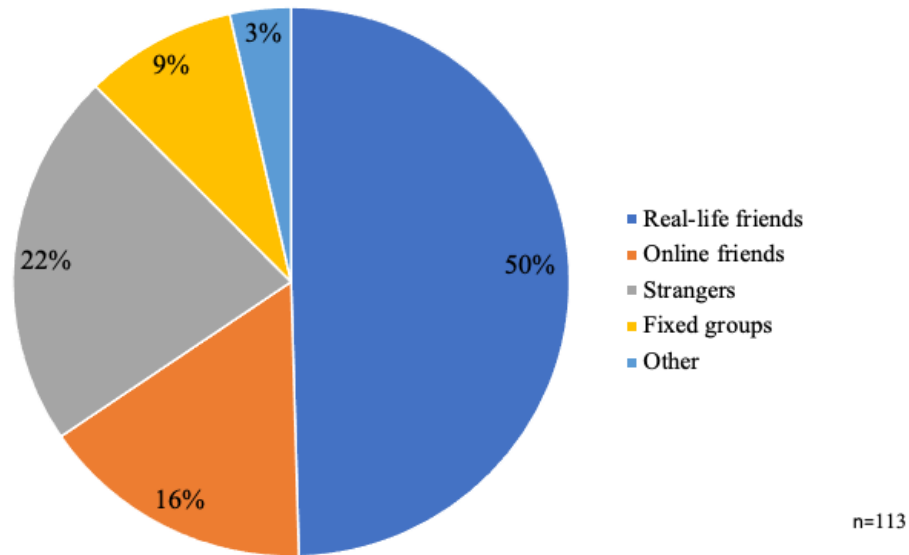


This figure shows that 35% of the participants prefer playing videogames on their mobile phones. If all consoles that are played with handheld controllers (Playstation, Xbox and Nintendo) are combined, the combined percentage is 35%, identical to those who prefer mobile phone gaming. Gaming on a PC scored 11% lower than the two other ways of playing. The most popular games, shown in table 5, are usually played on PC, Playstation or Xbox.

Figure 2 illustrates the participants' social interaction while playing multiplayer video games.

Figure 2

Who the participants reported they play video games with.



As shown in figure 2, most of the participants prefer to play with real-life friends. 16% report that they play with online friends and 22% report that they play with strangers.

Table 10 shows some interesting answers to the question "*aside from language learning, have you learned anything from playing video games?*" The answers are not listed as direct citations because several participants answered similar answers, instead answers providing the same content were grouped together for each main point in table 10.

Table 10

The participants' responses to the question "Aside from language learning, have you learned anything from playing video games?"

1. How racism and treating someone bad can affect people
2. Improved ability to be patient
3. Improved ability to communicate in general
4. Improved ability to cooperate with others
5. Improved ability to solve problems
6. Improved concentration
7. Improved creativity
8. Improved editing skills
9. Improved general knowledge
10. Improved geographical knowledge
11. Improved reflexes
12. Improved relationships with friends
13. Improved social abilities
14. Improved tactical and strategic thinking
15. You can learn how to drive cars
16. You can learn how to talk to strangers and befriend new people

As illustrated in table 10, the participants argue that they have learned more than language from playing video games.

5 Discussion

5.1 Exposure to extramural English, its effect on language proficiency and notable gender differences

The first and second research questions of this study asks how much time is spent on gaming compared to other extramural activities, if there are gender differences and which extramural activities are the best predictors of English language proficiency. Based on the results from this study it is safe to say that the participants overall engage regularly in extramural activities. The most popular activity, which also had the lowest standard deviation, was spending time on social media with English as the main language, with a mean exposure score of 6.85/10. Nordnes (2021) argued that this was a difficult variable to include because there might be massive differences in the quality of the authentic English input or output within the various types of social media. He based his argumentation on a comparison between watching videos on TikTok, looking at pictures on Instagram and writing posts on reddit (Nordnes, 2021). Acknowledging his arguments, this variable was changed to "watching videos with English language on social media." Arguably, there could be other forms of social media use that would be good sources of input but based on observations of current trends in social media use, watching these kinds of videos are undoubtedly very popular, as confirmed by the high exposure score for this activity. Further analyses are however needed to determine whether spending time on social media is a good predictor of vocabulary size or not.

The second most popular activity was watching TV (series, movies and so on) with English as the spoken language, and with English subtitles or no subtitles at all. This activity had a mean exposure score of 5.58. Being an audiovisual type of input, similarly to the social media variable, watching TV is often labeled as an excellent opportunity for exposure to large amounts of authentic English (Webb, 2015). However, because of insignificant results it was impossible to determine if spending time watching TV had a positive effect on this groups' overall language proficiency. Nordnes (2021) found that spending time watching TV with English spoken language and English subtitles, or no subtitles was a significantly positive predictor of large vocabulary size, while watching TV with Norwegian subtitles had a negative effect (Nordnes, 2021).

Spending time playing video games had the third highest exposure score among the participants. Along with the extramural activities spending time watching TV and using social media, playing video games was not found to have a significant effect on vocabulary scores in the regression analysis. Sundqvist and Wikström (2015) and Sundqvist (2019) discovered that there seem to be a significant positive relationship between playing video games and vocabulary size. Nordnes (2021) discovered that playing multiplayer

videogames had a significantly curved linear relationship with vocabulary size. In his analysis, he discovered that spending time on this activity had a positive effect on vocabulary size but to a certain point, after reaching the zenith at around 2-3 in exposure score it started to decline. Since no relationship between gaming and proficiency was found in this study, it is not possible to investigate this effect further. There was, however, found significant regression by the gaming related interactions, *writing in English while gaming*, *talking in English while gaming* and *watching gaming related videos and streams* and vocabulary size. Writing while playing video games turned out to be the activity that had the most positive effect on vocabulary size, while watching gaming related videos had a strong negative effect. A similar effect was discovered by Sundqvist (2009) when she found that activities which require the learners to be active/productive and rely on their language skills had a greater impact on vocabulary than passive/receptive activities. Watching gaming related content was found to have a significant negative effect on the participants' vocabulary size. Although this finding was not as predicted, the most surprising result was that talking in English while playing video games have a negative effect on the participants' vocabulary size. These findings will be discussed further in the following section.

Spending time reading was the extramural activity with the lowest exposure score, but it had a significant positive effect on vocabulary size. In fact, it was the second highest indicator of language proficiency. Based on these results and earlier reports from Nordnes (2021) and Busby (2021), reading can be confirmed to have a positive effect on student's vocabulary size. The problem with reading is that this activity seems to have a limited effect on language proficiency because it is not a very common extramural activity (Peters, 2018). This fact is also confirmed by the low exposure score.

Finally, although there was minimal variation between male and female participants' exposure to most of the listed extramural activities, there was a substantial difference in the number boys and girls who reported playing video games. These results were similar to results from Nordnes (2021), Sundqvist & Wikström (2015), Sundqvist (2019) and Peters et al. (2019). The female participants had an exposure score of 1.52 while the male participants had 5.91, a massive difference. Gaming was the least popular extramural activity among girls, while it was the second most popular for boys. In fact, 96% of the boys reported that they play video games, while 67,5% of the girls reported this. This means that a third of the girls never played video games. The male part of the sample spent more time on the extramural activities investigated in this study than girls, the only exception being that the girls reported reading slightly more. Considering the effect shown in R^2 , the fact that boys spend more time on extramural activities can be part of the explanation of why they score higher on the vocabulary size test than girls. Boys had a mean score of around 6700 word-families, while girls had around 6300. Overall,

the results of this study, that authentic input influences receptive vocabulary, are in line with a massive body of previous research. However, in comparison other studies, the effect found in the current study was fairly small. The adjusted correlation coefficient (R^2) of 0.212 means that all the independent variables explained 21.2% of the variation in the dependent variable.

Overall, a lot of the findings of this study were different from findings of Nordnes (2021), even though the choice of methods and groups of participants were very similar. Presumably, the main reason behind this could be individual differences within the groups of participants. Like his results, the findings of this study show that the relationship between gaming and proficiency is not a simple and straightforward one. Where he found a curved linear relationship between gaming and proficiency, this study found that gaming in general did not predict proficiency, but that one specific gaming activity, namely writing, did. This finding indicates that more research on the specifics of gaming in relation to L2 English proficiency is needed to better understand the accurate effect.

5.2 Video games and how they benefit language proficiency

The third and fourth research questions asked which video games are the most popular among 10. grade Norwegian students and how much they provide opportunities for input and interaction, and how specific games affect language proficiency. Compared to the results from a report from Norwegian Media Authority (2020), the list of games that were most popular within this study seem to be quite representable. The top 10 list consisted of first-person-shooter (FPS) games such as Call of Duty (COD), open-world games such as Grand Theft Auto (GTA), battle royale games (games where the objective is to be the last man standing) such as Fortnite, sports games such as Fifa and sandbox games such as Minecraft. Compared to the report released by the Norwegian Media Authority (2020), the top 5 games (boys and girls aged 15-16) from the report were close to the results from this survey. Specifically, four out of the listed games reoccurred as the most popular games among the participants of this study. Most of these genres share competitive traits, the exception being open-world games (for the most part) and sandbox games. Additionally, the games from the top 10 list are usually played on consoles (Playstation and Xbox) or PC. As a general comparison, both consoles and PC allow players to communicate with voice-chat. However, it is easier to communicate on PC because the use of a keyboard allows for quicker and better access to writing.

Overall, there was noteworthy variation in what types of video games the participants reported playing. 89 unique games were reported in the survey, games representing many different genres and ways of playing, each with unique potential and benefits in terms of language acquisition. However, nearly all of the most popular games

are very similar in terms of gameplay mechanics, their objectives and how much they provide opportunities for input and social interaction. Some exceptions are discussed below. Overall, these findings prove that gaming is not just gaming, and that one should seek avoid studying gaming as one monolithic activity when investigating its impact on L2 proficiency.

Sundqvist (2013) argued that mulitplayer games are generally considered to be more beneficial in terms of language learning than singleplayer games. Originally, the current study intended to investigate this phenomenon further, but because of the unclear difference between these categories in this study, the comparison was limited. This happened because many video games often were listed in both categories, regardless of being, by definition, multiplayer or singleplayer games. It is possible that the participants differentiate these categories based on whether they play alone or with their friends. An accurate categorization is necessary in order to determine if some games can be more beneficial for proficiency in certain areas than others, because there is a massive difference between games in general. The observation found within this study should encourage researchers to pay special attention to process of categorizing video games when investigating video games and their potential effect on receptive vocabulary.

In relation to Dörnyei & Muir's (2013) concept called directed motivational currents, most of the popular games listed in this study do not require specific English language competence to perform well. Based on the way most popular shooter-games and battle royale games are designed, success in these games relies much more on mastering the mechanics of the game, rather than being able to communicate with others in English. However, there are many and large differences between certain games. Due to the different nature of individual games, gamers who play Minecraft are likely driven by entirely different motivations than gamers who play Call of Duty. Whereas the objective in Call of Duty generally is to kill as many enemy players as possible within a short time frame, the objective in Minecraft is much more open and can allow players to take their time to explore and build creatively in relaxed environments. Since Minecraft, compared to Call of Duty, is a slow-paced game, it can be easier for players to communicate in written text without feeling that spending time writing will hinder success or take away precious time. Additionally, Sylvén and Sundqvist (2012) found that certain games, specifically MMORPGs, are particularly good for language learning because they expose L2 learners to linguistically rich and cognitively challenging environments. To succeed in these types of games, players must be able to communicate effectively in English. Although the participants rarely reported playing MMORPGs, Minecraft, by the nature of the game, could be said to facilitate more linguistically rich and cognitively challenging language environments than games such as the other most popular games found in this study.

Additionally, the findings of this study show that most participants who communicate while playing multiplayer video games play with real-life friends. Naturally, most of the communication with real-life friends in Norway, will be in Norwegian instead of English. However, in certain cases, such as the one described by Sunde (2017), Norwegian gamers can include English words when describing in-game phenomena to other players. Although, this is technically closer to communicating in Norwegian, gamers themselves could see this as valid communication in English. If this is the case, it can be part of the explanation of why talking in English while playing video games have a negative effect on vocabulary size in this study. However, more research is needed to draw any firm conclusion on this matter.

Finally, the fact that watching gaming related content had a significant negative effect on vocabulary size might be caused by the question not specifying which language it had to be in. It is likely that some of the gaming related content the participants watch is in Norwegian. As Nordnes (2021) found that watching TV with Norwegian subtitles had a significant negative effect on vocabulary size, the same would probably go for videos with Norwegian speech. In future research that study the effect of this particular activity, the language of the content should be specified.

5.3 Limitations and suggestions for further research

This study did not come without limitations in the research design, and there are several ways to improve the design that future researchers should be aware of. First, the current study, inspired by Nordnes (2021), used convenience sampling when recruiting participants. This caused the number of participants to be somewhat limited, and the participants were only from two separate schools from the same district. As a result, it can be argued that the sample within this study is not that representative in a wider population. Secondly, the small sample size or inaccurate questions could have been responsible for some of the null results found in this study. Additionally, because the participants completed the questionnaire and the VST in a group setting on individual computers there was no way to carefully control that they took the experiment seriously. According to Nation (2012), the validity of such a test depends strongly on how seriously learners sit the test. The students' motivation to perform well were likely affected by the time of day and what they had been doing recently before participating.

Thirdly, while the study, as Sundqvist (2019) puts it, is authentic and ecologically valid, it is difficult to specify the association between L2 outcomes and specific games and genres. This is mostly caused by ethical considerations when trying to limit the number of questions within the questionnaire to avoid spending too much time. I wanted to avoid fatigue among students and to respect teachers' workload, so that the data collection did

not take up too much lesson time. Additionally, I wanted to ask questions about other extramural activities apart from gaming to compare the gaming variables with. This prioritization meant that the items included in the questionnaire could give a broad perspective (similar to earlier studies) instead of a more focused perspective on gaming. Presumably, asking more accurate questions could create better suited independent variables which in turn could provide more accurate and detailed results. The phrasing of certain questions within the questionnaire could also have been better/more specific to avoid weaknesses in the variables, such as the unclear difference between singleplayer games and multiplayer games. Further research is needed to give a more nuanced look on levels of interaction in games, specific types of interaction and their possible benefit to language proficiency, and how specific games can affect language proficiency.

Fourthly, only using receptive vocabulary size as a proxy for language proficiency can cause limitations. Although vocabulary size is conveniently used as a proxy for language proficiency, additional areas of language competence are not considered in this study. In general, studies that use vocabulary size as a proxy for language competence often consider other proxies as well, such as oral proficiency or assessed essays and grades (Sundqvist, 2009; Sundqvist & Wikström, 2015). It would be interesting to see how grammar knowledge, writing skills, reading comprehension, listening comprehension or productive vocabulary size are affected by exposure to extramural English input.

Lastly, an interesting avenue for further research may be to study how the English language is related to esports in Norwegian gaming communities, or how English is present in Norwegian study programs based on gaming. This could help in determining if English proficiency is crucial for success in competitive gaming. Additionally, further research could focus on participants who label themselves as players of specific games, this could probably benefit detailed comparisons between games. Finally, further research on extramural input should also consider the effects of social media use and language proficiency in greater detail.

6 Conclusion

The current study used a linear regression analysis, bivariate analyses, and observations from descriptive statistics to determine how much time Norwegian 10th grade students (n=97) spend on extramural activities, if time spent on gaming is a good predictor of English language proficiency in comparison with other extramural activities and if there is gender difference in terms of gaming quantity and receptive vocabulary size. Additionally, the study found the most popular videogames, played by the participants, and investigated if these games had an effect on language proficiency. Although the results of this study generally are in line with previous research on that exposure to extramural English input affects vocabulary size, the overall effect seems to be smaller on the group of participants within this study. As opposed to a lot of previous studies, gaming in general did not have a significant effect on language proficiency, presumably because gaming is not best described as one monolithic extramural activity as it encompasses so many different games and ways of playing, as evidenced by a very positive effect of writing in-game.

Overall, the study found that participants are regularly engaged in extramural activities that expose them to authentic English input. Out of the investigated extramural activities, "writing while playing video games" turned out to be the strongest predictor of language competence, and "reading in English" came second. "Watching gaming related videos and streams" and "talking in English while gaming" turned out to have significant negative effects on vocabulary size. The variables concerning spending time "watching TV", "using social media", "playing video games" and "talking while playing video games" were not found to have a significant effect on proficiency, contrary to much previous research. Additionally, the current study found that 96% of the boys reported that they play video games, while 67.5% of girls reported this. Even among those who did report playing video games, boys on average spent more time playing than girls did. This means that there is, in accordance with previous studies, an apparent gender difference in terms of the average exposure to input from playing video games. Interestingly, the boys also scored higher on the vocabulary size test overall.

The study found that most of the popular video games have competitive gameplay that usually rely more on the mastery of gameplay mechanics than the ability to communicate effectively in English. Additionally, the fast-paced and objective-bound gameplay found in these types of video games can limit the possibility for a linguistically rich and cognitively challenging learning environment for players. Due to the nature of some games, it can be argued that those who play games such as Minecraft are allowed to write more and communicate in a more elaborate manner than in other games. This assumption was somewhat evidenced by the significant relationship between playing Minecraft and language proficiency. Additionally, playing video games on PC is, in this study, argued to have a more positive effect on language proficiency because it allows for

quicker and easier access to writing than other video game consoles. This argumentation was based on the fact that writing while playing was found to have a very positive effect on receptive vocabulary size.

Lastly, the study found that variables regularly used when investigating extramural activities are comprehensive and somewhat inaccurate, hindering the chance for an accurate and detailed understanding of how these activities affect language proficiency. As a result, further research is needed to give a more nuanced look on levels of interaction in games, specific types of interaction and their possible benefit to language proficiency, and how specific video games themselves can affect language proficiency.

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Appendices

Appendix 1 - Questionnaire

- 1) Kjønn
 - a) Fyll inn:

- 2) Har du norsk som morsmål (det språket du har vokst opp med)?
 - a) Ja
 - b) Nei

- 3) Har du flere morsmål (for eksempel norsk og spansk)?
 - a) Ja
 - b) Nei

- 4) Har du engelsk som morsmål?
 - a) Ja
 - b) Nei

- 5) Har du i en periode av livet bodd i et annet land enn Norge?
 - a) Ja
 - b) Nei

- 6) (Om deltager svarer a på 5) Hvilke land bodde du i, hvor gammel var du og hvor lenge bodde du i der? (eventuelt del dette inn i 3 ulike spørsmål).
 - a) Fyll inn:

- 7) (Om deltager svarer a på 5) Mens du bodde i utlandet, gikk du på en engelskspråklig skole eller barnehage?
 - a) Engelskspråklig skole
 - b) Engelskspråklig barnehage
 - c) Begge deler
 - d) Ingen av delene

- 8) Har én eller begge av foreldrene dine engelsk som morsmål?
 - a) Ja
 - b) Nei

- 9) Hvor gammel var du da du begynte å lære engelsk?
- a) Fyll inn:
- 10) Hvor enig er du i påstanden: "Jeg er motivert for å lære engelsk"?
- a) Svært enig
 - b) Enig
 - c) Hverken eller
 - d) Uenig
 - e) Svært uenig
- 11) Hvor føler du at du har lært mest engelsk?
- a) På skolen (undervisning og lekser)
 - b) Utenfor skolen (på fritiden)
- 12) Hvordan har du lært engelsk utenfor skolen (Du kan skrive stikkord)?
- a) Fyll inn:
- 13) Hvor ofte leser du sammenhengende tekst på engelsk utenfor skolearbeid?
(Med lengre sammenhengende tekster menes bøker, aviser, blogger, tegneserier, poster skrevet på for eksempel reddit - eller andre nettsamfunn).
- a) Aldri
 - b) En gang iblant, men ikke hver uke
 - c) Minst 1 gang i uka
 - d) Flere ganger i uka
 - e) Nesten hver dag
 - f) Hver dag
- 14) Om deltakeren svarer (e) eller (f) på (2): I løpet av en vanlig dag, omtrent hvor mye leser du lengre sammenhengende tekst på engelsk?
- a) Mindre enn 1 time om dagen
 - b) 1 til 2 timer om dagen
 - c) 2 til 3 timer om dagen
 - d) 3 til 4 timer om dagen
 - e) 4 til 5 timer om dagen
 - f) Mer enn 5 timer om dagen
- 15) Omtrent hvor ofte ser du på TV, serier, film, videoer på internett med engelsk tale og/eller skrift?

- a) Aldri
- b) En gang iblant, men ikke hver uke
- c) Minst 1 gang i uka
- d) Flere ganger i uka
- e) Nesten hver dag
- f) Hver dag

16) Om deltakeren svarer (e) eller (f) på (2): I løpet av en vanlig dag, omtrent hvor mye ser du på TV, serier, film, videoer på internett eller spiller spill med engelsk tale eller skrift?

- a) Mindre enn 1 time om dagen
- b) 1 til 2 timer om dagen
- c) 2 til 3 timer om dagen
- d) 3 til 4 timer om dagen
- e) 4 til 5 timer om dagen
- f) Mer enn 5 timer om dagen

17) Omtrent hvor ofte bruker du TikTok, YouTube, instagram (eller lignende) med engelsk tale eller skrift?

- a) Aldri
- b) En gang iblant, men ikke hver uke
- c) Minst 1 gang i uka
- d) Flere ganger i uka
- e) Nesten hver dag
- f) Hver dag

18) I løpet av en vanlig dag, omtrent hvor mye ser du på videoer på TikTok, YouTube, instagram (eller lignende) med engelsk tale eller skrift?

- a) Mindre enn 1 time om dagen
- b) 1 til 2 timer om dagen
- c) 2 til 3 timer om dagen
- d) 3 til 4 timer om dagen
- e) 4 til 5 timer om dagen
- f) Mer enn 5 timer om dagen

- 19) Omtrent hvor ofte spiller du spill med engelsk tale eller skrift? (mobilspill, dataspill, eller spill på konsoll - PlayStation, Xbox osv.).
- a) Aldri
 - b) En gang iblant, men ikke hver uke
 - c) Minst 1 gang i uka
 - d) Flere ganger i uka
 - e) Nesten hver dag
 - f) Hver dag

De kommende spørsmålene er kun for de som ikke svarte (a) på spørsmål (13).

- 20) I løpet av en vanlig dag, omtrent hvor mye spill med engelsk tale eller skrift spiller du?
- a) Mindre enn 1 time om dagen
 - b) 1 til 2 timer om dagen
 - c) 2 til 3 timer om dagen
 - d) 3 til 4 timer om dagen
 - e) 4 til 5 timer om dagen
 - f) Mer enn 5 timer om dagen
- 21) Hvilken plattform spiller du på? (Flere mulige avkryssninger)
- a) PC
 - b) PlayStation
 - c) Xbox
 - d) Nintendo (Switch eller andre konsoller)
 - e) Mobil
 - f) Annet (Gjerne fyll inn)
- 22) Hvilken plattform bruker du mest? (Kun ét svar)
- a) PC
 - b) PlayStation
 - c) Xbox
 - d) Nintendo (Switch eller andre konsoller)
 - e) Mobil
 - f) Annet
 - g) Jeg bruker flere samtidig (for eksempel PC og PlayStation like mye).

- 23) Hvor ofte spiller du singleplayer spill eller co-op spill (spill der du spiller alene eller sammen med venner på samme konsoll)?
- a) Aldri
 - b) En gang iblant, men ikke hver uke
 - c) Minst 1 gang i uka
 - d) Flere ganger i uka
 - e) Nesten hver dag
 - f) Hver dag
- 24) I løpet av en vanlig dag, omtrent hvor mye tid spiller du singleplayer videospill eller co-op spill?
- a) Mindre enn 1 time om dagen
 - b) 1 til 2 timer om dagen
 - c) 2 til 3 timer om dagen
 - d) 3 til 4 timer om dagen
 - e) 4 til 5 timer om dagen
 - f) Mer enn 5 timer om dagen
- 25) Hvilke singleplayer- eller co-op spill spiller du? Gjerne rams opp de du bruker mest tid på:
- 26) Hvor ofte spiller du online multiplayer-spill? (Spill der du spiller sammen med andre over internett)
- a) Aldri
 - b) En gang iblant, men ikke hver uke
 - c) Minst 1 gang i uka
 - d) Flere ganger i uka
 - e) Nesten hver dag
 - f) Hver dag
- 27) I løpet av en vanlig dag, omtrent hvor mye tid spiller du online multiplayer-spill?
- a) Mindre enn 1 time om dagen
 - b) 1 til 2 timer om dagen
 - c) 2 til 3 timer om dagen
 - d) 3 til 4 timer om dagen
 - e) 4 til 5 timer om dagen
 - f) Mer enn 5 timer om dagen

- 28) Hvem spiller du sammen med (flere svar er mulig)?
- a) Venner (som du også møter i den virkelige verden)
 - b) Venner (som du vanligvis ikke møter i den virkelige verden)
 - c) Fremmede
 - d) Faste grupper (guild/group/clan osv.)
 - e) Annet
- 29) Hvilke online multiplayer-spill spiller du? Gjerne rams opp de du bruker mest tid på:
- 30) Hvor ofte skriver du på engelsk mens du spiller?
- a) Aldri
 - b) En gang iblant, men ikke hver uke
 - c) Minst 1 gang i uka
 - d) Flere ganger i uka
 - e) Nesten hver dag
 - f) Hver dag
- 31) Hvor ofte snakker du engelsk mens du spiller?
- a) Aldri
 - b) En gang iblant, men ikke hver uke
 - c) Minst 1 gang i uka
 - d) Flere ganger i uka
 - e) Nesten hver dag
 - f) Hver dag
- 32) Hvor ofte ser du på guider (tips og triks) for spillene dine eller ser på at andre spiller spillene (på for eksempel YouTube eller Twitch)?
- a) Aldri
 - b) En gang iblant, men ikke hver uke
 - c) Minst 1 gang i uka
 - d) Flere ganger i uka
 - e) Nesten hver dag
 - f) Hver dag
- 33) Sett bort ifra språklæring, har du lært noe annet fra å spille spill? (åpent spørsmål) Fyll inn:

Appendix 2 - Consent form

Samtykkeskjema

Vil du delta i forskningsprosjektet "Engelsk og betydningen av gaming"?

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å utforske hvordan aktiviteter som tv-titting, lesing og spesielt spilling av videospill utenfor klasserommet kan påvirke engelskkunnskapene dine. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære.

Formål

Dette forskningsprosjektet vil inngå som en del av min mastergrad på NTNU. Formålet med forskningsprosjektet er å utforske hvordan det man gjør på fritiden påvirker engelskkunnskapene deres. Dette vil jeg teste ved å gjennomføre et eksperiment med norske 10.klasser og/eller elever på vgs., dere dere vil svare på noen bakgrunnsspørsmål om deres engelske input og vaner (knyttet til engelsk) utenfor skolen, før de som tar en test som tester vokabularet deres i engelsk.

Hvem er ansvarlig for prosjektet?

Institutt for språk og litteratur ved NTNU er ansvarlige for prosjektet

Hvorfor får du spørsmål om å delta?

Du blir spurt om å delta fordi du er i målgruppen og læreren din har sagt at vi får lov til å spørre deg. Det vil si at deltakerne har blitt plukket ut på enklest måte for å gjennomføre prosjektet. I dette tilfellet vil det si at vi har snakket med din engelsklærer og avtalt å gjennomføre forskningen i en engelsktime. Derfor har du fått spørsmål om å delta, sammen med resten av din engelskklasse.

Hva innebærer det for deg å delta?

Hvis du ønsker å delta i dette forskningsprosjektet innebærer dette at du gjennomfører en test som anslår omtrent hvor mange ord du kan på engelsk. Deretter vil du bli spurt om noen tilleggsspørsmål om deg selv som er viktig for forskningen. Disse spørsmålene vil handle om dine vaner i fritiden, som hvor mye tid du bruker på å se på tv, lese bøker og spille spill, hvor motivert du er for å lære engelsk og hvilket forhold du har til språket.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Dette forskningsprosjektet blir gjennomført på skolen, men inngår ikke i din ordinære undervisning. Det vil ikke få noen negative faglige konsekvenser for deg å trekke deg eller takke nei til å være med i prosjektet (svarene på denne prøven vil ikke ha noe å si for karakteren din i engelsk).

Ditt personvern - hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

Dataen som samles inn vil være anonym og det vil ikke være mulig for meg eller noen andre å knytte svarene dine til deg som person. Dataen vil lagres elektronisk og ingen persondata vil lagres etter prosjektet er ferdig. Vi vil benytte oss av NTNU sin egen datalagringsguide.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Opplysningene anonymiseres når oppgaven er godkjent, noe som etter planen er i august 2022.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om deg, og å få utlevert en kopi av opplysningene
- å få rettet personopplysninger om deg,
- å få slettet personopplysninger om deg,
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra NTNU har Norsk senter for forskningsdata AS (NSD) vurdert at behandlingen personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Institutt for språk og litteratur, NTNU, ved:
- Konrad Nordfjellmark (Masterstudent)
 - Mail: konradn@stud.ntnu.no
 - Tlf: 994 13 540
- Anne Dahl (Masterveileder)
 - Mail: anne.j.dahl@ntnu.no
 - Tlf: 735 96 794
- Vårt personvernombud:
 - Thomas Helgesen
 - Mail: thomas.helgesen@ntnu.no
 - Tlf: 930 79 038

Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med:

- NSD- Norsk senter for forskningsdata AS på e-post (personverntjenester@nsd.no) eller på telefon: 55 58 21 71

Ved å trykke videre fra denne siden godtar du at opplysningene fra denne undersøkelsen brukes i masterprosjektet slik det er forklart ovenfor.

Appendix 3 - Questions from the vocabulary size test

These are the first 5 and last 5 questions from the vocabulary size test. The unincluded questions had the same structure as the presented ones. The words increased in difficulty for every 10th question. For the full test use the link: <https://my.vocabularysize.com/>

(1) Write - *Please **write** it here*

- (a) make something better
- (b) cut into pieces
- (c) move to a new place
- (d) make words on paper

(2) Cross - *Don't **cross***

- (a) push
- (b) go to the other side
- (c) eat too fast
- (d) wait

(3) Far - *Have you walked **far?***

- (a) a long way
- (b) very fast
- (c) to your house
- (d) for a long time

(4) Carry - *Please **carry** it*

- (a) move it from side to side
- (b) talk about it
- (c) write your name on it
- (d) hold it and walk

(5) Game - *I like this **game***

- (a) way of playing
- (b) food
- (c) story
- (d) group of people

- (96) Shifty - *He looked **shifty***
- (a) as though he could not sit still
 - (b) guilty
 - (c) very annoyed
 - (d) as though he could not be trusted
- (97) Cardiac - *He has a **cardiac problem***
- (a) a problem with his brain
 - (b) a problem with his bones
 - (c) a problem with his heart
 - (d) a problem with his blood
- (98) Peeved - *He was **peev**ed*
- (a) excited
 - (b) annoyed
 - (c) tired
 - (d) hungry
- (99) Snarl - *They **sna**rled*
- (a) made an angry noise
 - (b) agreed
 - (c) died
 - (d) turned round in a circle
- (100) Dishonor - *They were **dishon**ored*
- (a) stirred up
 - (b) made very unhappy
 - (c) shamed
 - (d) gained honor from many people

Appendix 4 - Exposure score

The structure of the exposure scores were inspired by Nordnes (2021). The answers to the questions about "reading in English", "watching TV with English or no subtitles," "social media use", "playing video games", "playing singleplayer video games" and "playing multiplayer video games" were converted into numbers to represent the participants engagement in these activities. The exposure scores were assigned followingly:

Q1: "Approximately how often do you play video games with English as the main language?".

Answer:	exposure points
1. Never	0
2. Once in a while, but not every week	1
3. At least once a week	2
4. Multiple times a week	3
5. Almost every day	4
6. Every day	5

Q2: "On a day you play video games, how long do you typically play?".

Answer:	exposure points
1. Less than one hour	0
2. 1 to 2 hours	1
3. 2 to 3 hours	2
4. 3 to 4 hours	3
5. 4 to 5 hours	4
6. More than 5 hours	5

If the participants picked one of the options (c) , (d) , (e) or (f) in Q1, they automatically triggered Q2. The exposure points from Q1 and Q2 were added together to form the complete exposure score for the variable "playing video games". For example, if the

participants answered "every day" in Q1 and "1 to 2 hours" in Q2, their final exposure score would be 6 out of 10. The participants that had 0 as the final exposure score were also included in the variable, this was a measure to secure reliability.

Appendix 5 - Tables

Two tables showing the participants answers to the questions "how often do you play video games" and "how much time do spend playing video games on a normal day".

Table 1 Q - How often do you play?

Frequency	<i>Total</i>	<i>Boys & NS</i>	<i>Girls</i>
Never	17	2	15
Not every week	17	2	15
At least once a week	9	2	7
Several times a week	17	10	7
Almost every day	14	13	1
Every day	23	22	1
Total	97	51	46

Table 2 Q - How much do you play on a normal day?

Frequency	<i>Total</i>	<i>Boys & NS</i>	<i>Girls</i>
Less than 1 hour	25	3	22
1-2 hours a day	18	11	7
2-3 hours a day	23	21	2
3-4 hours a day	6	6	0
4-5 hours a day	7	7	0
More than 5 hours	1	1	0
Total	80	49	31

Appendix 6 – Relevance for future profession

This master's thesis was a part of the teacher training program at NTNU. As a future English teacher in Norwegian schools, having specific knowledge about second language acquisition can be very helpful in various situations. It can be useful in the classroom to facilitate the best possible learning environments for the L2 learning students, and it can be useful when creating lesson- or period plans. With this knowledge, I see myself as a useful resource in future professional collaborations in local schools and in educational fields overall.

From completing this study, I have learned a lot about the language learning potential in extramural English activities. Results from the current study, in accordance with previous studies, have found that there is generally a significant relationship between spending time on certain extramural activities (such as reading, watching TV, and playing video games) and general language proficiency. In traditional Norwegian ESL education, there has been a tendency to rely mainly on reading and watching films as the main sources of English input. What I have found is that other activities, such as playing video games, can be resourceful in that they provide good authentic language input. Although reading and watching movies are proven to be great sources of input, some students can be more motivated to engage in other types of activities. Including more activities that provide authentic English input can be a great way to achieve adaptive education, this has in later years become a vital goal within the Norwegian curriculum. Moreover, I have learned more about what genres and types of games fifteen-year-old students play and which consoles they seem to prefer. This is useful information since it can allow me to better understand students and their personal interests, and, hopefully, this will contribute to better relationship building with future students.

