

The Role of Subtitles in Second Language Acquisition

**An experimental study in the context of the
Norwegian school system**

Lisa Maria Grønn Aurstad

**Master's thesis in English
NTNU
Spring 2013**

Abstract

The aim of this master's thesis is to provide further information about the role of subtitled audiovisual material in second language acquisition. Quantitative experimental research was conducted with 49 17-year-old Norwegian high school students as participants. The participants were divided into three groups identical to their original school classes. One group watched an episode of the American animated cartoon *Family Guy* with Norwegian subtitles, the second group watched the same episode with English subtitles, and the control group watched the episode with no subtitles. Immediately after watching the episode, the participants responded to a comprehension questionnaire in order to investigate the potential short term effects of the subtitles, and four weeks later they responded to a word definition task and a lexical decision task in order to measure potential long term effects. The results indicated only short term effects of the subtitles as the presence of subtitles in the Norwegian group and the English group predicted better performance in the comprehension questionnaire. No effects of the subtitles were found in the word definition task and the lexical decision task, indicating that there were no long term effects of the subtitles in these two experiments. The analysis, however, also revealed other significant factors that positively predicted the participants' performance on all the three tests.

Preface

The inspiration for this master's thesis was the article "Foreign subtitles help but native-language subtitles harm foreign speech perception" by Mitterer and McQueen (2009).

Through cooperation with my supervisor Mila Vulchanova, I decided that the role of subtitled audiovisual material in second language acquisition, and the potentially facilitative effect of subtitles, would be further investigated in my thesis. The investigation of subtitled audiovisual material as a source of authentic target language input is relevant to my future occupation as a teacher, and having this as the topic for my master's thesis also allowed me to increase my knowledge of second language acquisition in general.

The process of designing the materials and procedure was challenging, but also fun, and conducting the experiments was very interesting. The process of producing results using a statistical program I'd never even heard of before, *R*, was a real struggle and incredibly difficult, but with help from both professors and other students I finally got the results and could really get the writing process going. Searching for and finding relevant literature for the thesis was inspiring, and I found myself becoming more and more fascinated by and interested in both second language acquisition in general and the role played by audiovisual material and subtitles. I am certain that everything I have learned from working on this thesis will be of use in my future occupation as a teacher.

This feels like the right place to say a great "thank you!" to my supervisor, Professor Mila Vulchanova, for all the support, feedback, inspiration and help during all stages of the process. I would also like to thank Associate Professor Juhani Järvikivi, both for helping with developing the materials and for wonderful, and sorely needed, help with *R*. A special thanks to Ingrid Kvitnes, who has conducted a similar study for her master's thesis, for all the cooperation and all the laughs and struggles we shared while working on our projects. Thanks also to Sander Kuitert for working as a research assistant for one day, and Marit Brakstad for proofreading the thesis.

Lisa Maria Grønn Aurstad,
Trondheim, May 2013.

Contents

1. Introduction.....	9
2. Theoretical background.....	11
2.1. Second language acquisition	11
2.2. Grammar, vocabulary and priming.....	12
2.3. The role of input in second language acquisition.....	14
2.4. Authentic material as input.....	17
2.5. Audiovisual material	19
2.6. Subtitles.....	22
3. Methods.....	25
3.1. Quantitative and experimental.....	25
3.2. Participants	26
3.4. Materials and procedure	27
3.5. Analysis.....	31
4. Results.....	33
4.1. Vocabulary and grammar tests	33
4.2. The comprehension questionnaire.....	33
4.3. The word definition task.....	35
4.4. The lexical decision task	37
5. Discussion	41
5.1. The comprehension questionnaire.....	41
5.2. The word definition task.....	44
5.3. The lexical decision task	46
5.4. General discussion.....	48
6. Conclusion.....	51
Works cited.....	55
Appendix	61
Appendix 1: Parental consent form.....	61
Appendix 2: The background questionnaire.....	62

Appendix 3: The comprehension questionnaire.....	68
Appendix 4: The word definition task.....	72
Appendix 5: The lexical decision task.....	79

1. Introduction

The role of input in second language acquisition is argued to be very important with both Krashen (1982) and sociocultural theories particularly emphasising the importance of receiving input at a level that is within reach for the learner. Gilmore (2007) further argues that the input ought to be an authentic sample of the target language as authentic material offers much richer samples of the target language than the language found in adjusted material. Authentic material can in this sense enhance both the communicative competence of the learners as well as their overall linguistic competence. Audiovisual material is a good source for authentic input, and Baltova (1999), Bianchi and Ciabattini (2008), and Neuman and Koskinen (1992) all note the facilitative potential of audiovisual material, particularly when accompanied by subtitles. The combination of sound, visual information, and subtitles contributes to a better learning environment for second language acquisition. In relation to films as authentic audiovisual material, Danan (2004), Markham (1999), Mitterer and McQueen (2009), and Vanderplank (1988) all argue that target language subtitles are more beneficial whereas d'Ydewalle and Van de Poel (1999) suggest that native language subtitles are the better option.

The aim of this study was to investigate the potential effect of subtitled audiovisual material in enhancing second language acquisition. The experiment was constructed so as to reveal both potential short and long term effects as well as potential differences based on the language of the subtitles. The main area of interest was to investigate whether exposure to different types of subtitles when watching an animated cartoon episode in the target language had an effect on the results on a comprehension questionnaire, a word definition task, and a lexical decision task. The aim of the comprehension questionnaire was to reveal to what extent the participants had understood the content of the audiovisual material and thus also indicate potential short term effect of the subtitles, whereas the word definition task and the lexical decision task allowed for an investigation into potential long term effects of the subtitles. If the subtitles turned out to have an effect, it would also be interesting to look into potentially varying effects of the subtitles. The main hypothesis was that the subtitles would influence the performances of the groups in all the three tasks indicating both short term and long term effects. It was also hypothesised that the English subtitles group would outperform the other two groups as the facilitative effect of target language subtitles has been found in

several studies (Bianchi & Ciabattini, 2008; Markham, 1999; Mitterer & McQueen, 2009; Vanderplank, 1988).

The participants were 49 Norwegian 17-year-olds with a fairly high level of proficiency in English as a second language. The participants were selected randomly based on their original school classes and divided into participant groups identical to these original classes. The English proficiency level of the groups was, however, believed to be fairly similar. The participants were divided into three groups where one group watched an episode of the American animated cartoon series *Family Guy* with Norwegian subtitles, the second group watched the same episode with English subtitles, and the third group watched the episode with no subtitles making this group the baseline control group. Immediately after having watched the episode, the participants responded to a comprehension questionnaire in order to check for potential short term effects of the subtitles, and four weeks later they responded to a word definition task and a lexical decision task in order to check for potential long term effects. The word definition task required the participants to select the appropriate definitions for words and idiomatic expressions that occurred in the *Family Guy* episode, whereas the lexical decision task required them to select from a list of words the words they believed had occurred in the episode. In the lexical decision task, prime words were included; back translations of words occurring in the Norwegian subtitles that were translated into English words that did not occur in the episode. The prime words were included in order to investigate if the Norwegian group was influenced by the Norwegian subtitles. The three tasks were all based on the *Family Guy* episode the participants had watched, and the results from the three tasks were analysed in the statistical program *R*. Predictors other than the subtitles were also included in the analysis based on information given by the participants in a background questionnaire, a vocabulary test and a grammar test.

2. Theoretical background

2.1. Second language acquisition

The second language (L2) of an individual is a language acquired in addition to the individual's first language (L1), which is often described as either the native language or the mother tongue. At least one L1 is acquired before one begins to learn a second language. Saville-Troike (2006) claims that there is "complete agreement [...] that since L2 acquisition follows L1 acquisition, a major component of the initial state for L2 learning must be prior knowledge of L1" (p. 18). The prior knowledge of the L1 is argued to influence the acquisition of the L2 through transfer of prior L1 knowledge onto the L2 affecting the acquisition of the L2 in either positive or negative ways (Saville-Troike, 2006). In contrast to the outcome of L1 acquisition, which is native linguistic competence, the outcome of the second language acquisition process varies in terms of the competence of the learners with some reaching a low level of competence and other reaching a near-native level. Whether or not this difference in final level of acquisition between the L1 and the L2 is related to the age of the learners at the time of acquisition has been widely debated. The existence of a critical period for language acquisition, relevant for both first and second language acquisition, has been widely debated ever since the 1960s. Whether there is a critical period for language acquisition or not, research at least seems to indicate that "young starters seem to end up as nativelike speakers of the L2, [something] which is rarely, if ever, the case for adult or adolescent starters" (Hyltenstam & Abrahamsson, 2003, p. 546).

Gass (2003, p. 225) distinguishes two main approaches to how both first and second languages are acquired: the nature approach, which argues that humans have an innate cognitive capacity for acquiring languages, and the nurture approach, which argues that language acquisition is inspired and stimulated by the environment and through social interactions. While the nature position is based on Chomsky's theory of Universal Grammar (UG) and an innate language faculty, the nurture approach argues that input and communication is most important when acquiring language. R. Ellis (1994) emphasises three types of second language acquisition theories: theories based on internal factors, theories based on external factors, and theories based on individual factors. Related to Gass's (2003) distinction between nature and nurture, the nature approach tends to focus more on internal factors and nurture approaches on more external factors. Additionally, cognitive approaches to second language acquisition argue that language is similar to any other cognitive ability,

and that language thus is acquired through an interaction between general cognitive abilities and external language data thus giving the individual learner a central role in the acquisition process (Berggreen & Tenfjord, 1999; N. C. Ellis, 2003). In terms of first language acquisition there is broad consensus that there is some innateness in L1 acquisition, and that language-specific input cooperates with the innate capacity in language acquisition. The roles of nature and nurture in second language acquisition, however, seem much more unclear.

2.2. Grammar, vocabulary and priming

According to Cook (2008), “[g]rammar is the most unique aspect of language” (p. 18), and grammar is often considered the central aspect of language around which other aspects of language, such as vocabulary and pronunciation, revolve. In this way, grammar is what connects the other aspects to each other. In terms of second language acquisition research, grammar is referred to as linguistic or grammatical competence. Chomsky (1980) defines grammatical competence in the following way:

By ‘grammatical competence’ I mean the cognitive state that encompasses all those aspects of form and meaning and their relation, including underlying structures that enter into that relation, which are properly assigned to the specific subsystem of the human mind that relates representations of form and meaning (p. 59).

Grammatical competence thus refers to the knowledge of grammar stored unconsciously in the mind of the speaker. In Universal Grammar this knowledge of grammar is defined as being made from principles and parameters, with the principles being what all languages have in common and the parameters being what separates the languages from each other. Kac (1992) argue that the linguistic competence should also include the speakers’ “internalized ‘program’ for production and recognition” (p. 52) as the ability to understand words and sentences depends on the speakers’ ability of recognition (p. 65). This grammatical or linguistic competence can in any case be argued to be the speakers’ underlying knowledge of language (Saville-Troike, 2006, p. 3) influencing for instance vocabulary comprehension.

Jackendoff (2002, p. 153) makes a distinction between the two terms ‘word’ and ‘lexical item’ with ‘lexical item’ describing the items that are stored in the mental lexicon. Learners learn components of the meaning of words and usually not the complete meaning of words all at once (Cook 2008, p. 54), and this information is stored in the learners’ lexical memory. As lexical items are stored in a network linking them to each other through meaning and form, acquisition of a new item is faster when related items are already stored in the mental lexicon.

The process of lexical storage seems to be quite unlimited, and when new items or information is added in the memory this appears to create opportunities for further additional storage: “[t]he more knowledge we have in a given domain, the more ways there are to store additional information” (Bjork & Bjork, 1992, p. 36). The information that has been stored in memory has to be retrieved from memory in processing and production. Kobasigawa (as cited in Nippold, 1998, p. 31) defines word storage as the availability of information in memory and word retrieval as the accessibility of the stored information. Storage and retrieval are related but also independent processes, and they interact in the learners’ ability to find the appropriate words in different contexts. Every item stored in the lexical memory has both storage strength and retrieval strength (Bjork & Bjork, 1992). Storage strength is a measure of to what extent a particular item has been learned, while retrieval strength is a measure of how easily an item stored in the memory is accessed. This accessibility depends on factors such as the presence of item associated contextual cues, the frequency with which the item is retrieved from memory, competition from other stored items, and how recently the item in question has been stored (Bjork & Bjork, 1992, p. 42).

The links between items stored in the mental lexicon are relevant in terms of the notion of priming. Some items, like ‘cat’ and ‘dog’, are more closely related than others, like ‘horse’ and ‘sky’, that do not exist in as strong a lexical relationship. Jackendoff (2002) describes priming as “spreading activation from associated items within the lexicon” (p. 210), meaning that upon encountering a word such as ‘camel’ related items such as ‘hump’, ‘dust’ and ‘desert’ are more easily activated. According to Trofimovich and McDonough (2012), priming refers to “the phenomenon in which prior exposure to specific language forms or meanings either facilitates or interferes with a speaker’s subsequent language comprehension or production” (p. 4). The priming process is a cognitive phenomenon that constitutes a part of the larger human implicit memory system as the process of priming is believed to be implicit and occurring with little awareness and conscious effort on behalf of the speakers (Trofimovic & McDonough, 2012, p. 4). Ferrand and New (2004) distinguish between semantic and associative priming. Semantic priming reflects the meaning similarity between two words, whereas associative priming reflects word use rather than word meaning in that it concerns the probability that one word will call to mind a second word (Ferrand & New, 2004, p. 26). In this sense the relationship between ‘dolphin’ and ‘whale’ is semantic, whereas the relationship between ‘spider’ and ‘web’ is associative (Ferrand & New, 2004, p. 26).

Trofimovich and McDonough (2012, p. 4) note that semantic priming is characterised by the tendency for speakers to process a word more easily if they have previously encountered a word with a related semantic meaning. Speakers are thus likely to process the word ‘cat’ more easily if they have previously been exposed to the word ‘dog’ compared to having previously been exposed to the unrelated word ‘shoe’. The meaning of ‘dog’ already being activated causes the meaning of ‘cat’ to be more quickly activated because of the meaning relationship between the two (Trofinovich & McDonough, 2012, p. 4). As shown by Meyer, Belke, Telling, and Humphreys (2007) and Mani and Plunkett (2010), humans are also capable of implicit generation of names of visually fixated images. Mani and Plunkett (2012, p. 908) in their infant-based experiment found that the systematic influence of prime images on target recognition could only be explained by the fact that infants are capable of naming such visually fixated images, and that such implicitly generated names can be argued to prime the infants’ responses in visual-object spoken-word-recognition tasks. In their study, Meyer et al. (2007) showed that the capability of implicitly generating the names of visually fixated images also is present in adults. This implies that when persons are presented with a picture of a cat they will implicitly generate the word ‘cat’ in their mind. Whether the priming effect found by Mani and Plunkett (2010) and Meyer et al. (2007) facilitates or interferes with target identification, however, as noted by Mani and Plunkett (2010: 911), appears to be unclear.

2.3. The role of input in second language acquisition

There is consensus about the importance of input, exposure to oral or written target language, as a requisite in development of the overall linguistic or grammatical competence in the second language (Mitchell & Myles, 2004). This linguistic competence is in turn also used to comprehend written and spoken target language (Anderson, 2005). The receptive skills reading and listening used in input processing share similar cognitive processes and represent two different sources of input (Bozorgian, 2012). They both include fundamental linguistic knowledge, word knowledge, decoding, and comprehension and involve “phonological, syntactic, and semantic orchestration of skill” (Bozorgian, 2012, p. 3). Also, “perceiving receptive input demands a pliable cognitive process to revise cognitive representations in that both listeners and readers construct while receiving input” (Bozorgian, 2012, p. 3). Bozorgian (2012, p. 3) further notes what he considers to be the most crucial difference between the two receptive skills: in terms of accessing the input, the listener is not able to rehear an utterance whereas the reader can go back to the text and reread. Vandergrift and Tafaghodtari (2010) argue that the listening comprehension skills of the learners’ influence their ability to

comprehend authentic oral input. The metacognitive processes and strategies underlying listening comprehension might thus contribute to the overall linguistic competence of the learners. Webb (2005) notes that vocabulary is learned through listening and reading, and Kurita (2012) argues that vocabulary knowledge is also important in predicting listening comprehension skills. Grabe (2004) and Anderson (2005) both argue that there is a strong relationship between grammar and reading skills in that knowledge of the language structure, possibly in combination with lexical knowledge (Kurita, 2012), facilitates comprehension of utterances and sentences.

Frequency and saliency are particularly important aspects of the input learners receive. Ellis and Collins (2009) note that frequency of the input affects “the processing of phonology and phonotactics, reading, spelling, lexis, morphosyntax, formulaic language, language comprehension, grammaticality, sentence production, and syntax” (p. 330), and Berggreen and Tenfjord (1999) argue that more frequent items in the input tend to be more easily noticed and recognized. However, as the most frequent words tend to be function words and not content words, their saliency in the input can be argued to be less important. As Golden (as cited in Berggreen & Tenfjord, 1999, p. 96) notes, content words are more context dependent in occurrence than function words and thus also less frequent. Snow and Hoefnagel-Höhle (as cited in Berggreen & Tenfjord, 1999, p. 96) remark that the frequency of the input may only have an effect and be stored in the memory if the same element occurs frequently in one same context. Saliency, the perceived strength of the stimuli, is also important for language acquisition and considered a key element for learning in general (Ellis & Collins, 2009). It concerns the degree to which elements of the input attract the attention of the learners in terms of, for instance, the item’s position in the utterance and the accent, pitch, and length of the utterance or item. Grammatical particles and inflections often have low saliency and are therefore more difficult to acquire in the target language than, for instance, adverbials, which are more salient and therefore more easily perceived (Ellis & Collins, 2009, p. 331). Garman (1990, p. 184) argues that the first and the last elements in an utterance are more likely to be stored in lexical memory, due to what he refers to as the initial effect with regards to the elements initially occurring and the recency effect with regards to the elements occurring in the end.

Krashen’s (1982) argument, that comprehensible input is the one thing necessary for acquiring a second language, can be argued to have laid the foundation for further research

concerned with the role of input in second language acquisition (Mitchell & Myles, 2004). Krashen (1982, p. 21) in his Input hypothesis argues that humans acquire language through receiving comprehensible input, moving from the current level i to the next level $i+1$ by understanding or being focused on the meaning of the comprehensible input containing $i+1$. In order for the input to be comprehensible and hopefully become intake, it should be slightly above the current language ability of the learner. Long was one of the theorists to build on Krashen's Input hypothesis in his research on the role of input in second language acquisition arguing that the input received through interaction is particularly important (Mitchell & Myles, 2004, p. 167). In his Interaction hypothesis, he notes the adjustment made by native speakers in communicating with non-native speakers causing the non-native speakers to be exposed to fine-tuned language input (Mitchell & Myles, 2004, p. 167). In this way, such interaction contributes to the comprehensible input proposed by Krashen:

Modification of the interactional structure of conversation [...] is a better candidate for a necessary (not sufficient) condition for acquisition. The role it plays in negotiation for meaning helps to make input comprehensible while still containing unknown linguistic elements, and, hence, potential intake for acquisition. (Larsen-Freeman & Long, 1991, as cited in Mitchell & Myles, 2004, p. 168).

The Input hypothesis resembles Vygotsky's (1978, p. 86) notion of the Zone of Proximal Development (ZPD) in which, concerning learning in general, Vygotsky claims that in order for new things to be learned the level of these things should be slightly above the current level of the learner. The ZPD and scaffolding theory (Wood, Bruner, & Ross, 1976) became particularly important for sociocultural theories of language acquisition (Cook, 2008, p. 228). Sociocultural theories also emphasise the role of social assistance by another person in acquiring a second language along with input slightly above the current level of the learner learned through the process of scaffolding (Cook, 2008, pp. 228-9). This social assistance can be argued to be related to other interactional approaches that emphasise the importance of social interaction in second language acquisition.

In Universal Grammar approaches to language, the role of input takes on a different form. The poverty of the stimulus argument is claimed to hold for L2 as well as L1 acquisition in that there is a mismatch between the input that the L2 learners are exposed to and the unconscious knowledge they have of the L2 (White, 2003, p. 20). At the time when a learner is acquiring a second language, the learner already has made all the "parametric choices that are appropriate for that L1, guided by UG" (Saville-Troike, 2006, p. 50). Second language learners might still

have access to UG when beginning the process of acquiring a second language, along with knowledge of an L1; however, the importance of UG in this process is unclear: the learners may have full access to UG even when learning a language subsequent to their L1, the learners may have partial access to UG thus keeping some of the UG components, the learners may have indirect access to UG through their knowledge of the L1, or the learners have no access to UG at all and learns the L2 through entirely different means than the L1 (Berggreen & Tenfjord, 1999; Saville-Troike, 2006). Despite the controversy regarding the role of UG in second language acquisition, input is nevertheless believed to play a role also in Universal Grammar-based approaches, mainly in serving as triggers to parameters thus enhancing the acquisition process. Corder (1967), influenced by Chomsky, was in fact the first to draw the distinction between input and intake:

The simple fact of presenting a certain linguistic form to a learner in the classroom does not necessarily qualify it for the status of input, for the reason that input is 'what goes in' not what is *available* for going in, and we may reasonably suppose that it is the learner who controls this input, or more properly his intake (p.165).

Corder additionally argued that whether or not language input was to become intake depends on the learners' Language Acquisition Device, thus making the input-intake process dependent of innate factors. Thus, also according to Chomskyan theorists, input is argued to play a role in second language acquisition. However, in to a larger extent emphasising the internal factors of language acquisition the role of input from a nativist position is not as significant as in the more externally oriented approaches.

2.4. Authentic material as input

The role of authentic material per se appears to be somewhat unclear in the input oriented approaches presented earlier. Neither Krashen nor theories based on ZDP and scaffolding theory emphasise what type of input they consider to be most facilitative. The type of input is thus less important than the fact that the learners are exposed to 'any kind' of input in the target language as long as the level of the input is within reach for the learner. Gilmore (2007) is critical of this view and argues that authentic input is preferable:

These constructivist and interactionist views of learning [Vygotsky and Bruner] to some extent push any distinctions between authentic and contrived discourse to the periphery since, as long as materials and tasks allow learners to operate within their ZPD, it could be argued that their origin is irrelevant. However, we might speculate that authentic materials are often superior because they provide rich input that is more likely to cater to the different stages of development and individual differences that exist within any classroom population (p. 112).

Gilmore (2007) further argues that it is indeed possible to adapt authentic texts to different learner levels through variations in the tasks the learners are given. In relation to this, Gilmore (2007) states that “[a]uthentic material is likely to expose learners to a wider variety of grammatical and lexical features but with less frequency than contrived input specifically designed to highlight particular target language” (p. 111).

Authentic material is input that is not initially produced with second language learners in mind but produced for native speakers, and in this way the material differs from the language usually presented to learners in second language textbooks. Benavent and Peñemaría (2011, p. 89) emphasise that authentic material is material produced by native speakers for native speakers and not with pedagogical matters in mind and that it presents the target language in a naturalistic environment, whereas Tomlinson (2012) defines authentic material as something that is “produced in order to communicate rather than to teach” (p. 162). Many second language acquisition researchers argue that the use of level adjusted textbooks in second language acquisition does not prepare the learners for the real world where the use of the target language is authentic, and authentic material is therefore frequently argued to be beneficial for second language acquisition. House (2008) states that authentic materials “link the formal, and to some extent artificial, environment of the classroom with the real world in which we hope our students will eventually be using the language they are learning” (pp. 56-7), whereas Schiffrin (1996, as cited in Gilmore, 2007, p. 103) argues that the material found in traditional textbooks often is a meagre version of the target language providing the learners with samples of language that fail to meet many of their communicative needs. Authentic material can provide the learners with samples of the target language in actual use, thus enabling learners to develop their communicative skills and their overall understanding of the target language in actual everyday use. Gilmore (2007, p. 103) argues that authentic material often offers much richer samples of the target language and can thus be used in different ways in order to enhance the communicative competence of the learners and their target language competence in general.

Some researchers, like Ellis (1999) and Day (as cited in Tomlinson, 2012, p. 161), however, argue that the positive effects of authentic input is overrated and is therefore not as facilitative and beneficial for second language acquisition as argued by, for instance, Gilmore (2007). Day argues that there is no empirical evidence supporting the claim of the facilitative effect of authentic material, and that evidence rather suggests that learners find authentic material more

difficult to understand and comprehend. Flowerdew and Peacock (2001, p. 182) also argue that authentic material often is linguistically too difficult, that the fact that some material is authentic does not mean that it is authentic for all, and that the fact that the material is authentic does not necessarily mean that it is relevant. However, they also find that non-authentic language do not represent real language use well enough, that simplified material tend to lose some of its meaning, and that non-authentic language does not prepare the learners for real world situations – all aspects supporting the claim about the facilitative effects of authentic materials.

2.5. Audiovisual material

Audiovisual material, such as films and computer games, can be a good source for authentic input, and Gilmore (2007, p. 103) even emphasises audiovisual material as a particularly good type of authentic material. Sherman (2003), regarding the possibility of using films to present the learners with authentic material, states the following:

...[t]he compelling power of video in the classroom, a power that is even enhanced by concentration on short sequences. The eye is caught, and this excites interest in the meaning of the words. Authenticity itself is an inducement – there is a special thrill in being able to understand and enjoy the real thing. In addition, video is today's medium. Print may still be powerful but many people spend more time with audio-visual media: video techniques, discourses and clichés are more familiar to them than the world of books and papers (p. 2).

Danan (2004, p. 68), quoting Baltova (1994, pp. 510-1), based on the rich context found in audiovisual material, remarks on the positive motivational effect this form of authentic input can have on the learners. Baltova (1999) also notes that exposing learners to authentic audiovisual material, particularly when subtitled in the target language, “seems a pedagogically healthier approach” (p. 42) than simplifying L2 input to suit the learners' level of proficiency. As such, any audiovisual material that is interesting, attractive to the eye, linguistically easy on the ear, and filled with things that native speakers say, do, or experience may therefore well be used in order to increase the learners' target language competence (Sherman, 2003, p. 5). Both computer games and films as audiovisual material that the learners find interesting can thus be good language learning tools.

Computer games provide the learners with authentic audiovisual input and can therefore be argued to facilitate language learning. In playing computer games, the learners encounter language in a virtual environment and can also often communicate with the game itself and/or

other players (Ang & Zaphiris, 2008). Juul (2003) gives the following definition of computer games:

A game is a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable (p. 5).

In this way, the players put in an effort to influence the outcome of the game and experience an emotional attachment to the outcome. With computer games allowing the learners to take part in a virtual environment in which the players take active part in interacting with the game, such games can contribute to language learning (Ang & Zaphiris, 2008). The language and dialogue supported by the visual animated material that the learners encounter in such player-game interaction is important to the understanding of the game and its progress. In playing computer games, the players are active agents in interacting with the game and potentially also with other players rather than passive 'readers' who make meaningful actions and observe the outcome of these actions (Murray, 1997, as cited in Ang & Zaphiris, 2008). Through partaking in such dialogues, the learners are exposed to input they take an interest in and that needs to be understood in order to understand the game. This input and language practice can in turn contribute to the players' language proficiency. Computer game types that allow for interaction with other players also facilitate collaborative learning more generally in encouraging social interaction related to the virtual environment (Ang & Zaphiris, 2008).

Films can also be viewed as highly appropriate sources for authentic input in the target language, presenting the learners with authentic input both in terms of the spoken language and the contextual clues that can be observed through the spoken language and the usually corresponding visual material. Sherman (2003, p. 2) also notes that learners can benefit from films in terms of comprehension of the target language as they are presented with all kinds of voices in all kinds of situations, with the visual dimension being a particular advantage for comprehension and in understanding the pragmatics of dialogues. The learners are presented with actual language use taking the focus away from the technicalities of language on to the content. The combination of the audio and the visual may also contribute to the interaction skills of the learners, and Schiffrin (1996) argues that learners "cannot discover the structure of interactions without repeatedly viewing and/or listening to what was said and done through those interactions" (p. 320). Sherman (2003, p. 14) also notes that such input in terms of exposure to natural speech and interaction may facilitate the learners' own production skills.

Audiovisual material can thus be viewed as a model of language with up-to-date vocabulary, grammar, discourse patterns, and accents as well as showing language use in appropriate contexts (Sherman, 2003).

Danan (2004), quoting Baltova (1994, p. 508), notes that the context and the visual clues present in audiovisual material “make it possible to “view” the message as much as listen to it” (p. 68). While emphasizing the positive effects of watching drama, Sherman (2003, pp. 15-6) does not, however, advise to use animated cartoons as a source of input arguing that cartoons lack many of the visual clues included in films with real people. She argues that animated cartoons lack the expressiveness of mouths, faces, and body language found in real people, something which might reduce the availability and thus the effect of the input as the film becomes more difficult to follow. This potential problem with animated cartoons can be well illustrated with the findings of Bianchi and Ciabottini (2008) who in a comprehensive study exposed their participants to clips from *Harry Potter* and the Disney animated cartoon *Fantasia*. Where in *Harry Potter* the visuals are crucial to understanding the meaning of the audio material, the visuals in *Fantasia*, though matching the content of the text, do not help the understanding of what is being said. Bianchi and Ciabattini (2008) found that great semantic match between audio-video-text input, like in *Harry Potter* and not in *Fantasia*, helped the participants achieve higher results at all levels of proficiency in short-term comprehension tasks and in both long-term and short-term vocabulary tasks.

Markham (1999) in his study, which was mostly concerned with the effect of target language subtitles, however, remarked that the effect of the subtitles remained consistent regardless of high or low correlation between the audio and the visual dimension. Sherman (2003) also remarks that, despite the issues previously mentioned, cartoons often involve more clearly enunciated speech, often in standard accents, that may facilitate target language comprehension. With the lack of expressiveness in, for instance, body language, the spoken language becomes more dominant allowing for a greater emphasis to be put on the target language itself. In this way, the language might be easier to understand in animated cartoons. Bahrani and Soltani (2011, p. 19) note the potential positive effects of animated cartoons, emphasising that the use of this kind of audiovisual material creates low affective filter learning atmosphere that increases the motivation of the learners. Sherman (2003) also recognizes that the bright colours, exaggerations in language, topics, and visuals characteristic of animated cartoons may increase the motivation of the learners.

2.6. Subtitles

In watching audiovisual material, there are often three channels of information available to the viewer all conveying the same content: the auditory channel (sound), the verbal visual channel (subtitles) and the nonverbal visual channel (visuals). Baltova (1999, p. 35) notes that these three channels combined might well create a better environment for learning than exposure to unsubtitled video or written text accompanied by visual information. Bianchi and Ciabattoni (2008, p. 86) argue that the semantic match between the verbal channels and the visual channel, the type of subtitles, and the proficiency level of the learners all play a role in determining the outcome of watching the material. Neuman and Koskinen (1992, p. 96) argue that the combination between the visuals and the audio material can help children establish relationships between words and meaning, with the contextual clues provided in the visual channel thus facilitating vocabulary acquisition. Sherman (2003, p. 16) argues that the eye is more powerful than the ear and therefore will dominate if the students are offered both reading in the form of subtitles and listening in form of the soundtrack. Based on this the learners will read rather than listen even if they have no real need for the subtitles. In terms of the type of subtitles, d'Ydewalle and Van de Poel (1999) argue that native language subtitles are particularly informative due to the fact that along with the visual and contextual clues and the audio material the viewers are presented with text translation of the audio. Vanderplank (1988, p. 275), however, found that learners benefit from target language subtitles in that the students learn to develop strategies such as switching back and forth between the audio material and the subtitles or by finding a strategy allowing them to process the audio, the visuals, and the text channel simultaneously.

Zarei and Rashvand (2011, p. 618), distinguishing between verbatim and non-verbatim subtitles as well as the between native and target language subtitles, found that native language subtitles, whether verbatim or non-verbatim, were of most use in terms of vocabulary production. They also found that non-verbatim subtitles were more facilitating in terms of vocabulary comprehension regardless of whether they were in the native or target language. Bianchi and Ciabattoni (2008, p. 87) in their study concluded that while beginners in general seemed to take more advantage of subtitles in their native language, more advanced learners benefitted more from target language subtitles – a view which corresponds to that presented by Danan (2004). Bianchi and Ciabattoni (2008) argue that the reason for this difference may be that native language subtitles are automatically processed, whereas target language subtitles require a more advanced knowledge of the language in order to be

processed without interfering with other involved cognitive processes such as listening and taking stock of the visual content. The automatic reading of subtitles has been proved in many eye movement experiments (Danan, 2004; d'Ydewalle & Van de Poel, 1999), and the automatic reading should thus be taking place independently of the learners' familiarity with the reading of subtitles, their target language proficiency, and the availability of the audio material (d'Ydewalle & Van de Poel, 1999, p. 228). In contrast to Bianchi and Ciabattoni's (2008) conclusion, however, d'Ydewalle and Gielen (1992) argue that this automatic reading of the subtitles does not prevent the audio material from being processed as well, and d'Ydewalle and Van de Poel (1999, p. 228) claim that the two are in fact processed almost in parallel. The learners' attention should thus be divided between the two channels of input in accordance with the needs of the learners, with the reading of subtitles most frequently occurring when the information to be processed is complex (d'Ydewalle & Gielen, 1992, p. 425).

Mitterer and McQueen (2009) showed that target language subtitles can also facilitate foreign language speech perception. They argue that the reason for the difficulties in understanding a foreign language is the unusual mappings between words and sounds in the foreign language (Mitterer & McQueen, 2009, p. 1). Based on the effects of lexically-guided retuning they argue that the use of subtitles in the target language can increase the learners' understanding of the spoken language. The use of target language subtitles helped the perception of the spoken language, something which is in line with the findings of Vanderplank (1988) who showed that target language subtitles made "fast, authentic speech and unfamiliar accents" (p. 275) much easier to understand. According to Mitterer and McQueen (2009), target language subtitles can facilitate speech perception by indicating to the learners through lexically-guided retuning what words and sounds are being uttered by complementing the uttered speech orthographically. Whereas target language subtitles provided lexical information supporting the target language speech perception, Mitterer and McQueen (2009) also found that native language subtitles appeared to create negative lexical inference as the experience of processing two languages simultaneously caused the participants to perform worse than the ones who were exposed to the audiovisual material with target language subtitles.

Danan (2004) argues that target language subtitles can also facilitate listening comprehension in the second language. Markham (1989, as cited in Danan, 2004, p. 69) found that university-level ESL (English as a second language) students performed significantly better on general

comprehension when exposed to audiovisual material with target language subtitles than the participants that were not exposed to target language subtitles. Markham (1999, pp. 324-5) found that the availability of target language subtitles improved university-level ESL learners' ability to recognize words that occurred in the audiovisual material. When the participants were presented with passages without subtitles, they recognized significantly fewer words. Neuman and Koskinen (1992) in their study on advanced bilingual 7th and 8th graders showed that target language subtitles can also help word recognition and vocabulary building. The students who watched audiovisual material with target language subtitles outperformed the other students in terms of word knowledge and information recall (Neuman & Koskinen, 1992, p. 94). Supporting Krashen's theory of comprehensible input they also found that "students' ability to acquire vocabulary through context is influenced by their level of linguistic competence" (Neuman & Koskinen, 1992, p. 104), with the more fluent L2 students learning more vocabulary than the less fluent ones. Neuman and Koskinen's (1992) results suggest that comprehensible input may play an important role in second language acquisition, and vocabulary acquisition in particular, something which is also pointed out by Danan (2004, p. 71). Thus, despite the positive effect of target language subtitles on second language acquisition, if the audiovisual material is too far beyond the level of the learner then it will not enhance the acquisition of the language.

3. Methods

The aim of this study was to shed more light on the potential facilitative effects of subtitles, and the potential varying effects of the language of the subtitles, on second language acquisition. Forty-nine Norwegian 17-year-olds watched an episode of the American animated cartoon series *Family Guy*, where one group watched the episode with Norwegian subtitles, one group watched the episode with English subtitles, and one group watched the episode with no subtitles. Immediately after having watched the audiovisual material the participants completed a comprehension questionnaire. Four weeks later they responded to a word definition task and a lexical decision task. The approach of the study was quantitative and experimental and the inferential analysis was conducted in R.

3.1. Quantitative and experimental

In order to study the potential effect of subtitles, and the potentially varying effects of native language subtitles, target language subtitles, and no subtitles on the acquisition of English as a second language in Norwegian high school students, a deductive quantitative research approach appeared to be the most suitable. Quantitative studies allow for a large number of participants whose results can be compared to each other related to a number of variables. The main variables in this experiment were different types of subtitles in watching audiovisual material: native language subtitles, target language subtitles, and no subtitles. The performances of the participants were measured with the variables, and the resulting numerical data was statistically analysed in R. The research design of this study might well be argued to be experimental, and Rasinger (2010) describes experimental research design in the following way:

In experimental designs, we as researchers explicitly manipulate the variables in order to prove/disprove our hypothesis. In addition, experiments usually comprise two groups of participants: the *experimental group* (EG), that is, the group that is undergoing the “treatment” or stimulus, and the *control group* (CG), which is unaffected by the stimulus” (p. 59).

The approach of this study is deductive and involves the manipulation of variables (type of subtitles). The research included two experimental groups and one baseline control group with each of the three groups being exposed to different types of stimuli in the form of subtitles or no subtitles. With the Norwegian group experiencing subtitles in their native language and the English group experiencing target language subtitles, this difference in stimuli allowed for a

comparison of the results in the two groups. The control group was not exposed to subtitles allowing for a comparison of the results from this group with the two experimental groups.

The experiment was divided into two parts. Part 1 included the collection of background information about the participants, exposure to the *Family Guy* episode with or without subtitles, and an immediately following comprehension questionnaire, whereas part 2 included a word definition task and a lexical decision task. The purpose of separating the study into two parts was the opportunity to look for potential differences in terms of short term and long term effects of the stimuli. By immediately conducting one of the tasks, the comprehension questionnaire, and the word definition task and the lexical decision task four weeks later, both potential short term and long term effects of the subtitles could be investigated.

3.2. Participants

Forty-nine 17-year-old native Norwegian speakers participated in the study: 25 females and 24 males. The participants were divided into three groups identical to their original school classes. The use of intact classes caused the groups to vary both in size, the distribution of males and females, and the time of day when the research was carried out based on the school's time schedule. The participants were Vg2 students in a Norwegian high school who all had English as one of their chosen subjects. Given that they all had chosen English, as it in Vg2 is not a compulsory subject, it was assumed that the students would all have a fairly high competence in English as their second language. All the students in these three classes, 55 in all, were encouraged to participate in the study. After finishing the research and going through the results, some of the participants were excluded due to them not being native speakers of Norwegian. This made the final number of participants 49, and they all reported to have normal hearing and normal or normal-to-corrected vision. Of the 49 participants, 3 were bilinguals. The bilinguals were not excluded because they were relatively few and because excluding them would lead to fewer participants. As there were few bilinguals it was believed that their participation would not affect the groups' results. The participants, being under 18, submitted a form of consent signed by their parents allowing them to participate in the study (Appendix 1). The school and relevant teachers also agreed to the experiment being carried out on the students, and the study has been reported to and accepted by NSD. So that there would be no way of identifying the individual participants in the study, the participants were each given a participant number by their teachers. The lists that linked the participants with

their respective participant numbers were only available to the teachers and not to me. Thus, in the analysis of the results, the results were only linked to the individual numbers and not the participants' names.

Experimental group 1- Norwegian subtitles

This group consisted of 14 participants and was the smallest in size of all the three groups. Of these 14 participants, 8 were female and 6 were male. During the testing there were 17 participants in this group; however, 3 participants were excluded afterwards due to them not being native speakers of Norwegian. This group watched the *Family Guy* episode with Norwegian subtitles.

Experimental group 2 – English subtitles

This group consisted of 16 participants: 11 females and 5 males. Out of the original 17 participants in this group, 1 was excluded due not being a native speaker of Norwegian. Out of the 16 remaining participants, 2 reported to be bilingual. This group watched the *Family Guy* episode with English subtitles.

Control group – No subtitles

The control group turned out to be the largest one with 19 participants where 6 were female and 13 were male. All the original participants reported to be native speakers of Norwegian, and thus there was no need to exclude any. One participant was bilingual. This group watched the *Family Guy* episode with no subtitles.

3.4. Materials and procedure

The experiment was divided into two parts in order to make room for both a pre-test and short-term effect part and a long-term effect part four weeks later. Neither the participants nor the teachers or the parents were at any stage informed about the particular aim of the research. They were only told that the study was about second language acquisition, and there was made no mention about the subtitles. The participants were not permitted to communicate with each other during the testing and were not given a time limit when completing the tasks.

Part I

Instructions about the procedure for this part were both written on the whiteboard in the classrooms and explained orally. The participants were presented with a background questionnaire in paper format containing both closed and open-ended questions where the aim

was to get an overview of the participants' linguistic background and other factors believed to be potentially relevant in terms of second language acquisition, like, for instance, the amount of time spent playing English computer games, time spent reading English, the participants' self-estimated proficiency in English, and diagnostic aspects (Appendix 2). Some of the questions in the questionnaire required the participants to choose either 'yes' or 'no' as their response and some of these asked the participants to provide an additional answer in their own words if the initial reply was 'yes'. Other questions were formed as to have the participants choose their answer from 5 alternatives ranging, for instance, from 'never' to 'every day'. The responses were later entered in the analysis as numbers ranging from 1 to 5 with 5 corresponding to 'every day' and 1 to 'never'. In estimating their level of proficiency in English the participants marked one of four alternatives ranging from 'basic' to 'fluent'. These responses were entered in the analysis as numbers from 1 to 4 with 4 being equivalent to 'fluent'. A question about the participants' personal choice of subtitles was also included where the participants could choose between 'Norwegian subtitles (native language)', 'English subtitles', and 'no subtitles'. The participants also provided information regarding factors in language acquisition such as aural or visual problems and whether they had any diagnoses known to have an effect on language acquisition and competence.

In relation to the background questionnaire the participants were also asked to complete a vocabulary test and a grammar test on the internet. The participants used their personal computers. The vocabulary test (<http://dynamo.dictionary.com/placement/level>) consisted of 10 tasks in multiple choice formats where the participants were asked to select the correct definition of a word from 4 alternative answers. At the end of the test the results were displayed as the estimated amount of words the participant knew in English. In order to get a better overview of the participants' English competence, the vocabulary test was conducted twice with the average result for each student from the two rounds being calculated afterwards. The vocabulary test was originally intended for native speakers of English, and therefore the 'middle school' level of the test was chosen rather than the 'high school' level. The choice of level was based on the assumption that the 'high school' level would be too difficult for high school students with English as their L2 and not their L1. The grammar test used was Cambridge Essential Grammar Test (http://www.cambridge.org/other_files/Flash_apps/inuse/EssGramTest/EssGramIndex.htm). The level of this test was chosen for the same reason as the level of the vocabulary test. The grammar test consisted of 50 sentences where the students were asked to fill in the correct grammatical expressions in given

sentences from a choice of 2, 3, or 4 options. The results were given as the number of correct answers, for instance, 46/50. The results from the vocabulary and grammar test were controlled and written down by me or the teacher in order to avoid participants reporting false results.

After completing the background questionnaire and the vocabulary and grammar tests, the participants were told to watch a film clip. The film clip was an episode from the American animated cartoon *Family Guy*. The decision to use a cartoon film clip was based on the assumption of it being attractive to the participants, thus motivating them to pay attention, and its comprehensible language. The particular episode was chosen based on its use of standard American and British accents with which the participants were likely to be familiar and the episode's easy-to-follow plot and lack of inappropriate language and events. The Norwegian subtitles were what Zarei and Rashvand (2011, p. 618) describe as non-verbatim as they were summarised so as to only convey the information necessary to understand what was going on in the episode. The English subtitles on the other hand were intended for the hearing impaired and were thus what Zarei and Rashvand (2011, p. 618) describe as verbatim as they included nearly everything uttered in the episode including pause fillers and hesitations. The episode was showed using a projector and speakers available in the classrooms. The episode lasted for 20 minutes and was only watched once.

Immediately after watching the episode, so as not to give them time to discuss the episode with each other, the participants were given a comprehension questionnaire in paper format based on the contents of the episode (Appendix 3). The aim of this task was to measure the extent to which the participants had understood the content of the episode, and the task did not focus on language as such. The instructions were written on top of the questionnaire and were also given orally. The comprehension questionnaire was designed in a multiple choice format with 18 questions that each had 4 alternative answers. One of the alternatives was the correct one, two were likely correct answers but not exactly correct, and the last alternative was intended to be obviously incorrect. When the participants had completed and handed in the comprehension questionnaire, they were orally informed that there would be more testing four weeks later. They were not informed about what the next part of the testing would be about.

Part II

Four weeks after the first testing and the exposure to the stimuli, the participants were presented with a word definition task and a lexical decision task related to the episode they had watched. For both tasks, instructions were written on top of the paper containing the tasks and were also given orally. The episode was not showed again as this part of the study was intended to measure potential long-term effects of the subtitles.

The word definition task was in paper form and consisted of 30 English words and idiomatic expressions that all occurred in the *Family Guy* episode (Appendix 4). The task was in multiple choice format, and for each word or expression there were 4 alternative definitions from which the participants could select the definition they believed to be correct. One of the alternatives was correct, two were likely correct answers but not exactly correct, and the last was intended to be obviously wrong. The participants were only asked to define content words, and not function words, as these were considered to be more salient parts of the input and also easier to define than function words. Some of the words were supposed to be familiar to the participants whereas others were intended to be more challenging words they had perhaps not encountered before watching the episode. The frequency of the words was checked in the Corpus of Contemporary American English (COCA) and used for further analysis in *R*. The noun ‘the gist’ is an example of a word with fairly low frequency which was included in the word definition task, whereas the included adjective ‘committed’ is more frequent. Some words were potentially challenging despite their fairly high frequency, such as, for instance, the noun ‘a novel’ which is very similar to the Norwegian word ‘novelle’ but with a slightly different meaning. Eight of the thirty trials were idiomatic expressions that also occurred in the *Family Guy* episode, such as, for instance, ‘a pain in the ass’.

When they had completed the word definition task, the participants responded to a lexical decision task in paper format consisting of 53 English words (Appendix 5). Of the 53 words, 22 occurred in the episode, and 31 did not occur in the episode. Of the 31 not occurring words, 10 were primed words and 4 were visually primed words. The primed words were words that were not uttered in the episode but back-translations of the words occurring in the Norwegian subtitles. The back-translated prime word was in this way semantically related to both the uttered word and the Norwegian word that occurred in the subtitles. For instance the word ‘start’ was uttered in the episode, translated in the Norwegian subtitles as ‘begynne’, and entered in the lexical decision task as ‘begin’. The prime words were included in order to

measure the potential influence of the Norwegian subtitles on the performance of the Norwegian group as the exposure to the Norwegian word might activate the English word present in the lexical decision task. The idea was that words occurring in the Norwegian subtitles ('begynne') would prime the participants in the Norwegian group in leading them to mark the target words ('begin') as occurring in the episode. Such a priming effect, if found, might have been argued to serve as an example of the Norwegian subtitles interfering with the processing of the English auditory material. The visually primed words were words that were not encountered in the episode but that described objects that were seen in the episode, measuring whether the participants were 'primed by the picture'; for instance, the noun 'pirate', which was not uttered but seen. These words were included to see if the participants' implicit naming of the pirate in their minds upon seeing a pirate in the episode would cause them to mark the word 'pirate' as an occurring word in the episode in the lexical decision task. If the verbal and/or the visually primed words would influence the results in this task, it would indicate an interference effect of the Norwegian subtitles and the visual dimension in leading the participants to mark words that did not occur in the episode as occurring.

The remaining 17 of the not occurring words were selected based on their frequency in COCA. Some of the selected words were high frequency words, and some were low frequency words. The frequency of the occurring words was also checked in COCA, and their frequency in the episode was also taken into consideration. As in the word definition task only content words were included in the lexical decision task due to them being considered to be the most salient parts of the input. The participants were not given any information regarding how many of the words in the lexical decision task occurred in the episode and were only encouraged to mark the words which they believed had occurred.

3.5. Analysis

Quantitative data needs statistical treatment and analysis. All the collected data was therefore coded and entered into an Excel worksheet that provided the basis for descriptive statistics allowing for calculation of the potential patterns in the data set. In order to investigate further whether the potential patterns found in the descriptive analysis in fact were statistically significant and not just a coincident, inferential statistics was carried out in *R* to check for dependencies between the results and the type of stimulus and information from the background testing. In this way the patterns found in the descriptive statistics would be

checked to see if the patterns “truly exist in some kind of meaningful way” (Levon, 2010, p. 70).

4. Results

The data was inspected in *R* using *languageR* and the *lme4* package. The data was fitted in a generalised linear mixed model fit by the Laplace approximation with the *lmer* function and by using binomial family and REML = F. The dependent variable was the accuracy of the responses to the questions in each task. Data from the background questionnaire, the grammar test, and the vocabulary test was entered as independent fixed effect predictors. The scores in the grammar test and the vocabulary test were entered as $\log(\text{Grammar})$ and $\log(\text{Voc})$, as was the per million word frequency of the words in the word definition task ($\log(\text{FreqWD})$), with *log* turning the numbers into scores that are normally distributed. The questions and words the participants responded to in the different tasks were entered as a random effect ITEM and the participants were entered as a random effect SUBJECT in order to allow for by-item and by-subject variation in the model. Models were compared using likelihood ratio tests (Anova). In addition to the inferential analysis, descriptive statistics will also be presented in the following.

4.1. Vocabulary and grammar tests

The average results on the background vocabulary and grammar tests for the three participant groups are presented in Table 1.

Table 1 | Average score on background grammar and vocabulary tests

	Vocabulary	Grammar
EG1	14 747,79	45,50
EG2	15 499,31	46,13
CG	16 917,53	45,21

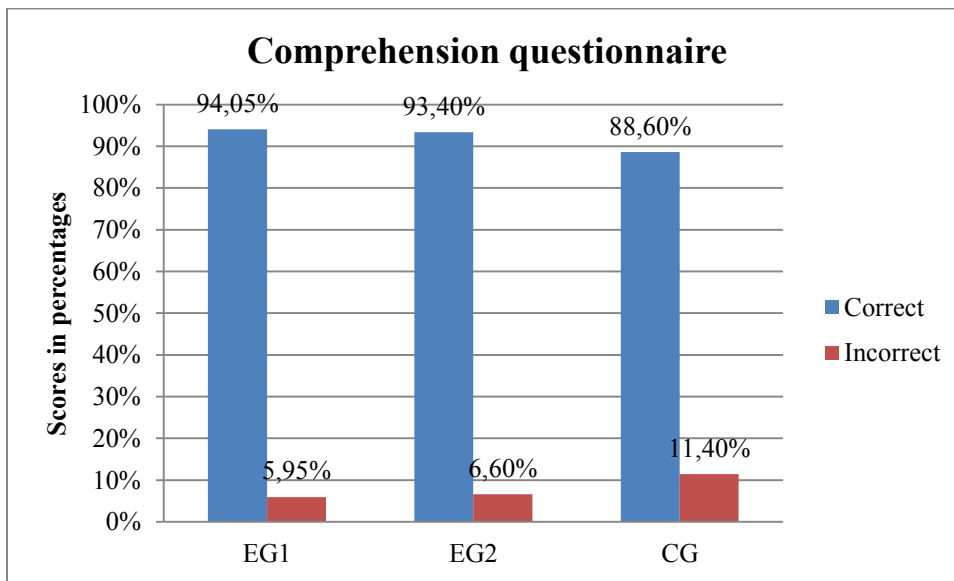
Note: EG1= Norwegian subtitles group, EG2 = English subtitles group, CG = control group – no subtitles. Vocabulary = estimated amount of words known to the participant, Grammar = number of correct responses (max. 50).

As illustrated in Table 1, the English subtitles group achieved the highest score on the grammar test, while the baseline control group performed best in the vocabulary test.

4.2. The comprehension questionnaire

Figure 1 shows the average scores of the Norwegian subtitles group, the English subtitles group, and the control group in the comprehension questionnaire in percentages.

Figure 1 | Distribution of correct and incorrect responses in the comprehension questionnaire



Note: The comprehension questionnaire consisted of 18 questions with 4 possible responses of which 1 was correct. EG1 = Norwegian subtitles group, EG2 = English subtitles group, CG = control group – no subtitles. Correct = correct responses, Incorrect = incorrect responses.

The performances of the Norwegian subtitles group and the English subtitles group in the comprehension questionnaire were very similar, with the average score of the Norwegian group being 94,05% correct responses and the score of the English group being 93,40% correct responses. Of the 14 participants in the Norwegian group, 6 achieved a 100% score whereas in the English group 7 of the 16 participants scored 100%. The results for the Norwegian group ranged from 14 correct responses to 18 responses, and from 13 correct responses to 18 correct responses for the English group. The average score of the control group turned out to be lower than the two other groups, with the average score for the control group being 88,60%. Only 5 out of 19 participants in this group scored 100%, and the results varied from 9 correct responses to 18 correct responses.

The inferential analysis of the results of the best model for the comprehension questionnaire is presented in Table 2.

Table 2 | Results of the inferential analysis of the comprehension questionnaire

	Estimate	SE	z value	Pr(> z)
(Intercept)	-35.6168	13.9389	-2.555	0.01061 *
GroupEng	1.5088	0.4979	3.030	0.00244 **
GroupNor	1.5172	0.5004	3.032	0.00243 **
EngGame	2.3338	0.5305	4.399	1.09e-05 ***
log(Grammar)	9.3537	3.6623	2.554	0.01065 *
FGyes	0.6939	0.4045	1.716	0.08623 (*)

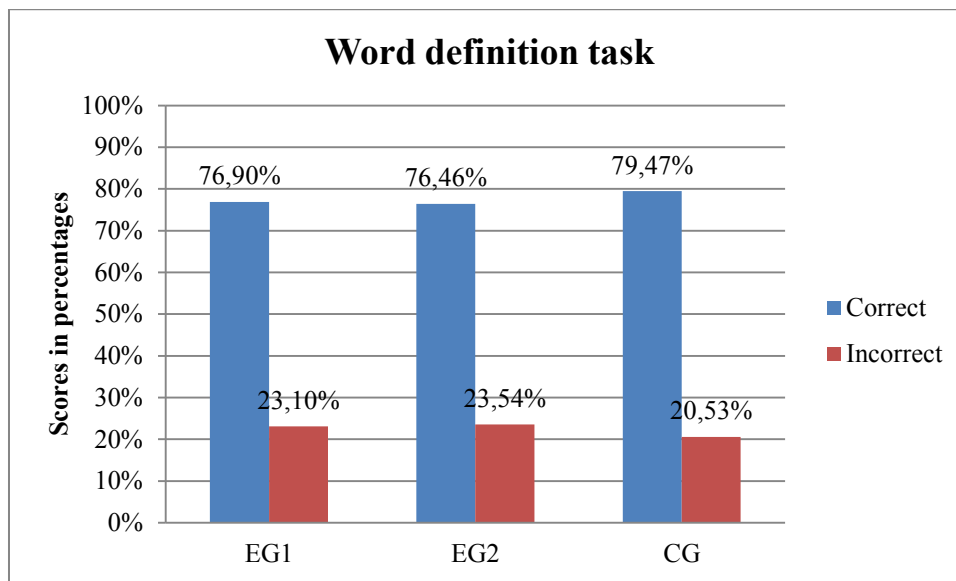
Note: GroupEng = English subtitles group, GroupNor = Norwegian subtitles group, EngGame = composite factor created by the ratio of the amount of time spent playing English computer games compared to self-estimated English writing skills, log(Grammar) = grammar test results (log), FGyes = have watched Family Guy before. Signif. codes: ‘ ’ $p > 1$. ‘(*)’ $p < .1$. ‘*’ $p < .05$. ‘**’ $p < .01$. ‘***’ $p < .001$.

The composite factor EngGame was created by the ratio of the time the participants had spent playing English computer games and their self-estimated English writing skills due to negative correlation between the two original factors (-0.367). The fact that EngGame is the most significant factor in this model ($p < .001$) indicates that the more often you play English computer games, compared to how proficient you estimate yourself to be at writing English, is very significant in terms of predicting a better score in the comprehension questionnaire. The results from the grammar test were also significant in predicting the score on the comprehension questionnaire ($p < .05$). Also, the analysis marginally predicted better results in the comprehension questionnaire for the participants who had watched *Family Guy* before ($p < .1$). The results also show that the different stimuli in terms of target or native language subtitles or no subtitles were predictive of the results in the comprehension questionnaire. With a significance of $p < .01$, the results indicate the watching the *Family Guy* episode with either Norwegian or English subtitles significantly predicted better results in the comprehension questionnaire. It should be noted that the p -values for the Norwegian and English groups are almost identical.

4.3. The word definition task

Figure 2 shows the average scores on the word definition task for the three participant groups in percentages.

Figure 2 | Distribution of correct and incorrect responses in the word definition task



Note: The word definition task consisted of 30 words and idiomatic expressions with 4 possible responses for each trial of which 1 response was correct. EG1 = Norwegian subtitles group, EG2 = English subtitles group, CG = control group – no subtitles. Correct = correct responses, Incorrect = incorrect responses.

As illustrated in Figure 2, the control group achieved the highest score with 79,47% correct responses. Like in the comprehension questionnaire, the results of the Norwegian subtitles group and the English subtitles group were very similar, with the Norwegian group achieving 76,90% correct responses and the English group 76,46% correct responses.

Even though the results as presented in Figure 2 indicate that the two experimental groups performed worse than the baseline control group, the inferential analysis of the word definition task in *R* revealed no significant effect of the subtitles on the accuracy of the groups in this task. A likelihood ratio test (Anova) comparing the model including the groups as a fixed effect to the null model only including the random effects showed $chisq = .9087$ and $p = .6349$. Further analysis, however, showed that other fixed effects were predictive of the accuracy of the participants, and the results are presented in Table 3.

Table 3 | Results of the inferential analysis of the word definition task

	Estimate	SE	z value	Pr(> z)
(Intercept)	-17.16533	7.04609	-2.436	0.01484 *
log(Grammar)	5.02720	1.82148	2.760	0.00578 **
log(FreqWD)	-0.57120	0.30673	-1.862	0.06257 (*)
Listen	0.44393	0.26054	1.704	0.08840 (*)
Eng_game	0.26633	0.06215	4.285	1.83e-05 ***

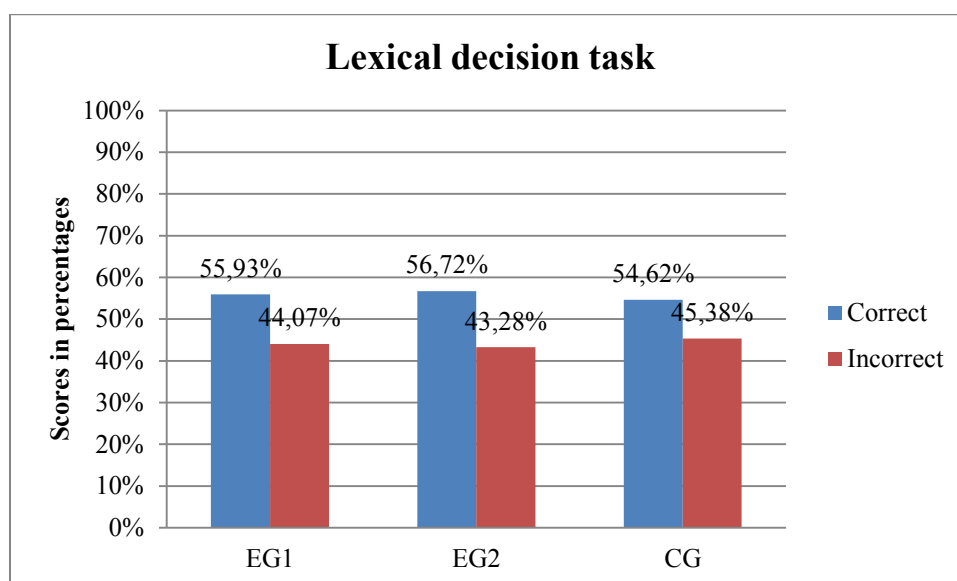
Note: log(grammar) = grammar test results (log), log(FreqWD) = frequency of the words (log), Listen = composite factor created by the ratio of self-estimated English listening skills compared to self-estimated English speaking skills, Eng_game = amount of time spent playing English computer games. Signif. codes: ‘ ’ $p > 1$. ‘(*)’ $p < .1$. ‘*’ $p < .05$. ‘**’ $p < .01$. ‘***’ $p < .001$.

The composite factor Listen was created by the ratio of the participants self-estimated English listening and speaking skills due to negative correlation between the two original factors (-0.272). The composite factor proved to be marginally predictive of the results in the word definition task ($p < .1$), indicating that the more proficient at listening compared to speaking proficiency, the better the results in the word definition task. The frequency of the target words was also marginally predictive ($p < .1$). Due to the estimate and the z value being negative, more frequent words marginally predicted more incorrect responses. The most significant factors in the word definition task were the results from the grammar test ($p < .01$), indicating that better scores in the grammar test predicted better scores in the word definition task, and the amount of time spent playing English computer games ($p < .001$), indicating that the more time spent playing English computer games predicted better scores in the word definition task.

4.4. The lexical decision task

The average results for the three participant groups in terms of correct and incorrect responses in the lexical decision task are presented in percentages in Figure 3.

Figure 3 | Distribution of correct and incorrect responses in the lexical decision task



Note: The lexical decision task consisted of 53 words of which 22 occurred in the Family Guy episode and 31 did not occur. EG1 = Norwegian subtitles group, EG2 = English subtitles group, CG = control group – no subtitles. Correct = marked occurring words and not marked not occurring words. Incorrect = not marked occurring words and marked not occurring words.

Figure 3 shows that the distribution of correct and incorrect responses in the lexical decision task is very similar across the participant groups, with the English subtitles group having the highest score with 56,72% correct responses and the control group the lowest score with 54,62% correct responses. A more detailed overview of the responses in the lexical decision task is given in Table 4.

Table 4 | Distribution of the words marked by the participants in the lexical decision task

	Occurring	Not occ.	Prime	Visual prime	Total
EG1	(128) 47%	(61) 22%	(52) 19%	(34) 12%	(275) 100%
EG2	(138) 48%	(75) 26%	(37) 13%	(37) 13%	(287) 100%
CG	(166) 45%	(101) 27%	(50) 13%	(54) 15%	(371) 100%

Note: 22 occurring words, 17 not occurring words, 10 primed words and 4 visually primed words. The distribution of not marked words is not showed in this table. EG1 = Norwegian subtitles group, EG2 = English subtitles group, CG = control group – no subtitles.

The most significant difference between the groups, as illustrated in Table 4, is the tendency for the Norwegian subtitles group to select more primed words than the two other groups. Also, the control group had a slight tendency to select more visually primed words and not occurring words, resulting in them marking slightly fewer occurring words. In order to investigate whether the Norwegian subtitles group had in fact been primed by the subtitles – that the presence of prime words in the lexical decision task could predict the result of this participant group – a model was created in *R* using *languageR* and *lme4* based only on the dataset for the Norwegian group. The results are presented in Table 5.

Table 5 | Priming effect in the Norwegian subtitles group

	Estimate	SE	z value	Pr(> z)
(Intercept)	0.4023	0.2999	1.342	0.180
PrimeLDp	0.2968	0.6358	0.467	0.641
PrimeLDvp	-0.9046	0.9355	-0.967	0.334

Note: PrimeLDp = primed words, PrimeLDvp = visually primed words. Signif. codes: ‘ ’ $p > 1$. ‘(*)’ $p < .1$. ‘*’ $p < .05$. ‘**’ $p < .01$. ‘***’ $p < .001$.

Table 5 shows that the presence of the prime words in the lexical decision task was not statistically significant in predicting the results of the Norwegian subtitles group, despite the tendency for this group to mark the primed words. A likelihood ratio test (Anova) for model comparison showed $chisq = 1.275$ and $p = .5386$ when comparing this model with PrimeLD as a fixed effect to the null model only including the random effects.

The inferential analysis in *R*, based on a dataset including all three groups, revealed no effect of the subtitles on the accuracy in the lexical decision task. A likelihood ratio test for model comparison (Anova) showed $chisq = .8773$ and $p = .6449$ when comparing the model including the groups as a fixed effect to the null model only including the random effects. Other factors did, however, turn out to be predictive of the accuracy in the lexical decision task, and the results from the best fitting model are presented in Table 6.

Table 6 | Results of the statistical analysis of the lexical decision task

	Estimate	SE	z value	Pr(> z)
(Intercept)	-9.3204	4.3318	-2.152	0.0314 *
log(Grammar)	2.4470	1.1255	2.174	0.0297 *
EngRead	0.2200	0.1183	1.860	0.0629 (*)

Note: log(Grammar) = grammar test results (log), EngRead = composite factor created by the ratio of time spent reading English compared to time spent writing English. Signif. codes: ‘ ’ $p > 1$. ‘(*)’ $p < .1$. ‘*’ $p < .05$. ‘**’ $p < .01$. ‘***’ $p < .001$.

The results from the statistical analysis of the lexical decision task show that the grammar test results predicted the lexical decision task results ($p < .05$). Thus, better results in the grammar test predicted better results in the lexical decision task. The composite factor EngRead was created by the ratio of the time the participants reported to have spent reading and writing English due to negative correlation (-0.525) between the two original factors. EngRead was marginally predictive of the results in the lexical decision task ($p < .1$), indicating that the more time spent reading English, compared to the time spent writing English, predicted more correct responses in the lexical decision task.

5. Discussion

5.1. The comprehension questionnaire

The results show that the subtitled information the participants in the Norwegian group and the English group were exposed to were predictive of the results in the comprehension questionnaire ($ps < .01$). Descriptive statistics also showed that the average scores of these two experimental groups were very similar, with the Norwegian subtitles group achieving 94,05% correct responses and the English subtitles group 93,40%. In contrast, the control group only had 88,60% correct responses, significantly lower than the two experimental groups. These results indicate that the presence of subtitles predicts a better performance when comprehension is tested immediately after exposure to the stimuli, and in this way the results indicate clear short term effects of the subtitles. The facilitative effect of the subtitles is in line with the argument made by Baltova (1999, p. 35) that the combination of auditory, verbal visual, and nonverbal visual information creates a better language learning environment. In this sense, the presence of subtitles together with sound and video can be argued to contribute to the comprehension of the content of the audiovisual material the participants were exposed to. The control group lacked one input channel, the verbal visual one, and did not perform at the same level as the two other groups, something which might indeed have been due to them not being assisted by subtitles in comprehending the material.

The results from the comprehension questionnaire indicate that there was not a difference between the effects of the Norwegian non-verbatim and the English verbatim subtitles in predicting the performance in the comprehension questionnaire. Whereas Mitterer and McQueen (2009), Vanderplank (1988), and Markham (1999) all found that target language subtitles are more beneficial and d'Ydewalle and Van de Poel (1999) found that native language subtitles are more beneficial, the results from the comprehension questionnaire indicate no such difference between the two types of subtitles. Despite the lack of difference between the different types of subtitles, the results from this experiment still indicate that being exposed to subtitles in addition to the auditory and nonverbal visual information is facilitative in terms of comprehending the content of the audiovisual material in the target language. This might also suggest that subtitles and audio material, as argued by d'Ydewalle and Gielen (1992), are processed almost in parallel and that the subtitles are not hindering the processing of the auditory input but rather contributing to the comprehension of the content.

The presence of subtitles in either language can thus be argued to have a positive effect enhancing comprehension.

The most significant factor in predicting the outcome of this task was, however, the amount of time spent by the participants playing English computer games ($p < .001$), indicating that the more time spent playing English computer games, compared to the participants' self-estimated English writing skills, predicted better performance in comprehension. In playing computer games the players are exposed to authentic input in a sensory audiovisual environment that the player arguably takes an interest in comprehending. In this sense one may argue that the players are used to comprehending audiovisual material, something which might be of use when encountering different types of audiovisual material such as the *Family Guy* episode in this study. The fact that the nonverbal visual dimension in computer games is animated might also facilitate the comprehension of animated cartoons. As the players are accustomed to interpreting and understanding the language of such audiovisual input, the shortcomings of animated material in terms of a lower match between audio and nonverbal visuals, as noted by Sherman (2003) and Bianchi and Ciabattini (2008), might not reduce the availability of the input. In this sense it is possible to argue that the practice of comprehending animated audiovisual material the players had from playing English computer games contributed to their comprehension of the *Family Guy* episode.

The great significance of English computer games in enhancing comprehension might also be explained in terms of motivation, based on the effort put into the playing and the emotional attachment to the outcome noted by Juul (2003). The participants who reported to be spending a large amount of time playing English computer games were presumably doing this for enjoyment, and it would thus not be unreasonable to assume that this enjoyment creates a lower affective filter learning atmosphere, as noted by Bahrani and Soltani (2011) with regards to animated cartoons. Thus, the motivation for learning to understand the target language used in the computer games in order to influence the outcome of the game might in turn increase the overall target language competence in the players, something which might have lead the more frequent players to perform better in the comprehension questionnaire. The audiovisual animated input, the motivational factor, and the interaction with the game and other players may thus contribute to the overall target language competence of the players. Interestingly though, the amount of time spent watching films and cartoons, other sources for audiovisual input, did not predict the comprehension results. The fact that computer games

did, might be argued to be due to the players participating actively in interaction in the target language when playing English computer games, and in that way actively improving their target language competence.

In relation to the great significance of computer games in predicting the results in the comprehension questionnaire, it should also be noted that having watched *Family Guy* before marginally predicted the performance in this task ($p < .1$). This is hardly surprising as being familiar with the show would lead to the participants already being familiar with the characters and the language used in the show, something which in turn would lead to a better understanding of the contents of the episode watched in this experiment. The time spent playing computer games was, however, much more predictive than having watched *Family Guy* before, perhaps indicating that the more general facilitative effect of computer games on language learning was more important in this task than simply being familiar with the show. Language competence in general can thus be argued to be significant in this task, a claim which can also be supported by the fact that the participants' grammar skills also enhanced the comprehension of the episode.

The results on the background grammar test turned out to be significant ($p < .05$) in the comprehension questionnaire. One would perhaps assume that the results on the background vocabulary test would also be predictive in the comprehension questionnaire as the amount of words familiar to the participant, as estimated in the vocabulary test, would perhaps enhance comprehension; however, the vocabulary test results did not predict the results. That the analysis rather indicated that the better the participants scored in the grammar test predicted better comprehension results might, however, indicate that the underlying knowledge of language enhanced comprehension in this case, rather than their specific knowledge of English grammar rules. The underlying grammar competence, including perhaps a better understanding of how utterances are structured and the ability to detect the meaning of the words based on context, might thus have been beneficial in the comprehension questionnaire. Kac (1992) notes that the learners' ability to understand words and sentences in the target language depends on their underlying linguistic competence, and Anderson (2005) states that the linguistic competence is used to comprehend spoken and written language. In this sense it is not surprising that the higher the linguistic competence of the participants the better they performed on the comprehension questionnaire. The significance of grammar competence can also be related to the fact that the amount of time spent on English computer games was so

significant as such games are an important source of input in the target language. In being exposed to this input the overall linguistic competence, and target language competence in particular, is likely to have been influenced and improved, leading to better comprehension skills when presented with authentic target language material. The fact that input and underlying linguistic competence are predictive in this task is therefore hardly surprising.

5.2. The word definition task

Unlike in the comprehension questionnaire, the presence of subtitles did not predict the participants' performance in the word definition task; $\chi^2 = .9087$ and $p = .6349$. The fact that the subtitles were not significant in the word definition task indicates that there were no long term effects of the different subtitles. At least, the effects of the subtitles observed in the comprehension questionnaire did not last four weeks. However, if the word definition task had been conducted immediately after the stimuli as well there might well have been some effects of the subtitles. Also, if the methodology had been different, for instance in regularly exposing the participants to subtitled audiovisual material for a period of time and then test them, subtitles might have had a long term effect on the performance.

As in the comprehension questionnaire, the most significant predictive factor in the word definition task was the amount of time spent playing English computer games ($p < .001$). The more time the participant had spent playing English computer games, the better the results were in the word definition task. The authentic input in the target language provided in computer games might very well contribute to an increased ability to select the most appropriate definitions for familiar and unfamiliar words. The language of English computer games is also authentic, intended for communicating with native speakers, thus providing the players with samples of actual language use. As argued by Gilmore (2007), authentic material offers rich samples of the target language, enhancing the target language competence of the players. In line with Krashen's (1982) Input hypothesis, Vygotsky's (1978) ZDP, and scaffolding theory, the players are able to come to an understanding of the meaning of unfamiliar language when encountering language that is within their reach. The interaction with the game and other players and the motivational aspects of playing computer games for pleasure might contribute to the players' target language competence, and the input the players receive might thus be argued to lead to better performances in word definition tasks. One might assume that when playing English computer games in a foreign language the player will encounter unfamiliar words and phrases that the player needs to detect the

meaning of in order to understand and proceed with the game. This problem-solving practice contributes to the development of the players' heuristic skills, something which can be argued to facilitate the players' ability to detect correct word definitions. Also, the newly encountered and understood words are stored in the players' lexical memory, increasing the vocabulary size of the players. It is indeed possible to argue that the larger amount of words the players know might also have influenced their performance on the word definition task.

The results in the word definition task also indicate that the more proficient the participants were at listening in the target language compared to their speaking proficiency was marginally predictive ($p < .1$). This suggests that the auditory receptive skills of the participants were more important than productive skills in this task. The ability to comprehend auditory input thus was more significant than the ability to produce output, indicating once again the importance of being exposed to target language input. Vandergrift and Tafaghodtari (2010) argue that the listening skills of the learners influence their ability to comprehend authentic oral target language input, and Webb (2005) notes that vocabulary is indeed learned through the receptive language skills of reading and listening. Based on this it is possible to argue that the participants with better listening competence would be familiar with more vocabulary, something they might have benefitted from in the word definition task. This indicates, as does the significance of computer games, that the more used to and skilled at processing and comprehending input the participants are, resulting in increased vocabulary size, the better they will be at detecting meanings and definitions of familiar and unfamiliar words and phrases.

The results from the background grammar test were also predictive of the results in the word definition task ($p < .01$). As noted by Cook (2008) and Savielle-Troike (2006), this underlying linguistic competence influences for instance vocabulary comprehension, and Kac (1992) also argues that the ability to recognize items in language constitutes part of this grammatical competence. The reason for the significance of the grammar test might be that the grammar test results reflect the more general underlying linguistic competence of the participants. The ability to work out the correct definition of a word, a skill potentially strengthened in frequent encounters with computer games and other sources of target language input, can be argued to require such underlying linguistic competence. Vocabulary acquisition is, according to Neuman and Koskinen (1992), influenced by the learners' linguistic competence, and the vocabulary competence the learners have would presumably influence their performance on

the word definition task. The specific knowledge of grammar rules might therefore not be what is influencing the performance in word definition but rather the competence that the grammar test results reflect.

In relation to linguistic competence it was not unreasonable to expect a potential effect of the frequency of the words in the word definition task in that high frequency words would perhaps predict more correct responses, based on the fact that frequency is important in vocabulary storage and retrieval (Bjork & Bjork, 1992; Berggreen & Tenfjord, 1999). The results indeed showed that frequency was marginally predictive of the result ($p < .1$); however, the results indicated less correct responses the higher the frequency of the words. This is a surprising result that is difficult to explain, as high frequency words should be more easily retrieved from memory than words with lower frequency. It might, however, be that some of the high frequency words in the task were not familiar to the participants, or that the participants were confused by for instance 'a novel' since this English word resembles a Norwegian word with a slightly different meaning, something which might have caused the participants to choose the alternative answer corresponding to the Norwegian meaning. If this was the case, it indicates that the Norwegian word was activated rather than the English word, leading the participants to choose an incorrect response when defining a word that was believed to be familiar to them.

5.3. The lexical decision task

As in the word definition task, subtitles were not predictive of the results in the lexical decision task either; $\chi^2 = .9087$ and $p = .6349$. Markham (1999) found that target language subtitles improved the ability to recognize words occurring in the audiovisual material; however, no such facilitative effect of the target language subtitles was found in this experiment. This indicates that the participants did not experience any long term effects of the presence of subtitles. As with the word definition task, there might have been differences between the groups based on the subtitles if the lexical decision task had been conducted immediately after, or if the participants had been exposed to subtitled audiovisual material regularly in the four week period. However, with the methodology used in this experiment no effects of the subtitles were observed in the lexical decision task. Inferential analysis also showed that the tendency for the participants in the Norwegian subtitles group to mark more of the prime words than the two other groups was not statistically significant; $\chi^2 = 1.275$ and $p = .5386$. This indicates that the Norwegian subtitles did not interfere with the

processing of the audio material. This lack of priming effect might, like the lack of a subtitling effect in general, be explained in terms of no long term effects of the stimuli. The inferential analysis including all the groups also revealed that the participants were not visually primed by the pictures in the episode, suggesting that the names for the visually fixated images, presumably implicitly generated by the participants when watching the episode, did not influence the performance on the lexical decision task four weeks later. The four weeks between exposure to the stimuli and the lexical decision task might thus have caused the lack of priming and subtitles results in this task. It seems reasonable to argue that if the lexical decision task had been conducted shortly after exposure to the stimuli the results might have showed some significance of both the subtitles and the prime words.

Only two factors turned out to be predictive of the results in the lexical decision task: the background grammar test and the amount of time spent reading English compared to the time spent writing English. The results on the grammar test were predictive of the results ($p < .05$), indicating that better scores on the grammar test significantly predicted more correct responses in the lexical decision task. Specific grammar skills as such are not likely to be predictive on a lexical decision task; however, the underlying grammar or linguistic competence might have had an effect on the participants' results. As Kac (1992) notes, the ability to recognize words might well be considered part of the speakers' underlying linguistic competence. This might indicate that the participants' ability to retrieve words encountered under particular circumstances four weeks earlier from memory is related to the participants' linguistic competence as reflected in the grammar test. In this sense it may be argued, like in the word definition task and the comprehension questionnaire, that it was this grammar competence, and not the participants' knowledge about specific English grammar rules as such, that influenced the results.

Reading as a receptive skill is, as argued by Grabe (2004) and Anderson (2005), strongly related to grammar as knowledge of language structure. Along with the grammar test results the amount of time spent reading English turned out to be predictive in the lexical decision test ($p < .1$), indicating that the more time spent reading the target language predicted more correct responses in the lexical decision test. The processing of input is important in a task like this, and the ability to process the target language is more likely to develop when partaking in receptive activities like reading. In processing target language input words are stored in, and retrieved from, the mental lexicon, and for learners who spend time reading in

the target language the process of lexical storage and retrieval might be argued to take place more often than for learners who do not read as much. In this sense it might be possible to argue that the practice the reading learners have in this sense might facilitate their performance in such a lexical decision task.

5.4. General discussion

The results of this study suggest that the potential effect of subtitles was only significant in the comprehension questionnaire conducted immediately after exposure to the stimuli. In this task there was, however, no significant difference between the two participant groups who had been exposed to subtitles, indicating that there was no difference in the effect of target and native language subtitles on the comprehension of the animated cartoon *Family Guy*. However, the results nevertheless showed that both the Norwegian and English subtitles groups benefitted from having the subtitles available as a source of information in watching the audiovisual material, with these two groups performing significantly better than the control group that was not exposed to subtitles. This suggests that the participants in the Norwegian and English groups benefitted from the combination of the auditory, the verbal visual, and the non-verbal visual channel in the input material, with the subtitles thus enhancing comprehension. The fact that the word definition task and the lexical decision task were conducted four weeks after exposure to the stimuli may account for the lack of effect of the subtitles on the results in these two tasks. The time factor might also account for the lack of priming effect on the Norwegian subtitles group, and the visual priming for all the groups, in the lexical decision task. It is possible that the prime words would have affected the outcome had the task been conducted sooner. However, the intention when deciding to separate the study into two parts was to check for both potential short term and long term effects of the subtitles. In this sense, the lack of significance of the subtitles in the word definition task and the lexical decision task simply indicated that there were no such long term effects.

The role of input and receptive processing skills were found to be important predictors in all the three tasks. That the amount of time spent playing English computer games was a very significant factor in both the comprehension questionnaire and the word definition task suggests that being exposed to authentic target language input is beneficial in tasks concerned with comprehension and the ability to define words. In playing computer games the learners process and interact in the target language at the same time as they presumably encounter new

words and phrases that have to be understood in order to progress in the game. The authentic material presented in computer games might thus be a very good source for authentic input, contributing to the players' overall target language competence relevant both in comprehension and in word definition. The amount of time spent on computer games might also have been beneficial in the comprehension questionnaire due to the players being accustomed to comprehending animated audiovisual material in the target language. The fact that computer games were not at all significant in the lexical decision task suggests that, for instance, the heuristic skills developed when playing computer games are not as relevant in tasks where processing skills are more important. In the word definition task and the lexical decision task the receptive language skills of listening and reading English were marginally predictive of the results. Reading and listening skills are important in processing input, thus contributing to increased target language competence and vocabulary growth, and might also be argued to be related to aspects of lexical storage and retrieval, something which might have enhanced the performances in the word definition task and the lexical decision task.

The scores in the background grammar test being predictive of more correct responses in all the three tasks can be argued to indicate that the participants' overall linguistic competence was influential. Assuming that the amount, quality, and relevance of the input that learners are exposed to contributes to second language acquisition, this input would then also contribute to the overall underlying linguistic competence of the learner. The participants with the highest linguistic competence as such, as potentially reflected in the grammar test, performed better in all the three tasks conducted in this study. As Kac (1992) notes, the ability to recognize items in language should be considered part of the linguistic competence, something which might account for the significance in the lexical decision task. This might be related to the word definition task, in that this underlying knowledge of language might enhance the learners' ability to retrieve words from memory and assist them in detecting the meaning of unfamiliar words and phrases. In terms of comprehension, the underlying linguistic competence might contribute in that the knowledge of the target language might contribute to making the learners more able to process and comprehend the content of the authentic audiovisual input.

6. Conclusion

The aim of this study was to investigate the potential effect of subtitled audiovisual material on comprehension, word definition, and lexical decision. Forty-nine Norwegian 17-year-olds were divided into three participant groups according to their original school classes. The participants watched a 20 minute long episode of the American animated cartoon *Family Guy*: one group watched the episode with Norwegian subtitles, the second group watched the episode with English subtitles, and the control group watched the episode with no subtitles. Immediately after being exposed to the stimuli, the participants responded to a comprehension questionnaire that tested the extent to which the participants had comprehended the contents of the episode, and whether there were differences in the performance of the groups dependent on the different types of subtitles they had experienced. Four weeks later the participants responded to a word definition task and a lexical decision task, both based on the *Family Guy* episode, in order to investigate potential long term effects of the subtitles.

Baltova (1999), Bianchi and Ciabattini (2008), and Neuman and Koskinen (1992) all argue that the use of authentic audiovisual material in the target language can facilitate second language acquisition. Particularly when the material includes subtitles as an extra information channel audiovisual material has been argued to be facilitative, with the combination of auditory, verbal visual, and non-verbal visual information together contributing to a better environment for acquisition. Research (e.g. Danan, 2004; Markham, 1999; Mitterer & McQueen, 2009; Vanderplank, 1988), however, also suggests that the outcome from watching subtitled material differs depending on whether the subtitles are in the native language or the target language. This experiment showed that the participants who were exposed to subtitles as part of the audiovisual material performed better on the comprehension questionnaire than the control group, showing clear short term effects of the subtitles. However, no differences between the Norwegian subtitles group and the English subtitles group were found, something which suggests that the language of the subtitles did not matter and that the mere presence of subtitles enhanced comprehension of the contents of the audiovisual material. The analysis of the word definition task and the lexical decision task indicated that there were no effects of the subtitles in these two tasks, something which indicates that there were no long term effects of the subtitles. Also, the prime words that were included in the lexical decision task in order to check whether the Norwegian group had been effected by the Norwegian subtitles did not have any statistically significant effect on the results of this group.

There were, however, other factors that turned out to be predictive of the outcome in all the three tasks. Particularly interesting was the highly significant facilitative effect of having spent a lot of time playing English computer games in the comprehension questionnaire and the word definition task. The significance of computer games might in part be explained by the fact that in playing computer games the participants were accustomed to animated audiovisual material in the target language, and in part by the great source of authentic target language input computer games can be in increasing target language competence. This might have enhanced the participants' ability to comprehend content and detect appropriate definitions for words and phrases, and based on the high significance of this factor in both the comprehension questionnaire and the word definition task further research on the role of target language computer games in second language acquisition should indeed be conducted. Another interesting factor that was predictive of the results was the grammar test results. That this factor was significant on all the three tasks can be argued to suggest that the underlying linguistic competence of the participants influenced their performance. That the grammar test results were equally significant on all the three tasks is not necessarily surprising, however, as this simply can be argued to emphasise the importance of underlying linguistic competence in second language acquisition in general.

Subtitles were found to enhance the performance of the participants only on the task that immediately followed the stimuli. Despite the fact that no significant differences were found regarding native and target language subtitles, the results in the comprehension questionnaire showed that the mere presence of subtitles in either language did have a facilitative short term effect on the performance of the participants in the Norwegian and English subtitles groups. This result can indeed be used to argue that subtitles should be used when watching audiovisual material in a target language, as the presence of subtitles appears to facilitate comprehension of the content. That the presence of subtitles had a facilitative short term effect also supports previous research that has found similar positive effects of having subtitles available when watching target language audiovisual material. The lack of effect of subtitles in the word definition task and the lexical decision task, however, indicates that there were no long term effects of the stimuli. This does, however, not necessarily show that there are no long term effects of subtitles in second language acquisition from which learners might benefit, but rather that the methods applied in this research did perhaps not serve to measure the effects properly. In order to investigate the long term effects of subtitles one could perhaps expose the participants to animated audiovisual material in the target language on a more

regular basis, and apply tests after a period of time in order to see whether their target language competence increased dependent on the subtitles. In any case, the role of subtitles in second language acquisition certainly deserves further investigation, both in terms of short and long term effects.

Works cited

- Anderson, J. R. (2005). *Cognitive psychology and its implications*. (6th ed.). New York, NY: Worth Publishers.
- Ang, C. S. & Zaphiris, P. (2008). Computer games and language learning. Retrieved from <http://ktisis.cut.ac.cy/bitstream/10488/5304/1/Computer%20Games%20and%20Language%20Learning.pdf>.
- Bahrani, T., & Soltani, R. (2011). The pedagogical values of cartoons. *Research on Humanities and Social Sciences, 1* (4), 19-22. Retrieved from <http://www.iiste.org/Journals/index.php/RHSS/article/view/1267/1188>.
- Baltova, I. (1999). Multisensory language teaching in a multidimensional curriculum: The use of authentic bimodal video in core French. *Canadian Modern Language Review, 56* (1), 31-48. doi:10.3138/cmlr.56.1.31.
- Benavent, G. T., & Peñamaría, S. S-R. (2011). Use of authentic materials in the ESP classroom. *Encuentro, 20*, 89-94. Retrieved from http://dspace.uah.es/dspace/bitstream/handle/10017/10109/use_torregrosa_ENCUESTRO_2011.pdf?sequence=1.
- Berggreen, H., & Tenfjord, K. (1999). *Andrespråkslæring*. Oslo: Ad Notam Gyldendal.
- Bianchi, F., & Ciabattini, T. (2008). Captions and subtitles in EFL learning: An investigative study in a comprehensive computer environment. In A. Baldry, M. Pavesi, C. T. Torsello & C. Taylor (eds.), *From didactas to ecolingua: An ongoing research project on translation and corpus linguistics* (pp. 69-90). Trieste: Edizioni Università di Trieste. Retrieved from <http://www.openstarts.units.it/dspace/handle/10077/7720>.
- Bjork, R. A., & Bjork, E. L. (1992). A new theory of disuse and an old theory of stimulus fluctuation. In A. F. Healy, S. M. Kosslyn & R. M. Shiffrin (eds.), *From learning processes to cognitive "processes": Essays in the honor of William K. Estes, Volume 2* (pp. 35-67). Hillsdale, NJ: Lawrence Erlbaum.
- Bozorgian, H. (2012). Listening skill requires a further look into second/foreign language learning. *ISRN Education, 2012*, 1-10. doi:10.5402/2012/810129.
- Chomsky, N. (1980). *Rules and representations*. Oxford: Blackwell.
- Cook, V. (2008). *Second language learning and language teaching* (4th ed.). London, UK: Hodder Education.
- Corder, S. P. (1967). The significance of learner's errors. *International Review of Applied Linguistics in Language Teaching, 5*, 161-169. doi:10.1515/iral.1967.5.1-4.161.

- Danan, M. (2004). Captioning and subtitling: Undervalued language learning strategies. *Meta: Translators' Journal*, 49 (1), 67-77. doi:10.7202/009021ar.
- d'Ydewalle, G., & Gielen, I. (1992). Attention allocation with overlapping sound, image, and text. In K. Rayner (ed.), *Eye movements and visual cognition: Scene perception and reading* (pp. 415-427). New York: Springer-Verlag.
- d'Ydewalle, G., & Van de Poel, M. (1999). Incidental foreign-language acquisition by children watching subtitled television programs. *Journal of Psycholinguistic Research*, 28 (3), 227-244. Retrieved from <http://link.springer.com/content/pdf/10.1023/A%3A1023202130625>.
- Ellis, N. C. (2003). Constructions, chunking, and connectionism: The emergence of second language structure. In C. J. Doughty & M. H. Long (eds.), *The handbook of second language acquisition* (pp. 63-103). Malden, MA: Blackwell Publishing Ltd.
- Ellis, N. C., & Collins, L. (2009). Input and second language acquisition: The roles of frequency, form, and function. Introduction to the special issue. *The Modern Language Journal*, 93 (3), 329-335. doi: 10.1111/j.1540-4781.2009.00893.x.
- Ellis, R. (1994). *The study of second language acquisition*. Oxford and New York: Oxford UP.
- Ellis, R. (1999). Input-based approaches to teaching grammar: A review of classroom-oriented research. *Annual Review of Applied Linguistics*, 19, 64-80. <http://dx.doi.org/10.1017/S0267190599190044>.
- Ferrand, L., & New, B. (2004). Semantic and associative priming in the mental lexicon. In P. Bonin (ed.), *Mental lexicon: "Some words to talk about words"* (pp. 25-43). New York: Nova Science Publishers.
- Flowerdew, J., & Peacock, M. (2011). *Research perspectives on English for academic purposes*. Cambridge: Cambridge UP.
- Garman, M. (1990). *Psycholinguistics*. Cambridge, UK: Cambridge UP.
- Gass, S. (2003). Input and interaction. In C. J. Doughty & M. H. Long (eds.), *The handbook of second language acquisition* (pp. 224-255). Malden, MA: Blackwell Publishing Ltd.
- Gilmore, A. (2007). Authentic materials and authenticity in foreign language learning. *Language Teaching*, 40 (2), 97-118. <http://dx.doi.org/10.1017/S0261444807004144>.
- Grabe, W. (2004). Research on teaching reading. *Annual Review of Applied Linguistics*, 24, 44-69. <http://dx.doi.org/10.1017/S0267190504000030>.

- House, S. (2008). Authentic materials in the classroom. In S. S-R. Peñamaría & R. D. Martínez (eds.), *Didactic approaches for teachers of English in an international context*, (pp. 53-70). Salamanca: Ediciones Universidad de Salamanca.
- Hyltenstam, K., & Abrahamsson, N. (2003). Maturation constraints in SLA. In C. J. Doughty & M. H. Long (eds.), *The handbook of second language acquisition* (pp. 539-588). Malden, MA: Blackwell Publishing Ltd.
- Jackendoff, R. (2002). *Foundations of language: Brain, meaning, grammar, evolution*. New York, NY: Oxford UP.
- Juul, J. (2003). The game, the player, the world: Looking for a heart of gameness. Keynote presented at Level Up: Digital Games Research Conference Preceedings, Utrecht University, 2003. Retrieved from http://ocw.metu.edu.tr/pluginfile.php/4471/mod_resource/content/0/ceit706/week3_new/JesperJuul_GamePlayerWorld.pdf.
- Kac, M. B. (1992). *Grammars and grammaticality*. Amsterdam: John Benjamins Publishing Company.
- Krashen, S. (1982). *Principles and practices in second language acquisition*. Internet edition 2009. Retrieved from http://www.sdkrashen.com/Principles_and_Practice/Principles_and_Practice.pdf.
- Kurita, T. (2012). Issues in second language listening comprehension and the pedagogical implications. *Accents Asia*, 5 (1), 30-44. Retrieved from <http://accentsasia.org/5-1/kurita.pdf>.
- Levon, E. (2010). Organizing and processing your data: The nuts and bolts of quantitative analyses. In L. Litosseliti (ed.), *Research methods in linguistics* (pp. 68-92). London and New York: Continuum International Publishing Group.
- Mani, N., & Plunkett, K. (2010). In the infant's mind's ear: Evidence for implicit naming in 18-month-olds. *Psychological Science*, 21 (7), 908-913. doi:10.1177/0956797610373371.
- Markham, P. (1999). Captioned videotapes and second-language listening word recognition. *Foreign Language Annals*, 32 (3), 321-328. doi: 10.1111/j.1944-9720.1999.tb01344.x.
- Meyer, A. S., Belke, E., Telling, A. L., & Humphreys, G. W. (2007). Early activation of object names in visual search. *Psychonomic Bulletin & Review*, 14 (4), 710-716. doi:10.3758/BF03196826.
- Mitchell, R., & Myles, F. (2004). *Second language learning theories* (2nd ed.). London: Hodder Education.

- Mitterer H., & McQueen, J. M. (2009). Foreign subtitles help but native-language subtitles harm foreign speech perception. *PLoS ONE*, 4 (11), 1-5. doi:10.1371/journal.pone.0007785.
- Neuman, S. B., & Koskinen, P. (1992). Captioned television as ‘comprehensible input’: Effects of incidental word learning from context for language minority students. *Reading Research Quarterly*, 27 (1), 95-106. Retrieved from <http://www-personal.umich.edu/~sbneuman/pdf/CaptionedTelevision.pdf>.
- Nippold, M. A. (1998). *Later language development: The school-age and adolescent years* (2nd ed.). Austin, TX: Pro-Ed.
- Rasinger, S. M. (2010). Quantitative methods: Concepts, frameworks and issues. In L. Litosseliti (ed.), *Research methods in linguistics* (pp. 49-67). London and New York: Continuum International Publishing Group.
- Saville-Troike, M. (2006). *Introducing second language acquisition*. Cambridge, UK: Cambridge UP.
- Schiffrin, D. (1996). Interactional sociolinguistics. In S. L. McKay & N. H. Hornberger (eds.), *Sociolinguistics and language teaching* (pp. 307-328). New York: Cambridge UP.
- Sherman, J. (2003). *Using authentic video in the language classroom*. Cambridge, UK: Cambridge UP.
- Tomlinson, B. (2012). Materials development for language learning and teaching. *Language Teaching*, 45 (2), 143-179. doi: 10.1017/S0261444811000528.
- Trofimovich, P., & McDonough, K. (2011). Using priming methods to study L2 learning and teaching. In P. Trofimovich & K. McDonough (eds.), *Applying priming research to L2 learning, teaching and research: Insights from psycholinguistics* (pp. 3-17). Amsterdam and Philadelphia: John Benjamins Publishing Company.
- Vandergrift, L., & Tafaghodtari, M. H. (2010). Teaching L2 learners how to listen does make a difference: An empirical study. *Language Learning*, 60 (2), 470-497. doi: 10.1111/j.1467-9922.2009.00559.x.
- Vanderplank, R. (1988). The value of teletext sub-titles in language learning. *ELT Journal*, 42 (4), 272-281. Retrieved from <http://203.72.145.166/ELT/files/42-4-5.pdf>.
- Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard UP.
- Webb, S. (2005). Receptive and productive vocabulary learning: The effects of reading and writing on word knowledge. *Studies in Second Language Acquisition*, 27 (1), 33-52. <http://dx.doi.org/10.1017/S0272263105050023>.

- White, L. (2003). On the nature of interlanguage representation: Universal Grammar in the second language. In C. J. Doughty & M. H. Long (eds.), *The handbook of second language acquisition* (pp. 19-42). Malden, MA: Blackwell Publishing Ltd.
- Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry*, *17*, 89-100. Retrieved from <http://isites.harvard.edu/fs/docs/icb.topic862383.files/Wood1976.pdf>.
- Zarei, A. A., & Rashvand, Z. (2011). The effect of interlingual and intralingual, verbatim and nonverbatim subtitles on L2 vocabulary comprehension and production. *Journal of Language Teaching and Research*, *2* (3), 618-625. doi:10.4304/jltr.2.3.618-625.

Appendix

Appendix 1: Parental consent form

Samtykke til deltakelse i undersøkelse om andrespråkforståelse

Ansvarlig institusjon: NTNU

Studenter: Lisa Aurstad (*email address*) og Ingrid Kvitnes (*email address*)

Veiledere: Mila Vulchanova og Juhani Järvikivi

Vi ønsker å gjennomføre en undersøkelse i elevens klasse der vi med utgangspunkt i engelsk som andrespråk vil se på elevenes kompetanse i og forståelse av det engelske språket.

Studien vil bestå av to deler og begge vil foregå i skoletiden. Del 1 vil foregå i desember (uke 50), og del 2 vil foregå i januar (uke 2). Del 1 innebærer at elevene skal være med på en kort kartlegging av sin språklige bakgrunn og kompetanse i engelsk, samt at de skal se et filmklipp. Denne delen inkluderer også en kartlegging av eventuelle diagnoser o.l. som kan være relevant for språklæring. Del 2 inneholder språklige tester knyttet til filmklippet.

En kode knytter eleven til sine opplysninger gjennom en deltakerliste. Det er kun autorisert personell knyttet til prosjektet som har adgang til deltakerlisten og som kan finne tilbake til informasjonen. Det er kun læreren som har oversikt over hvilke navn som er knyttet til koden. Læreren vil ikke ha tilgang til elevens resultater i studien, og studien vil derfor ikke kunne ha innvirkning på elevens karakterer. Denne oversikten vil også bli slettet når studien er ferdig. All informasjon vil bli anonymisert ved prosjektslutt, og alle opplysninger gitt i undersøkelsen vil bli behandlet konfidensielt. Det vil ikke være mulig å identifisere eleven i resultatene av studien når disse publiseres. Også skolen vil bli anonymisert.

Selv om eleven ikke skal delta i studien, vil eleven måtte være til stede i klasserommet under gjennomføringen av studien. Eleven får altså ikke fri til å gjøre andre ting mens undersøkelsen pågår.

Deltakelse i undersøkelsen er frivilling, og eleven kan når som helst trekke seg fra undersøkelsen underveis uten å oppgi en spesiell grunn.

Vennligst fyll ut og lever denne samtykkeerklæringen til elevens engelsklærer. Vi ber om at skjemaet leveres så raskt som mulig for at eleven skal kunne delta.

Ta kontakt med Lisa eller Ingrid for spørsmål.

Jeg samtykker til at _____(elevens navn) kan delta i undersøkelsen.

Trondheim, Dato: _____ Underskrift: _____

Appendix 2: The background questionnaire

Bakgrunnsinformasjon for forskningsprosjekt om andrespråkforståelse

Tusen takk for at du har sagt ja til å delta i vårt forskningsprosjekt om andrespråkforståelse. I dette skjemaet ber vi om bakgrunnsinformasjon som er nødvendig for at resultatene fra undersøkelsen skal kunne brukes.

Alle opplysningene du gir her, vil senere bli behandlet uten direkte gjenkjennende opplysninger. En kode knytter deg til dine opplysninger gjennom en deltakerliste. Det er kun autorisert personell knyttet til prosjektet som har adgang til deltakerlisten og som kan finne tilbake til infoen. Del B, C og D av dette skjemaet vil bare oppbevares med koden. All informasjon vil bli anonymisert ved prosjektslutt. Det vil ikke være mulig å identifisere deg i resultatene av studien når disse publiseres.

Legg merke til at skjemaet har 6 sider.

Med takknemlig hilsen,

Lisa Aurstad / Ingrid Kvitnes

Studenter ved lektorutdanning med master i språk, NTNU

Del A: Personlig informasjon

Studieretning og trinn: _____

Fødselsår: _____

Kjønn **Kvinne** **Mann**

Bostedskommune: _____

Deltakerkode:

Del B: Språklig bakgrunn

Morsmål

Er norsk morsmålet ditt?

- Ja Nei

Hvis ja, har du andre morsmål i tillegg?

- Ja Nei

Hvis ja, hvilke(t) språk? _____

Hvilket språk bruker dere hjemme? _____

Hvor ofte leser du tekst skrevet på norsk?

- Hver dag Flere ganger per uke Et par ganger i uken Av og til Aldri

Hvor ofte skriver du tekst på norsk?

- Hver dag Flere ganger per uke Et par ganger i uken Av og til Aldri

Engelsk og andre fremmedspråk

I engelsk, hvordan vurderer du ferdighetene dine på hvert av disse områdene?

	Grunnleggende	Middels	Avansert	Flytende
Lesing				
Skriving				
Snakke				
Lytte				

Totalt				
--------	--	--	--	--

Har du bodd i, eller hatt lengre opphold i, et land hvor engelsk er hovedspråk?

Ja Nei

Hvis ja, hvor lenge varte oppholdet/oppholdene? _____

Har du vært på kortere (under 14 dager) reise i et land hvor engelsk er hovedspråk?

Ja Nei

Har du bodd i, eller hatt lengre opphold i, et land hvor annet enn engelsk er hovedspråk?

Ja Nei

Hvis ja, hvor var det, og hvor lenge varte oppholdet/oppholdene? _____

Hvilke språk kan du utover morsmålet ditt og engelsk?

Språk	Nivå			
	Grunnleggende	Middels	Avansert	Flytende
Tysk				
Fransk				
Spansk				
- angi språk				
- angi språk				
- angi språk				

Hvor ofte leser du tekster på engelsk?

- Hver dag Flere ganger pr uke Et par ganger i uken Av og til Aldri

Hvor ofte skriver du tekster på engelsk?

- Hver dag Flere ganger pr uke Et par ganger i uken Av og til Aldri

Hvor ofte lytter du til/hører du engelsk?

- Hver dag Flere ganger pr uke Et par ganger i uken Av og til Aldri

Hvor ofte ser du engelskspråklige serier/filmer?

- Hver dag Flere ganger pr uke Et par ganger i uken Av og til Aldri

Når du ser engelskspråklige filmer, hvilken av disse alternativene bruker du oftest?

- Undertekst på norsk (morsmål) Undertekst på engelsk Ingen undertekst

Hvor ofte ser du engelskspråklige tegneseriefilmer/serier?

- Hver dag Flere ganger pr uke Et par ganger i uken Av og til Aldri

Har du sett tegneserien “Family Guy”?

- Ja Nei

Hvis ja, i hvor stor grad? _____

Hvor ofte spiller du engelskspråklige dataspill?

- Hver dag Flere ganger pr uke Et par ganger i uken Av og til Aldri

Hvilken type spill spiller du? _____

Hvor mange timer per dag? _____

Hvor mye TV ser du hver dag?

- 7 timer eller mer 5-6 timer 3-4 timer 1-2 timer Ser ikke TV

Del C: Andre faktorer i språklæring

Har du, eller har du hatt, problemer med synet utover normal brillebruk?

- Ja Nei

Har du, eller har du hatt, problemer med hørselen?

- Ja Nei

Har du, eller har du hatt, språkvansker av noe slag (spesifikke språkvansker, lese-/lærevansker eller lignende)?

- Ja Nei

Hvis ja, spesifiser: _____

Har du, eller har du hatt, andre diagnoser som kan tenkes å påvirke språklæring (ADHD, autisme eller lignende)?

- Ja Nei

Er du venstrehendt?

- Ja Nei

Del D: Vokabulartest og grammatikktest

Resultat vokabulartest:

Runde 1.

Runde 2.

Resultat grammatikktest:

Appendix 3: The comprehension questionnaire

Note: The correct responses are marked “X”.

Deltakerkode:

Select the correct alternative. Select only one alternative for each question.

1. Jillian’s boyfriend is...

- a. Stewie
- b. Peter
- c. Brian X
- d. Carl

2. Stewie is...

- a. A dog
- b. A girl
- c. A boy X
- d. A cat

3. Brian is...

- a. A dog X
- b. A girl
- c. A boy
- d. A cat

4. “Pe-ople” is...

- a. A television show
- b. A magazine X
- c. A movie
- d. A girl

5. Peter and Jillian go to see...

- a. Les Miserables
- b. Walt On Ice
- c. Disney On Snow
- d. Disney On Ice X

6. The book Brian is writing is called...

- a. Faster than the speed of love X
- b. Faster than the speed of lightning
- c. Fast and furious
- d. Faster than the speed of ice skaters

7. Lois...

- a. Is in love with Brian
- b. Likes Brian's book idea
- c. Wants to direct a movie based on Brian's book
- d. Makes fun of Brian's book idea X

8. Stewie is looking for...

- a. French fries
- b. Fanta lemon
- c. Graham crackers X
- d. Chocolate cake

9. Jillian's neighbour is...

- a. A sailor
- b. A pirate X
- c. An opera singer
- d. A thief

10. Jillian ends the relationship because...
- a. Her boyfriend is too lazy
 - b. Her boyfriend lied about wanting to live with her X
 - c. Her boyfriend wants to move to Africa
 - d. Her boyfriend kissed another girl
11. Stewie has...
- a. An Australian accent
 - b. An Indian accent
 - c. An American accent
 - d. A British accent X
12. Meg goes to buy...
- a. Diapers X
 - b. Deodorant
 - c. Underwear
 - d. Magazines
13. Carl is...
- a. A hair-dresser
 - b. A shop manager X
 - c. A sports commentator
 - d. A movie star
14. Chris is Meg's...
- a. Baby
 - b. Boyfriend
 - c. Bingo partner
 - d. Brother X

15. Chris tries to pay for comic books with his...
- a. Money
 - b. Insects
 - c. Pooh X
 - d. Pee
16. Carl and Chris discuss...
- a. TV shows X
 - b. Christmas
 - c. Cover girls
 - d. Movies
17. Meg eventually gets a job for...
- a. A television show
 - b. A phone-sex line X
 - c. A telemarketing company
 - d. A travelling circus
18. Chris helps Meg by...
- a. Getting her job back X
 - b. Saving her life
 - c. Buying her jewelry
 - d. Lending her money

Appendix 4: The word definition task

Note: The correct responses are marked “X”.

Deltakerkode:

Select the most appropriate definition for each word. Select only one alternative for each word.

1. A novel

- a. A short piece of narrative prose fiction
- b. A fictional prose narrative of considerable length X
- c. A prose narrative consisting of minimum two volumes
- d. An encyclopedia

2. Rent

- a. Money used to pay back a bank loan
- b. Payment for living in an apartment/house which belongs to someone else X
- c. An object free from dirt, stain, or impurities
- d. Fixed compensation for services, paid to a person on a regular basis

3. To hire

- a. To get rid of an employee
- b. To tie a metallic rod
- c. To employ someone X
- d. To advance to a higher position

4. A supervisor

- a. Someone who works in a supermarket
- b. An employee
- c. A person responsible for cleaning the bedroom
- d. Someone in charge of a particular unit X

5. To promote

- a. To raise someone to a higher rank X
- b. To assign someone to a lower position
- c. To give someone a second chance
- d. To prefer someone to another

6. A sequel

- a. A constitution
- b. A continuation X
- c. Someone who sneaks about
- d. A conclusion

7. To smother

- a. To cough
- b. To bore
- c. To die
- d. To suffocate X

8. A pamphlet

- a. A short piece of printed paper on a current topic X
- b. A porcupine
- c. A soft piece of toilet paper
- d. A flying piece of printed paper on a current topic

9. Off-putting

- a. Turning something off
- b. Interesting
- c. Cheating
- d. Repelling X

10. Hazy

- a. Hazardous
- b. Undecided
- c. Unclear X
- d. Unsited

11. Disposable income

- a. The money someone pays in taxes
- b. Diapers that can only be used once
- c. The money someone has available to buy consumer goods X
- d. The money someone has to borrow to afford to buy consumer goods

12. A cruller

- a. Sweet cake dough fried in deep fat X
- b. French fries
- c. A fruit-flavored and glazed twisted candy roll
- d. A hair curler

13. Crabby

- a. Humorous
- b. Ill-tempered X
- c. Lazy
- d. Annoying

14. The gist of something

- a. A central idea X
- b. A protagonist
- c. A conception
- d. A poison

15. Braces

- a. A dental regulating tooth brush
- b. An appliance that creates dental irregularities
- c. A dental device that is used for flossing
- d. An appliance that corrects dental irregularities X

16. An underrated actress

- a. A female with low self-esteem
- b. A female whose acting talent is underestimated X
- c. An underestimated female magician's assistant
- d. A female with great acting talent who has low self-esteem

17. A captive

- a. A person who only writes in capital letters
- b. A person who has committed a crime
- c. A person who is held against his will X
- d. A person who is held responsible for an accident

18. To stack

- a. To arrange things in a pile X
- b. To organize things in a line
- c. To hit someone with a stick
- d. To arrange piles of hay in a line

19. “No way”

- a. “You are joking”
- b. “Not possibly” X
- c. “Not a road”
- d. “Never mind”

20. To alphabetize

- a. To learn the alphabet
- b. To arrange in alphabetical order X
- c. To mark with letters
- d. To organize by date

21. Paper route

- a. The job of delivering newspapers regularly X
- b. The road taken by the toilet paper after flushing
- c. The job of delivering mail regularly
- d. The process in which a newspaper is made

22. Committed

- a. To be happy about a change
- b. To leave someone out
- c. To be bound to something X
- d. To evolve into something more serious

Idioms

23. To be game

- a. To be happy
- b. To be agreeable to participate in something X
- c. To be excited about an upcoming event
- d. To be willing to play a game

24. To take charge

- a. To be responsible
- b. To reload batteries
- c. To take control over something X
- d. To make someone pay for something

25. To make up one's mind

- a. To conclude a chapter in a book
- b. To choose the direction of a play
- c. To paint one's face
- d. To come to a decision X

26. A pain in the ass

- a. A suppository pill
- b. Something causing trouble X
- c. A donkey with problems
- d. Constipation

27. To cheer up

- a. To buy new furniture
- b. To view something from above
- c. To become happy X
- d. To sing cheerfully

28. To get pushed around

- a. To do something bad
- b. To be supported by someone
- c. To be physically harassed
- d. To do everything you are being told X

29. To have a broken heart

- a. To experience great emotional pain X
- b. To have a cardiac arrest
- c. To feel a strong pain in the chest
- d. To be broke

30. Not my cup of tea

- a. A borrowed cup used for drinking tea
- b. A type of tea you do not like
- c. Something you enjoy or like
- d. Something you do not like X

Appendix 5: The lexical decision task

Note: “o” = occurring word, “n” = not occurring word, “p” = primed word, “v” = visually primed word.

Mark the words that occurred in the Family Guy episode you watched.

<input type="checkbox"/> Pilot	o	<input type="checkbox"/> Begin	p
<input type="checkbox"/> Hot	o	<input type="checkbox"/> Aerial	o
<input type="checkbox"/> Pirate	v	<input type="checkbox"/> Immigrant	o
<input type="checkbox"/> Pressed	p	<input type="checkbox"/> Stunning	n
<input type="checkbox"/> Flat	n	<input type="checkbox"/> Money	o
<input type="checkbox"/> Equal	o	<input type="checkbox"/> Accuse	n
<input type="checkbox"/> Overpaid	o	<input type="checkbox"/> Stock room	o
<input type="checkbox"/> Error	n	<input type="checkbox"/> This is functioning	p
<input type="checkbox"/> Job	o	<input type="checkbox"/> Biscuit	p
<input type="checkbox"/> Dumb	n	<input type="checkbox"/> Ugly	n
<input type="checkbox"/> Ache	n	<input type="checkbox"/> Be sorry	o
<input type="checkbox"/> Will do	p	<input type="checkbox"/> Pig	p
<input type="checkbox"/> Work	o	<input type="checkbox"/> Paycheck	o
<input type="checkbox"/> Bedroom	v	<input type="checkbox"/> Cupboard	n
<input type="checkbox"/> Backpack	p	<input type="checkbox"/> Sexy	p
<input type="checkbox"/> Daughter	n	<input type="checkbox"/> Skating duet	o
<input type="checkbox"/> Fatherly	o	<input type="checkbox"/> Dog	v
<input type="checkbox"/> Kill	n	<input type="checkbox"/> Constitution	n
<input type="checkbox"/> Genuine	p	<input type="checkbox"/> Awesome	o
<input type="checkbox"/> Move in	o	<input type="checkbox"/> State	n
<input type="checkbox"/> Basketball	n	<input type="checkbox"/> Brand-new	o
<input type="checkbox"/> Film	o	<input type="checkbox"/> Motherly	n
<input type="checkbox"/> Married	n	<input type="checkbox"/> Lonesome	n
<input type="checkbox"/> Sabbatical	o	<input type="checkbox"/> Paper towel	o
<input type="checkbox"/> Shop	v	<input type="checkbox"/> Chick	o
<input type="checkbox"/> Cry	n	<input type="checkbox"/> Dreadful	p
<input type="checkbox"/> Cobbler	o		