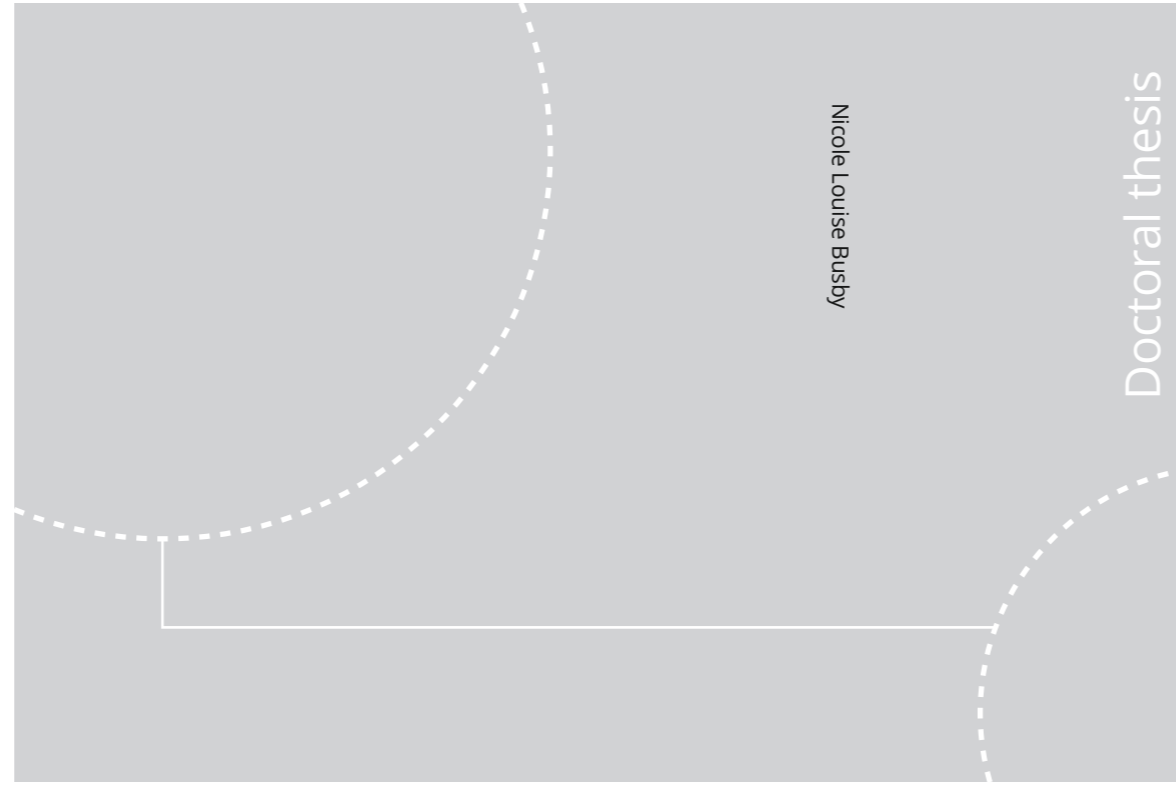


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Nicole Louise Busby

Presumptions, proficiencies, and parallel languages

Investigating academic English reading
among Norwegian university students

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Trondheim, November 2020

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Abstract

The status of English as an academic lingua franca means that English is often used in higher education settings where it is not the native language (L1) of the majority of students. In countries like Norway, English and the local language are both used in parallel for teaching at the university level. The aim of this doctoral thesis is to explore academic reading in a second language (L2) by advanced L2 English users in the Norwegian parallel language university environment. Norwegians are considered to be among the most proficient L2 English users globally and are exposed to English on a daily basis. Despite this, previous research has shown that even with their relatively high English proficiency, many Norwegian university students still struggle with reading academic texts in English (e.g. Hellekjær, 2009, 2012a). The thesis comprises three studies which contribute quantitative data about Norwegian university students' reading strategies, L2 vocabulary knowledge, and reading speed. The goal is to learn more about academic L2 reading in this population and the extent to which the use of two languages in the university context may affect reading approaches and outcomes.

The first study compares Norwegian university students' awareness of reading strategy use in L1 and L2 academic reading. Despite reporting more difficulties when reading L2 texts, the students in this sample did not appear to use more strategies to compensate for these difficulties, perhaps due to institutional expectations that reading in English should be similar to reading in L1. The second study investigates receptive English vocabulary at different frequency levels. It found a high degree of variation in L2 vocabulary knowledge, for which the main predictor was the amount of English encountered outside of formal education. The third study compares the reading speed of an academic text between Norwegian university students and matched groups of L1 and L2 English-speakers in the UK. It found that L2 reading speed of Norwegians was significantly slower, on average, than that of L1 and L2 readers in an English-speaking environment. This suggests that slower reading is not purely a consequence of reading in L2, but perhaps also of the linguistic environment.

Overall, the studies in this thesis suggest that although many of the participants demonstrate the L2 skills and proficiency needed for academic reading in English, there are many who are likely to be struggling due to slow reading, gaps in L2 vocabulary, and inefficient strategies to overcome these obstacles. The findings indicate that the parallel language situation found in Norway can help to explain aspects of academic L2 reading in this population and that the linguistic context needs to be considered in developing expectations and offering support to

students. This has implications for our understanding of academic L2 reading, not only in Norway but also in other parts of the world where students need to read in L2 English as part of their higher education.

Sammendrag

Statusen til engelsk som akademisk *lingua franca* betyr at engelsk ofte blir brukt i høyere utdanning selv der det ikke er morsmålet for flertallet av studentene. I mange land, deriblant Norge, brukes både engelsk og det lokale språket parallelt for undervisning på universitetsnivå. Målet med denne PhD-avhandlingen er å utforske akademisk lesing på engelsk som andrespråk hos avanserte andrespråksbrukere i en slik parallellspråklig kontekst på norske universitet. Nordmenn regnes for å ha blant de høyeste nivåene av engelsk som andrespråk i verden og blir daglig eksponert for språket. Likevel har tidligere forskning vist at selv med relativt høye engelskkunnskaper, er det fortsatt mange norske universitetsstudenter som sliter med å lese akademiske tekster på engelsk (f.eks. Hellekjær, 2009, 2012a). Avhandlingen består av tre studier som presenterer kvantitative data om norske universitetsstudenters lesestrategier, engelske ordforråd og lesehastighet. Målet er å forstå mer om engelsk akademisk lesing i denne gruppen, og å forstå i hvilken grad bruken av to språk i universitetssammenheng kan påvirke lesemetoder og utbytte.

Den første studien sammenligner norske universitetsstudenters bevissthet om lesestrategibruk i akademisk lesing på norsk og engelsk. Til tross for at de rapporterte om større vanskeligheter med å lese tekster på engelsk enn på norsk, så det ikke ut til at studentene i denne studien brukte flere strategier for å kompensere for disse vanskene, kanskje på grunn av institusjonelle forventninger om at lesing på engelsk skal være likt lesing på norsk. Den andre studien undersøker reseptivt engelsk ordforråd på forskjellige frekvensnivåer. Den fant en høy grad av variasjon i ordforråd, der den viktigste prediktoren var hvor mye engelsk deltakerne ble eksponert for utenfor formell utdanning. Den tredje studien sammenligner lesehastighet for en akademisk tekst mellom norske universitetsstudenter og matchede grupper med morsmålsbrukere og andrespråksbrukere av engelsk i Storbritannia. Den fant ut at lesehastigheten på engelsk i gjennomsnitt var betydelig lavere for nordmenn enn både morsmåls- og andrespråksbrukere i et engelsktalende miljø. Dette tyder på at lavere lesehastighet ikke bare er en konsekvens av lesing på andrespråk, men kanskje også av det språklige miljøet.

Til sammen tyder studiene i denne avhandlingen på at selv om mange av deltakerne har engelskferdighetene som trengs for akademisk lesing, er det mange som sannsynligvis vil ha problemer på grunn av lav lesehastighet, manglende ordforråd og ineffektive strategier for å overvinne disse hindringene. Disse funnene indikerer at den parallelle språksituasjonen i Norge

kan bidra til å forklare aspekter ved akademisk lesing på engelsk i denne gruppen, og at den språklige konteksten må tas i betraktning med hensyn til forventninger og støtte som tilbys til studentene. Dette har konsekvenser for hvordan vi forstår akademisk lesing på engelsk, ikke bare i Norge, men også i andre deler av verden der studenter må lese på engelsk som andrespråk som en del av sin høyere utdanning.

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Obviously, huge and heartfelt thanks must go to my supervisors Associate Professor Anne Dahl and Professor Glenn Ole Hellekjær for their generous support and guidance. This project never would have even started without Anne's encouragement, and she has been a beacon of awesomeness throughout the entire adventure, acting as a mentor, sounding board, cheerleader, and co-author on one of the articles, as well as a warrior in the epic Survey Saga. Thank you so much for the insightful comments, enthusiastic discussions, and for reminding me of my passion for this topic when things got difficult. Thank you to Glenn for being such a wonderful source of wisdom, knowledge, and experience, for ensuring that I anchored my work in theory, for encouraging me to aim high, and for vastly improving my academic writing in the process. Huge thanks as well to Professor Diane Pecorari for your helpful and insightful comments on my work and a very useful and enjoyable discussion at the Master Class.

I would like to thank everyone who was involved in the data collection for this project. This work could not have existed without the hundreds of participants who took part in this study, and I am incredibly grateful and touched that so many people wanted to contribute to this project. Their enthusiasm for this topic and the feedback I received have been a tremendous source of encouragement. Thanks as well to the many, many lecturers at NTNU who allowed me to take over their classes to tell students about my study. Special thanks to Associate Professor Rannveig Grøm Sæle, Dr Steven Frisson, Professor Joel Talcott, and Dr Angie Johnson for their generous help with recruiting participants from other institutions.

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Nicole Busby

Trondheim, June 2020

Part I: Cover article

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Part II: The articles

Article 1

Busby, N. L. (2018). Comparing first and second language reading: the use of metacognitive strategies among Norwegian students. *Acta Didactica Norge*, 12(2), 1-26.

<https://doi.org/10.5617/adno.5579>

Article 2

Busby, N. L. (2020). Words from where? Predictors of L2 English vocabulary among Norwegian university students. *ITL - International Journal of Applied Linguistics*, published online first.

<https://doi.org/10.1075/itl.19018.bus>

Article 3

Busby, N. L. & Dahl, A. (accepted) Reading rate of academic English texts: Comparing L1 and advanced L2 users in different language environments. *Nordic Journal of English Studies*.

This article is written in collaboration with my supervisor Associate Professor Anne Dahl. I had the main responsibility for the conception and design of the experiment as well as the data collection and statistical analysis. Both authors worked on writing and revising the manuscript and discussed each stage of the analysis and interpretation of the results.

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List of abbreviations

ANOVA – Analysis of Variance

AVL – Academic Vocabulary List

AWL – Academic Word List

BIA+ – Bilingual Interactive Activation + model

BICS – Basic interpersonal communicative skills

CALP – Cognitive academic language proficiency

CEFR – Common European Framework of Reference

CLIL – Content and language integrated learning

EAP – English for academic purposes

EFL – English as a foreign language

ESP – English for specific purposes

EMI – English medium instruction

IELTS – International English Language Testing System

L1 – First or native language

L2 – Second language

NSD – Norwegian Centre for Research Data

RHM – Revised Hierarchical Model

SORS – Survey of Reading Strategies

VLT – Vocabulary Levels Test

1. Introduction

The use of English as an academic lingua franca means that advanced English proficiency is a prerequisite for most non-native English speakers undertaking higher education. Students with English as a second language (L2) therefore need the ability to read university textbooks produced primarily with native English-speaking (L1) students in mind which, in many places, has led to English proficiency tests being a prerequisite for university admission. In Norway, however, Norwegian students are not required to document their English proficiency because it is assumed that they have developed the L2 skills needed for university reading in secondary school. Norwegians have some of the highest levels of L2 English proficiency in the world (Bonnet, 2004; Education First, 2020), and Norwegian students are generally expected to read English textbooks on par with native English speakers, as 'advanced L2 users' (see McMillion & Shaw, 2016). Despite this, studies have shown that at least a third of Norwegian students about to begin university would not meet the English proficiency requirements for an English-speaking university (Hellekjær, 2009, 2012a), even though many students will have much or all of their course reading in English.

This thesis investigates aspects of academic English reading among Norwegian university students. From a theoretical viewpoint, the project aims to add to our understanding of L2 reading and of the variables which are predictors of L2 knowledge and reading proficiency. It also focuses on the possible influence of the parallel language situation in Norwegian universities, where students are expected to use both English and their L1 interchangeably. The project provides empirical data about important aspects of Norwegian university students' English reading skills which can help to evaluate how well the students' reading proficiencies match with the expectations of the universities.

The underlying structure of the thesis is based on the observation that L2 reading requires both reading skills and L2 proficiency (e.g. Alderson, 1984; Carrell, 1991; Koda, 2007). Reading itself is a difficult phenomenon to investigate because it is impossible to directly observe the process itself, only some aspects of the outcome. Reading involves recognising the sounds of language through print, but also understanding the structure of language, and then constructing meaning in relation to the reader's existing concepts and intentions (Alderson, Haapakangas, Huhta, Nieminen, & Ullakonoja, 2015). While L1 reading has been extensively studied, it is still not entirely understood. Assessing L2 reading is even more complicated because it also involves the knowledge of and the ability to use the L2 in addition to reading (Alderson et al., 2015). These

authors also note that the threshold for L2 reading comprehension varies according to text type, topic, purpose of reading, and world knowledge. Therefore, this thesis is not 'testing' L2 reading per se. Instead, the goal is to add to our understanding of the process by investigating a number of different variables that relate to academic L2 reading in this particular context.

The present thesis comprises three studies based on quantitative data collected using online surveys, with different groups of participants recruited for each study; 800 university students altogether. All were over the age of 18 and participated voluntarily. The overall project as well as the individual studies were registered with the Norwegian Centre for Research Data (NSD).

The goal was to learn more about what characterises academic L2 reading in a parallel language context. Research suggests that differences between L1 and advanced L2 readers may be due to the influence (either positive or negative) of L1 reading strategies, to limited L2 knowledge or to L2 processing being less automatized (Shaw & McMillion, 2008). Each of the three studies in this thesis focused on one of these aspects of L2 reading in order to give an overall picture of academic L2 reading in this particular context. Each of the aspects targeted is discussed in more detail below.

Study 1 investigates metacognitive awareness of reading strategies, with the aim of finding out whether Norwegians use different reading strategies when reading academic texts in L1 and L2. It has been suggested (e.g. Brevik, 2015a; Hellekjær, 2005, 2008, 2009) that inefficient reading strategy use may be one explanation for the difficulties experienced by Norwegian students when reading in English. The parallel language context, where students are expected to read texts in both languages, may also impact how they approach L2 reading. This study therefore targeted participants whose study programs required them to read in both Norwegian and English to compare their approaches to reading academic texts in L1 and L2.

Hellekjær (2005) found that Norwegian students reported unfamiliar vocabulary to be their main difficulty when reading in English, and there have also been questions as to whether the Norwegian school curriculum for English contains suitable and sufficient materials to teach students the vocabulary they need for reading in English at university (Hellekjær, 2005; Skjelde, 2015). Therefore, Study 2 examines the students' L2 vocabulary knowledge, as well as which types of input are associated with vocabulary learning, and how the vocabulary they know matches with the lexical coverage figures that have been demonstrated to be important for academic reading. The participants were recruited from three study programs with varying

proportions of English to investigate whether L2 vocabulary knowledge varied in relation to the amount of English reading required.

Study 3 investigated reading speed, as previous research has suggested that Norwegian students need more time than expected to complete L2 reading tasks (Hellekjær, 2005), and studies have found slower reading in L2 than L1 even among highly proficient L2 users (Fraser, 2007; Shaw & McMillion, 2008). This, however, has not previously been tested using academic texts. This study therefore compares reading speed among Norwegian university students to matched groups of native English speakers and to advanced L2-English users in an English-speaking environment in order to find out whether L2 status and/or the linguistic context affects reading speed of academic texts.

In combination, the studies give a picture of academic L2 reading from three different perspectives and facilitate investigation of the overall research question of *what characterises academic L2 reading in a parallel language context*. The three studies with their individual research questions and the overall research question are presented in Table 1.

Table 1: Design of the studies

	Study 1	Study 2	Study 3
Focus	Reading strategies	Vocabulary knowledge	Reading speed
Main tool for data collection	Survey of Reading Strategies	Vocabulary Levels Test	Timed academic reading task
Number of participants	316	189	295
Main research question	Do Norwegian university students use different reading strategies when reading in L1 (Norwegian) and L2 (English)?	What are the levels of receptive English vocabulary knowledge among Norwegian university students and what input factors are associated with vocabulary knowledge?	How does the reading speed of Norwegian students compare with that of native English-speakers and other L2 users when reading academic English texts?
Overall research question	What characterises academic L2 reading in a parallel language context?		

The combination of these studies gives a multi-faceted perspective on academic reading in this population and contributes to our understanding of how input factors and context play a role in this. The results of this project are relevant to other countries with a similar parallel language approach to university education. This project is also relevant more widely in that if Norwegian students, with their reputation for high levels of English proficiency, are experiencing difficulties, it could help us to understand and highlight the challenges facing non-native English-speaking students in other parts of the world.

With regard to structure, the thesis begins by introducing the background (Chapter 2) and context for the study (Chapter 3), as this is very important for understanding the factors under investigation. Chapter 3 gives an overview of the relationship between English and Norwegian, the role of English in Norway, and previous relevant research that has been conducted on this population. This is followed by a literature review section which begins by introducing theories of reading (Chapter 4) before expanding into a discussion of L2 reading (Chapter 5), and finally academic L2 reading (Chapter 6). After a summary of the literature, the studies are introduced with a focus on research questions and methodology (Chapter 7). Finally, the main findings from the studies are described and discussed in terms of the contributions this research makes to the field (Chapter 8). The articles themselves are found at the end of the thesis.

2. English in academia

As mentioned above, the use of English as an academic lingua franca means that reading in L2 is a common requirement around the world for university students who are not native speakers of English, whether they are studying in an English-speaking country or in their own. In fact, the overall use of English in higher education is increasing (Dearden, 2015; Wächter & Maiworm, 2008), which makes it important to understand how students read academic texts in an L2. This section describes the motivations and practices behind the use of L2 English in higher education and the impact they have on students.

The use of English in higher education in situations where it is not the main language of the majority of students has been variously classified as parallel language use, English medium instruction (EMI), content and language integrated learning (CLIL), and English for academic/specific purposes (EAP/ESP). Although these terms have a large degree of overlap, they have slightly different meanings and usages. The learning of English is a more explicitly stated goal in CLIL and EAP/ESP than it is in EMI or parallel language use, since the focus of EMI, and of parallel language use, is the use of English as a tool to teach academic content, with little or no overt focus on language learning (Pecorari & Malmström, 2018). However, incidental language learning is often a hoped-for or expected, although often unacknowledged, outcome of EMI (Dearden, 2015; Pecorari & Malmström, 2018). Parallel language use, on the other hand, is motivated by the wish to protect the status of the local language(s) (Hultgren, 2014), while at the same time acknowledging that English is already present and largely unavoidable (Airey, Lauridsen, Räsänen, Salö, & Schwach, 2017), as is the case in the current context.

There are many reasons why English is used in university settings in countries where it is not the majority language. Increased globalisation has led to a need for a lingua franca to enable international communication; English is the undisputed language of science and technology worldwide (Nunan, 2003), and therefore the majority of research articles and publications read by university students are written in English. In 2012, approximately 80% of the journals indexed on Scopus (the largest abstract and citation database of peer-reviewed literature) were published in English (van Weijen, 2012). English is particularly prevalent in the science publishing community with over 95% of journals listed in the Science Citation index published in English in 1998 (Van Leeuwen, Moed, Tijssen, Visser, & Van Raan, 2001).

Traditionally, English language materials have been used in university reading lists when there was no appropriate equivalent in the students' L1 (Pecorari, Shaw, Malmström, & Irvine, 2011; Schwach & Dalseng, 2011). This is particularly the case in countries with smaller populations, where there is little financial incentive to translate these texts, especially for more specialised subjects with fewer students (Pecorari, Shaw, Malmström, et al., 2011). Even when reading materials are available in the local language, higher market share means the original English-language texts usually have higher production values, more regular updating, careful editing and more support material available than translated versions (Pecorari, Shaw, Malmström, et al., 2011). Higher print runs also mean that English language textbooks are likely to be cheaper (Hatlevik & Norgård, 2001) which can make them more popular with students as well.

English is also often associated with prestige and excellence (Graddol, 2006) and some universities have specialised English-language courses targeted at high-achieving students (Pecorari, Shaw, Malmström, et al., 2011). English-medium teaching can also be used to attract international students and staff (Coleman, 2006; Macaro, Curle, Pun, An, & Dearden, 2018; Wächter & Maiworm, 2008), and as part of a rhetoric of increasing internationalisation (Mežek, Pecorari, Shaw, Irvine, & Malmström, 2015).

2.1 English at the individual level

Despite it not being an explicit goal of EMI or parallel language use, the use of English language teaching or reading materials is often motivated by the expectation that exposure to English will improve English proficiency among students through incidental language learning (Pecorari, Shaw, Irvine, & Malmström, 2011; Pecorari, Shaw, Malmström, et al., 2011). Teaching staff may believe that the increased contact with English, especially language related to their field of study, will assist students in gaining English skills that are necessary for their future careers (Mežek et al., 2015; Pecorari, Shaw, Malmström, et al., 2011). In some ways, this is an unusual approach to improving language skills since 'teaching English to speakers of other languages is typically accomplished through deliberate, form-focused instruction' (Pecorari & Malmström, 2018, p. 497). Despite, or perhaps because of this underlying belief, very few studies have actually measured the impact of English-medium teaching on English language learning or proficiency (Macaro et al., 2018).

The use of English in universities is met with both positive and negative attitudes, sometimes expressed by the same individuals (Pecorari, Shaw, Malmström, et al., 2011). Positive attitudes towards English have been linked to expectations that reading in English will improve English language skills which will be helpful in the students' future careers (Pecorari, Shaw, Malmström, et al., 2011) and have been shown to be correlated with higher levels of confidence and proficiency in English (Bukve, 2018). On the negative side, researchers have found that Swedish university students report having to spend more time reading when texts were in English, and that they are able to read less of the material (Airey, 2009; Pecorari, Shaw, Malmström, et al., 2011). Some students also report feelings of frustration associated with comprehension difficulties when reading in L2, and that they consider English textbooks as a barrier to their academic success (Pecorari, Shaw, Malmström, et al., 2011). Students with lower English proficiency may even avoid reading textbooks altogether (Pecorari, Shaw, Malmström, et al., 2011; Ward, 2001) because it is 'just too difficult' (Ward, 2001, p. 150).

Using English as an integral part of the university system also presupposes a certain level of L2 English proficiency from the staff and students involved (Pecorari & Malmström, 2018). However, this assumed proficiency does not always match the actual proficiency of the individuals involved, and research has demonstrated that this discrepancy can lead to difficulties for both students (Airey, 2010; Airey & Linder, 2006; Flowerdew & Miller, 1992; Hellekjær, 2010, 2012a; C. Jensen, Denver, Mees, & Werther, 2011; Miller, 2007) and staff (Helm & Guarda, 2015; C. Jensen et al., 2011; C. Jensen, Denver, Mees, & Werther, 2013; Vinke, Snippe, & Jochems, 1998). Compared to teaching in L1, the use of L2 English in higher education has been shown to lead to differences in teaching style (Dafouz, Nunez, & Sancho, 2007; Helm & Guarda, 2015), less participation by students (Airey & Linder, 2006; Tatzl, 2011), and less motivation to read in L2 (Pecorari, Shaw, Malmström, et al., 2011; Ward, 2001). These differences are apparent even when the students themselves claim that the language makes no difference to their learning (Airey & Linder, 2006). Since it is important that students are taught in a language they understand (Cummins, 1984), these findings have led to concern that non-native English-speakers may be at a disadvantage when they have to read academic materials in English.

2.2 English at the societal level

In addition to potential challenges at an individual or institutional level, it is also important to consider the more general impact of L2 English on society. The use of English instead of the local

language in higher education has led to concern about the influence it may have on the local language's status in the community (C. Jensen & Thøgersen, 2011), potentially leading to domain loss. This refers to a situation where a language loses territory because another, more dominant, language takes over some domains of society; for example, if English becomes the language of academia and the local language is relegated to administrative or everyday social situations only (Airey et al., 2017). The possible consequences of such a language shift have been the subject of considerable discussion (see Coleman, 2006 for an overview). In addition to the potential for domain loss or even language loss, there are also concerns about social responsibility, namely that publicly funded institutions such as universities should serve the local people, preserve the language, and disseminate knowledge in a language the public can understand (Hultgren, Gregersen, & Thøgersen, 2014).

There are particularly strong concerns about domain loss in academia in the Nordic countries (Brock-Utne, 2001; Ljosland, 2007), which have relatively small language communities and tend to have a high percentage of English in the university curriculum (Airey et al., 2017; Arnbjörnsdóttir & Prinz, 2013; H. P. Jensen & Johannesson, 1995; Schwach & Dalseng, 2011; Shaw & McMillion, 2008). Many graduate programs in these countries are even taught entirely in English (Airey et al., 2017). Consequently, the Nordic countries have adopted the idea of 'parallel language use' as a means of preventing domain loss (Bukve, 2019; Hultgren, 2016; Nordic Council, 2007). In a document called Declaration on a Nordic Language Policy, the Nordic Council (2007, p. 93) describes parallel use of languages as 'the concurrent use of several languages within one or more areas' and a situation where 'none of the languages abolishes or replaces the other; they are used in parallel'. In an ideal context of parallel language use, two (or more) languages coexist on equal terms (Harder, 2008), with neither encroaching on the other (Hultgren, 2016). Nordic governments are determined that increasing proficiency in English should not come at the expense of the national languages (Phillipson, 2012). Parallel language use emphasises the need for multiple languages to exist in the same space, but does not necessitate an exact reduplication of all activities in both languages (Hultgren, 2014). Although it can sometimes be unclear how parallel language policies are expected to be enacted (Hultgren, 2016), such an approach presupposes a high level of competence in both/all languages concerned.

3. The Norwegian context

The situation in Norway makes for an interesting case study for investigating academic L2 reading. The majority of reading research has focused on L1 reading, and studies that have focused on L2 readers have largely concentrated on those with lower levels of L2 proficiency (McMillion & Shaw, 2016). Furthermore, research conducted on higher proficiency L2 readers has tended to focus on regions with a greater linguistic distance between the L1 and L2 (e.g. Fraser, 2007). Norwegians have a reputation for high levels of English proficiency (Education First, 2020), and have many advantages when it comes to learning to read in English. Therefore, Norway can be a good test case for academic L2 reading in a high proficiency population with a closely related L1¹. The following section gives an overview of the Norwegian context in which this study is set, including the role of English in Norway, how it is taught, and previous research into English proficiency in Norway.

Norway is one of the wealthiest countries in the world with high standards of living, a public welfare system, relatively equal income distribution (OECD, 2018), and a fairly small population of just over 5 million (Statistics Norway, 2020a). English has been variously described as both a foreign language and a second language in Norway, although neither of these labels seem entirely accurate (Graddol, 1997). Although Norway has traditionally been included in the 'expanding circle' of countries that use English as a foreign language (Kachru, 1990), the situation is more complex and categorisations of foreign or second language are often based on historical and political factors (Crystal, 2012). According to a more usage-based classification, English in Norway has long been considered as being on the verge of becoming a second language (Bruthiaux, 2003; Phillipson, 1992). The relatively small population, the use of English in higher education, and substantial involvement in international activities using English as a lingua franca all contribute to this characterisation (Bruthiaux, 2003). In the present thesis, English is referred to as an L2 in Norway for these reasons, rather than as a reflection of proficiency. Research into English proficiency in Norway is discussed in Section 3.2.

General levels of education in Norway are high. According to OECD reports, 44% of Norwegians aged 25–64 have a tertiary degree, which is higher than the OECD average of 39% (OECD, 2019). The majority of tertiary institutions in Norway are publicly funded and do not charge tuition fees

¹ It should be noted that Sámi also has official language status, and there are many other languages spoken in Norway, but this thesis will focus on Norwegian students who have Norwegian as an L1, which is the vast majority.

and, in addition, students receive generous financial support to help cover living expenses while they study. This support comes in the form of student loans, of which 40% is converted to a grant for students who follow the normal rate of progression (OECD, 2019). Access to most fields of study is open and contingent only on achieving a minimum standard in examinations at the end of upper secondary general education. However, only 43% of students graduate from university within the expected duration of their program of study, and 12% of bachelor students leave their program after only a year of study (OECD, 2019).

3.1 Relationship between Norwegian and English

The focus of this thesis is how Norwegian students read in English as their L2, so it is important to examine the relationship between the languages. Norwegian and English are both Germanic languages and originate from a common branch of the Indo-European language family. English is a West Germanic language and Norwegian comes from the North Germanic branch, as do the other Scandinavian languages of Swedish and Danish. However, historical events have led to English being strongly influenced by Romance languages such as Latin and French. Norwegian and English share many cognates, some of which date back to a common Anglo-Saxon language or from the time of Viking occupation of parts of the British Isles in the 9th and 10th centuries (Freeborn, 1998), and some which have been loaned in more recent times. Norwegian and English also share a very similar grammatical structure (Olsen, 1999). The similarity between these languages means knowledge can be transferred more easily than between unrelated languages, and 'Norwegians have a reputation for learning English easily since their first language facilitates the learning' (Olsen, 1999, p. 192). The similarity between the two languages can even lead to confusion, and researchers have described an overreliance on language similarities leading to errors in English production (Hasselgren, 1994; Olsen, 1999).

English is also influencing the Norwegian language with regard to the borrowing of individual lexical items and in the form of calques, the latter being when idiomatic English phrases are translated directly into Norwegian (Sunde & Kristoffersen, 2018). Lexical borrowing is common (Norås, 2007), and English is the prime source of loanwords in Norwegian (Sandøy, 2013). These loan words and calques are shown to be used more by Norwegians with higher English proficiency and more exposure to English (Sunde & Kristoffersen, 2018). Code-switching between English and Norwegian is common, especially among younger Norwegians

(Johannessen, 2014; Norås, 2007), and is often associated with identifying oneself with international communities (Johannessen, 2014; Sunde, 2016).

3.2 English proficiency in Norway

English is considered an essential language in Norway (Crystal, 2012), and is found everywhere in daily life. The amount of everyday exposure to English, as well as the generally high proficiency, means that 'English no longer feels *foreign* to Norwegians' (Rindal, 2013, p. 1). Foreign language television (usually in English) in Norway accounts for more than 90% of programming time and, with the exception of children's television, is usually subtitled rather than dubbed (Media Consulting Group, 2011). A survey of Norwegian 16-year-olds from 2004 found that all participants reported watching television programs in English, and the majority also listened to music, used the internet and played computer games in English (Bonnet, 2004). Access to the internet and the growing popularity of streaming services for movies and TV shows means the exposure to English in everyday life is increasing. Norway has the highest total rates of daily participation in social media among OECD countries (OECD, 2019), much of which is in English. English is also extremely important in the workplace, with the vast majority of export activities in Norwegian firms being conducted in English, whether in English-speaking countries or as a lingua franca in other countries (Hellekjær, 2012b).

As mentioned above, Norwegians consequently have a reputation for high levels of English proficiency. In a study of eight European countries, Norwegian students achieved the highest scores on written English production and oral comprehension, even compared to their Nordic neighbours (Bonnet, 2004). International rankings of L2 English proficiency have shown that Norway is consistently ranked among the top countries in the world (Education First, 2020). Some Norwegian secondary school students have even been found to be better readers in English than in Norwegian, particularly those who have a lot of exposure to English outside of school (Brevik, 2016; Brevik & Hellekjær, 2018; Brevik, Olsen, & Hellekjær, 2016).

Although daily exposure to conversational English is common, and proficiency appears to be high in terms of basic communication, the proficiency needed for academic English reading has been called into question by a number of studies. Hellekjær (2005, 2009, 2012a) tested upper secondary school students' English reading comprehension using the academic module of the IELTS (International English Language Testing System) tests which are used as an entry

requirement to English-speaking universities, especially in Australia and the UK. Among students tested in 2002, he found that only one third of these students would have achieved Band 6 (out of 9) on the IELTS Academic Reading Module, which is the minimum score for entry into English-speaking universities in those countries (Hellekjær, 2005). In a follow-up study in 2012, he found that more than half (57%) achieved this level. This is clearly a significant improvement, but still a serious concern since these students had met the requirements for admission to university in Norway, where a large proportion of academic reading takes place in English. Furthermore, researchers have raised doubts as to whether this score is sufficient for academic success at university (Bretag, 2007; Feast, 2002), and in the IELTS handbook people who achieve a Band 6 level of English are said to require further English teaching before undertaking university courses (IELTS, 2007).

These results have also been found to be reflected in the students' perceptions of their own English reading, with 33% of surveyed Norwegian upper secondary school students reporting experiencing serious difficulties with English reading and a further 44% experiencing some level of difficulty (Hellekjær, 2009). Norwegian university students have also reported experiencing difficulties with understanding lectures in English (Hellekjær, 2010). Interviews with Norwegian university students in a study by Arnsby (2013) also revealed that many were finding reading in English to be slow and more difficult than in their L1, and that some were even considering changing their program of study to something that required less English reading.

There appears to be a discrepancy between the apparent high proficiency seen in international rankings and the poor results in academic reading tests and reported difficulties with reading for university. This may be at least partly explained by considering the different types of language proficiencies. Cummins (2000) describes a distinction between conversational (BICS: basic interpersonal communication skills) and academic (CALP: cognitive academic language proficiency) language skills. The fact that Norwegians are exposed to large quantities of receptive informal English outside of school has probably led to high levels of BICS-type proficiency, but they may not have developed the CALP-type skills needed for academic reading, which could explain why they are struggling with English in IELTS tests and at university (Hellekjær, 2009).

Furthermore, it should be noted that despite a high average proficiency in test scores, there appears to be extensive variation in English proficiency among Norwegian students, as reflected in the high standard deviations in tests of reading comprehension and written English

production (Bonnet, 2004). Hellekjær (2009) also found much greater variation in reported difficulty with reading English textbooks compared to reading textbooks in Norwegian. A similar situation has been seen in other Nordic countries, with substantial variation in English proficiency levels observed in Sweden (Mežek, 2013c) and Iceland (Pétursdóttir, 2013) despite similar educational backgrounds. This demonstrates the importance of recognising variation both between individuals and between different types of language proficiencies when considering how Norwegian students read academic English texts for university.

Another potential explanation for the poor results on studies using IELTS tests is that, rather than being unable to understand the texts, instead students read and worked too slowly to complete the tests in the allotted time and simply did not answer all of the questions (Hellekjær, 2005). It is well established that even highly proficient L2 readers read more slowly in L2 than L1 (Fraser, 2007; Shaw & McMillion, 2008), but Hellekjær (2008) suggests that inefficient strategy use may also play a role in this. Hellekjær (2008, p. 13) explains that for many students, the poor results on the IELTS tests appear to result from a 'counterproductive strategy of careful reading for detail which is typical of textbook reading in [L2 English] instruction'. Although many students did not complete the test in time, most of the answers they managed were correct (Hellekjær, 2005). This inefficient approach to working in English nevertheless calls into question the assumption that upper secondary school prepares students well for academic reading in English both in terms of L2 proficiency and reading skills (Hellekjær, 2008).

3.3 English instruction in Norway

The first ten years of education in Norway are mandatory, and English is taught for all of these years. The next three years of upper secondary school are voluntary, and students can choose between general or vocational education programs. In the current Norwegian national curriculum, English is listed as a core subject and as separate from foreign languages. From years 1 to 4, Norwegian students are taught English in the classroom for 138 hours, which is an average of 34.5 hours a year, or less than an hour a week (UDIR, 2020a). This increases to 228 hours in years 5 to 7 and 222 hours in years 8 to 10. In upper secondary school (years 11 and 12), depending on the program chosen, English is usually taught for 140 hours over one or two years, or more in the case of language specialisation students (UDIR, 2020a).

There is evidence that the amount of English teaching in the curriculum, at least in the early years of primary school, has a limited impact on language acquisition. A study of Norwegian first-grade pupils found no significant gains in receptive English vocabulary over a year of following the normal curriculum, whereas an experimental group who received increased English input in the classroom made significant gains (Dahl & Vulchanova, 2014). This suggests that the amount of formal English teaching students receive may not be sufficient and that they are likely acquiring a significant proportion of their English knowledge from sources outside of the classroom. However, it is still important to recognise the special place of English in young Norwegians' educational experience. As Chvala and Graedler (2010, p. 75) point out, in Norwegian schools 'literacy in English develops alongside the pupils' first language literacy. Other foreign languages, by contrast, are not introduced until after the foundation for literacy has been established'.

English is a compulsory subject in the first year of upper secondary school, and students can then choose to study English for an additional one or two years. This means that for students who finish their English education in the first year of upper secondary school, which the majority currently do, there could be two-year gap without formal English education by the time they start university. Arnsby (2013, p. 25) points out that in practice, 'this gives the message to pupils that by finishing this first-year English course they have the skills and qualifications needed to study at higher levels'. A study by Skarpaas (2011) found that less than half of students in the General Studies (university track) program chose to take at least one elective English subject at upper secondary school. She found that those who chose the English subjects were motivated by wanting to improve English skills for future academic or professional situations. Students who did not choose English classes usually made this decision because they had to prioritise other classes, but still recognised the importance and usefulness of English skills for their future.

Preparing students for reading in English as part of higher education is not an explicitly stated goal of English instruction in upper secondary school, although the curriculum goals do relate to the L2 proficiency required for university study. The national curriculum which has been in place since 2013 for the obligatory part of the English program, including the first year of upper secondary school, notes that 'English is increasingly used in education' and that in order to 'succeed in a world where English is used for international communication, it is necessary to be able to use the English language and to have knowledge of how it is used in different contexts' (UDIR, 2020a). It also refers to English proficiency as providing 'the opportunity to acquire

information and specialised knowledge through the English language'. The competence aims for the English program also explicitly mention comprehension and use of both general and academic vocabulary, text comprehension, and being able to 'read to acquire knowledge in a particular subject from one's education programme' (UDIR, 2020a). Changes to the national curriculum will be phased in from Autumn 2020 onwards, and the updates to the curriculum include the slightly more specific goals that students should be able to understand and use academic language (UDIR, 2020b). The number of hours of English teaching remain the same in the next curriculum (UDIR, 2020b), although there has been some discussion of making English classes obligatory in all three years of upper secondary school (Lied-commission, 2020).

There has been some criticism of both the materials and techniques used for teaching English reading skills in Norway. Skjelde's (2015) study of written materials used for teaching English at upper secondary school revealed that because these texts were simplified and tailored to L2 learners, they therefore had a much lower percentage of academic vocabulary than is found in authentic academic texts. She suggests that the texts on the curriculum are therefore not preparing students for academic reading in English at a university level. Brevik (2015b) suggests that although students are taught about reading strategies in upper secondary school, many fail to see the personal relevance to their own reading and do not make use of the strategies unless explicitly instructed to do so. Hellekjær (2005, 2008) has also suggested that the method of teaching of reading strategies in Norwegian schools has led to an overemphasis on reading slowly and carefully, to the detriment of the students' efficient L2 reading, especially at the university level.

3.4 English in the Norwegian university context

Within the Norwegian higher education system, English plays an important role, accounting for a considerable proportion of written materials and lectures (Ljosland, 2011; Schwach & Dalseng, 2011). While Norwegian universities have developed policies emphasising the importance of parallel language use (see, for example, NTNU, 2009; UiO, 2019), choices about which language is to be used for lectures, reading, and writing assignments are often made by the faculty, department or by the individual teachers (Bukve, 2019). The parallel language approach means that either Norwegian or English may be used for these different academic activities, and that the two languages are often used for different activities (for example, lectures and assignments

may be in Norwegian and reading texts in English) in the same class, meaning students need to master new concepts and terminology in two languages simultaneously.

The amount of English literature in Norwegian university courses tends to vary by level, so that more English is required at a graduate than undergraduate level (Ljosland, 2007). Although teaching in the first year of university is often in Norwegian, this is not mandated, and '[t]eaching in English could be given without any further approval being necessary' (NTNU, 2009). The proportion of English in the curriculum also varies considerably by discipline. A report on the language of Norwegian first year undergraduate reading lists revealed that while almost all of the literature for nursing students was in Norwegian, first year physics students were required to read more than 70% of their texts in English (Schwach & Dalseng, 2011). This is part of a more general pattern, with very few Norwegian textbooks published in the fields of natural sciences and mathematics, possibly because of the costs associated with producing teaching materials in these subjects (Schwach, Brandt, & Dalseng, 2012). Selecting reading materials in English is often a matter of necessity rather than choice, as the majority of academic materials are in English (see Chapter 2), which means that students are expected to read the same textbooks as their counterparts in English-speaking countries (Shaw & McMillion, 2008, 2011).

The transition from upper secondary school to university therefore signals a shift in students' relationship with English: from being taught English as a language, as *L2 learners*, university students are suddenly *L2 users*, being taught new content *in* English. This is a contrast to other parts of the world which may offer academic English training as a part of university education. As in other Scandinavian countries, it is often taken for granted that since spoken comprehension and production is so advanced, students will be equally capable of understanding advanced academic texts in English (Shaw & McMillion, 2008). McMillion and Shaw (2016) use the term 'advanced L2 readers' for those who have had many years of English education and are expected to read more or less on par with L1 readers, regardless of actual proficiency. Norwegian university students have typically been taught English for at least 11 years, are in an English-rich environment, and are expected to read academic texts in English. Therefore, I will adopt this terminology as a reflection of their situation rather than an indication of proficiency at an individual level.

As well as being given texts to read in English, students may also have lectures or other academic activities in English, which may be part of the design of the course (for example when English is the subject of study) or can also occur due to the presence of non-Norwegian-speaking

staff or students. Ljosland (2007) explains that even classes that in theory are taught in Norwegian can often end up being taught in English due to the presence of even one foreign student. The goal of internationalisation also plays a role in language choices. In 2002, the clause in the Universities and Colleges Act stating that the 'language of instruction is normally Norwegian' was removed with the intention of allowing for more English-medium courses, thereby attracting more exchange students to Norway (Ljosland, 2007). She also found that many PhD students chose to write their thesis in English, even when they had the option to write in Norwegian, in order for it to be readable by an international committee or accepted in their academic community.

Norwegian students do not need to pass any specific English exam to be admitted to Norwegian universities, only to achieve sufficiently good grades overall. As Hellekjær (2009, p. 199) puts it, 'Norwegian institutions of higher education take for granted that English as a foreign language (EFL) instruction in upper secondary schools effectively prepares students for the use of English in higher education'. Foreign students intending to study at Norwegian universities, however, must demonstrate a minimum level of English proficiency. There is no formal correspondence between grades in Norwegian upper secondary school and external measures such as the Common European Framework of Reference (CEFR), but international students must generally document proficiency at B2 level or above to gain admission to Norwegian universities (Samordna Opptak, 2019). The high English proficiency requirements for foreign students leads to the assumption that all university students 'should be able to take the use of English in their stride' (Pecorari, Shaw, Malmström, et al., 2011, p. 328). In some ways, this parallels the situation in many English-speaking countries where it is assumed that L2 English users who have met the English proficiency requirements are able to read and write in English at the same level as native speakers (Pecorari, Shaw, Irvine, et al., 2011).

Given the high levels of English encountered in the Norwegian university context, and the high levels of English proficiency that students are expected to, or presumed to have upon starting university, it is important to understand how this translates into their *actual* L2 reading. The following chapters will give an overview of the processes involved in reading, as well as how L2 reading differs from reading in L1, before introducing the research into Norwegian university students' academic L2 reading which was conducted for this thesis.

4. Reading

The general aim of this thesis is to investigate studying in a second language, and reading is the skill in focus because this is the most common activity to be conducted in L2 in the context of the present project. Reading is something we usually take for granted (Grabe, 2009). Alderson et al. (2015) have commented that in a 'literate society, it is not always realized how complex the act of reading is' (p. 68). As Grabe (2009) points out, reading takes place with seemingly little effort and little planning, and that people gain information from a huge range of texts as part of everyday life, often without consciously intending to do so. In reading research, a distinction is commonly made between the product, typically comprehension or fluency, and the process, which is 'usually hidden: it is internal to the reader, it is private and not easily examined' (Alderson et al., 2015, p. 71) and therefore presents some challenges with regard to how it can be studied. This chapter describes the processes and products of (L1) reading and the theories that have been developed about these, before a discussion of L2 reading in the next chapter.

4.1 Reading processes

Reading processes can be investigated at a variety of different levels from the reading of single words to entire texts, and can be focused on measuring knowledge of factors such as syntax and vocabulary (Shiotsu & Weir, 2007) or on the underlying comprehension processes, using response times, neuroimaging, or eye-tracking as indicators (see Keating & Jegerski, 2015 for a review). The comprehension processes involved in reading are generally divided into two basic categories: 'lower-level' processes, which relate to the input of information, and 'higher-level' processes, which are involved in the interpretation of information and relating it to what the reader already knows. The basic, lower-level processes include word recognition, syntactic parsing and encoding of meaning. The higher-level processes involve interpretation and processing of the text and direction of attention. Sequential models of this process aim to explain reading as a series of stages, with one stage needing to be completed before moving to the next. An alternative view is that these stages occur non-sequentially and the information may be processed simultaneously (Urquhart & Weir, 1998).

The sequential process models are traditionally divided into two categories, bottom-up models and top-down models. The bottom-up theories (e.g. Gough, 1972; LaBerge & Samuels, 1974) propose that a reader begins with the information gained in the lower-level processes and uses

these to construct meaning. Bottom-up, or data-driven, models begin with the stimulus, which is the text, and explain reading as the process of sequentially converting this stimulus into meaning in the brain. This type of model is referred to as 'bottom-up' because it assumes that the process progresses from the smallest units of information to the largest, i.e. first letters, then words, then sentences (Bernhardt, 2011). Top-down models, on the other hand, focus on the higher-level processes as providing a framework for the lower level processes to fit into. In top-down, or reader-driven, models the 'top' refers to the expectations and prior knowledge of the reader, and these models argue that such factors play a crucial role in the processing of the text (Urquhart & Weir, 1998). Top-down models (e.g. Goodman, 1967) presume that good reading is 'always conceptually driven, and that lower-level processes are important only in so far as they might signal or point toward conceptual features' (Bernhardt, 2011, p. 36). This approach has been used to explain why two readers could have two very different interpretations of the same text because they have had different experiences throughout their lives, and consequently the scaffolding onto which the information from the text is organised will be different (Urquhart & Weir, 1998).

Research suggests that strictly top-down or bottom-up models are unable to account fully for the complexity of the reading process and the vast majority of researchers now accept that the two processes are involved at all stages of reading and interact with each other (Block, 1992). Interactive theories of reading propose that the processing is not linear (either from higher levels to lower or vice versa), but is instead based on information from several sources (e.g. orthographic knowledge, lexical knowledge, semantic knowledge, syntactic knowledge) that is processed simultaneously (Stanovich, 1980). Where the other types of models consider each of these types of processes as dependent upon each other and operating sequentially, the interactive models regard reading as a process of synthesising information from different and relatively independent sources at the same time. One advantage of this approach is that it does not rely on one stage of the process to be completed before the next can begin, meaning that if a reader has trouble with one aspect of reading, they are not necessarily 'stuck' at that stage, which seems to be a more accurate reflection of how reading occurs in the real world. It is now generally agreed that all readers are both top-down and bottom-up readers at the same time (Grabe, 2009).

The current thinking about the reading process emphasises the purpose and ultimate goal of the reading in attempting to understand what processes are most active in a given instance.

Comprehension may be affected by individual differences such as vocabulary knowledge, subject knowledge, age and experience of the reader, motivation, concentration, and so on. The process may change depending on any of these (or many other) factors. For example, a text containing a majority of high frequency words will be read fluently by a skilled reader who will process whole words at a time. If readers come across words they are less familiar with, they may resort to reading the word by processing it in smaller parts and sounding out each letter (Samuels, 2006). The number of variables involved and the fact that the process itself is not directly observable makes it very challenging to arrive at a comprehensive theory of how reading works. The reading process is further complicated in the case of L2 reading since this requires L2 proficiency in addition to reading skills, as discussed in the next chapter.

4.2 Reading comprehension

Comprehension is generally thought of as a product of reading, and can be defined as ‘the process of simultaneously extracting and constructing meaning through interaction and involvement with written language’ (RAND, 2002, p. 11). The model of reading comprehension described by the RAND Reading Study Group emphasises the importance of different elements that affect reading outcomes: the reader (including their abilities and experiences), the text, and the activity, meaning that the construction of meaning from the text takes place in a larger socio-cultural context (RAND, 2002). Alderson et al. (2015) point out that the process of reading is usually more variable than the product, and that individual differences and context can lead to variation in processes even when this is not reflected in the outcome of the reading as measured by a reading test.

Monitoring of comprehension is a crucial part of successful reading (Grabe, 1991) because it enables a reader to recognise when the goals of reading are not being met, and undertake strategies to repair understanding (Grabe, 2009). This monitoring and awareness of one’s own comprehension processes is commonly referred to as metacognitive awareness and is vital for enabling the effective use of reading strategies to regulate the reading process (Flavell, 1979; Grabe, 1991; Mokhtari & Reichard, 2002). The ‘ability to use metacognitive skills effectively is widely recognized as a critical component of skilled reading’, and good readers, and those with more experience, have been shown to be more effective at using these skills than less fluent readers (Grabe, 1991, p. 382).

Reading strategies, broadly defined as ‘mental plans, techniques, and actions taken while reading’ (Mokhtari & Sheorey, 2002, p. 2), are under the control of the reader and include techniques such as thinking about the topic, checking understanding, and using strategies to improve comprehension (Mokhtari & Reichard, 2002; Paris & Jacobs, 1984). The use and adaptation of reading strategies to suit the goals of the reading task reflect the reader’s metacognitive skills (Van Gelderen et al., 2004). Awareness and use of reading strategies has been linked to reading ability (Alhaqbani & Riazi, 2012; Sheorey & Mokhtari, 2001; Zhang & Wu, 2009) and poor readers tend to be less aware of strategies and how to choose the best strategy for the situation (Alderson, 2000; Grabe, 2009). Training in metacognitive skills, and particularly in when to use strategies, has also been shown to improve reading (Anderson, 1991; Bannert, Hildebrand, & Mengelkamp, 2009; Block, 1992; Brevik, 2015a; Grabe, 2004), although strategy selection may be dependent on having sufficient vocabulary and background knowledge of the topic (Anderson, 1991), and can vary according to text difficulty (Feng & Mokhtari, 1998).

Reading strategies are ‘crucial to deep, long-lasting comprehension and learning’, and involve strategic activities that enable the reader to connect the information being read to existing knowledge (McNamara, 2011, p. 195). Reading comprehension involves the use of both skills and strategies (RAND, 2002), although the exact difference between these can be difficult to pinpoint since skills and strategies both help to improve comprehension when reading and the instruments used to measure the effects of strategy use on reading comprehension may not always be able to separate this from the effects of underlying skills (McNamara, 2011). However, strategies tend to be thought of as procedures that occur more consciously as a result of identifying problems with comprehension, and ‘are open to conscious reflection’, whereas skills are more automatized and unconscious as a result of practice (Grabe, 2009, p. 221). Grabe (2009) points out, however, that all skills that are automatic for fluent readers were first developed as a result of active, conscious attention while learning, and were usually first used as strategies to solve problems. Using strategies to overcome comprehension problems is particularly important for L2 reading, as will be discussed in Chapter 5.

4.3 Reading speed and fluency

Reading fluency has been described as ‘both an antecedent to and a consequence of comprehension’, and depends on efficient recognition of words and parsing of syntax (RAND, 2002, p. 13). Theories focusing on L1 reading have emphasised the importance of automatized

word recognition for reading fluency and comprehension based on the idea that more automatic word recognition leaves more cognitive capacity available for comprehension, thus enabling more focus on and enjoyment of the text (Nathan & Stanovich, 1991). Researchers have developed a number of approaches to describing the relationship between processing speed and reading outcomes, including Automaticity Theory (LaBerge & Samuels, 1974), Verbal Efficiency Theory (Perfetti, 1985), and the Compensatory-Encoding Model (Walczyk, 2000). This last model developed by Walczyk (2000) proposes that readers differ in vocabulary and topic knowledge and consequently need to use a variety of strategies to compensate for inefficient automatized processing. Because compensatory strategies take time to enact, differences between readers can be seen in reading speed, even when there is no measurable difference in comprehension.

Reading speed has also been said to vary according to the purpose of the reading. A very influential theory by Carver (1992) describes five distinct types of reading task which he relates to 'gears' of reading, which have different outcomes for both reading speed and comprehension. These range from scanning and skimming, which are quick ways to find specific information, to normal reading (which he terms 'rauding'), and then to slower rates for reading to learn or memorise. He describes skilled readers as being able to 'shift gears' to match their reading speed to the purpose of the reading. His proposed rate for normal reading was based on the speed at which reading was judged to be maximally efficient, about 300 words per minute, although this estimate had more of a theoretical than an empirical basis. The idea of readers adapting reading speed to suit the type of reading has been widely influential, although the actual number of words per minute predicted has not been borne out by research. A meta-analysis of reading rate studies by Brysbaert (2019) could find no evidence for a clear distinction between reading for learning and reading for pleasure, although there was some indication that skimming and scanning to find specific information could be distinguished using eye-tracking methods. Moreover, the meta-analysis found that the average L1 silent reading rate is only 238 words per minute, and slower again for L2 reading for reasons which will be discussed below.

5. L2 reading

Reading comprehension in L2 shares many features with L1 (Alderson & Urquhart, 1984; Bunch, Walqui, & Pearson, 2014), but is more complex because it involves two languages which interact at each stage of the process (Koda, 2007). Koda (2004, p. 123) claims that L2 text comprehension differs from that in L1 in both process and product. Reading in L2 ‘imposes a number of additional constraints on reading and its development’ (Grabe, 1999, p. 11), and cannot be fully accounted for by models of reading which have historically been based on L1 reading (Bernhardt, 2003). Alderson (1984, p. 1) famously raised the question of whether difficulties in foreign language reading are ‘a reading problem or a language problem’, and the ensuing discussion has clearly demonstrated that both of these elements are important in L2 reading comprehension, although the challenge has been to determine how they interact (Laufer, 1992). This chapter will discuss the relationship between L1 and L2 reading, as well as factors that have been shown to be important in L2 reading including strategies, L2 proficiency, and fluency.

Koda (2004) points out that from the start, the process of learning to read is usually different in L2 than it is in L1. Learning to read in L1 is mainly focused on making connections between the orthographic form of the word and the vocabulary already learned in an oral form, whereas for L2 readers, the acquisition of oral language and literacy skills tends to happen more simultaneously. This means that the acquisition of literacy skills tends to occur while L2 proficiency is still limited, but literacy skills may be transferred from the L1.

There are several different theoretical perspectives on the exact nature of the L1 – L2 relationship in reading. Bernhardt’s (2011) compensatory hypothesis claims that L1 literacy and L2 knowledge work together in L2 reading so that weaknesses in one area will be compensated for by the other. Cummins’ (1979, 2000) interdependence theory argues for the transfer of L1 literacy skills to the L2, so that development of literacy in L1 is a predictor for L2 literacy. Researchers have proposed that the transfer of L1 literacy skills can only occur once a threshold of L2 proficiency has been reached (Alderson, 1984; Clarke, 1980). Below this threshold, insufficient mastery of the L2 will ‘short-circuit’ the ability to use efficient reading strategies, and cause the reader to revert to less efficient strategies when confronted with a difficult task (Clarke, 1980). The exact nature of this threshold depends on factors such as the topic of the text, the reader’s existing knowledge, and the purpose of reading and can therefore vary between individuals and situations (see Alderson et al., 2015 for a discussion).

The L1 – L2 reading relationship has been investigated empirically in a number of studies looking for evidence of a linguistic threshold for L2 reading (e.g. Bernhardt & Kamil, 1995; Carrell, 1991; Jiang, 2011; Schoonen, Hulstijn, & Bossers, 1998; Van Gelderen et al., 2004). The majority of studies have found that although there is a modest correlation between L1 reading and L2 reading, L2 proficiency is a better predictor of L2 reading (see Van Gelderen et al., 2004 for a discussion). However, this appears to be linked to a linguistic threshold. Studies of Dutch secondary school pupils who were learners of English have found that among those with higher L2 proficiency, L1 literacy was a better predictor of L2 reading than L2 proficiency was (Schoonen et al., 1998; Van Gelderen et al., 2004). The authors suggest that this may be due to their participants already having surpassed the L2 proficiency threshold, meaning they were therefore able to make more efficient use of reading strategies to overcome gaps in understanding. In general, these studies support the idea that a threshold level of L2 proficiency must be attained before L1 reading skills can be effectively used for L2 reading, although the degree to which L1 skills can be transferred depends on the linguistic and, particularly, orthographic distance between the L1 and L2 (Fraser, 2007; Jiang, 2011).

5.1 Strategies for L2 reading

Metacognitive reading skills are believed to be learned for L1 reading and subsequently transferred to L2 reading, but are dependent on knowledge of text characteristics and reading strategies (Van Gelderen et al., 2004). Researchers have investigated awareness of reading strategy use in academic L2 reading among student populations around the world, and have generally found that readers are more aware of using strategies in L2 than L1 reading (Alsheikh & Mokhtari, 2011; Feng & Mokhtari, 1998; Kong, 2006; Mokhtari & Reichard, 2004; Sheorey & Mokhtari, 2001), presumably in order to compensate for lower L2 proficiency. As discussed in Section 4.2, another reason why readers may be more aware of reading strategies used in L2 is because these strategies are less automatized than they are in L1.

Readers at different levels of L2 proficiency also tend to use different types of strategies: those with lower proficiency have been found to use more lower order strategies for decoding text, or translating it into their L1, whereas those with higher levels of proficiency tend to use more higher-order strategies to critically examine what they are reading and fit the new information into their existing understanding of the topic (Malcolm, 2009; Zhang & Wu, 2009). Some strategies, such as translation and being able to think about the information in more than one

language, are unique to bilingual or multilingual readers (Mokhtari & Sheorey, 2002). Proficient bilingual readers are also able to use knowledge of the relationship between their L1 and L2 as a resource to help with L2 reading comprehension (Jiménez, García, & Pearson, 1995, 1996).

5.2 L2 proficiency

In addition to reading strategies and literacy skills, a key ingredient in L2 reading is L2 proficiency. Although there are many important elements of L2 proficiency, vocabulary and syntactic knowledge are often discussed as the most crucial components of L2 reading ability² (Grabe, 2009) and, of these, vocabulary has been identified as the best predictor of reading comprehension (Laufer, 1992; Laufer & Ravenhorst-Kalovski, 2010; Laufer & Sim, 1985; Qian, 1999; Schmitt, Jiang, & Grabe, 2011). Grabe (1988, p. 63) claims that the lack of ‘a massive receptive vocabulary that is rapidly, accurately, and automatically processed [. . .] may be the greatest single impediment to fluent reading’ by L2 readers. Given the grammatical similarities between English and Norwegian (see Section 3.1), and the fact that vocabulary has been discussed in previous research as a source of L2 reading difficulties among Norwegian students (Hellekjær, 2005; Skjelde, 2015), the present discussion will focus on vocabulary, since this is a key area in which the languages differ. This section will discuss vocabulary in relation to academic reading, including vocabulary acquisition and different ways to classify and test vocabulary.

5.2.1 Vocabulary

One of the goals of vocabulary research has been to determine the number of words required for fluent reading, although this is complicated by several factors. Firstly, words occur with varying frequency; whereas the most frequently occurring 1,000 word families account for 78% of written text (which is influenced by a small number of function words which make up a large proportion of the text), the next 1,000 words only contribute around 8% (Nation, 2013). Secondly, calculating the number of words needed depends on how a ‘word’ is defined. For

² It should be noted that the dichotomy between syntax and vocabulary has been problematized in several ways. Firstly, there are difficulties in judging syntactic knowledge without accounting for vocabulary (Alderson & Kremmel, 2013); secondly, studies using confirmatory factor analysis recommend collapsing syntax and vocabulary into a single ‘language’ factor (Guo & Roehrig, 2011); and thirdly, this distinction creates difficulties in accounting for phraseological knowledge (Kremmel, Brunfaut, & Alderson, 2017).

vocabulary size estimates, lemmas (a headword and its inflected forms) or word families (the base form of a word plus its derived and inflected forms) are often the subjects of investigation (Goulden, Nation, & Read, 1990; Nation, 2013). Word families are often used to create vocabulary size estimates and as a tool for L2 teaching on the assumption that once a learner knows one word in the family (e.g. *develop*), they will also be able to recognise and understand the other forms (e.g. *development*, *developmentally*) without having to learn each separately (Bauer & Nation, 1993). However, this can be problematic because the semantic transparency within a word family can be extremely variable (e.g. *nation* and *nationalism*), and assuming that a learner knows all members of a word family based on recognition of one can lead to misleading vocabulary size estimates (Schmitt & Zimmerman, 2002), especially for lower proficiency learners or those whose L1 does not facilitate transfer of morphological knowledge (Ward & Chuenjundaeng, 2009). Furthermore, different members of a word family may occur at different frequency levels, which can lead to additional complications for estimates of vocabulary size.

A further challenge is estimating how many of the words in a text need to be known to enable comprehension. Research using missing and nonce words has indicated that fluent reading and reasonable comprehension can only occur when a reader understands 98% of the words in what they read (Hu & Nation, 2000; Schmitt et al., 2011), and the chances of understanding increase linearly with the proportion of known vocabulary (Hu & Nation, 2000; Laufer & Ravenhorst-Kalovski, 2010; Schmitt et al., 2011). In practical terms, this means a reader should not expect to encounter more than one unfamiliar word in every 2–5 lines of text if they are to have a good chance of understanding what they read (Nation, 2013). The actual number of words required to meet these text coverage goals depends on the type of text, but Nation (2006) proposes that for authentic texts (e.g. novels), 98% coverage equates to a vocabulary of 8,000–9,000 word families. Hazenberg and Hulstijn (1996) calculated that at least 10,000 words would be needed to understand first year university textbooks in Dutch, because of the new information and specific terminology, and this estimate is also commonly cited in literature discussing academic reading in English.

Vocabulary size is generally discussed as being the number of words for which a person has some degree of form-meaning mapping (e.g. Meara, 1996), although it should be noted that this is only the first stage of vocabulary acquisition, and does not account for deeper knowledge or network building, which is much more difficult to quantify or measure (Henriksen, 1999). The

method of measuring vocabulary size, for example whether it requires receptive or productive skills, and the test format, will affect estimates of vocabulary size (Milton & Treffers-Daller, 2013; Schmitt, 2014). In vocabulary testing, researchers tend to focus on either the lexical form or the meaning, and either recognition or recall of vocabulary items. In terms of understanding L2 vocabulary required for reading comprehension, receptive vocabulary size, and specifically meaning recognition, has been shown to be the strongest predictor (Laufer & Aviad-Levitzky, 2017). In addition, there is often a substantial difference in the ability to use a word for comprehension compared to production (Malmström, Pecorari, & Shaw, 2018; Pétursdóttir, 2013; Schmitt, 2008), so a combination of tests are needed to determine a learner's lexical competence along the reception–production scale.

Other complications for vocabulary estimates are homonyms, where words with unrelated meanings have the same written form, and multi-word units (known as collocations, formulaic sequences or multi-word expressions), which are also very important for L2 reading (see, for example, Durrant, 2009; Green & Lambert, 2019; Gyllstad, 2007; Kremmel et al., 2017) and are often not accounted for by traditional single-word methods of vocabulary testing. These are further discussed in Section 7.6 in relation to academic vocabulary.

5.3 L2 acquisition

While reading comprehension clearly requires vocabulary knowledge, it is important to note that vocabulary learning can also result from reading (Cobb, 2007; Koda, 2004), especially since 'the lexis (vocabulary) of texts, at least in languages like English, is far more extensive than the lexis of conversation' (Cobb, 2007, p. 38). Vocabulary acquisition results from exposure to new words, whether explicitly taught or learned through incidental exposure. Explicit learning processes require direct attention and conscious processing, and can be very effective for vocabulary acquisition (Jóhannsdóttir, 2009; Laufer, 1998; Laufer & Paribakht, 1998; Mondria, 2003). However, a vocabulary large enough for reading authentic texts is unlikely to be learned from explicit vocabulary instruction alone (Grabe, 2009). Incidental learning involves language knowledge and processing skills without consciously paying attention to the specific information being learned (Grabe, 2009), and occurs in the absence of an apparent reason or intention to learn (De Bot, Jagt, Janssen, Kessels, & Schils, 1986). Repetition of items and the way they pattern together gradually builds associations (Grabe, 2009), and new words need to be encountered many times before becoming part of a learner's vocabulary (Horst, Cobb, & Meara,

1998; Saragi, Nation, & Meister, 1978). Proficiency also plays a role in vocabulary acquisition, with Elgort and Warren (2014) finding that more proficient L2 learners were better able to learn new words from context than those with lower L2 proficiency.

As discussed in Chapter 2, incidental exposure to English is one motivation for the use of L2 English in higher education (Mežek et al., 2015; Pecorari, Shaw, Malmström, et al., 2011), although there has been surprisingly little research into the extent to which conducting academic activities in English leads to L2 acquisition (Macaro et al., 2018). A systematic review by Macaro et al. (2018) identified a small number of studies that had investigated language acquisition in relation to EMI, of which few used standardised testing instruments. Overall, there appeared to be some small gains in L2 proficiency in most of the studies reviewed, but interpretation of the results was hindered by inconsistent measurement or lack of comparison groups, and it is difficult to be sure that L2 gains over time are solely due to English used in teaching. From a theoretical perspective, Elgort and Warren (2014) infer from their research that reading textbooks could lead to vocabulary gains, especially in terms of discipline-specific terminology since these words are likely to be encountered often in course readings, although they did not test textbook reading specifically. However, as Pecorari, Shaw, Irvine, Malmström, and Mežek (2012) point out, not all students read their textbooks, especially if they find it difficult to do so, and this may further complicate the issue of incidental vocabulary acquisition in EMI/parallel language contexts.

L2 exposure outside of the language classroom has been the subject of increased interest in recent years. This type of language input has been referred to as extramural English (i.e. outside the walls of the classroom: Sundqvist, 2009) and out-of-class language exposure or learning. Studies investigating language acquisition from input outside the classroom have found L2 proficiency to be significantly associated with different types of exposure, especially reading (Day, Omura, & Hiramatsu, 1991; González Fernández & Schmitt, 2015; Nation, 2015), watching television (Lindgren & Muñoz, 2013; Peters, 2018; Peters & Webb, 2018; Puimège & Peters, 2019, 2020), gaming (Brevik, 2016; Coxhead & Bytheway, 2015; Sundqvist, 2019; Sundqvist & Wikström, 2015; Sylvén & Sundqvist, 2012), and use of the internet (De Wilde, Brysbaert, & Eyckmans, 2019; Peters, 2018; Peters, Noreillie, Heylen, Bulté, & Desmet, 2019). The effects of different types of input depend on a range of factors including the age and L2 proficiency of the learner.

Extramural exposure to English has been shown to be particularly important in the Norwegian context because of the availability of input (see Chapter 3). Studies have found that Norwegian upper secondary students who reported spending a lot of time gaming in English had higher scores on tests of reading proficiency in English than they did in Norwegian (Brevik & Hellekjær, 2018). Lower secondary students who reported gaming in English have also been found to achieve significantly higher test scores in English than their peers (Sletten, Strandbu, & Gilje, 2015). It is important to note, however, that the relationship between L2 input and L2 proficiency likely works both ways: proficiency is likely to improve as a result of input, but individuals who already have higher L2 proficiency may also be more motivated to engage in activities which require L2 proficiency (a Matthew effect, see Stanovich, 1986).

5.4 Cross-linguistic effects on word recognition

Word recognition in L2 varies according to the amount of experience with L2 reading, the distance between the L1 and L2 orthographic systems, and the reader's understanding of the L1 and L2 orthographic relationship (Koda, 1996). The acquisition of L2 word recognition skills is facilitated by similarity in the L1 and L2 orthographic systems (Koda, 1996), and cognates, or 'translation equivalents that are similar in sound and spelling' (Schelletter, 2002, p. 93), have been shown to facilitate L2 learning and processing. Cognates can be learned (d'Ydewalle & Van de Poel, 1999; White & Horst, 2012) and read (Dijkstra, Grainger, & van Heuven, 1999; Dijkstra, Van Hell, & Brenders, 2015; Kroll, Gullifer, & Rossi, 2013) faster than non-cognates, and can facilitate the guessing of unknown words (Elgort, 2013; Ittzes, 1991; Laufer & Paribakht, 1998). Cognate facilitation effects have been shown to be affected by L2 proficiency (Libben & Titone, 2009) and cognate linguistic distance has been shown to be one of the best predictors of L2 acquisition (Lindgren & Muñoz, 2013; Van der Slik, 2010). When it comes to testing vocabulary, cognates can lead to higher rates of correct guessing, meaning that vocabulary *learning* is tested to a lesser extent. However, it is important to note that cognate facilitation can also be beneficial for reading comprehension and therefore cognates should not be excluded from vocabulary tests (Nation, 2013).

The fact that bilingual word recognition is influenced by cognates has led researchers to question whether bilinguals 'switch off', or inhibit, one language when using the other. Research indicates that in fact all languages that a person knows are briefly activated simultaneously in the brain when reading, speaking and listening in just one of the languages (Duyck, Van Assche,

Drieghe, & Hartsuiker, 2007; Kroll et al., 2013; Van Assche, Duyck, & Hartsuiker, 2012; Van Hell & Tanner, 2012). Kroll et al. (2013) argue that although this activation varies according to the proficiency level in each of the languages and the task at hand, languages cannot to be switched off at will. This language co-activation is not due to a lack of fluency; even highly proficient L2 users show evidence of L1 influence on their L2 (Dijkstra et al., 1999; Dijkstra, Van Jaarsveld, & Ten Brinke, 1998; Duyck et al., 2007; Libben & Titone, 2009; Schwartz & Kroll, 2006; Schwartz, Kroll, & Diaz, 2007; Van Assche, Drieghe, Duyck, Welvaert, & Hartsuiker, 2011). Depending on the situation, this language co-activation can facilitate performance or can create costs to performance due to the delays caused by competition between languages (Kroll et al., 2013).

The linguistic environment can also affect lexical access. Linck, Kroll, and Sunderman (2009) investigated the effects of immersion in the L2 environment on L2 learning. They compared English-speaking learners of Spanish who were either studying abroad in Spain or only exposed to Spanish in the classroom in their home country. The researchers tested the students on tasks involving both comprehension (translation equivalence) and production (verbal fluency) and found that the students in the L2-immersion environment showed significantly less interference from their L1 than those in their home environment. Linck et al. (2009) conclude that this indicates that the students in the L2-immersion environment were better able to inhibit their L1 in order to facilitate their L2 use. This effect disappeared once the learners returned to their L1 environment. This suggests that the linguistic environment could have an impact on language processing speed, which may have implications for students' L2 reading in a parallel language environment.

5.4.1 Bilingual lexicon

While it has been established that both languages are simultaneously activated in bilinguals during any language activity, researchers are still unsure how lexical knowledge is stored in the bilingual lexicon. One of the central questions in this field has been how L2 learners map new word forms onto concepts they already have words for in the L1 (see Kroll & De Groot, 2002; Van Hell & Kroll, 2013). Related to this is the question of whether concepts can be directly accessed through the L2 or whether this access is mediated by the L1, which has implications for processing speed.

There are a number of models for explaining the relationship between the L1 and L2 lexicon, which all have different aims and can be used to account for different phenomena. The Revised Hierarchical Model (RHM) proposes that concepts have separate representations in L1 and L2, and are accessed more easily through the L1 (Kroll & Stewart, 1994; Kroll, Van Hell, Tokowicz, & Green, 2010). This model was originally designed to explain asymmetries in translation to or from the L1. The Distributed Features Model (De Groot, 1992) argues that instead of exact translation equivalents, words in different languages have overlapping semantic features. The Shared (Distributed) Asymmetrical Model (Dong, Gui, & MacWhinney, 2005) combines aspects from these first two models and is based on evidence that there are stronger links between a concept and its name in the L1 than in the L2, and that although some concepts are shared between languages, others are stored separately.

The models described above propose a separate lexicon for L1 and L2 words. The Bilingual Interactive Activation + (BIA+) model (Brysbaert & Duyck, 2010; Dijkstra & Van Heuven, 2002), like the RHM, assumes that semantic representations are shared between L1 and L2, but the BIA+ model proposes a combined lexicon rather than separate storage for L1 and L2 words. This means that when a person reads (or hears) a word, all words in the combined bilingual mental lexicon starting with the same letters (or sounds) will be activated simultaneously (non-selective access), and there will be competition between these words until the ambiguity is resolved. The degree to which the words are activated depends on the frequency with which they are encountered, meaning that L2 words may take longer to be retrieved if a person has lower proficiency in the L2 or encounters it less often than the L1. This could predict slower processing in L2, although context and semantic constraints limit the duration of the lexical ambiguity (Libben & Titone, 2009). Opinion is still divided as to which of the models described above best explains the process of bilingual lexical access and what this means for reading speed and fluency, but the following section will discuss the measurable outcomes of reading fluency.

5.5 L2 reading speed

In addition to the reader's knowledge of the L2, another key difference between L1 and L2 reading is the speed of processing (see, for example, Perfetti, 1999). Differences in processing between L1 and L2 can account for considerable differences in reading speed over the length of an entire text, and slower reading speeds among L2 readers is a widely acknowledged phenomenon (Fraser, 2007). Even among highly proficient L2 users, reading in L2 is

demonstrated to be slower than L1 (Cop, Drieghe, & Duyck, 2015; Fraser, 2007; Shaw & McMillion, 2008, 2011). Cop et al. (2015) found that reasonably proficient Dutch–English bilinguals were approximately 17% slower at reading in L2 than L1 over the duration of an entire novel. Eye movement patterns during L2 reading were found to be similar to those of children reading in L1, presumably reflecting less experience in reading in L2. Although higher language proficiency is generally associated with faster reading speed (e.g. Nathan & Stanovich, 1991), native speakers and more advanced L2 users have been shown to be more sensitive to syntactic ambiguities than less proficient users were, and are therefore slowed down more by encountering them (Avery & Marsden, 2019; Marsden, Thompson, & Plonsky, 2018).

Slower reading in L2 is thought to be a consequence of less efficient lower-level processes such as word recognition and decoding (Segalowitz, Poulsen, & Komoda, 1991). Slower word recognition in L2 has been hypothesised to be the result of weaker links to L2 words or of more competition for words in a shared L1–L2 lexicon (Bialystok, 2009), as described in Section 5.4.1. Reading fluency depends on the speed of lexical access (Harrington, 2018), which has been shown to depend on the reader’s familiarity with the specific words in the text, which is generally predicted by the frequency of the individual words (Rayner, Schotter, Masson, Potter, & Treiman, 2016) as well as by general L2 proficiency (Tanabe, 2016). The number of characters in the text has also been demonstrated to affect L2 reading speed, with longer words taking more time to read (Kramer & McLean, 2019).

Among high proficiency L2 readers, researchers have also found that reading speed is not strongly correlated with comprehension (Biancarosa, 2005; Jackson, 2005; Shaw & McMillion, 2011; Van Gelderen et al., 2004). Although Walczyk’s (2000) Compensatory-Encoding Model was developed to explain differences between stronger and weaker L1 readers, McMillion and Shaw (2009) suggest that it also applies to advanced L2 readers, who are also able to compensate for less automatized L2 processing by using background knowledge and higher-level processes such as inferencing to compensate. The degree to which these types of skills can be transferred from the L1 can be affected by the linguistic distance between L1 and L2 (Fraser, 2007). In situations involving time constraints, such as exam conditions, slower reading times will result in poorer comprehension test scores, whereas in a situation where time is not limited the same processing differences would be discernible only in a difference in reading speed (Shaw & McMillion, 2008; Walczyk, 2000).

Much of the research on L2 reading has been focused on readers with lower levels of proficiency, but research on advanced L2 readers, who perform at levels close to their L1 equivalents, gives insights into processing differences that underlie L2 reading, even when the outcome of the reading is very similar (McMillion & Shaw, 2016). Studies by Shaw and McMillion (2008, 2011) tested reading comprehension of English texts among Swedish and British undergraduate biology students, and found that the L1 readers performed significantly better than the Swedish students when time was limited, but that there were no major differences when the same test was performed without time restrictions. They found that Swedish students reading in English were, on average, less than 75% as efficient as L1 readers of the same texts, although there was no evidence that they read less accurately if given enough time.

Researchers have investigated whether reading speed can be improved, or at least predicted, by reading experience. Studies on lower proficiency L2 learners have demonstrated positive effects of extensive reading programs on reading speed (Beglar & Hunt, 2014; Beglar, Hunt, & Kite, 2012; McLean & Rouault, 2017). Other studies have shown that reading practice using timed tests improved reading speed and comprehension among Taiwanese college students (Chang, 2010) and that training with specific lexical items can improve speed of L2 lexical access for Dutch high school students, although it is unclear whether this has a measurable effect on higher level text comprehension (Fukkink, Hulstijn, & Simis, 2005). Studies aimed at improving reading speed tend to be focused on L2 readers with lower proficiency than those under investigation in the present thesis, and less is known about the relationship between extramural exposure (for example through extensive reading) and reading speed among advanced L2 readers. It should be noted that reading slowly (providing it does not hinder comprehension) is not necessarily entirely negative, provided there is enough time and motivation to keep up with class requirements. Spending more time with a text and encountering 'desirable difficulties' has been suggested to enable better recall of information (Bjork & Bjork, 2011; Metcalfe, 2011; Rovers, Stalmeijer, van Merriënboer, Savelberg, & De Bruin, 2018). Understanding and remembering information can be particularly important when reading for academic purposes, as will be discussed below.

6. Academic L2 reading

Academic English is not a native language for anyone (Mauranen, Hynninen, & Ranta, 2010), and even native English-speakers can find academic reading challenging. University students who are L2 users of English have usually had less exposure to English, particularly in academic settings, than native speakers, which adds further challenges.

However, it should be noted that English proficiency does not necessarily relate in a straightforward way to academic success. Although it makes intuitive sense that for students to be successful in their studies, they need a certain level of proficiency in the language in which they are studying, the results of studies comparing pre-admission tests of English proficiency (such as IELTS) to academic outcomes have been mixed. Some studies have found a weak correlation between L2 proficiency tests and academic success (Cho & Bridgeman, 2012; Cotton & Conrow, 1998; Hill, Storch, & Lynch, 1999; Kerstjens & Nery, 2000; Vinke & Jochems, 1993) and some have found little or no relationship between these (Dooey & Oliver, 2002; Light, Xu, & Mossop, 1987), indicating that the situation is much more complex. Given the high stakes involved in academic reading, it should also be recognised that non-linguistic factors such as motivation, self-efficacy, and anxiety are also important for reading comprehension and academic outcomes (see discussion in, for example, Brantmeier, 2005; Grabe, 2009; Rose, Curle, Aizawa, & Thompson, 2019; Thompson, Aizawa, Curle, & Rose, 2019), although a thorough discussion of this is topic outside the scope of the present thesis.

Nevertheless, 'nobody would argue that [L2 proficiency] has no role to play in academic achievement' (Hill et al., 1999, p. 72). As discussed in Chapter 5, successful L2 reading requires both L2 proficiency and reading skills, and the relationship between L2 reading proficiency and academic success may depend on the extent to which students are able to compensate for lower proficiency using general reading proficiency and appropriate reading strategies, as well as on whether external support is available.

Since we know that reading comprehension depends on the text, the task, and the reader (RAND, 2002), it is important to consider the roles each of these factors play for L2 reading in a university context. Background information about the readers who are the focus for this project is covered in Chapter 3, so the following discussion describes factors relating to the texts and the tasks under investigation before defining 'academic L2 reading' as it is used in the present thesis.

6.1 Academic text

Some types of text are more difficult to read than others, and Alderson (2000) argues that the linguistic threshold increases in relation to task difficulty, meaning that academic reading may require a higher level of L2 proficiency than other types of reading. Krashen (2011, p. 382) points out that 'the discourse and grammar of academic language is quite complex' and that reading academic text requires both academic language proficiency and background knowledge about the content. Obviously, academic text type will vary according to discipline, but there are some characteristics which can be generalised. Academic texts are designed to be 'concise, precise, and authoritative' (Snow, 2010, p. 450) and tend to use complex grammatical constructions and specific vocabulary (Coxhead, 2000; Gardner & Davies, 2013) that can be an obstacle to reading comprehension even for otherwise fluent readers (Snow, 2010). In addition to general vocabulary (Brezina & Gablasova, 2015), readers of academic texts also need discipline-specific vocabulary (Chung & Nation, 2004; Ward, 2009) and generalised academic vocabulary (Coxhead, 2000; Gardner & Davies, 2014) for proper comprehension.

Word lists of generalised academic vocabulary such as the Academic Word List (AWL: Coxhead, 2000) and the Academic Vocabulary List (AVL: Gardner & Davies, 2014) have been developed to help students reading in English as an L2 to develop their academic reading skills. The words on these lists are found more often in academic than non-academic writing and constitute around 10–15% of academic texts (Coxhead, 2000; Gardner & Davies, 2014). Academic vocabulary knowledge has been shown to be a strong predictor of academic success (Masrai & Milton, 2017), and explicit instruction using the AWL has been shown to lead to significant improvements in the comprehension of academic texts (Coxhead & Byrd, 2007; Pétursdóttir, 2013). Academic English vocabulary differs from general vocabulary in having a large proportion of words originating from Greek or Latin rather than Germanic languages (Corson, 1997). Coxhead (2000) notes that over 82% of the words on the AWL are of Greek or Latin origin and points out that this means that learning about the affixes that tend to accompany these words may be an effective strategy for mastering this vocabulary.

6.2 Reading for academic purposes

Alderson (2000, p. 50) explains that 'the reason you are reading a text will influence the way you read it, the skills you require or use, and the ultimate understanding and recall you have of that text'. Reading for academic purposes usually comes with the expectation that the reader's

comprehension and recall of the information will later be assessed. Grabe (2009) points out that the particular context and goals of reading in educational settings lead to different approaches to reading and lists the main academic purposes for reading as: searching for information (scanning), reading for quick understanding (skimming), learning, integrating information, evaluating, critiquing and using information, and general comprehension (p. 8). Reading of the same text read by the same reader can have different outcomes depending on the reading purpose, for example reading a novel for pleasure on the one hand, or for the purposes of literary analysis on the other. Different purposes of reading will lead to the use of different strategies and therefore different outcomes on measures of comprehension and recall (Grabe, 2009).

The fact that the outcome (i.e. the comprehension) of reading in an educational context will be somehow examined and assessed means that it is not a private activity, and students report feeling a sense of pressure to understand and remember everything they read for academic study (Mann, 2000). For this reason, metacognitive awareness is particularly important in academic reading in order to monitor and repair comprehension (see Sections 4.2 and 5.1 for further discussion). Mann (2000, p. 297) describes academic reading as 'disturbed' because the outcomes will be scrutinised, and the focus is on completing a task rather than necessarily reading out of curiosity or enjoyment. In situations where students need to read academic texts with similar difficulty in L1 and L2, the L2 proficiency requirement adds an additional dimension of pressure to the task. This is particularly important since there is usually a limited time to read the given materials before being assessed. Students report feeling that reading in L2 adds to their workload both in terms of cognitive and time resources (Arnbjörnsdóttir & Ingvarsdóttir, 2010; Arnsby, 2013; Pecorari, Shaw, Malmström, et al., 2011).

6.3 Defining academic L2 reading

The research on L2 reading, particularly in academic contexts, clearly demonstrates that this is a complex phenomenon with many variables contributing to both the process and the outcome. Academic L2 reading is defined in the present thesis as the reading of academic materials (textbooks or academic articles) by university students who are advanced L2 users of English for the purpose of learning academic content (generally with the expectation of being assessed on their understanding of this content). This definition will be used in the discussion of the research conducted for the present thesis which begins in Chapter 7.

6.4 Summary of literature review

In summary, it is important to understand what characterises academic L2 reading because it is an important aspect of university studies in many settings around the world. Previous research has shown that successful L2 reading is contingent on both reading ability and L2 proficiency, and that language processing is different in L2 from that in L1. It has been demonstrated that reading in L2 can differ from L1 in both process and product. Research also indicates that L2 reading requires a certain level of L2 proficiency before literacy skills can be successfully transferred from L1, and that a great deal of input is needed to acquire the level of L2 proficiency essential for academic reading. Moreover, reading in L2 has been shown to be slower than in L1, even for highly proficient L2 users, and the linguistic environment can also affect language processing speed. Furthermore, reading for academic purposes places additional challenges on the L2 reader, with specialised vocabulary and expectations of comprehension.

The Norwegian context provides an interesting case study to investigate academic L2 reading because of the high general English proficiency among students in an environment with opportunity for extensive extramural exposure to English. The use of English in the parallel language context of Norwegian universities is to a large extent taken for granted, and students are generally expected to be able to read in English in the same way as in their L1. Many Norwegian students are expected to learn academic skills and new terminology simultaneously in two languages, having, for example, lectures in L1 and textbooks in L2. Despite the assumption that they have sufficient L2 proficiency and literacy skills, research has indicated that many Norwegian students may in fact be facing significant challenges with academic English reading, which has been suggested to be related to both L2 proficiency and inefficient reading strategies.

Although, contrary to expectations and assumptions, research has suggested that many Norwegian students may struggle to read academic texts in English, there has been little research to date on their academic L2 reading at university level, or on pinpointing the source of potential difficulties. The aim of this thesis is therefore to investigate what characterises academic L2 reading in this population, and to explore this from the perspectives of reading processes, including strategy use and L2 proficiency, and of reading products, including comprehension and reading speed. Since research shows that processing and comprehension are affected by the social and linguistic environment, the context of the parallel language situation of Norwegian universities will also be considered. In order to provide the best support

to students studying in L2, we must first understand more about their academic L2 reading. The following chapter introduces the methods used in this investigation of academic English reading among Norwegian university students.

7. Methods

This section describes the research questions and methodology that form the basis of the three studies reported in this thesis, including design, analysis, validity, and ethical considerations. It supplements the methods sections in the individual articles and discusses the choice of methodology in the research project overall.

This project comprises three studies which collected quantitative data about academic English reading among Norwegian university students. Previous research has shown that successful L2 reading is the result of both L2 proficiency and reading skills, so the project was designed to test these two aspects of Norwegian students' academic English reading. The first study investigated reading skills by comparing awareness of reading strategies used for reading academic texts in English and Norwegian. The second study examined L2 proficiency by testing English vocabulary knowledge at different word frequency levels. The third study tested reading speed, which is an outcome of both language proficiency and reading skills. The overall goal of the thesis was to investigate the main research question:

What characterises academic L2 reading in the Norwegian parallel language context?

In addressing this question, three sub-questions were developed, and these form the basis for the three studies. Table 2 provides an overview.

Table 2: Design and participants for each of the studies

	Study 1	Study 2	Study 3
Focus	Reading strategies	L2 vocabulary	Reading speed
Research questions	Do Norwegian university students use different reading strategies when reading in L1 (Norwegian) and L2 (English)?	What are the levels of receptive English vocabulary knowledge among Norwegian university students and what factors are associated with vocabulary knowledge?	How does the reading speed of Norwegian students compare with that of native English-speakers and immersed L2 users when reading academic English texts?
Tools for data collection	Survey of Reading Strategies	Vocabulary Levels Test	Timed academic reading task
Number of participants	316 university students	189 university students	295 university students
Student fields of study	Geography (37) Social anthropology (38) Archaeology (36) Psychology (156) Sign language / interpreting (33) Other (16)	English (60) IT (85) Sociology (44)	Psychology (295)
Aim	Compare L1 and L2 reading among students from a wide range of fields of study who read academic texts in L1 and L2	Compare L2 vocabulary among students with different proportions of English in their curriculum	Compare reading speed of academic text among closely matched students with different language backgrounds
Native language of participants	Norwegian (316)	Norwegian (189)	Norwegian (72) English (195) Other (28)

As shown in Table 2, the three studies in this thesis each focused on investigating a different aspect of academic L2 reading, and each used a survey-based instrument for data collection, and different groups of participants. The design of each of the studies, as well as the overall design of the project is discussed in detail below.

7.1 Research design

This project has a nonexperimental correlational research design (Johnson & Christensen, 2012) which combines the results of three separate quantitative studies to build an overall picture of academic L2 reading in a parallel language context. The data for all three studies were collected using online surveys, each comprising a main instrument to collect information about the aspect under investigation, as well as background questions. One reason for using online surveys was that they are easy to distribute, meaning that a large number of participants could be recruited. Another important consideration was that they allow participants to undertake the survey in their own time and in a more naturalistic (the way they would normally read) and informal (and therefore less stressful) setting, as the overall goal of the study was to investigate reading in a real-world context. The anonymity of an online survey format also minimises social desirability bias and enables participants to feel that they can answer questions honestly (see Krumpal, 2013 for a review of this issue). It also encourages all students to participate, including those who might feel uncomfortable about their English proficiency. Finally, the digital collection of data eliminated the need for separate data entry.

Other approaches that were considered for this study included laboratory-based methods involving eye-tracking and measuring event-related potentials which can give very important information about the reading process. For the current project, however, the emphasis was on eliciting behavioural rather than neurological data and collecting data in a more naturalistic setting than is possible in a laboratory. Additionally, laboratory-based techniques are often very time-intensive and require participants to be in a laboratory setting, limiting the number of participants and also meaning that their reading experience will not necessarily reflect how they would read in a real-life situation. It could also bias the sample towards participants who were willing to turn up to take part in an experiment, as opposed to an online survey which can be done by anyone in a setting of their own choosing.

7.2 Procedure

A total of 800 participants took part in the three studies. Of these, 577 participants were L1 Norwegian speakers studying in Norway and 223 participants were studying in the UK; 195 of these were native English-speakers, and 28 were native speakers of a language other than Norwegian or English.

Participants were purposively recruited from specific study programs for each of the three studies. Study 1, which compared students' awareness of strategies used in L1 and L2 academic reading, involved participants from a range of degree programs which required reading in both English and Norwegian to ensure that they had experience reading academic texts in both languages. Study 2 compared the English vocabulary knowledge of students enrolled in programs with different proportions of English: the students taking English classes had their teaching and reading in English, IT students had English texts but teaching in Norwegian, and the Sociology students had teaching and reading mostly in Norwegian. Study 3 collected reading speed data from students in Norway and the UK who were enrolled in first- and second-year Psychology classes. The groups were matched as closely as possible and, in addition to recruiting from the same study program and year levels, the ranking of the universities was also considered: the top 10 universities in the UK were not targeted because the entry requirements could have biased results in comparison with the Norwegian institutions.

With regard to recruitment, for the first study, participants were informed about the study by the researcher during class time and were invited to complete the survey during the 15-minute break between lectures, which led to a very high participation rate. For the second study, participants were recruited by contacting lecturers and talking to classes. Participants were offered a chance to win travel vouchers. The third study recruited participants from three universities in Norway and three in the UK, but mainly from one in each country. Since not all the students contacted chose to participate, there is a potential for a bias in participation in relation to how the project description and recruitment strategies aligned with their underlying personal beliefs and its perceived personal relevance. Ideally it would have been useful to calculate the response rates for the studies, but since many classes were contacted for each study and some students were enrolled in more than one of the classes, this was unfortunately not possible. The effects of this sampling method and their potential threat to the validity of the results are discussed below, see Sections 7.3 and 7.10.

7.2.1 Exclusion criteria

The main exclusion criterion for the three studies was the participants' reported L1. Since the focus was on students who had been educated in Norway and had Norwegian as a mother tongue, only those who reported their L1 as Norwegian were classified as 'Norwegian students'

for the purpose of the studies in this thesis. Participants recruited from Norway who did not report having Norwegian as an L1 or who reported also having English as an L1 were excluded.

In all studies, participants were also asked if they had a diagnosis that would affect their reading. This was done in order to check whether diagnosed reading problems were affecting the data. However, analysis showed that data from participants who reported having such a diagnosis were not outside the normal range of responses, so these participants were still included.

7.3 Sample

It should be noted that the data collected for this project have some limitations in terms of generalising to the reference population of Norwegian university students. Since the aim of the present thesis was to investigate academic English reading among Norwegian university students, the ideal sample would be representative of Norwegian university students from the 10 universities, 6 university colleges and 5 scientific colleges which are owned by the state (UDIR, 2020c). However, due to constraints of time and resources, and the specific goals of the three individual studies, the data were collected from three purposive samples. The majority of Norwegian students in the sample were studying at the Norwegian University of Science and Technology (NTNU), although the third study also recruited students from the University of Oslo and UiT The Arctic University of Norway. The British students, who functioned as the comparison group in the third study, were also recruited from three universities – The University of Birmingham, Aston University, and The Open University – but were mainly from the first of these.

Although the project recruited students from a range of study programs and years, in practice only eight study programs (out of 371 at NTNU) were well represented, and Psychology students constituted a large proportion of the Norwegian students in this project (approximately 30%). Moreover, the majority of students in the sample were recruited from Humanities subjects (see Table 2) because these subjects tend to require a lot of reading, but it should be noted that in 2018, students in Humanities subjects accounted for only 10% of students enrolled in Norwegian universities (Statistics Norway, 2020b). Another potential limitation of the sample is the gender balance. Overall, 67% of the participants in this project were female, which is higher than in the reference population, and probably reflects the fact that the majority of Psychology

students (which constitute a large proportion of the samples in Studies 1 and 3) are female. In 2018, almost 60% of students in higher education in Norway were female (Statistics Norway, 2020b). The number of Norwegian participants by gender in each of the studies is shown in Table 3. The proportion of UK-based female participants was higher, at 86% which, again reflects the gender imbalance in Psychology studies.

Table 3: Number of Norwegian participants by gender in the three studies

	Study 1	Study 2	Study 3	Total
Female	239 (75.6%)	93 (49.2%)	53 (73.6%)	385 (66.7%)
Male	75 (23.7%)	96 (50.8%)	19 (26.4%)	190 (32.9%)
Other/missing	2 (0.6%)	0	0	2 (0.3%)

To summarize, the resulting purposive sample in all three of the separate studies clearly limits the extent to which it can be said to be representative of the reference population of Norwegian university students. The samples from the UK were only included for comparison purposes.

7.4 Instruments

Multiple choice questions and Likert scales were used in each of the studies. Having categorical responses was necessary for the types of statistical analysis used and also to make it easier (and more appealing) for people completing the survey in a second language. The Likert-type questions generally gave response options on a 5-point or 7-point scale, with the odd number of categories enabling participants to choose a middle ground option. Questions with more response options may have allowed for a more fine-grained analysis, especially for questions asking participants to rate their language proficiency, but this may also have been more cognitively taxing, leading to higher dropout rates, and would not necessarily have increased accuracy. The emphasis instead was placed on making the layout of the questions consistent throughout the survey in order to reduce the cognitive load on participants.

To maximise participation, the surveys were designed to be as comprehensive as possible, but also short and succinct enough that students would want to participate without feeling that they were giving up too much of their time. As well as generating a larger sample size, and

therefore greater statistical power, the focus was also on trying to ensure that the sample was not biased towards students who had strong feelings (one way or another) about the use of English in Norwegian universities. Of course, this meant a trade-off between the number of participants and the amount of data collected about each participant.

The surveys for all studies were in English and pilot tested on both L1 English speakers and L1 Norwegian speakers. Each survey went through several stages of pilot testing and revisions to ensure that the questions were comprehensible to the target audience, and that there was minimal ambiguity in the questions. Another main goal of the pilot testing was to determine the average time taken to complete the surveys so that potential participants could be informed accordingly.

As discussed above, the studies were designed to tap into different aspects of academic L2 reading. Each of the studies comprised a main data collection instrument and then a selection of background questions which functioned as either exclusion criteria and/or predictor variables in the data analysis. Because the studies were designed and conducted sequentially, each survey could build upon the previous one(s) in identifying and replicating the most interesting and valuable questions about language background, exposure and use. The exact questions used in each study can be found in the articles and appendices. The justification of the selection and limitations of each data collection instrument, and their contribution to the overall project are discussed below. Following this, the background questions, many of which were common to all studies, are discussed.

7.5 Study 1: Survey of Reading Strategies

The first study employed the widely-used and validated Survey of Reading Strategies (SORS; Mokhtari & Sheorey, 2002) to compare awareness of reading strategies in L1 and L2 academic reading. Previous studies have suggested that inefficient reading strategies (especially slow and careful reading) play a role in difficulties observed in English proficiency tests (see Hellekjær, 2005, 2009). Also, the parallel language context, in which students are expected to read in both languages, motivated this comparison of L1 and L2 reading. The data collection for this study was conducted using Select Survey, an online survey program managed by NTNU. A more detailed description of the SORS, as well as the survey itself, can be found in Article 1.

Two versions of the survey were created for this study: one in which participants were instructed to report their awareness of reading strategy use (the items adapted from the SORS) when reading academic texts in Norwegian and one for academic texts in English. Participants were randomly assigned to either the Norwegian (n = 156) or the English (n = 160) version of the survey. Although it would have been interesting to compare responses for L1 and L2 reading within the same participants, the concern was that it would be difficult for participants to switch to the mindset of thinking about reading in the other language after answering the questions for the first language. The amount of time it would take participants to complete the survey for both languages would also have been a drawback with this approach, as well as the potential for incomplete surveys resulting from boredom or frustration. As mentioned above, the short survey design enabled students to complete the survey in the 15-minute break in their lectures, which maximised the response rate. In fact, almost all students who were present in the targeted classes participated in the survey.

Pilot testing of the survey revealed some confusion about some questions that were part of the SORS, particularly item 17 ('I use context clues to help me better understand what I am reading'). Several pilot testers asked about the meaning of 'context clues' and requested that this be clarified. However, the wording could not be changed because it was part of a validated test and would mean it would not be comparable to other studies using the same instrument.

It is important to note that data collected using the SORS gives information about *awareness* of strategy use, rather than *actual* strategy use and that it is based on self-reports rather than objective measures. Particularly for highly proficient readers, use of reading strategies may be so automatic that readers are less aware that they use them (see Section 4.2), so awareness cannot be said to equal use of reading strategies, and higher awareness of reading strategies does not necessarily mean higher reading proficiency. The method of measuring reading strategies can influence the results (see Brantmeier, 2002 for a review). Other methods, such as think-aloud protocols, were also considered for collecting data on reading strategies use. Although these would have been interesting for comparison, these are also problematic because the procedure of speaking and having an audience will likely affect the reading process, and language proficiency can also affect outcomes when using these procedures (e.g. Kong, 2006). It is worth noting that some of the 'strategies' on the SORS could also be classified as 'skills', depending on the reader (see Section 4.2), and some may be more helpful in the reading process than others.

It should also be noted that it is possible to interpret the items on the SORS in very different ways. A study by RuMei and Sheng-hui (2019) demonstrated that high and low proficiency readers had very different interpretations of the same items on the SORS. For example, for a high proficiency reader, reviewing the text before reading (item 8) meant planning and looking up unfamiliar vocabulary items in advance. For a lower proficiency reader, it meant deciding whether to read the text or to give up if it was too difficult. Therefore, the same responses on this item could in fact reflect very different practices. This study would therefore have benefited from a qualitative element to learn more about how these strategies were being used by the participants, but this was not possible due to time limitations.

7.6 Study 2: Vocabulary Levels Test

The second study used the Vocabulary Levels Test (VLT: Schmitt, Schmitt, & Clapham, 2001), based on Nation's (1990) original test, to investigate English vocabulary knowledge among Norwegian university students as a measure of L2 proficiency. The VLT measures receptive written vocabulary knowledge, specifically meaning recognition, which is the main type of knowledge required for reading comprehension (Kremmel & Schmitt, 2018; Laufer & Aviad-Levitzky, 2017), by asking participants to match vocabulary items to their meanings in a multiple matching format. It should be noted that reading requires meaning recall as well as recognition. However, when reading a text, the context does give substantial clues as to the meaning of the word, so meaning recognition will still give important information about how the students' L2 proficiency could impact their reading for university. Additionally, meaning recognition has been shown to be a better predictor of reading comprehension than meaning recall was (Laufer & Aviad-Levitzky, 2017). A more detailed description of the VLT and the reasons it was selected for this study can be found in Article 2. Participants were also asked to answer questions about their exposure to English in the form of extramural activities and formal English education. This survey was also conducted online using Select Survey and the questions can be found in Appendix A.

As with all multiple-choice tests, the VLT is susceptible to guessing. Stewart and White (2011) calculated that the six-choice format design of the VLT leads to an average score increase of 16.7% due to guessing. They also found that the probability of correctly guessing a word increases with the number of words known in a group because of the diminishing number of remaining options. The high number of English-Norwegian cognates may also increase the

likelihood that participants in this study could guess correctly, especially since there were no consequences for incorrect guesses. However, it is also important to note that partial knowledge of vocabulary plays an important role in reading, especially since readers will also have access to context and world knowledge when reading, which is not accounted for when looking at isolated items on a vocabulary test. Furthermore, since the focus was on comparing groups and relating vocabulary scores to predictor variables rather than giving a total vocabulary estimate, providing that the chances of guessing were not higher for some participants than others (and there is no reason to believe this to be the case), this should not have strongly biased the results.

There are several other limitations with the VLT that should be noted. Firstly, it is based on word lists derived from texts written in the 1930s and 1940s, which may not reflect current vocabulary (Webb, Sasao, & Ballance, 2017), especially in academic texts. Also, knowing some of the words at the 10,000-word level, even in an L1, would require world knowledge as well as language proficiency (see Article 2 for further discussion). Another limitation of the VLT in terms of testing vocabulary knowledge is that it does not account for collocations (formulaic sequences) or polysemy, and it uses word families rather than lemmas. As discussed in Section 5.2.1, individual words within a word family may occur at different frequencies and being able to recognise a word on a vocabulary test does not necessarily translate into knowing all members of that family.

Another limitation of the VLT is that it uses the AWL as the basis for estimating academic vocabulary knowledge. Although the AWL has been extremely useful and influential, it has been subject to a number of criticisms, which are mainly related to how the list was constructed. The AWL is based on word families and excludes words that appear on the General Service List (West, 1953) of the most frequently occurring 2,000 words. Although the AWL was developed from a range of academic corpora, it has been found to cover some subject areas better than others (Chen & Ge, 2007; Coxhead, 2000; Hyland & Tse, 2007; Vongpumivitch, Huang, & Chang, 2009). Creating academic word lists based on word families can be problematic because words with relevance to academic writing may be discarded along with their homonyms which occur frequently in general language (Hyland & Tse, 2007; Vongpumivitch et al., 2009). Another complication is that the AWL does not account for multi-word collocation patterns which are made up of common words which take on a different meaning when used together, such as *control group* (Durrant, 2009). The AVL (Gardner & Davies, 2014) was developed in order to

address some of these limitations and is based on a much larger and more recent corpus and uses lemmas rather than word families, which reduces problems associated with homonyms. However, given the morphological similarities between Norwegian and English, and the fact that receptive rather than productive L2 vocabulary knowledge was under investigation, the participants in this study would probably have been less disadvantaged by testing based on word families than those whose L1 differs more from their L2. For this reason, the AWL was used since it is part of the overall VLT test.

This study could, of course, have benefitted from including a test of reading comprehension to allow for comparison with the vocabulary test scores, and to test how well vocabulary knowledge predicted reading comprehension in this sample. Unfortunately, this would have made the survey unduly long and have reduced the number of participants, giving lower statistical power, and potentially biased the sample in favour of students who wanted to invest time in completing the survey. Previous studies have shown very clearly that vocabulary knowledge as measured by the VLT is strongly associated with reading comprehension (Laufer & Aviad–Levitzky, 2017) and results from proficiency tests (Beglar & Hunt, 1999), so it is reasonable to assume that the VLT scores would be an important predictor of academic L2 reading comprehension in this sample as well.

7.7 Study 3: Reading speed task

The third study was designed to compare academic reading speed of first- and second-year Psychology students in Norway and in an English-speaking environment (the UK). Participants in the UK consisted of one group of native English speakers and one group of L2 English users. The instrument for this study comprised an extract of authentic academic text, displayed on three pages of the online survey program, followed by eight comprehension questions to check that participants had read the text carefully. Participants were instructed to spend as much time as they felt they needed to read each page of text, making it a kind of self-paced reading task, and the time that participants spent on each page was recorded, giving a measure of reading speed that could be compared between groups. Participants were asked to report their extramural English exposure. This survey was conducted using SurveyGizmo, an online survey program which was able to record the time per page, and which also used display logic to present only relevant questions to participants based on their responses to previous questions. Details about

the reading task and comprehension questions can be found in Article 3 and the survey itself can be found in Appendix B.

In contrast to the previous two studies, this study did not use a pre-existing, validated test, and all items on the instrument used were developed for this study. The comprehension questions, which were used to check that participants had followed the instructions to read the text carefully, were pilot tested but not validated, although this would be a suggested area for improvement in future research. An important consideration of this survey was ensuring content validity, i.e. that this was testing the type of reading that these students would normally undertake as part of their studies (see Section 7.10.1). The majority of reading speed studies to date have measured reading using short extracts of texts (see Brysbaert, 2019 for a review) and, to my knowledge, reading speed of authentic academic text has not been investigated. Therefore, the aim of this study was to test reading speed using a longer and academic text in order to better simulate academic reading as part of university studies. The majority of participants rated the text as similar to or easier to read than their usual university readings and an analysis of the vocabulary found in the text showed the percentage of academic words (as per the AWL) to be similar to other academic texts. Furthermore, all but 14 of the 295 participants reported that they at least sometimes read texts for university on a digital screen, meaning that the data collection method also simulated most participants' normal academic reading behaviour.

Because the survey was anonymous and unsupervised, and we do not know the circumstances under which participants were reading, or how motivated they were to read to learn the information as instructed, some decisions needed to be made about which data to include for analysis. Participants who answered fewer than half of the comprehension questions correctly were excluded, since this indicated that they had not read carefully or that their reading times did not reflect the amount of time they needed to spend to understand the text. Some outliers whose extremely high or low reading times (as identified using the median absolute deviation) skewed the data were also excluded. The remaining reading speed data were found to be in normal distribution. The details of the exclusion criteria can be found in Article 3.

This study may have benefited from including a measure of English proficiency as a predictor of reading speed. The survey did originally include items from the 10,000-word level of the VLT as an indicator of L2 proficiency and exposure, but unfortunately this data could not be included in the analysis due to technical problems. However, previous research has demonstrated that

among advanced L2 readers, L2 proficiency is not a strong predictor of reading speed (Cop et al., 2015; Fraser, 2007).

7.8 Background questions

All three studies asked participants to report background variables such as age, gender, native language, amount of time spent at university, and what they were studying. Studies 2 and 3 also asked participants to report the frequency with which they were exposed to English outside of formal education settings as measured on a seven-point scale (never–several hours a day). These questions were unfortunately limited in number (only three types of activity in Study 2 and four in Study 3) and scope (only asking what activities they were doing at the time of testing, without accounting for their history of engagement with these activities). Including more questions, perhaps even enough to create an additive index using these questions, would of course have been beneficial to the project. Still, even this limited number of questions gave results that may be important in understanding what characterises L2 English reading in this population.

All studies asked for self-reports of various aspects of English proficiency and reading ability on a five-point scale (poor–excellent). This was used as a predictor variable in Study 1 to look for relationships between self-reported proficiency and awareness of reading strategy use. The results were not included in the other two articles. It should be noted that self-reported proficiency is not the same as *actual* proficiency (see, for example the study by Airey & Linder, 2006), although in this study it was used for comparing self-reported proficiency between L1 and L2.

7.9 Statistical analysis

The data in the three studies were analysed using R and R Studio, and in some cases cross-checked using SPSS. For each of the studies, the focus was on comparing groups and looking for predictors of outcome variables. The studies used a combination of descriptive statistics (means, standard deviations), comparisons of group means (t-tests, Mann-Whitney/Wilcoxon, Analysis of Variance (ANOVA) and Kruskal-Wallis tests), and regression analysis (linear regression, multiple regression and ordinal regression). The analysis for the individual studies is for the most

part discussed in the individual articles, but some further details of these analyses, including justifications for choice of analysis, is discussed below.

All three studies used Likert-type items (on a five- or seven-point scale) for comparing groups or as predictor variables. Likert scales (such as those used in the SORS to give the Global, Support and Problem Solving categories of strategies) are composed of a series of several Likert-type items that are combined into a single score or variable. Therefore, this combined variable can be analysed as an interval scale, allowing for the use of statistical tests designed for continuous data (Boone & Boone, 2012; Norman, 2010), which was the approach was taken with the analysis of the categories of items on the SORS.

Likert-type items are considered to give ordinal (ordered and categorical) data because although the categories are ranked (something that is reported as happening 'always' is more frequent than something that happens 'sometimes' or 'never'), we cannot say with any certainty that the distances between the categories are equal. While the use of parametric tests for analysing ordinal data is discouraged by many (Kuzon, Urbanchek, and McCabe (1996) refer to it as a 'deadly sin'!), Norman (2010) provides compelling evidence (including worked examples) that analysing ordinal data using parametric tests will not only give accurate results, but that parametric tests are more robust than non-parametric ones when statistical assumptions (such as normal distribution of data) are violated. Therefore, I have used parametric tests to analyse much of the data, including data from Likert-type items. In most cases I also performed non-parametric equivalents of these tests (Mann-Whitney/Wilcoxon, Kruskal-Wallis, ordinal regression) and confirmed that these tests identified the same variables as significant.

7.10 Validity

Validity refers to 'the correctness or truthfulness of the inferences that are made from the results of the study' (Johnson & Christensen, 2012, p. 245), and is an important consideration in research. The validity of the individual studies is discussed in the articles themselves, but the following section will discuss validity concerns for the project as a whole, for which the most relevant aspects are construct, content, and external validity.

7.10.1 Construct validity

Tests are designed to measure specific constructs, and Alderson (2000) highlights the importance of defining the construct for the given context. Construct validity is an indication of how well the construct under investigation (in this case academic L2 reading) is accurately represented in the particular study (Johnson & Christensen, 2012). It should be noted that none of the studies in this project can be said to be fully testing academic L2 reading per se. Instead, each of the studies in this thesis investigates different aspects of L2 reading, with the aim of bringing together multiple sources of data to help understand what characterises academic English reading in Norwegian context. This thesis sheds light on different facets of L2 reading, including reading strategies, L2 vocabulary knowledge, L2 reading speed, and the relationship these have with the parallel language context, and with input variables including extramural English exposure.

The first two studies incorporated items from existing validated tests developed by researchers and used extensively in a variety of settings around the world. The construct validity for these measures (awareness of reading strategies in the SORS and meaning recognition of English vocabulary at different frequency levels in the VLT) has already been established to a large extent by the developers of these tests. Using these measures helped to ensure construct validity for the investigation of these aspects of L2 reading, and enabled comparisons with other groups of L2 readers in different situations studied in previous research. It should, however, be noted that every test is validated using a specific population, and factors such as the first language of participants, age and exposure to English will all affect outcomes, and this should be considered when interpreting the results.

7.10.1.1 Content validity

One of the key aspects of construct validity is content validity, or the extent to which items on an assessment measure accurately represent the construct under investigation (Johnson & Christensen, 2012). This was another important consideration, especially in Study 3, since this study did not use a pre-existing validated test. Study 3 used an extract of authentic academic text and comprehension questions to investigate reading speed of academic text, and therefore the content validity of this study is dependent on both the text (whether it is representative of the type of text that we want to make inferences about) and the comprehension questions (and whether these were a good measure of whether participants had read and understood the text).

Although this study would have benefited from the use of a validated test of reading speed, I was unable to find an existing test of reading speed and comprehension that assessed academic reading specifically, which meant that to ensure good content-related evidence of validity, I needed to create my own measurement instrument. This involved finding text on a topic appropriate for the target population, ensuring that the vocabulary was representative of the frequency levels found in academic text, and asking participants to evaluate the text in relation to what they usually read for university (see Article 3 for details). The comprehension questions were a way to check that participants had read the text and understood the information in it. Although these were carefully designed to tap into the relevant aspects of reading comprehension, they could not be extensively tested or validated, and this should be kept in mind.

7.10.2 External validity

In order for results of research to be generalisable to a population, the sample needs to be representative of that population. External validity refers to the extent to which the results of a study can be generalised to a larger population and across different settings (Johnson & Christensen, 2012). This thesis is based on data from a large sample size and includes data from three universities, a variety of degree programs, and across a different levels of university experience. However, as discussed in each of the articles, the external validity of the data in this thesis is limited by the purposive sampling of participants. The majority of participants were based at one Norwegian university and from only a selection of degree programs, and this should be kept in mind when considering the results. The limitations of the sample are also discussed above in Section 7.3.

Because participation was voluntary, and not all students who were invited to participate elected to do so, there is a possibility that there was a self-selection bias that could limit external validity (Lavrakas, 2008). An attempt was made to maximise external validity by collecting data from a relatively large sample size (800 participants in total), by targeting university students from a variety of study programs, by making the data collection instruments as accessible as possible (i.e. relatively short, anonymous, and with multiple-choice questions), and by using external rewards (such as travel vouchers or research participation credit) to encourage participation among many different types of student.

The data for this project came from three separate samples, which means the aspects of reading investigated in each study could not be directly compared for individual participants. However, using three separate samples meant that a wider range of participants could be reached, which helped to increase the external validity of the overall project. By recruiting participants from different study programs and different stages of their university education, the results from this project are more transferable than if only a very specific group of students had been targeted. Although it is not possible to claim that the results from this thesis are generalisable to all Norwegian university students, the relatively large sample size and diversity of participant backgrounds means the results are transferable to similar contexts in other Norwegian institutions, providing the limitations are kept in mind. While the current project focuses on Norwegian university students, the findings may also be transferable to other contexts, particularly to other countries where English has a similar status.

7.11 Ethical considerations

The overall project and each of the surveys used for the data collection, as well as information given to participants was registered with the Norwegian Centre for Research Data (NSD). The information provided and some questions were modified in line with recommendations from NSD. The collection of personal data was limited as far as possible, although some indirectly identifiable data was a necessary part of the project (such as mother tongue, gender, age and diagnosis that may affect reading). Wherever possible, the collection of indirectly identifiable information was minimised and functioned only as an exclusion criterion. For example, the first two studies only included participants who reported having Norwegian as a first language and who did not have English as a first language, therefore the only options when asking for the mother tongue were 'Norwegian', 'English', or 'Other', since this was enough information to determine whether a participant met the criteria for inclusion in the study, but did not give more information than needed.

Collecting data using online surveys means that data storage and security can be more legally and ethically complex than when using paper-based surveys. Therefore, the survey program used for collecting the data for the first two studies was securely managed by the university (Select Survey) and the survey for the third study was collected using SurveyGizmo, with which the university had a data processing agreement.

Participants were informed on the front page of the survey that their participation was voluntary and that they could stop any time. They were informed that the project had been registered with NSD and every effort would be made to ensure the anonymity of their data.

For the second and third studies where incentives were offered for participation, participants were invited to provide a contact email address if they wished to be given the opportunity to win the prize on offer. Providing contact information was optional, and the email addresses were removed from the data prior to analysis.

8. Main findings and discussion

This thesis explored aspects of L2 proficiency and reading skills to provide insight into academic English reading among Norwegian university students. The aim was to investigate what characterises Norwegian university students' academic L2 reading to identify factors that may potentially lead to difficulties, including L2 proficiency, reading skills, and the expectations of L2 proficiency that are associated with the parallel language context of Norwegian universities. Another goal was to investigate differences in academic English reading for advanced L2 users in Norway compared to students in a monolingual English environment, since both groups are expected to read the same English language texts as part of their higher education. This chapter will give an overview of the findings of the studies and the implications they have for understanding academic L2 reading in Norway.

8.1 Summary of the studies

8.1.1 Study 1: Reading strategies

Busby, N. L. (2018). Comparing first and second language reading: The use of metacognitive strategies among Norwegian students. *Acta Didactica Norge*, 12(2), 1-26. DOI: <https://doi.org/10.5617/adno.5579>

The first study investigated metacognitive awareness of reading strategies in Norwegian (L1) and English (L2) academic reading among 316 Norwegian university students from a range of study programs. This study was designed to investigate whether problems found with Norwegian students' English reading (Arnsby, 2013; Hellekjær, 2005, 2009, 2012a) are related to inefficient use of reading strategies and to compare approaches to L1 and L2 reading in a parallel language environment. Students reported the frequency of their use of 28 reading strategies in L1 and L2 using items from the Survey of Reading Strategies (SORS: Mokhtari & Sheorey, 2002).

The main finding was that there was a striking similarity in awareness of reading strategies for L1 and L2 for these students. This is in contrast to previous research on other populations around the world which has found much higher rates of reading strategy use for L2 than for L1 reading. This may indicate that the students in this study do not approach English reading as L2 reading but as if it were L1 reading and are therefore possibly not using the most effective reading strategies for the task. The relatively low use of reading strategies for L2 reading may

also be an indication of relatively high L2 proficiency in this group compared to those in previous research, and that the strategies used have become automatized so that students are less aware of using them. It may also be a consequence of the parallel language environment of Norwegian institutions of higher education which expect native-like reading of academic English texts.

A significant association was found between use of lower-level (i.e. decoding) reading strategies and lower self-rating of proficiency and lower grades, especially for L2 reading, which indicates that the students with lower reading proficiency were needing to rely more on decoding strategies. Higher-level strategies, such as thinking critically about the text, were more strongly associated with higher self-ratings of reading proficiency and better grades.

8.1.2 Study 2: Vocabulary

Busby, N. L. (2020). Words from where? Predictors of L2 English vocabulary among university students. *ITL - International Journal of Applied Linguistics*, published online first. DOI: <https://doi.org/10.1075/itl.19018.bus>

The second study investigated L2 proficiency among Norwegian university students as indicated by receptive English vocabulary knowledge at different word frequency levels, as well as exploring sources for vocabulary acquisition. A survey which included the Vocabulary Levels Test (Schmitt et al., 2001) and self-reports of exposure to extramural English and formal English education was completed by 189 Norwegian university students from three different study programs that had different proportions of English in their curriculum. One aim of this study was to investigate sources of English vocabulary for these students, and the extent to which they were acquiring knowledge of English from outside of formal education. The other goal was to investigate whether a lack of L2 vocabulary could help to explain poor results from English reading tests (Arnsby, 2013; Hellekjær, 2005, 2009, 2012a) following criticism of the materials used to teach English at upper secondary school (Skjelde, 2015). This is the first study to directly test English vocabulary in Norwegian university students.

This study demonstrated a high degree of variation in English vocabulary knowledge among the students in the sample. Although some participants correctly identified all vocabulary items in the test, others struggled even with high frequency words, suggesting that they have gaps in their vocabulary that may cause problems for their academic reading in English. This variation was shown to be significantly associated with the frequency with which they reported being

exposed to English outside of formal education, but not significantly associated with the amount of formal English language teaching they had received. This suggests that students may be learning a significant proportion of the vocabulary they need for academic L2 reading from activities outside of school, which could help to explain the high degree of variation in vocabulary scores in this group. Analysis indicated that the number of semesters completed at university was not a strong predictor of vocabulary knowledge, which suggests that students do not necessarily acquire the English vocabulary they need simply by being given texts in English at university. The relatively weak association between time spent at university and L2 vocabulary scores may be a consequence of the parallel language environment: they are needing to conduct academic activities in two languages which may allow less opportunity for input and therefore vocabulary acquisition in each language.

Scores on the academic vocabulary section of the VLT were generally quite high, and more strongly predicted by study experience than the other sections, so it appears that the main problems lie with general low frequency vocabulary, and explicit teaching using academic vocabulary lists (see Section 6.1) may not be a solution.

Another interesting finding was that vocabulary knowledge was significantly different between students in different study programs. Vocabulary scores were significantly higher among students whose curricula required more reading in English, even for students in the first year of university, suggesting that this difference could not be accounted for solely by acquisition resulting from course readings. This, in line with previous research (Arnsby, 2013), suggests that students may be selecting what they study based on the amount of L2 reading required. The results of this study indicate that students may not be acquiring the L2 proficiency needed for university reading from secondary education. The fact that L2 proficiency is not ensured through admission requirements and that no L2 reading support is offered to students may be a consequence of the largely unacknowledged parallel language situation in Norwegian universities.

8.1.3 Study 3: Reading rate

Busby, N. L. & Dahl, A. (accepted) Reading rate of academic English texts: Comparing L1 and advanced L2 users in different language environments. *Nordic Journal of English Studies*

The third study investigated reading speed of academic text among 295 undergraduate Psychology students with different language backgrounds. Studies by Hellekjær (2005, 2009, 2012a) have suggested that poor English reading results from Norwegian students may be a consequence of slow reading rather than poor comprehension. Slow reading is a recognised characteristic of L2 reading even among advanced L2 users (e.g. Cop et al., 2015; Fraser, 2007; Shaw & McMillion, 2008). A group of Norwegian undergraduate Psychology students was therefore compared with matched groups of L1 and L2 users of English in the UK. This study comprised an academic reading task followed by comprehension questions, and then background measures for comparison. The aim was to compare reading speed of academic text for Norwegian students in a parallel language environment (reading in English, but other academic activities in Norwegian) students in an English-speaking environment. To our knowledge, this is the first study to test reading rate using an authentic academic text, simulating realistic reading in a university context.

This study showed that although all three groups achieved similar comprehension scores, reading speed among Norwegian students was, on average, significantly slower than among both native and non-native English-speakers in the UK. This suggests that the slower reading by Norwegian students was not simply a result of their L2 status. There was a high degree of overlap between the Norwegian and UK-based groups, but the majority of the Norwegian participants were clearly reading more slowly. The reading times of the L2 readers in the UK, in contrast, were almost entirely overlapping with the native speakers. Unlike in Study 2, where extramural English was found to be a significant predictor of vocabulary knowledge, this study showed no significant relationship between extramural English and reading speed in the Norwegian group.

The difference in reading speed between the Norwegians and the UK-based students, despite no apparent difference in comprehension, suggests that the language environment may be an important factor in predicting reading speed. It may be that the parallel language environment found in Norwegian universities, where academic activities are conducted in two languages, could affect reading speed. This is in line with previous research (Linck et al., 2009) showing that L2 immersion environments are associated with faster lexical retrieval in L2 users. This study

highlights the need for a greater understanding of academic L2 reading among students in a parallel language environment in order to improve awareness of the amount of time needed for university reading as well as support that could be offered to students.

8.2 General discussion

The overall goal of the project was to examine what characterises academic L2 reading in the Norwegian parallel language university environment, and the three studies each contribute towards this goal. The first study found that the students surveyed did not approach academic English reading as L2 reading with regard to the strategies they reported using, but instead showed a similar awareness of reading strategy use to that in their L1 reading. This is possibly a consequence of these strategies being highly automatized, or their use being influenced by the expectation of their having close to native-like proficiency in English. The second study demonstrated a high degree of variation in L2 vocabulary knowledge which was better predicted by extramural activities than by formal English language teaching or by study experience at university, and that many of the students in this sample may struggle with academic reading in English due to gaps in their L2 vocabulary knowledge. The third study revealed that Norwegian students read more slowly in English than matched groups of native and non-native English-speakers studying in a monolingual English environment. This suggests that the differences in reading speed were not simply due to L2 reading but may also be related to the parallel language environment. The results of the studies and their contributions to the overall research question of what characterises academic L2 reading in the Norwegian university context are summarised in Table 4.

Table 4: The main findings from the studies and how they relate to the overall research question

	Study 1	Study 2	Study 3
Main research question from each study	Do Norwegian university students use different reading strategies when reading in L1 (Norwegian) and L2 (English)?	What are the levels of receptive English vocabulary knowledge among Norwegian university students and what factors are associated with vocabulary knowledge?	How does the reading speed of Norwegian students compare with that of native English-speakers and other L2 users when reading academic English texts?
Main finding	Very similar reported awareness of reading strategies in L1 and L2 academic reading	Large variation in L2 vocabulary knowledge between individuals which was more strongly predicted by extramural English than formal English education	L1 and L2 readers of English studying in the UK read academic text significantly faster than did comparable Norwegian students
Contribution to overall research question	Similarity in approach to L1 and L2 reading may reflect expectations of L2 reading proficiency as a consequence of the parallel language environment or general expectations of proficiency	Variation in L2 proficiency indicates that not all students are prepared for academic L2 reading and that they may not be learning enough from formal English education	L2 reading was slower among Norwegian students than L2 readers in an English-speaking environment, indicating that reading speed may be affected by the linguistic context

In summary, the findings indicate that academic L2 reading in this context can be characterised by the Norwegian students having an L1-like approach to reading strategies, a variable L2 vocabulary knowledge (which for a significant proportion of students may be under the threshold for fluent reading), and that, on average, they read more slowly than did comparable L1- and L2-readers in a monolingual English educational context. This suggests that while some of the students tested are likely to have a good basis for L2 reading at university, a significant proportion experience some degree of difficulty.

It has been well established that successful L2 reading requires both reading skills and L2 proficiency (Carrell, 1991; Koda, 2007), and the findings in the present thesis suggest that many of the students in the sample have weaknesses in one or both of these areas which may lead to problems with their academic L2 reading. Previous studies have also found L2 reading difficulties among Norwegian university students (Arnsby, 2013; Hellekjær, 2009), and the present work supports and helps to explain these findings. One explanation is that the gaps in vocabulary and the lack of efficient strategies to overcome these may short-circuit the reading process for the students with lower L2 proficiency and thus contribute to slower L2 reading. As discussed in Sections 4.3 and 5.5, Walczyk's (2000) Compensatory-Encoding Model proposes that comprehension problems caused by gaps in vocabulary knowledge can be overcome using compensatory strategies, but that use of these strategies takes time. Therefore, in a time-limited situation (like an exam), the outcome manifests in lower comprehension scores due to not having enough time to process the text. This phenomenon has also been observed among Swedish university students who had similar L2 comprehension scores to native speakers when time was unlimited (although they took longer to read than the native speakers did), but lower comprehension scores in a limited-time situation (Shaw & McMillion, 2008, 2011). Study 3 showed that not only did Norwegian students read more slowly than native speakers, but that they also read significantly more slowly than comparable L2 readers in the UK, perhaps indicating that their use of compensatory strategies was not as efficient as students in a monolingual English environment.

It is important, as well as encouraging, to note that the results of these studies do not suggest that *all* Norwegian students are likely to struggle with reading English texts at university. Although the findings in this thesis indicate that many are likely to be experiencing difficulties with some aspects of the reading process, there are still many students who appear to have a reasonably extensive L2 vocabulary and many who read in English at a similar rate to native speakers. The fact that many students reported using higher-level ('global') processing strategies in their L2 reading also indicates that they are able to understand and think critically about texts in English. In other words, the situation of academic L2 reading in Norway is complex and nuanced. As noted in Chapter 6, academic English can present challenges even to L1 English-speakers, which is why it is important to focus on *academic* reading when investigating how students read texts as part of their university studies.

To sum up so far, the present thesis brings together and builds upon research from many different disciplines to test aspects of academic L2 reading in the Norwegian university context, investigating reading strategies, vocabulary knowledge and reading speed in the same project. Each of the three studies sheds light on academic L2 reading from a different perspective, and the overall findings indicate that, along with reading strategies and L2 knowledge, the linguistic context is also important. The parallel language environment of Norwegian universities, where academic activities are often conducted in L1 *and* L2, means that there is less time available for developing academic skills in both languages. This is not necessarily detrimental to learning in and of itself, but it does need to be acknowledged and investigated to a greater extent. The input available affects the different types of language proficiencies that develop, and in this context, it appears that extramural English is important, but not sufficient, for the development of skills and knowledge necessary for academic L2 reading. Finally, the untested presumptions of English proficiency of Norwegian university students may be unhelpful for students in that it means they are not offered EAP training or other language help and may have nowhere to turn if they are struggling with reading in English. The type and amount of L2 input and the linguistic context of Norway and Norwegian universities appear to be particularly important in explaining the characteristics of academic L2 reading in this population, and these are discussed in further detail below.

8.2.1 The importance of input

Studies 2 and 3 found that all students in the sample reported reading in English in their free time, which indicates that they are already L2 *users* to some extent, even outside of education settings. However, the gaps seen in many students' L2 vocabulary (Study 2) and the lower-level reading strategies reported to be used for L2 reading (Study 1) indicate that they are also still L2 *learners*. Next, and given the extensive opportunities for English exposure in daily life in Norway and the strong associations between extramural English and L2 reading proficiency among younger Norwegians seen in previous research (Brevik, 2016; Brevik & Hellekjær, 2018; Brevik et al., 2016), it was interesting to find that extramural exposure was a significant predictor of L2 vocabulary knowledge, but not for academic reading speed.

While extramural English exposure was a significant predictor of L2 vocabulary knowledge, this study shows that formal English education, including the number of English classes completed at upper secondary school, is not. This may be an indication that teaching at this level is not

working optimally, perhaps because there are not enough hours available to provide the amount of input required for vocabulary acquisition, or possibly because the teaching does not take what students already know from outside school into account, as has been proposed in the similar context of Iceland (Jeeves, 2018). The textbooks used in Norwegian upper secondary schools tend to be designed for EFL learners rather than L2 users, and contain much lower levels of academic vocabulary than authentic academic texts (Skjelde, 2015). This means there is a large and important transitional gap between upper secondary school, where students are regarded as L2 learners, and university, where they are viewed as L2 users who no longer have a need, or even an opportunity, to work on improving their academic English reading skills.

Although language learning can be an expected (although often unacknowledged) consequence of conducting academic activities in English (Dearden, 2015; Pecorari & Malmström, 2018), the number of semesters completed at university was not a strong predictor of vocabulary scores on the VLT. This suggests that assigning university texts in English might not necessarily lead to students acquiring the vocabulary they need to read them. However, the finding that the academic vocabulary section did show a slightly stronger correlation with the number of semesters completed compared to the other sections suggests that some academic vocabulary gains may result from reading academic texts in English, presumably because this vocabulary is most common in academic texts. The larger problem shown in this study was that many students were lacking general lower frequency vocabulary which is essential for academic reading but is less likely to be acquired through extramural activities such as watching movies, gaming or reading novels because these tend to use less formal language and higher frequency vocabulary (Nation, 2013).

The fact that extramural English exposure was found to be a significant predictor of vocabulary knowledge but not of reading speed may indicate that the amount of extramural English the students are exposed to, although relatively massive, is still not enough to lead to L1-like reading speed. The L2 readers in the UK can be assumed to have more English input both in academic contexts as well as their everyday lives. The type of language encountered extramurally may also help to account for the difference. Reading speed was measured in this study using an academic text, which likely contains very different language from what most of the students were reading in their spare time. Previous research has shown that Norwegian university students read academic text significantly more slowly than native English speakers, but that there was no significant difference in reading speed for non-academic text (Busby,

2015), suggesting that proficiency in one type of reading may not necessarily equal proficiency in another. It may also be the case that reading fluency can be seen as an aspect of reading proficiency in itself and that, at relatively advanced levels of L2 proficiency, it is not necessarily further improved by additional input but rather varies between individuals just as it does among L1 readers, but with generally lower reading speeds.

Recognising differences between academic reading and other types of reading may also help to explain the findings from previous research. The contrast between the high levels of L2 English proficiency in Norway seen in some studies (Bonnet, 2004; Education First, 2020) and the problems with academic English reading seen in the present thesis, as well as previous research (Arnsby, 2013; Hellekjær, 2005, 2009, 2012a), indicates that estimates of proficiency may depend on the type of proficiency being tested. Hellekjær (2009) argues that this relates to the distinction between conversational (BICS) and academic (CALP) types of language proficiencies as described by Cummins (2000). The extensive opportunities for receptive informal English outside of school have probably led to high levels of BICS-type proficiency, leading to a confidence in English proficiency that is not necessarily transferable to academic contexts. A similar contrast has been seen in Iceland and Sweden, where researchers note that despite being confident and capable in receptive informal English of the type encountered extramurally, students can struggle with the formal registers of writing found in academia (Arnbjörnsdóttir, 2018; Ingvarsdóttir & Jóhannsdóttir, 2018; Mežek, 2013b). This highlights the importance of considering different types of proficiencies and the type of text and purpose of reading when investigating academic L2 reading.

8.2.2 The importance of context

Parallel language environments such as Norwegian universities are different from both the purely immersion or foreign-language environments that have typically been the subject of research on L2 reading (Mežek, 2013a), and the context is an important consideration in this thesis. Each of the studies presented here demonstrated findings that could be linked to or explained by the parallel language context of the Norwegian academic environment. The finding from Study 1 that, in general, students are not aware of using different strategies for their reading in L1 and L2 could be explained by the fact that they are expected to read both languages in the same academic context, and are presumed to have sufficient L2 proficiency to be able to reach a high level of comprehension in both. The relatively weak link between

vocabulary knowledge and time spent at university (Study 2) could be a consequence of having two languages in academic settings, meaning less time is available for vocabulary acquisition in each language, or for focusing on developing L2 vocabulary more generally. This may be exacerbated by the fact that these students are no longer considered to be L2 learners at the university level, and have little or no opportunity or provisions for language support. Finally, the slower academic English reading by Norwegian students compared to students in an English-speaking environment suggests that slower reading speeds are not necessarily solely an effect of L2 reading. This may be a consequence of having two languages in the academic context and another language dominant in everyday life, since both languages are activated in bilinguals at all times but being in an L2 immersion context can facilitate L2 access by inhibiting the connections to the L1 (Linck et al., 2009).

In Norway, it is assumed that Norwegian university students, like those in other Nordic countries, are able to 'take the use of English in their stride' (Pecorari, Shaw, Malmström, et al., 2011, p. 328), and they are often expected to read the same textbooks and articles as L1 readers. This has an impact at an individual and an institutional level. As Arnsby (2013) notes, the fact that compulsory English education ends in the first year of upper secondary school (and the English reading proficiency of Norwegian students is not tested as part of the university admissions process) gives students the message that the English skills and proficiencies they have are sufficient for university studies. Researchers from Iceland have also described the problems associated with untested presumptions of English proficiency, noting that students 'seem to come to university confident in their English skills which are mostly receptive and mostly developed through their recreational activities extramurally and fortified at school' (Arnbjörnsdóttir, 2018, p. 158).

It can be difficult for students to assess their preparedness for academic L2 reading at university, since they are not aware of how much reading they will need to do in English, or of their own English proficiency (Arnsby, 2013), especially since the textbooks at upper secondary level are written for EFL learners and therefore do not give an accurate picture of what they will need to read at university (Skjelde, 2015). Even with some experience at university, the Swedish students in, for instance, Airey and Linder's (2006) study seemed to be largely unaware of the impact that studying in the L2 had on their learning, workloads and participation in class. Students in that study who reported experiencing no negative impact of L2 teaching, or even that the language used made no difference to them, were found to have differences in their

learning and recall of information compared to when teaching was in their L1 and had to put in extra effort to compensate for the difference.

This calls into question the parallel language policies that inform language choices for teaching and for assigning class reading, first and foremost that these seem to be based on the presumption that Norwegian students are equally capable of carrying out academic activities in English or Norwegian even though quite advanced English proficiency is required for almost all studies, especially at higher levels. In fact, the differences in L2 vocabulary knowledge seen between students in different study programs, even in their first year, suggest that some students may be choosing what to study based on how much they need to read in English. Norwegian university students have reported intending to change study program because there was more reading in English than they felt they could cope with (Arnsby, 2013).

As mentioned above, in contrast to many parts of the world where L2 English is used in universities (including for international or exchange students in many English-speaking universities), students are expected to already have the English proficiency they need when they start university in Norway, and there is generally no testing or language support (e.g. EAP classes) offered to Norwegian students. This means that EAP proficiency needs to be developed to a large extent incidentally and in the students' own time, meaning that some students could be missing out on opportunities, and possibly making some study programs less accessible to students who have had less extramural exposure to English before starting university. This could mean that otherwise capable students are avoiding particular study programs, dropping out, or are not able to achieve their full potential due to limited L2 proficiency. The lack of English proficiency requirements for admission and the lack of English language support for university students reflect the presumption that Norwegian students are capable of reading and understanding academic texts in English. The findings in this thesis suggest that this is problematic.

Parallel language use is common in universities throughout the Nordic and other Northern European countries and the present findings are generally in line with studies conducted in these countries (e.g. Arnbjörnsdóttir, 2018; Mežek, 2013a; Pecorari, Shaw, Malmström, et al., 2011; Shaw & McMillion, 2008, 2011). However, they differ from much of the research conducted on readers with lower L2 proficiency. For example, Study 1 found much lower reported use of strategies for L2 reading than in populations with lower L2 proficiency (Alsheikh & Mokhtari, 2011; Feng & Mokhtari, 1998; Kong, 2006; Mokhtari & Reichard, 2004; Sheorey &

Mokhtari, 2001). Study 3 found that extramural English input was not a significant predictor for reading speed, whereas previous research on lower proficiency L2 learners has shown strong correlations between extramural input and reading speed (Beglar & Hunt, 2014; Beglar et al., 2012; McLean & Rouault, 2017). This indicates that the students who are the subject of the present investigation differ from the population traditionally characterised as EFL learners or L2 learners, and that assuming that all non-native readers have the same abilities and needs can obscure important differences between them. The participants in this thesis represent a significant, and growing, group of L2 users who should be studied in their own right. Additionally, research into advanced L2 readers can give insights into processing differences between L1 and L2 reading, even when the reading outcomes are similar (McMillion & Shaw, 2016).

Finally, it should be noted that having two languages in the academic context is not inherently negative or a hindrance to learning and, as mentioned in Chapter 6, studies have shown that the relationship between L2 proficiency and academic success is not a straightforward one (e.g. Dooley & Oliver, 2002; Light et al., 1987). In fact, having two languages available, and being able to switch between them, can also be an advantage in that it can lead to greater understanding of the content (García & Wei, 2018; Malmström, Mežek, Pecorari, Shaw, & Irvine, 2017). Moreover, the additional effort involved in thinking about information in two languages may lead to 'desirable difficulties' which have been suggested to enable better recall of information (Bjork & Bjork, 2011; Metcalfe, 2011; Rovers et al., 2018). Therefore, the findings from this thesis are not an argument against parallel language use, but instead suggest that more research is needed with a particular focus on the challenges and potential benefits of this linguistic situation. Recognising that the parallel language context in places like Norway is a special situation that comes with its own set of challenges and intricacies is important in better understanding academic L2 reading in these populations.

8.2.3 Key findings

In summary, three key topics emerged as being important in the overall project: presumptions of academic L2 reading ability (from both institutions and the students themselves), different types of language proficiencies (academic reading requires specific skills that may be different from general language proficiency), and the influence of the parallel language context. Acknowledging the variation in L2 proficiency in this population and the challenges associated

with academic L2 reading could be an important step in developing policies and providing support so that all students have equal opportunities to succeed academically in a parallel language context.

8.3 Implications for education

The aim of this thesis was to investigate aspects of academic English reading among Norwegian university students. Although providing recommendations for education was not the focus, this research is understandably very relevant to discussions around education and how well the Norwegian education system prepares students for reading at university. Therefore, the implications for education should be discussed briefly.

First, the present findings indicate that it can be problematic to assume that all students are equally prepared for academic L2 reading at university, or that they are equally able to benefit from academic English reading materials. In fact, the unacknowledged requirement of advanced English proficiency may be a serious impediment to some students. The finding that extramural exposure was a better predictor of L2 vocabulary than formal English education also suggests that students may not be gaining the English proficiency they need for university studies from upper secondary education, and that incidental English learning at university may not be sufficient to compensate for this. These results indicate that additional language support at university may be necessary for some students. The need for increased competence in English is indeed also highlighted in the bill for a new Norwegian Language Act (Regjeringen, 2020), and may be important to ensure that higher education is accessible for all.

The findings from these studies may also have implications for lower levels of education. The role of extramural input in L2 vocabulary knowledge, as well as previous studies linking extramural English to L2 reading proficiency among upper secondary students (Brevik, 2016; Brevik & Hellekjær, 2018), suggests that L2 proficiency may vary considerably even among much younger students. On the one hand, prior knowledge and varying abilities should ideally be taken into consideration in upper secondary English classes in order to avoid some students becoming bored and/or overconfident in their English skills and other students being left behind. On the other, putting greater focus on actively developing EAP skills will also be important. For reading, this could perhaps also involve more exposure to authentic academic English texts at an earlier stage, alongside strategies for reading this type of text.

The overall findings of this project highlight the complexity of the situation of academic L2 reading. Some aspects of L2 reading, such as strategy use, may be improved with explicit instruction, some, such as vocabulary knowledge, may be improved through extramural input, and others, like slow reading speed, may be partially an unavoidable consequence of the parallel language situation. The untested assumption that students have the L2 reading skills they need by the time they start university appears to be counterproductive in that it leads to overconfidence from both students and staff and a consequent lack of support offered by institutions or sought by students. Taking Norwegian students' academic L2 reading proficiency for granted may be a mistake which has serious consequences for many.

8.4 Limitations and suggestions for future research

As noted in Chapter 1, although the focus of this thesis is investigating factors associated with academic L2 reading, the studies do not directly test L2 reading. Instead, the aim of the studies was to investigate characteristics of L2 reading and predictors of these. However, it is also important to investigate how well these characteristics relate to reading outcomes and academic success. This project brought together various different types of data about reading and reading behaviour among Norwegian university students but, although it was not possible in this case, it would also be informative to compare data for the same individuals to look for patterns. A longitudinal study would be a useful approach for future research, especially to observe changes in L2 English reading abilities over time. Another potential avenue for future research might be some more qualitative studies, for example interviews with students to learn more about their approach to L2 reading in terms of strategies, and where they believe they are encountering difficulties with English reading. This could help to shed light on some of the questions raised by these findings, such as the direction of causation in the relationship between L2 proficiency and extramural input as well as how to motivate students to engage in activities that could help with their L2 reading at university.

The main limitation of the studies in this thesis relates to the sample, as discussed in Section 7.10. The external validity of these findings is limited by the purposive sampling, which means there is a limit to the extent to which they can be said to be generalisable. Nevertheless, the results of these studies are in line with those of previous research on Norwegian university students and upper secondary students who were soon to attend university. They also reflect results from studies conducted in other countries such as Sweden, Denmark, and Iceland which

have a similar parallel language relationship with English in the university system (Bukve, 2019). Therefore, although it is not possible to claim the generalisability of these results to all Norwegian university students, a strong case can be made for transferability within Norway and potentially to other Nordic countries or those with a similar education system. The findings described in the present thesis, as well as previous research, indicate that parallel language situations present particular challenges to students, and that further research is needed into the effects this can have on students' academic L2 reading and the best ways to offer support.

9. Conclusion

The present thesis investigated academic English reading among Norwegian university students in terms of their reading strategies, L2 vocabulary knowledge, and reading speed. The goal was to learn more about academic L2 reading by advanced L2 users in a parallel language environment. It was shown that in this context, academic L2 reading was characterised by native-like reading strategy use, variable L2 vocabulary knowledge, and slower reading, on average, than students in a monolingual English environment. The parallel language context, whereby two languages are used in both the university and the wider society, appears to influence the academic L2 reading in this population. The results of the studies point to different explanations for the characteristics identified in academic L2 reading in this particular group of students. Vocabulary knowledge appears to be best addressed as an L2 issue, whereas the slower L2 reading seen in Norway but not the UK suggests that reading speed may be affected by the use of two languages in the academic context. There may be no single cause of differences between L1 and L2 reading and, therefore, no single solution to make L2 readers read like L1 readers. This may indeed not be possible. Therefore, it is important to acknowledge these differences and continue research into understanding academic L2 reading in this context.

Although many Norwegian university students are capable of reading and understanding academic texts in English with minimal difficulties, and many may read on a par with native English speakers, there are also many who are likely to be struggling with academic L2 reading. This means that many students are at risk of not reaching their full academic potential because of insufficient L2 proficiency, which, because of the presumptions about Norwegians' English proficiency, is not tested or supported at the university level. Having found that even this group of advanced L2 readers includes many who are likely to be struggling with reading, there is reason to believe that other students around the world who also have to read in L2 are probably also experiencing difficulties. Further research into the effects of parallel language use on L2 reading and how to best prepare students for studying in a second language is therefore needed, and acknowledging the challenges inherent to this situation is a good place to start.

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Appendix A

The survey used in Study 2

Hello and welcome to this survey about studying in a second language.

Thank you so much for visiting this page and being willing to help out with some important research which is investigating the effects of studying in a second language. Participation in this research will involve answering some questions about your experience with English, and then a vocabulary matching game. The survey should take approximately 15 minutes. All data will be treated confidentially.

This survey is being conducted as part of a PhD project at the Norwegian University of Science and Technology (NTNU) and is due to be completed in June 2019. The project has been registered with the Data Protection Official for Research, NSD (Norwegian Centre for Research Data).

If you have any questions about this survey, please contact the main researcher Nicole Busby (nicole.busby@ntnu.no)

Your participation in this survey is completely voluntary and you can stop any time you like.

By clicking the 'next' button you are indicating that you would like to participate, but your response will only be counted if you complete the survey, so make sure you continue to the end if you want your responses to count :-)

Thanks again!

[next]

1. In which class did you hear about this survey? (please write the name of the course, e.g. 'Global English', or the course code, e.g. 'ENG1001')

2. What is your program of study? (e.g. 'Biology')

3. What is your native language? (this means a language you have been speaking at home since you were very young. You can select more than one)

- Norwegian
- English
- Other

4. Gender

- Female
- Male
- Other

5. Age _____

6. Do you have any diagnosis which may influence your reading or language learning, e.g. severe loss of vision, hearing problems, dyslexia, autism?

- No
- Yes, please specify _____

7. Do you usually speak English at home?

- Never
- Rarely
- Monthly
- Weekly
- Daily
- Always

8. Did you attend videregående skole (upper secondary school) in Norway?

- Yes
- No (go straight to question 13)

9. Which program did you attend at videregående skole?

- General studies (studiespesialiserende) - realfag
- General studies (studiespesialiserende) - språk, samfunnsfag og økonomi
- Vocational studies (yrkesfag)
- Other - please specify: _____

10. Did you take any English courses at videregående skole beyond normal English in VG1 (studiespesialiserende)/ VG1 & VG2 (yrkesfag)?

- No
- Yes

11. If yes, which English course(s) did you take at videregående skole?

- Internasjonal engelsk
- Engelskspråklig litteratur og kultur
- Samfunnsfaglig engelsk
- Other, please specify _____

12. For how many years did you study English at videregående skole?

- 1
- 2
- 3

13. How many courses have you **completed** at university/college in total?

- None (this is my first semester)
- up to 30 credits (up to one semester of full-time study equivalent)
- between 30 and 60 credits (up to one year of study equivalent)
- between 60 and 90 credits (up to a year and a half full-time study equivalent)
- between 90 and 120 credits (up to two years of full-time study equivalent)
- between 120 and 150 credits (up to two and a half years of full-time study equivalent)
- between 150 and 180 credits (up to three years of full-time study equivalent)
- more than 180 credits (more than three years of full-time study equivalent)

14. What proportion of your textbooks and required course readings have been in English during your university/college studies overall?

- 100% (everything is in English)
- 75-99%
- 50-75%
- 25-50%
- 1-25%
- none

15. How many courses in **English as a subject** have you completed at university/college?

16. How many study points have you taken in total in English as a subject?

17. How often do you read books in English in your spare time?

- Never
- Sometimes
- Monthly
- Weekly
- Several times a week
- Daily
- Several hours a day

18. How often do you read in English on the internet in your spare time?

- Never
- Sometimes
- Monthly
- Weekly
- Several times a week
- Daily
- Several hours a day

19. How often do you play electronic games where you use English?

- Never
- Sometimes
- Monthly
- Weekly
- Several times a week
- Daily
- Several hours a day

20. How quickly do you feel that you read course materials in English?

- Very slowly
- Quite slowly
- Average
- Quite quickly
- Very quickly

21. How many of the words do you understand in the English texts on your reading lists?

- I only understand about half of the words or less
- I understand quite a lot of the words
- I understand most of the words
- I understand almost all of the words
- I understand all of the words

22. How easy do you find it to understand the content of the English texts you read for university?

- Very difficult
- Difficult
- Neutral
- Easy
- Very easy

23. How would you rate your reading proficiency in English?

- Poor
- Below average
- Okay
- Good
- Excellent

On this page and the following pages you will be asked to choose the right word to go with each meaning, like in the example below.

	business	clock	horse	pencil	shoe	wall
part of a house	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
animal with four legs	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
something used for writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you think you know what the word means, you should try to guess, but if you have no idea, leave it blank. This is designed to measure what you already know, so please complete the following questions without looking up words or discussing with others

24.

	copy	event	motor	pity	profit	tip
end or highest point	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
this moves a car	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
thing made to be like another	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25.

	accident	debt	fortune	pride	roar	thread
loud deep sound	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
something you must pay	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
having a high opinion of yourself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26.

	coffee	disease	justice	skirt	stage	wage
money for work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
a piece of clothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
using the law in the right way	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27.

	arrange	develop	lean	owe	prefer	seize
grow	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
put in order	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
like more than something else	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28.

	clerk	frame	noise	respect	theatre	wine
a drink	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
office worker	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
unwanted sound	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29.

	blame	elect	jump	threaten	melt	manufacture
make	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
choose by voting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
become like water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

30.

	dozen	empire	gift	tax	relief	opportunity
chance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
twelve	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
money paid to the government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

31.

	ancient	curious	difficult	entire	holy	social
not easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
very old	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
related to God	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32.

	admire	complain	fix	hire	introduce	stretch
make wider or longer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
bring in for the first time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
have a high opinion of someone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

33.

	slight	bitter	lovely	merry	popular	independent
beautiful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
small	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
liked by many people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

34.

	bull	champion	dignity	hell	museum	solution
formal and serious manner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
winner of a sporting event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
building where valuable objects are shown	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

35.

	muscle	counsel	factor	hen	lawn	atmosphere
advice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
a place covered with grass	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
female chicken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36.

	blanket	contest	generation	merit	plot	vacation
holiday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
good quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wool covering used on beds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

37.

	abandon	dwell	oblige	pursue	quote	resolve
live in a place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
follow in order to catch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
leave something permanently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

38.

	comment	gown	import	nerve	pasture	tradition
long formal dress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
goods from a foreign country	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
part of the body which carries feeling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

39.

	assemble	attach	peer	quit	scream	toss
look closely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
stop doing something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
cry out loudly in fear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

40.

	pond	angel	frost	herd	fort	administration
group of animals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
spirit who serves God	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
managing business and affairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

41.

	drift	endure	grasp	knit	register	tumble
suffer patiently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
join wool threads together	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hold firmly with your hands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

42.

	brilliant	distinct	magic	naked	slender	stable
thin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
steady	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
without clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

43.

	aware	blank	desperate	normal	striking	supreme
usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
best or most important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
knowing what is happening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

44.

	area	contract	definition	evidence	method	role
written agreement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
way of doing something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
reason for believing something is or is not true	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

45.

	adult	vehicle	exploitation	infrastructure	termination	schedule
end	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
machine used to move people or goods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
list of things to do at certain times	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

46.

	debate	exposure	integration	option	scheme	stability
plan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
choice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
joining something into a whole	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

47.

	alter	coincide	deny	devote	release	specify
change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
say something is not true	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
describe clearly and exactly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

48.

	access	gender	psychology	license	orientation	implementation
male or female	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
study of the mind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
entrance or way in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

49.

	correspond	diminish	emerge	highlight	invoke	retain
keep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
match or be in agreement with	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
give special attention to something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

50.

	edition	accumulation	guarantee	media	motivation	phenomenon
collecting things over time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
promise to repair a broken product	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
feeling a strong reason or need to do something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

51.

	bond	channel	estimate	identify	mediate	minimize
make smaller	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
guess the number or size of something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
recognizing and naming a person or thing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

52.

	explicit	final	negative	professional	rigid	sole
last	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
stiff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
meaning 'no' or 'not'	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

53.

	abstract	adjacent	neutral	global	controversial	supplementary
next to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
added to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
concerning the whole world	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

54.

	analysis	curb	gravel	mortgage	scar	zeal
eagerness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
loan to buy a house	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
small stones mixed with sand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

55.

	artillery	creed	hydrogen	maple	pork	streak
a kind of tree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
system of belief	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
large gun on wheels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

56.

	cavalry	eve	ham	mound	steak	switch
small hill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
day or night before a holiday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
soldiers who fight from horses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

57.

	chart	forge	mansion	outfit	sample	volunteer
map	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
large beautiful house	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
place where metals are made and shaped	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

58.

	circus	jungle	trumpet	sermon	stool	nomination
musical instrument	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
seat without a back or arms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
speech given by a priest in a church	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

59.

	revive	extract	gamble	launch	provoke	contemplate
think about deeply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
bring back to health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make someone angry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

60.

	shatter	embarrass	heave	obscure	demonstrate	relax
have a rest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
break suddenly into small pieces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make someone feel shy or nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

61.

	decent	frail	harsh	incredible	municipal	specific
weak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
concerning a city	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
difficult to believe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

62.

	correspond	embroider	lurk	penetrate	prescribe	resent
exchange letters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hide and wait for someone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
feel angry about something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

63.

	adequate	internal	mature	profound	solitary	tragic
enough	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
fully grown	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
alone away from other things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

64.

	alabaster	tentacle	dogma	keg	rasp	chandelier
small barrel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
soft white stone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tool for shaping wood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

65.

	throttle	convoy	lien	octave	stint	benevolence
kindness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
set of musical notes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
speed control for an engine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

66.

	bourgeois	brocade	consonant	prelude	stupor	tier
middle class people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
row or level of something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
cloth with a pattern or gold or silver threads	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

67.

	scrawl	cringe	immerse	peek	contaminate	relay
write carelessly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
move back because of fear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
put something under water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

68.

	alcove	impetus	maggot	parole	salve	vicar
priest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
release from prison early	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
medicine to put on wounds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

69.

	blurt	dabble	dent	pacify	strangle	swagger
walk in a proud way	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
kill by squeezing someone's throat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
say suddenly without thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

70.

	alkali	banter	coop	mosaic	stealth	viscount
light joking talk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
a rank of British nobility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
picture made of small pieces of glass or stone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

71.

	illicit	lewd	mammoth	slick	temporal	vindictive
immense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
against the law	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wanting revenge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

72.

	dissipate	flaunt	impede	loot	squirm	vie
steal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
scatter or vanish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
twist the body about uncomfortably	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

73.

	indolent	nocturnal	obsolete	torrid	translucent	wily
lazy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
no longer used	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
clever and tricky	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

74.

What do you usually do when you encounter unfamiliar words when reading?

	Never	Rarely	Sometimes	Often	Always
Look up words in a dictionary/online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guess the meaning of the word using your knowledge of the subject	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guess the meaning of the word from the context of the text	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ask the lecturer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ask other students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Continue reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Give up on reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Finished! Click 'done' to submit the survey

If you have any feedback, or anything you would like to add, please feel free to write it below

If you would like to enter the lottery to win a travel voucher (of your choice) worth 1000NOK, please enter your email address below:

Appendix B

The survey used in Study 3

Introduction

Hello and welcome to this survey about language and education!

Thank you so much for being willing to help out with some important research into the effects of studying in a second language. Participation in this research will involve reading a text and answering some comprehension questions, some questions about your reading habits and finally a short vocabulary matching game. The survey should take approximately 20 minutes. All data will be treated confidentially.

This research is being conducted as part of a PhD project at the Norwegian University of Science and Technology (NTNU) and is due to be completed in June 2019, after which time the data will no longer be stored. The project has been registered with the Norwegian Centre for Research Data.

If you have any questions about this research, please feel free to email me, Nicole Busby (nicole.busby@ntnu.no)

Your participation in this survey is completely voluntary and you can stop at any time you like.

By clicking the 'next' button you are indicating that you would like to participate, but your response will only be counted if you complete the survey, so make sure you continue to the end if you want your responses to count :-)

Thanks again!

Nicole

Instructions

The first part of this study involves reading an extract from a research article (spread over 3 pages) and then answering some comprehension questions. The pages with the text are timed, so make sure you can focus on reading the whole text without distractions. Once you feel that you have understood each page of the text, click the 'next' button at the end of that page. You will not be able to go back and read the text again.

After the third page of text, you will be asked some comprehension questions.

Reading text (page 1 out of 3)

Wild capuchin monkeys adjust stone tools according to changing nut properties
Luncz, Falótico, Pascual-Garrido, Corat, Mosley & Hasla
Published in Nature, September 2016

Wild bearded capuchin monkeys (*Sapajus libidinosus*) use stone tools to access a variety of nut species, including otherwise inaccessible foods. This study tests whether wild capuchins from Serra da Capivara National Park in Brazil adjust their tool selection when processing cashew (*Anacardium* spp.) nuts. During the ripening process of cashew nuts, the amount of caustic defensive substance in the nut mesocarp decreases. We conducted field experiments to test whether capuchins adapt their stone hammer selection to changing properties of the target nut, using stones of different weights and two maturation stages of cashew nuts. The results show that although fresh nuts are easier to crack, capuchin monkeys used larger stone tools to open them, which may help the monkeys avoid contact with the caustic hazard in fresh nuts. We demonstrate that capuchin monkeys are actively able to distinguish between the maturation stages within one nut species, and to adapt their foraging behaviour accordingly.

When foraging in their natural environments, animals need to recognize and respond to changes in food targets. This ability is especially useful when dealing with a defensive mechanism of the target food (e.g., toxicity, venom, irritants) where risk of injury represents an important cost for the forager. Several animal species have evolved foraging strategies to minimize those potential risks involved when dealing with dangerous prey. For example, meerkats (*Suricata suricatta*) are able to effectively disarm scorpions to reduce the threat of injury to younger group members. Some animals also use foraging strategies that include objects to reduce or prevent the risk of injury involved in consuming challenging food sources. Bottlenose dolphins (*Tursiops* sp.), for example, use detached marine sponges over their nose to nuzzle for prey in rocky sea grounds. Primates have especially been shown to exhibit a variety of solutions as a response to dealing with the defense mechanisms of harmful target foods. White-faced capuchins (*Cebus capucinus*) wrap naturally-defended caterpillars and fruits in leaves before rubbing them against a substrate, which is suggested to be a means of avoiding noxious substances. Chimpanzees (*Pan troglodytes*) foraging on aggressive army ant nests use nearby trees to reposition themselves off the ground, from where they can more securely dip for the ants below. Similarly, chimpanzees are able to minimize risk to accompanying young by preying on aggressive army ants on ant trails rather than at the ant nests, even though feeding at nests yields a higher rate of energetic return. Different solutions to minimize painful bites when preying on army ants, including stick tool use, are described for multiple chimpanzee populations throughout Africa. The observed diversity suggests that hazard avoidance may be a socially influenced response.

Animal tool use increases net gain by enabling the exploitation of inaccessible or costly to process food resources. This allows access to higher nutritional value foods, an adaptive advantage in times of food scarcity, competition, or opportunistic foraging. Tool size, weight and required transport distance influence the amount of energy expended during a given task. To maintain the balance between cost and gain, individuals must recognize and manage energy expenditure relative to the task at hand. This requires a comprehension of the functional aspects of the food item, its physical constraints and potential risks involved.

Reading text (page 2 out of 3)

Selectivity in the physical properties of tools has been observed amongst different primate species as well as corvids. Wild chimpanzees adjust their tool selection to changing properties within one target food. For example, with increasing ripeness of *Coula edulis* nuts within one fruiting season the nuts become easier to crack and chimpanzees adjust their tool selection accordingly. Neighboring chimpanzee communities that live in similar environmental conditions however react differently to changes in the target food. This indicates that responses to changing food items are socially learned. Reports on wild capuchin monkeys (genera *Cebus* and *Sapajus*) suggest that they are capable of both hazard reduction and adjustment of their behaviour to match food properties. When foraging for embedded larvae (*S. apella*) capuchins are able to distinguish between pay-off rates between two stages of the same foraging substrates. Bearded capuchins (*Sapajus libidinosus*) have been observed modifying the force - although not the stone tool - throughout the sequence of cracking a single nut as a response to the state of the nut. The same monkeys selected different stone tool sizes based on the resistance of different nut species. It is important to note that no primate studies to date have been able to determine whether a wild animal considers two states of the same food species (e.g., fresh or dry nuts, intact or partially-opened nuts) to be two different foods. Instead, these studies concentrate on animal behaviour towards the differing food targets, and we follow the same approach here.

Capuchins in Serra da Capivara National Park (SCNP) are known to exhibit a range of tool using behaviour, including different stick and stone tools for foraging, social display and self-maintenance. They habitually use stone tools to crack open cashew (*Anacardium* spp.) nuts, which are native to the northeastern part of Brazil. Cashew trees produce a pseudo-fruit in the form of an apple and a hard nut at the end of the apple which holds the reproductive seed. The shell of unprocessed cashew nuts contains caustic Cashew Nut Shell Liquid (CNSL), a phenolic resin (similar to poison ivy or poison oak), which causes severe reactions when in contact with the skin and mucosa. We focused on capuchin processing of cashew nuts because, as cashews ripen, they appeared to change in both nut hardness and in the amount of CNSL in the nut mesocarp. At SCNP, capuchin monkeys use stone tools to open all maturity stages of cashew nuts. Average weight of tools used by the monkeys to open cashews was greater than the average of available stones in the area, indicating a selecting behaviour. On average, males use stone tools more frequently than females to process cashew nuts (70% of the episodes), due to the larger body size of males this is a common pattern in capuchins populations.

Reading text (page 3 out of 3)

There is no difference in the weight, size and success of stone tool use between sexes at SCNP, however juveniles are less successful than adults in opening cashews. Even though fresh cashew nuts are on average 25% larger than dry ones, tools are not necessary to open fresh nuts as the outer mesocarp is still soft. Some monkeys in SCNP have been observed to bite and rip open fresh cashews using their hands and teeth. However, adult group members usually used stone tools to open both fresh and dry cashew nuts, before extracting the cashew kernel with either fingers or teeth.

Our focus on tool-based processing of this potentially hazardous foraging item is of additional interest, as a different capuchin group of the same species at the Fazenda Boa Vista (FBV) site, approximately 350 km away from Serra da Capivara, specifically avoids contact with CNSL when eating cashew nuts. At FBV the monkeys have never been seen using stone tools to open fresh cashew nuts. Instead they use a rubbing technique which allows them to extract the kernel using their fingers to avoid contact with the CNSL. The FBV capuchins use stone tools only to process dry nuts towards

the end of the fruiting season, when the toxic CNSL hardens into a more resinous material that is less likely to come into contact with the monkey's skin.

Based on previous studies, we hypothesized that wild capuchin monkeys would adapt their tool selection when processing a food item that changes its condition over time. To test this hypothesis, we carried out field experiments with a group of wild bearded capuchins in Serra da Capivara National Park (SCNP), northeast Brazil. As part of this study, we predicted that cashew nuts would increase in hardness as they dry and mature, which would require a correspondingly greater force from the monkeys to open dry nuts. We tested cashew nut hardness of different maturity stages using a standardized nut cracking device. We also expected to find that fresh cashew nuts contain more easily dispersed CSNL than dry nuts, as it is in a more liquid form in this earlier maturation stage. We therefore compared exposed CSNL between the different cashew maturation stages. The capuchins were therefore expected to use fewer strikes to open a nut when using heavier stones, and were expected to use heavier stones to open dry (harder) nuts.

Comprehension questions

Which of the following best describes the results from the research described in this article?

- Tool use is an exclusively human ability
- Animals only use tools if taught to do so by humans
- Animals are able to use tools and adapt them to suit the situation
- Animals use the same tool for every situation

Which of the following best describes how capuchin monkeys learn about how to eat cashew nuts?

- The monkeys are born with the knowledge of the best strategies to open cashew nuts
- The monkeys learn how to open nuts and adults are more successful than juveniles
- Cashew nuts are easy to eat - the monkeys just eat them straight from the tree
- The researchers taught the monkeys more effective ways to eat cashew nuts

The article describes different groups of the same species that have developed different methods of dealing with food that is challenging to eat. What do the authors suggest that this indicates?

- That food gathering behaviours are socially learned
- That animals are born with all the knowledge they need to gather food
- That food items vary according to environment
- That the monkeys in one group had learned how to eat nuts by watching humans eat them

Did the researchers find a difference in the weight of the stone tools used by male and female capuchin monkeys?

- No difference between males and females in the weight of tools selected
- Males always used heavier tools than females
- Females always used heavier tools than males
- Males used heavier tools than females, but only when the nuts were mature

What was the aim of the research discussed in this article?

- To determine whether monkeys adjust their tool selection when processing cashew nuts
- To determine whether monkeys were able to eat cashew nuts without being injured by the caustic shell liquid found in the nut shell
- To determine whether male monkeys used heavier tools than females
- To determine whether monkeys could be taught to use tools by the researchers

What do the capuchin monkeys at the Fazenda Boa Vista (FBV) site do differently from the monkeys at the Serra da Capivara National Park (SCNP) site?

- Monkeys at the FBV site do not eat cashew nuts
- Monkeys at the FBV site only eat cashew nuts towards the end of the fruiting season when the toxic Cashew Nut Shell Liquid (CSNL) hardens, making it less likely to come in contact with the skin
- Monkeys at the FBV site use a rubbing technique to process fresh cashew nuts, rather than stone tools
- Monkeys at the FBV site use stone tools more often than those at the SCNP site

What motivates capuchin monkeys to use tools to eat cashew nuts?

- To demonstrate their skills to members of the opposite sex
- To avoid skin irritation caused by the liquid in the shell of the nut
- To avoid injury from the spines on the outer shell of the nut
- To avoid coming in contact with the strong-smelling juice found in mature nuts

Based on the characteristics of the nuts, what change in the monkeys' behaviour did the researchers predict would be associated with increasing nut maturity?

- The monkeys would not need to use tools as the nuts matured and became softer
- The monkeys would use heavier tools so they would be able to crack the tougher shell more efficiently
- The monkeys would be less likely to eat the more mature nuts because of an increase in caustic shell liquid
- There would be no difference in behaviour when eating more mature nuts

Questions about your experience of reading the text

How much did you know about the monkeys and tool use before reading the text?

- I already knew all of the information in this text before reading it
- I already knew quite a lot of the information in the text before reading it
- I knew some of the information before reading this text
- I didn't know much of the information before reading this text
- This information was all new to me

Have you ever studied biology at university?

- Yes, I've taken many biology classes
- Yes, I've taken one or two classes
- No, I've never studied biology at university

Were there any parts of the text that you had trouble understanding because there were words you didn't know?

- Yes, many
- Yes, several
- Yes, but only a few
- No, not at all

Logic: Hidden unless: #11 Question "Were there any parts of the text that you had trouble understanding because there were words you didn't know?" is one of the following answers ("Yes, many", "Yes, several", "Yes, but only a few")

What did you do when you came across words you didn't know the meaning of?

	Always	Often	Sometimes	Rarely	Never
I looked up the meaning of the word	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I guessed the meaning of the word from the context	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I ignored it with no problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I ignored it, but felt like I was missing something	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I stopped reading and gave up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What did you think of the text?

- It was very easy to understand
- It was mostly easy to understand
- It was neither easy nor difficult
- It was mostly difficult to understand
- It was very difficult to understand

How does this text compare to other (English language) texts you are asked to read for your classes at university?

- This text is much easier than the university readings
- This text is a little easier than the university readings
- This text was a similar level of difficulty
- This text was a little harder than the university readings
- This text is much harder than the university readings

Do you usually read on paper or on the screen when you are reading texts for university?

- Always on paper
 - Mostly on paper
 - Half on paper, half on screen
 - Mostly on screen
 - Always on screen
-

Background questions

Where are you studying?*

- Norway
- UK
- Other - Write In (Required): _____ *

Which university are you studying at?*

- Aston University
- University of Birmingham
- The Open University
- NTNU
- UiT
- UiO
- Other - Write In (Required): _____ *

What is your native language? (this means a language you have been hearing/speaking at home since you were a baby. You can select more than one)*

- English
- Norwegian
- Other(s) - Write In (Required): _____ *

How do you identify yourself?

- Female
- Male
- Other

Age

Do you have any diagnosis that might affect your reading or language learning, e.g. severe loss of vision, hearing problems, dyslexia, autism?

- No
- Yes (please specify): _____

How long have you been studying at university?

- This is my first year
- This is my second year
- This is my third year
- This is my fourth year
- I have completed more than 4 years of university

What are you studying?

- Psychology
- Neuroscience
- Other - Write In (Required): _____*

Logic: Hidden unless: (#16 Question "Where are you studying?" is one of the following answers ("Norway") AND #25 Question "What are you studying?" is one of the following answers ("Psychology"))

Which study program are you in?

- Bachelor of psychology
- Clinical psychology (profesjonsstudiet)
- One year study (årsstudium) in psychology
- Other - Write In: _____

Logic: Hidden unless: #16 Question "Where are you studying?" is one of the following answers ("Norway")

How many of your textbooks and required course readings are in English?

- 100% (everything is in English)
- 75-99%
- 50-75%
- 25-50%
- 1-25%
- none

Logic: Hidden unless: #16 Question "Where are you studying?" is one of the following answers ("Norway")

How many courses in English as a subject (e.g. English linguistics or literature) have you taken at university?

- None
- 7.5 credits (one course)
- 15 credits (two courses)
- 22.5 credits (three courses)
- 30 credits (four courses)
- more than 30 credits

How often do you read books, magazines or newspapers in English in your spare time?

- Never
- Occasionally
- Monthly
- Weekly
- Several times a week
- Daily
- Several hours a day

How often do you play massive multiplayer online games (where you use English)?

- Never
- Occasionally
- Monthly
- Weekly
- Several times a week
- Daily
- Several hours a day

How often do you play other types of electronic games where you use English?

- Never
- Occasionally
- Monthly
- Weekly
- Several times a week
- Daily
- Several hours a day

How often do you read English on the internet in your spare time?

- Never
- Occasionally
- Monthly
- Weekly

- Several times a week
 - Daily
 - Several hours a day
-

Self-assessment questions

Logic: Hidden unless: #16 Question "Where are you studying?" is one of the following answers ("Norway")

How quickly do you feel that you read texts in English for university?

- Very quickly
- Quite quickly
- Average
- Quite slowly
- Very slowly

Logic: Hidden unless: #16 Question "Where are you studying?" is one of the following answers ("UK")

How quickly do you feel that you read texts for university?

- Very quickly
- Quite quickly
- Average
- Quite slowly
- Very slowly

Logic: Hidden unless: #16 Question "Where are you studying?" is one of the following answers ("Norway")

How easy do you find it to understand the language used in the English language texts you read for university?

- Very easy
- Quite easy
- Neutral

- Quite difficult
- Very difficult

Logic: Hidden unless: #16 Question "Where are you studying?" is one of the following answers ("UK")

How easy do you find it to understand the language used in the texts you read for university?

- Very easy
- Quite easy
- Neutral
- Quite difficult
- Very difficult

Logic: Hidden unless: #20 Question "What is your native language? (this means a language you have been hearing/speaking at home since you were a baby. You can select more than one)" is one of the following answers ("Norwegian")

How fast do you feel that you read in English compared to Norwegian?

- English is much slower than Norwegian
- English is a bit slower than Norwegian
- Both languages take the same amount of time to read
- English is a bit faster than Norwegian
- English is much faster than Norwegian

Logic: Hidden unless: #20 Question "What is your native language? (this means a language you have been hearing/speaking at home since you were a baby. You can select more than one)" is not exactly equal to ("English")

Do you feel like the English you learned in school prepared you for the English you encounter at university?

- Yes, completely
- Yes, mostly
- Neutral
- No, not really
- No, not at all

Vocabulary quiz

On this page, you will be asked to choose the right word to go with each meaning, like in the example below:

	business	clock	horse	pencil	shoe	wall
part of a house	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
animal with four legs	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
something used for writing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you think you know what the word means, you should try to guess, but if you have no idea, leave it blank.

This is designed to measure what you already know, so please complete the following questions without looking up words or discussing with others

	alabaster	tentacle	dogma	keg	rasp	chandelier
small barrel	()	()	()	()	()	()
soft white stone	()	()	()	()	()	()
tool for shaping wood	()	()	()	()	()	()

	throttle	convoy	lien	octave	stint	benevolence
kindness	()	()	()	()	()	()
set of musical notes	()	()	()	()	()	()
speed control for an engine	()	()	()	()	()	()

	bourgeois	brocade	consonant	prelude	stupor	tier
middle class people	()	()	()	()	()	()
row or level of something	()	()	()	()	()	()
cloth with a pattern or gold or silver threads	()	()	()	()	()	()

	scrawl	cringe	immerse	peek	contaminate	relay
write carelessly	()	()	()	()	()	()
move back because of fear	()	()	()	()	()	()
put something under water	()	()	()	()	()	()

	alcove	impetus	maggot	parole	salve	vicar
priest	()	()	()	()	()	()
release from prison early	()	()	()	()	()	()
medicine to put on wounds	()	()	()	()	()	()

	blurt	dabble	dent	pacify	strangle	swagger
walk in a proud way	()	()	()	()	()	()
kill by squeezing someone's throat	()	()	()	()	()	()
say suddenly without thinking	()	()	()	()	()	()

	alkali	banter	coop	mosaic	stealth	viscount
light joking talk	()	()	()	()	()	()
a rank of the British nobility	()	()	()	()	()	()
picture made of small pieces of glass or stone	()	()	()	()	()	()

	illicit	lewd	mammoth	slick	temporal	vindictive
immense	()	()	()	()	()	()
against the law	()	()	()	()	()	()
wanting revenge	()	()	()	()	()	()

	dissipate	flaunt	impede	loot	squirm	vie
steal	()	()	()	()	()	()
scatter or vanish	()	()	()	()	()	()
twist the body about uncomfortably	()	()	()	()	()	()

	indolent	nocturnal	obsolete	torrid	translucent	wily
lazy	()	()	()	()	()	()
no longer used	()	()	()	()	()	()
clever and tricky	()	()	()	()	()	()

Logic: Hidden unless: #17 Question "Which university are you studying at?" is one of the following answers ("University of Birmingham")

RPS number (to get participation credit)

Logic: Hidden unless: #16 Question "Where are you studying?" is one of the following answers ("Norway")

If you would like to be entered in the draw for a 1000NOK travel voucher, please enter your email address below. This information will only be used to contact you if you are selected for the prize and will not be linked to your responses to the survey.

Logic: Hidden unless: #16 Question "Where are you studying?" is one of the following answers ("UK")

If you would like to be entered in the draw for a £100 travel voucher, please enter your email address below. This information will only be used to contact you if you are selected for the prize and will not be linked to your responses to the survey.

If you have any feedback, or anything you'd like to add, please feel free to write it in the box below

Thank you so much for taking part in this study!

If you have any questions about this survey or the research project in general, don't hesitate to email: nicole.busby@ntnu.no

Article 1

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DOI: <http://dx.doi.org/10.5617/adno.5579>

Comparing first and second language reading: the use of metacognitive strategies among Norwegian university students

Abstract

Metacognitive awareness is one of the key predictors of successful reading, in particular for second language and academic reading. This article presents a study that investigated Norwegian university students' metacognitive awareness when reading academic texts in Norwegian (L1) and English (L2). 316 students answered a questionnaire which included a 30-item survey of reading strategies and self-ratings of reading proficiency in both languages. The analysis reveals a surprisingly similar awareness of reading strategies in L1 and L2. The main differences found were in the use of two specific reading strategies: reading more slowly and using resources such as dictionaries. Despite overall similarities in the approach to L1 and L2 reading, participants rated their own proficiency as much higher in L1 reading than L2. Regression models show significant associations between self-ratings of proficiency and the number and type of reading strategies reported, particularly in the L2, demonstrating that there is an important connection between these. Research on other populations has shown a much higher use of reading strategies in L2. However, the similarity in approaches to L1 and L2 reading among the university students in this study may reflect a higher level of L2 proficiency among these students, as well as high expectations of proficiency, meaning they do not feel a need to use reading strategies for decoding L2 text. Instead, these students may benefit from additional training in the use of higher level reading strategies to improve their comprehension of L2 academic texts.

Keywords: metacognitive awareness, academic reading, L2 reading, English as a second language, reading strategies

Sammenligning av første- og andrespråkslesing: bruk av metakognitive strategier blant norske universitetsstudenter

Sammendrag

Metakognitiv bevissthet er avgjørende for gode leseferdigheter, spesielt når det gjelder leseferdigheter i andrespråk og akademisk lesing. Denne artikkelen

presenterer sentrale funn fra en studie som undersøkte norske universitetsstudenters metakognitive bevissthet ved lesing av akademiske tekster på norsk (L1) og engelsk (L2). 316 studenter ble bedt om å fylle ut et spørreskjema med 30 spørsmål om lesestrategier, samt å vurdere egne leseferdigheter i begge språk. Deltakerne viser en overraskende lik bevissthet omkring bruken av lesestrategier i L1 og L2. De største forskjellene som ble funnet, angår bruken av to spesifikke lesestrategier: det å lese sakte og det å bruke ressurser som ordbøker. Til tross for generelle likheter i studentenes tilnærming til lesing i L1 og L2, vurderer deltakerne sine egne leseferdigheter som mye bedre i L1 enn i L2. Regresjonsmodeller viser signifikante sammenhenger mellom egenvurderingen av leseferdigheter og antall og type rapporterte lesestrategier, særlig i L2, noe som viser at det er en viktig relasjon mellom disse. Forskning på andre populasjoner har vist en mye høyere bruk av lesestrategier i L2. Likheten i tilnærminger til L1- og L2-lesing blant universitetsstudenter i denne studien kan indikere et høyere nivå av L2-leseferdighet blant disse studentene, samt høye forventede ferdigheter, noe som betyr at de ikke føler behov for å bruke lesestrategier for å dekode L2-tekst. I stedet kan disse studentene dra nytte av opplæring i bruk av lesestrategier på mer overordnet nivå for å forbedre forståelsen av L2 akademiske tekster.

Nøkkelord: metakognitiv bevissthet, akademisk lesing, andrespråkslesing, engelsk som andrespråk, lesestrategier

Introduction

English is the common language of academia, which means that non-native English-speaking university students around the world need to read academic texts in a second language (L2). Reading in L2 is inherently more complex than reading in the first language (L1), because two languages are involved in almost every stage of the process (Koda, 2007). Even for highly proficient L2 users, reading is slower in L2 than L1 (Fraser, 2007; Shaw & McMillion, 2008), which is thought to be the result of having to stop and “repair” gaps in comprehension (Block, 1992). In spite of these challenges, non-native English speakers at universities around the world are expected to read and understand complex concepts and new ideas in the L2. In order to provide targeted support for these students, researchers need to understand what strategies L2 readers use to overcome these challenges (Mokhtari & Reichard, 2004). Much research has focused on L2 readers with low proficiency, but less research has been conducted on readers with relatively high proficiency in L2. This study investigates academic reading among Norwegian university students, whose high English proficiency is generally taken for granted (Hellekjær, 2008), to find out how they approach academic reading in a second language.

Norwegians have some of the highest levels worldwide of English language proficiency among non-native speakers (Bonnet, 2004; Education First, 2017), and they are expected to read and understand academic English texts at university without assistance. In school, however, Norwegian students need to study English from year 1 until year 11, and do not need to pass any English examination or test to be admitted to Norwegian universities, they only need to achieve sufficiently good grades overall (Utdanningsdirektoratet, 2013). In practice, “Norwegian institutions of higher education take for granted that English as a foreign language [...] instruction in upper secondary schools effectively prepares students for the use of English in higher education” (Hellekjær, 2009, p. 199).

There are many reasons why English proficiency levels in Norway are reported to be high. English and Norwegian are both Germanic languages, with many cognates and similar grammar, and most Norwegians are also extensively exposed to English on an everyday basis through the media. Norwegian learners also score high in international tests (Education First, 2017), and English is becoming widely regarded as a second language, rather than a foreign language, in Norway (Graddol & Meinhof, 1999). However, studies have shown that a large proportion of Norwegian students struggle with English at university (Hellekjær, 2005, 2009). Previous studies have found that two-thirds of Norwegian students about to start university would not meet the English proficiency requirements for entry into English-speaking universities (Hellekjær, 2005) and that Norwegians read academic, but not non-academic, English texts more slowly than native English speakers (Busby, 2015). A lack of English proficiency has also been suggested as contributing to high drop-out rates in the first year of university in other Nordic countries (Berman, 2010). This study aims to investigate whether the strategies they use to cope with L2 reading could explain the discrepancy between high levels of general English proficiency and low scores on measures of academic English reading.

Theoretical background

Successful L2 reading results from the combination of reading ability and L2 proficiency (Carrell, 1991; Koda, 2007). A number of studies have demonstrated that higher L1 literacy levels are linked to higher L2 literacy levels (e.g. Olsen, 1999; Royer & Carlo, 1991). Bernhardt’s (2011) compensatory model of L2 reading explains that L1 and L2 knowledge interact so that weaknesses in one area may be compensated for by strengths in another. She notes that although the combination of L1 literacy and L2 knowledge have been found to account for around half of the variance in L2 reading success, the other half comprises less easily defined variables such as motivation and use of strategies for reading comprehension. Also, Cummins’ (1979) interdependence theory states that academic reading proficiency transfers from L1 to L2 so “that students who have developed literacy in their first language will tend to make stronger

progress in acquiring literacy in their second language” (Cummins, 2000, p. 173). Various factors have been shown to affect how well this transfer happens. Linguistic distance – the extent to which the L1 and L2 are related – is an important factor in L2 reading development (Grabe, 2009), and being aware of the relatedness of the two languages confers additional benefits (Jiménez, García, & Pearson, 1995).

One of the most critically important factors for successful reading is metacognitive awareness (Grabe, 1991): the readers’ awareness and monitoring of their own comprehension processes while reading (Mokhtari & Reichard, 2002). Metacognitive awareness enables successful use of reading strategies, broadly defined as “mental plans, techniques, and actions taken while reading” (Mokhtari & Sheorey, 2002, p. 2), to regulate text comprehension (Mokhtari & Reichard, 2002). Reading strategies include techniques such as thinking about the topic, looking forward and backward in the text, and undertaking deliberate actions to improve understanding (Mokhtari & Reichard, 2002; Paris & Jacobs, 1984). Skilled readers, and those with more experience, have been shown to display high levels of metacognitive awareness (Malcolm, 2009). They tend to plan, make predictions, and observe and monitor their own performance and comprehension more consistently than less experienced readers (Block, 1992; Huang & Nisbet, 2012; Malcolm, 2009). Studies have also shown a significant link between students’ reading ability and their awareness and use of reading strategies while reading (Alhaqbani & Riazi, 2012; Sheorey & Mokhtari, 2001; Zhang & Wu, 2009). Poor readers are less aware of strategies and how and when to use them (Alderson, 2000).

The use of reading strategies is especially important in L2 reading, where comprehension monitoring plays a vital role (Block, 1992). Research has suggested that effective use of reading strategies can help compensate for a lack of L2 proficiency (Carrell, Pharis, & Liberto, 1989). Some reading strategies are unique to L2 reading, such as translation and being able to think about information in both languages (Mokhtari & Reichard, 2002). A survey of reading strategies (SORS), developed by Mokhtari and Sheorey (2002), has been used to measure metacognitive awareness in academic reading (i.e. reading textbooks and other academic material) among native and non-native English-speaking student populations around the world. Studies using this instrument have found that reading strategies are reported to be used at a high rate when reading in L2 (Alhaqbani & Riazi, 2012; Feng & Mokhtari, 1998; Malcolm, 2009; Mokhtari & Reichard, 2004; Sheorey & Mokhtari, 2001; Zhang & Wu, 2009), especially when compared to reported strategy use in L1 reading (Alsheikh & Mokhtari, 2011; Kong, 2006; Mokhtari & Reichard, 2004; Sheorey & Mokhtari, 2001).

The choice of reading strategy also appears to be linked to the proficiency of the reader. Less proficient L2 readers may apply fewer higher-order thinking processes while reading, and tend to focus more on word recognition and word-for-word translation (Auerbach & Paxton, 1997; Malcolm, 2009). In other

words, struggling readers may be more motivated to use reading strategies to compensate for a lack of understanding, and benefit from having an obvious link between strategies and task demands (Brevik, 2015). As a consequence, training in the use of metacognitive strategies is most effective when the emphasis is placed on teaching people to become strategic readers, and knowing when to use particular strategies, rather than teaching strategies alone (Anderson, 1991; Grabe, 2004). This suggests that teaching students that problems can arise during reading and that there are strategies to overcome these, can be more important to successful reading than teaching vocabulary or other aspects of language in isolation (Block, 1992). However, as Anderson (1991) points out, a certain minimum level of vocabulary and background knowledge of a topic is required before helpful strategy choices can be made.

Knowing how to communicate in everyday settings is not always the same as being able to read and understand academic language, and reading academic language can be an additional challenge, even in L1, with different vocabulary, phrasing and conventions. Consequently, academic language can pose particular challenges to L2 readers at a tertiary level. Cummins (1979) distinguishes between basic interpersonal communication skills (BICS) used for conversational purposes, and cognitive academic language proficiency (CALP), the ability to understand and express concepts relevant for academic purposes. It has been demonstrated that these types of language develop at different stages of life (e.g. Hakuta, Butler, & Witt, 2000). Reading strategies are thought to be used to a greater extent when reading academic texts because of the greater cognitive demand (Mokhtari & Reichard, 2008), and thus a higher level of CALP is required. The complexity of the task further appears to have an effect on strategy choice, with more difficult texts found to prompt a greater use of reading strategies (Feng & Mokhtari, 1998; Brevik, 2015).

Research into how and when reading strategies are used by proficient readers is important in designing instructions to help less proficient readers (Huang & Nisbet, 2012; Sheorey & Mokhtari, 2001). Instruction in metacognitive strategies has been shown to improve reading in children who are learning to read (Paris & Jacobs, 1984) as well as adult L2 readers (Bannert, Hildebrand, & Mengelkamp, 2009; Huang & Nisbet, 2012). It has also been suggested (e.g. Brevik, 2015; Hellekjær, 2008) that inefficient strategy use may be one explanation of the difficulties experienced by Norwegian students when reading in English. The present study therefore aims to find out more about how these students use reading strategies in L2 compared to in L1.

Research questions

In order to investigate Norwegian students' metacognitive awareness of reading strategies in L1 and L2 academic reading, this study will focus on the following questions:

1. Do the Norwegian students in this study use different strategies, or use them at different frequencies, when reading in L1 and L2?
2. How does the use of reading strategies by these students compare with previous research on students in other countries?
3. Is there a relationship between metacognitive awareness and self-ratings of reading proficiency for the students in this sample?
4. Does reported reading strategy use differ between first year university students and those with more university study experience?

Methods

The present quantitative study used a survey to investigate awareness of reading strategies in L1 and L2 among Norwegian university students. The survey was conducted during lecture periods in order to ensure a high participation rate and thereby as representative a sample of the student population as possible. The survey was administered in English. Feedback from pilot testing on native Norwegian speakers confirmed that the wording was comprehensible to the target audience.

The participants in this study were 316 native Norwegian-speaking university students at a Norwegian university who reported not having English as a first language. Participants were recruited from undergraduate classes which had both English and Norwegian language texts on the course reading list to ensure that participants had experience reading academic texts in both L1 and L2. Although this precluded a completely random sample, the classes from which participants were recruited covered a range of subject areas (including psychology, geography, social anthropology, archaeology, and sign language) and amount of time spent at university (from first semester to 4+ years) in order to provide as representative a sample as possible.

The survey used for data collection consisted of items from the Survey of Reading Strategies (SORS) developed by Mokhtari and Sheorey (2002) as well as questions asking participants to rate aspects of their own reading proficiency in both English and Norwegian. The survey can be found in Appendix A. The SORS is a validated survey designed to test metacognitive awareness of reading strategies among L2 readers. It comprises 30 items relating to strategies used while reading academic texts, and participants are asked to rate how often they are aware of using each of these on a 5-point Likert scale. The SORS is adapted from the Metacognitive Awareness of Reading Strategies Inventory developed by Mokhtari and Reichard (2002), which was validated using responses from a large native English-speaking population of high school and university students ($N = 825$), and shown to be a reliable measure of metacognitive awareness of reading strategies (Cronbach's alpha for the total sample $\alpha = .93$). The SORS is designed for use with non-native speakers of English and includes two strategies

relevant for L2 reading: translating from L2 to L1, and thinking about information in both languages. Responses to each of the items on the SORS are classified as high (mean 3.5 or above), moderate (mean between 2.4 and 3.5), and low usage (mean 2.4 or below).

The items are divided into three subscales: Global, Support and Problem Solving. Global reading strategies (13 items) consist of items relating to the analysis of the text as a whole such as “I think about what I know to help me understand what I read” and “I have a purpose in mind when I read”. Support strategies (9 items) are practical strategies used to support understanding, such as using reference materials or underlining important information. Problem Solving strategies (8 items) are oriented around resolving difficulties encountered while reading such as “I try to get back on track when I lose concentration” and “when text becomes difficult, I pay closer attention to what I am reading”. These subscales were developed following a series of factor analyses, and were found by Mokhtari and Sheorey (2002) to have Cronbach’s alpha coefficients of $\alpha = .92$, $.79$ and $.87$ for the Global, Support and Problem Solving subscales respectively.

Two versions of the survey were created for this study: one in which participants were instructed to report their use of reading strategies (the items adapted from the SORS) while reading academic texts in Norwegian and one for academic texts in English. Participants were randomly assigned to either the Norwegian ($N = 156$) or the English ($N = 160$) version of the survey. In the Norwegian version, the two final questions, which were specific to L2 reading, were omitted because participants were being asked about reading in their native language. Therefore, when comparing responses to the two versions of the survey, the first 28 reading strategy items are analysed separately from the last two unless otherwise specified.

The results from the survey give quantitative data indicating the extent of students’ metacognitive awareness of reading strategies when reading in L1 and L2. Three main methods were used to analyse the data collected. Descriptive statistics are used to provide an overview of the data and enable comparisons with previous research in other populations. Then, *t*-tests are used to compare means and check whether samples are significantly different from one another. Finally, multiple regression models were used to estimate the effects of reported reading strategy use on self-ratings of proficiency and academic achievement as measured by average¹ grade. Linear regression is a standard statistical test in reading research, so results are displayed using these models. It could be mentioned that ordinal regression, which is more appropriate for results collected from Likert scales (Chen & Hughes Jr., 2004), was also conducted and yielded similar results. Model simplification was conducted, but made no

¹ Participants were asked “What grades do you usually get at university?” (see Appendix A for details). This may have led to reports of their mode or mean grade, so I have referred to it as ‘average’ throughout. This should be kept in mind when interpreting the results.

significant difference to the explained variance (R^2) values. Given that the emphasis is on comparing L1 and L2 reading rather than constructing a model to predict reading outcomes, the full models are presented in order to provide more information.

Results

The analysis of the survey results will be discussed in two sections: first a comparison of reading strategies used in L1 and L2 reading, and second an investigation of responses in relation to time spent at university (as a proxy for exposure to academic language).

Comparing L1 and L2 reading

Self-ratings of proficiency

In order to meaningfully compare participants' approaches to reading in L1 and L2, it was important to first understand how they perceived their relative reading proficiency in the two languages. All participants were asked to rate their reading ability, speed of reading and ease of understanding on a five-point scale for both English and Norwegian reading.

Table 1. Paired-sample *t*-tests comparing self-rating of aspects of reading proficiency in Norwegian (L1) and English (L2) on a 5-point scale from 1 low to 5 high

	Norwegian (N = 316)		English (N = 316)		<i>t</i> (316)	<i>p</i> -value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Reading ability	4.67	0.56	3.87	0.87	18.84	.000*
Reading speed	3.95	0.73	3.15	0.91	16.33	.000*
Ease of understanding	4.68	0.77	3.54	1.29	16.31	.000*

* $p < 0.05$

As can be seen in Table 1, participants on average rated all of these aspects of reading proficiency much higher in Norwegian than in English. Paired-sample *t*-tests showed that this difference was highly significant ($p < .001$) for all three questions (see Table 1), indicating that on average they felt much more proficient at reading in L1 than in L2. However, over a third of the participants rated their reading proficiency for Norwegian and English as equal, while approximately 1% of the participants rated their English reading proficiency higher than Norwegian for each of the measures.

Reading strategies

The next step was to compare awareness of reading strategy use in L1 and L2. Mean responses were calculated for the 28 items common to the Norwegian and English versions of the survey and ranked in order of most to least used. The full

list of strategies, ranked according to frequency of use, can be seen in Appendix B, and the five most frequently used are shown in Table 2.

Table 2. The five most frequently used reading strategies reported for Norwegian (L1) and English (L2) and mean rates of reported use

Reading Strategy	Mean L1	Mean L2
Adjusting reading speed	4.11	4.19
Trying to stay focused	4.04	4.18
Paying close attention	4.03	4.09
Re-reading difficult text	3.97	4.04
Setting purpose for reading	3.89	3.78

Interestingly, the first five items were the same in the two languages, indicating that there were some reading strategies that participants considered to be very useful in both languages. This also suggests that they did not feel a need to approach reading in L1 and L2 very differently. The number of reading strategies in the high, moderate and low usage categories can be seen in Table 3.

Table 3. Numbers of reading strategy items reported to be used at high, moderate and low rates in L1 and L2 (first 28 items)

	High (≥ 3.5)	Moderate	Low (≤ 2.4)
Norwegian (L1)	9 (32%)	16 (57%)	3 (11%)
English (L2)	10 (36%)	18 (64%)	0 (0%)

Table 3 shows a remarkable similarity in the mean reported reading strategy use for L1 and L2 reading. Based on the classification of means in the SORS, nine of the reading strategies were reported to be used at a high rate for L1 reading, and 10 for L2 reading. Only three of the strategies were reported at a low rate for L1 reading and none were classified in this category for L2 reading.

Next, between-subjects *t*-tests were used to investigate whether there were any significant differences between the number of reading strategies reported for L1 and L2 reading by subscale or for the 28 items in total (Table 4).

Table 4. Results from between-subjects *t*-tests comparing awareness of reading strategies (on a 5-point scale) in L1 and L2 by subscale and overall

	Norwegian (N = 156)		English (N = 160)		<i>t</i> (316)	<i>p</i> -value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Global	3.27	0.54	3.27	0.54	0.06	.956
Support	2.93	0.62	3.06	0.64	1.81	.071
Problem Solving	3.57	0.57	3.68	0.49	1.85	.064
Overall (28 items)	3.27	0.42	3.34	0.46	1.21	.228

As shown in Table 4, reading strategy use was only slightly higher for English reading than for Norwegian. Between subjects *t*-tests confirmed that the difference between the overall number of reported reading strategies was not significant between languages ($t = 1.21$, $p = .228$). Nor were differences by

language significant when analysed by subscale (Global, Support and Problem Solving), suggesting that the students in this sample did not feel the need to use more reading strategies in L2 reading than in L1.

Between-subjects *t*-tests were also conducted to compare mean reported use of each of the 28 reading strategy items between L1 and L2 to see whether they were reported used at different rates. Analysis revealed that only two of the individual reading strategies were reported to be used at significantly higher levels when reading in English (L2) than in Norwegian (L1): the use of reference materials such as dictionaries ($t = 2.62, p = .009$) and reading slowly and carefully ($t = 2.08, p = .039$). The other reading strategies were not reported at significantly different rates in L1 and L2.

Relationship between reading strategies and self-rated reading proficiency

Multiple regression models were calculated to investigate whether the self-rated proficiency scores could be predicted based on reported use of reading strategies by subscale. This showed that reported reading strategy use accounted for small but significant amounts of variance in some aspects of Norwegian reading, as can be seen in Table 5, although the models for L1 reading were not good predictors of self-ratings of reading proficiency overall.

Table 5. Multiple regression models: aspects of self-rated reading proficiency in Norwegian (L1) as a function of reading strategies by subscale

Model 1: self-rated reading ability in L1 as a function of reading strategies by subscale						
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	<i>R</i> ²
Model 1					<.001	.04
Global strategies	.22	.11	.23	2.09	.038*	
Support strategies	-.15	.10	-.17	-1.53	.128	
Problem Solving strategies	.07	.10	.08	0.72	.476	
Model 2: self-rated reading speed in L1 as a function of reading strategies by subscale						
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	<i>R</i> ²
Model 2					<.001	.04
Global strategies	.26	.15	.18	1.67	.097	
Support strategies	-.05	.14	-.04	-0.33	.744	
Problem Solving strategies	.08	.15	.06	0.55	.585	
Model 3: self-rated ease of understanding in L1 as a function of reading strategies by subscale						
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	<i>R</i> ²
Model 3					<.001	.05
Global strategies	.29	.14	.22	2.07	.040*	
Support strategies	-.09	.12	-.08	-0.70	.484	
Problem Solving strategies	.06	.13	.05	0.472	.638	

* $p < 0.05$

As seen in Table 5, Global strategies were found to be significantly and positively associated with self-ratings of reading ability ($\beta = .23, p = .038$) and ease of understanding ($\beta = .22, p = .040$). This means that participants who

reported using higher levels of Global reading strategies were significantly more likely to rate their reading ability and ease of understanding as higher. Support strategies and Problem Solving strategies did not contribute significantly to the predictions of any aspect of reading proficiency in Norwegian.

Table 6 shows the results of the models for English reading, i.e. the relationship between self-reported L2 reading proficiency measures and reading strategies by subscale. Reported reading strategy use accounted for slightly more of the variance in the L2 reading proficiency ratings than it did for L1, as reflected by more of the predictors contributing significantly to the models and slightly higher R^2 values.

Table 6. Multiple regression models: aspects of self-rated reading proficiency in English (L2) as a function of reading strategies by subscale

Model 4: self-rated reading ability in L2 as a function of reading strategies by subscale						
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	R^2
Model 4					<.001	.09
Global strategies	.41	.16	.26	2.55	.012*	
Support strategies	-.38	.12	-.29	-3.07	.003*	
Problem Solving strategies	.19	.17	.11	1.12	.265	
Model 5: self-rated reading speed in L2 as a function of reading strategies by subscale						
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	R^2
Model 5					<.001	.09
Global strategies	.56	.18	.32	1.32	.002*	
Support strategies	-.37	.14	-.25	-2.71	.007*	
Problem Solving strategies	.86	.19	.05	0.45	.651	
Model 6: self-rated ease of understanding in L2 as a function of reading strategies by subscale						
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	R^2
Model 6					<.001	.02
Global strategies	.29	.26	.12	1.09	.274	
Support strategies	-.33	.20	-.16	-1.62	.107	
Problem Solving strategies	.10	.28	.04	0.38	.708	

* $p < 0.05$

As displayed, Global strategies were found to be positively associated with self-ratings of reading ability ($\beta = .26$, $p = .012$) and reading speed ($\beta = .32$, $p = .002$), meaning that participants who reported using higher levels of Global reading strategies were significantly more likely to rate their reading ability and reading speed as higher. Support strategies were found to be negatively associated with both reading ability ($\beta = -.29$, $p = .003$) and speed ($\beta = -.25$, $p = .007$), meaning that those who reported high levels of use of these strategies were significantly more likely to describe their reading as poorer and slower. Problem Solving strategies did not contribute significantly to predictions of any aspect of self-rated reading proficiency. None of the reading strategy subscales were significantly associated with ease of understanding for English. The explained variance for the L2 models is still low, but slightly higher than for the

L1 models. Stronger associations between reading strategies and ratings of proficiency in English reading than Norwegian reading indicates that use of reading strategies for this sample functions as a stronger predictor of self-rated proficiency in L2 reading than for L1.

In order to investigate further whether awareness of reading strategies might be a predictor of academic achievement, participants were asked to report the average grade they received across all their university classes. This was used as a dependent variable with the reading strategy subscales using multiple regression models (Table 7). Variance in grades could be partly accounted for by reading strategy use in both L1 and L2 reading although, interestingly, different strategies functioned as significant predictors in the two languages.

Table 7. Multiple regression models: average grade as a function of reading strategies (by subscale) in L1 and L2

Model 7: average grade as a function of reading strategies in L1 (Norwegian)						
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	<i>R</i> ²
Model 7					<.001	.06
Global strategies	.35	.16	.24	2.24	.027*	
Support strategies	.11	.14	.09	0.78	.439	
Problem Solving strategies	-.18	.15	-.13	-1.19	.238	
Model 8: average grade as a function of reading strategies in L2 (English)						
	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	<i>R</i> ²
Model 8					<.001	.08
Global strategies	.11	.18	.07	.62	.540	
Support strategies	.39	.14	.27	2.816	.006*	
Problem Solving strategies	-.47	.18	-.26	-2.57	.011*	

* $p < 0.05$

Table 7 shows that awareness of Global reading strategies in Norwegian was a significant predictor of average grade ($\beta = .24$, $p = .027$). Awareness of Support strategies in English was significantly and positively associated with average grade ($\beta = .27$, $p = .006$), and Problem Solving strategies were negatively associated with grades ($\beta = -.26$, $p = .011$). This indicates that the awareness of Support strategies in English reading is associated with higher grades, and also suggests that students who are struggling academically may be using more Problem Solving strategies in their English reading.

Strategies specific to L2 reading

Items 29 (“When reading, I translate from English into my native language”) and 30 (“When reading, I think about the information in both English and my mother tongue”) of the SORS relate to strategies specific to second language reading, so only participants who answered the version of the questionnaire that asked about their English language reading were asked these questions. The first of these, translating into L1, was reported at a moderate rate of usage ($M = 2.78$,

$SD = 1.38$) and thinking about information in both languages was reported at a higher rate ($M = 3.80$, $SD = 1.22$).

These reading strategies were also tested as possible predictors of self-rated reading proficiency. Multiple regression modelling demonstrated that both of these items were predictors for self-rated reading proficiency with fairly high and significant correlations. Item 29 was negatively associated with self-rated reading ability ($\beta = -.48$, $p < .001$) and reading speed ($\beta = -.49$, $p < .001$), meaning participants who were aware of using translation frequently were more likely to rate their English reading ability as poorer and slower. Item 30 was a significant predictor of positive ratings of reading ability ($\beta = .26$, $p < .001$) and ease of understanding ($\beta = .15$, $p = .028$), indicating that students who reported thinking about information in both languages were more likely to rate their reading ability in English as high and have an easier time understanding English texts.

Relation between academic experience and reading measures

To investigate whether having more practice at reading academic texts affects reported reading strategy use or perceptions of proficiency, participants were grouped into two categories based on the number of semesters of university they reported having completed at the time of participation. Participants who had completed two or fewer semesters of full-time study were classified as “first year” students ($N = 177$) and those who had completed more than two semesters were “later year” students ($N = 139$). Analysis using between-subjects t -tests showed no significant differences between the first year and the later year group with regard to levels of reported reading strategies either overall or by subscale. The L2-specific items (questions 29 and 30) did not significantly differ by study experience either.

Next, between-subjects t -tests were used to compare average self-ratings of reading proficiency in L1 and L2 between first year and later year students to see whether perceptions of reading proficiency changed as a result of university experience.

Table 8 shows that for Norwegian reading, only reading ability was rated as significantly higher ($t = -2.58$, $p = .01$) for later year students than first year students. For English reading, later year students rated their reading proficiency significantly higher than first year students on all three measures (see Table 9), indicating that students felt that their reading proficiency in English improved over time. These results imply that academic experience was more strongly associated with self-ratings of reading proficiency in English than in Norwegian reading for this sample, although awareness of reading strategies did not vary significantly in relation to time spent at university.

Table 8. Results from between-subjects *t*-tests comparing self-rated reading proficiency (on a 5-point scale) in Norwegian (L1) in first year and later year students

	First year (N = 177)		Later year (N = 139)		<i>t</i> (316)	<i>p</i> -value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Reading ability	4.59	0.60	4.75	0.50	-2.58	.010*
Reading speed	3.89	0.80	4.01	0.79	-1.19	.231
Ease of understanding	4.59	0.83	4.76	0.69	-1.95	.052

p* < 0.05Table 9.** Results from between-subjects *t*-tests comparing self-rated reading proficiency (on a 5-point scale) in English (L2) in first year and later year students

	First year (N = 177)		Later year (N = 139)		<i>t</i> (316)	<i>p</i> -value
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Reading ability	3.74	0.93	4.00	0.78	-2.73	.006*
Reading speed	3.03	0.97	3.27	0.82	-2.38	.018*
Ease of understanding	3.38	1.32	3.71	1.25	-2.27	.023*

**p* < 0.05

Discussion

The main finding of this study was that the Norwegian students in this sample reported remarkably similar strategy use for L1 (Norwegian) and L2 (English) academic reading, despite rating their reading proficiency as much higher in L1 than L2. Additionally, the results indicated that metacognitive awareness was more strongly associated with self-rated reading proficiency and academic achievement in L2 than L1, which suggests that strategy use is especially important in L2 reading. Finally, study experience, measured by comparing first year and later year students, showed no significant differences between reported reading strategy use, although self-ratings of L2 reading proficiency were significantly higher among later year students.

Comparing reading strategy use in L1 and L2

On the whole, it appears that Norwegian students approach academic reading in Norwegian and English in a remarkably similar fashion with regard to reading strategy use. There were no significant differences in awareness of reading strategies between L1 and L2 overall or by subscale, and only two of the individual items (reading slowly and carefully, and use of additional resources) were reported at a significantly higher rate when reading in English. Additionally, the five most frequently used reading strategies in Norwegian and English were the same (see Table 2 for details).

Compared with previous research on other populations using the SORS, the Norwegian students completing this survey reported relatively low levels of reading strategy use for L2 reading, with only 10 strategies out of 30 being used at a high rate (mean of 3.5 or above) for reading in English. In comparison, students in Bahrain reported using 19 of the strategies at a high rate when

reading in L2 (Malcolm, 2009), Chinese students reported using 15 strategies at a high rate (Zhang & Wu, 2009), Moroccan students reported 15 strategies at a high rate (Mokhtari & Reichard, 2004), and students reading in Arabic as L2 reported using 18 strategies at a high rate (Alhaqbani & Riazi, 2012). In contrast, native English-speaking students in the US reported using only eight of the strategies at a high rate when reading in L1 (Mokhtari & Reichard, 2004; Sheorey & Mokhtari, 2001). In other words, the use of reading strategies by Norwegian students reading in L2 was more similar to that of American students reading in L1, which most probably reflects their high levels of English proficiency.

Previous studies comparing L1 and L2 reading in other populations have also found significantly higher levels of reported reading strategies for L2, even among highly proficient L2 readers (Alsheikh & Mokhtari, 2011; Feng & Mokhtari, 1998; Kong, 2006). The similarities in awareness of reading strategies in L1 and L2 reported by the Norwegian students in the present study could be interpreted as meaning that these students feel equally comfortable reading in both languages, and therefore do not need additional strategies to enable them to cope with L2 reading. However, questions about reading experiences indicated that students felt their reading was significantly slower, and they understood less when reading in English than in Norwegian. It may be that the high expectations of English proficiency associated with the reputation Norwegians have of being “good at English”, their high level of conversational English, and the expectations of the universities, mean that these students assume that reading in English *should* be the same as reading in Norwegian, and therefore they do not adopt additional reading strategies to cope with any difficulties.

Relationships between strategy use and experience, academic performance and self-perceptions of reading proficiency

Later year students reported their reading ability, reading speed and ease of understanding as significantly higher than first year students did for English reading. For Norwegian reading, only reading ability was reported as significantly higher for later year students, and there were no significant differences in self-reported reading speed or ease of understanding. There did not seem to be an increase in metacognitive awareness associated with university reading experience among these participants. No significant differences were seen in the number of reading strategies used (either overall or by subscale) in first year compared to later year students in either English or Norwegian. This is an interesting contrast to the SORS study conducted on medical students in Bahrain by Malcolm (2009) which found that later year students tended to use many reading strategies at a significantly higher rate than first year students.

Many of the studies finding large differences in L1 and L2 metacognitive awareness have compared reading between English and languages which are linguistically very different from English, such as Arabic or Chinese (Alsheikh

& Mokhtari, 2011; Feng & Mokhtari, 1998; Kong, 2006). Compared to native speakers, Alhaqbani and Riazi (2012) suggest that L2 readers expect to encounter difficulties such as unfamiliar vocabulary or cultural references. The extensive exposure to Anglophone culture and the similarities between English and Norwegian appear to lead to high general proficiency, but perhaps also a false sense of security among Norwegian students (Mahan & Brevik, 2013).

The present study found a stronger link between metacognitive awareness of reading strategies and self-ratings of reading proficiency for L2 than L1 reading. Average grades were also more strongly associated with reading strategy use in English than Norwegian. This is in line with previous research showing links between metacognitive awareness and reading proficiency (Grabe, 1991) and reading comprehension test scores (Karbalaee Kamran, 2012). This also fits with the idea that reading strategies are particularly important for L2 academic reading (Mokhtari & Reichard, 2008) and more complex texts (Feng & Mokhtari, 1998).

It is also interesting to note that awareness of reading strategies was a predictor for self-ratings of proficiency and average grade, but the association was not always positive. Global strategies for English reading were positively associated with self-rated reading ability and speed, but Support strategies were negatively associated with these. Support strategies, which include procedures such as using dictionaries and reading aloud, are less likely to be associated with proficient reading than Global or Problem Solving strategies (Mokhtari & Reichard, 2002). They are presumably used when readers get stuck and need help with understanding what they are reading. This fits with the study of Norwegian upper-secondary school students which found that poorer readers were motivated to use strategies that helped them to directly improve their reading comprehension when reading English, whereas the better readers tended to use more Global strategies such as selective reading in order to achieve specific goals (Brevik, 2015).

In terms of individual strategies found to differ between L1 and L2, the high reported use of slow and careful reading as a strategy for coping with L2 reading may help to explain results of previous research showing a slower reading rate for Norwegian students reading in English (Busby, 2015; Hellekjær, 2005, 2009). It is even possible that slow and careful reading and having two languages to assist with processing information may lead to better recall of information, and the strategy “thinking about information in both languages” was positively associated with self-reports of reading proficiency. This would fit with Bernhardt’s (2011) model in that L1 reading skills may be used to compensate for a lack of L2 proficiency. Without sufficient proficiency in L2, however, the benefits of skills acquired through L1 reading may be “short circuited” and the reader will revert to poorer reading strategies in L2 and consequently poorer comprehension (Clarke, 1980).

There has been some suggestion (Hellekjær, 2009) that Norwegian students are not well trained to read even in L1 and may be too focused on decoding rather than reading to learn. The Programme for International Student Assessment (PISA) found that Norwegian 15-year-olds scored significantly below the OECD average in L1 reading proficiency (Kjærnsli, Lie, Olsen, & Roe, 2007), although this has been improving in recent years (PISA, 2016). It has been suggested that these problems are still present among university students, and that they are unable to adjust reading strategies to suit the purpose of the task (Fjeldbraaten, 1999). Therefore, the English reading difficulties found in previous studies (Busby, 2015; Hellekjær, 2005, 2012) and relatively low levels of metacognitive awareness observed in the students in this study may be a reflection of a more general reading problem, and not just an L2 problem.

Limitations

Caution should be used when directly interpreting results from studies using the SORS, which is designed to measure students' self-awareness rather than actual metacognition. This survey gives an indication of students' *awareness* of reading strategies, and studies using think-aloud procedures have shown that this does not always equal actual strategy use (Anderson, 1991; Kong, 2006). A survey such as this is also not able to give information about *when* strategies are used, and research has shown that context is important in understanding strategy use (Alsheikh & Mokhtari, 2011; Zhang & Wu, 2009). Furthermore, it has been shown that the selection of *appropriate* strategies is just as important as the overall number of strategies (Anderson, 1991).

There are also limitations in the extent to which the results from this study are applicable to Norwegian university students more generally, because the participants surveyed were from a limited range of subject areas (mostly humanities) and from only one university. Only students who were present in lectures were surveyed, and this might bias the sample towards students who are more active participants in the classes. It is also important to note that later year students are generally those who have been successful in a university environment, so it may be that they have always had higher levels of metacognitive awareness than those who dropped out. Despite these limitations, this type of survey is nevertheless useful as a comparison to other populations studied in previous research.

Conclusion

In contrast to research in other countries which found that students employ a greater use of reading strategies when reading academic texts in L2, this study found no significant differences between awareness of reading strategies in L1 and L2 among Norwegian university students. This suggests that these students

have reached a level of proficiency where reading strategies are not essential for decoding L2 writing, but the lower self-ratings of proficiency in L2 than L1 indicate that these students are still not entirely comfortable with reading in English.

Metacognitive awareness is vital for successful academic reading, particularly in a second language, so further research is needed into whether additional support and training in higher-level reading strategies would be beneficial to these students. Future research should also include actual measures of reading speed and comprehension in L1 and L2 so that these could be compared with data from the self-reports in this study. The more we know about how students read in L2, the more support can be offered to promote skilful academic reading and to improve comprehension.

About the author

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Appendix A

(This is the version of the questionnaire which asks about reading in English.)

Survey of Reading Strategies in English

Hello and welcome to this survey about reading strategy use!

Thanks so much for being willing to help out with research about studying in a second language. Participation in this study involves answering some questions about strategies you use when reading for university and also some background questions. The survey takes around 10 minutes to complete and all data will be treated confidentially.

This research is being conducted as part of a PhD project at NTNU and has been registered with the Data Protection Official for Research, NSD – The Norwegian Centre for Research Data. The project is due to be completed by the 30th June 2019.

If you have any questions about this research, please contact the main researcher, Nicole Busby (nicole.busby@ntnu.no).

Your participation in this survey is completely voluntary and you can stop any time you like. Thanks again! :D

The purpose of this study is to collect information about the various techniques you use when you read ACADEMIC materials in ENGLISH (e.g. reading textbooks for homework or examinations, reading journal articles, etc).

All of the items on this page [the next pages] refer to your reading of university-related academic materials (such as textbooks and academic articles, not newspapers or magazines). Select the answer which best reflects how often you use each of these techniques for your English readings.

Each statement is followed by five numbers, 1, 2, 3, 4, and 5 and each number means the following:

- '1' means that 'I never or almost never do this'
- '2' means that 'I do this only occasionally'
- '3' means that 'I sometimes do this' (About 50% of the time)
- '4' means that 'I usually do this'
- '5' means that 'I always or almost always do this'

After reading each statement, select the number which applies to you. Note that there are no right or wrong responses to any of the questions on this survey.

Click the 'next' button to begin the survey.

Please note that your response will only be counted if you complete the survey.

	1	2	3	4	5
I have a purpose in mind when I read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take notes while reading to help me understand what I read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about what I know to help me understand what I read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take an overall view of the text to see what it is about before reading it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When text becomes difficult, I read aloud to help me understand what I read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think about whether the content of the text fits my reading purpose	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I read slowly and carefully to make sure I understand what I am reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I review the text first by noting its characteristics like length and organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to get back on track when I lose concentration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I underline or circle information in the text to help me remember it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1	2	3	4	5
I adjust my reading speed according to what I am reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When reading, I decide what to read closely and what to ignore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use reference materials (e.g. a dictionary) to help me understand what I read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When text becomes difficult, I pay closer attention to what I am reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use the tables, figures and pictures in the text to increase my understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I stop from time to time and think about what I am reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use context clues to help me better understand what I am reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I paraphrase (restate ideas in my own words) to better understand what I read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to picture or visualize information to help remember what I read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use typographical features like bold face and italics to identify key information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	1	2	3	4	5
I critically analyze and evaluate the information presented in the text	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I go back and forth in the text to find relationships among ideas in it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I check my understanding when I come across new information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to guess what the content of the text is about when I read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When text becomes difficult, I re-read it to increase my understanding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I ask myself questions I like to have answered in the text	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I check to see if my guesses about the text are right or wrong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I read, I guess the meaning of unknown words or phrases	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If English is your native language, please select 'not applicable' for the next two questions

	1	2	3	4	5	Not applicable
When reading, I translate from English into my native language	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When reading, I think about information in both English and my mother tongue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How would you rate your reading ability in English?

- Poor
- Below average
- Okay
- Good
- Excellent

How would you rate your reading ability in Norwegian?

- Poor
- Below average
- Okay
- Good
- Excellent

How quickly do you feel that you read course materials in English?

- Very slowly
- Quite slowly
- Average
- Quite quickly
- Very quickly

How quickly do you feel that you read course materials in Norwegian?

- Very slowly
- Quite slowly
- Average
- Quite quickly
- Very quickly

How easy do you find it to understand course material in English?

- Many things are difficult to understand
- Some things are difficult to understand
- Some things are easy, some are harder
- Most things are easy to understand
- Everything is easy to understand

How easy do you find it to understand course material in Norwegian?

- Many things are difficult to understand
- Some things are difficult to understand
- Some things are easy, some are harder
- Most things are easy to understand
- Everything is easy to understand

What is your native language? (you can select more than one if you consider yourself to have more than one native language)

- Norwegian
- English
- Other

Gender

- Female
- Male
- Other

Age

- under 18
- 18 - 20
- 21 - 23
- 24 - 26
- 27 - 29
- 30 or over

How many courses (7.5 credits) have you completed at university?

- None (this is my first semester)
- 1 - 4 courses (7.5 – 30 credits)
- 5 - 8 courses (37.5 – 60 credits)
- 9 - 16 courses (67.5 – 120 credits) (one - two years of full-time study equivalent)
- 17 - 24 courses (two - three years of full-time study equivalent)
- 25 - 32 courses (three - four years of full-time study equivalent)
- more than 32 courses (four years of full-time study equivalent)

What grades do you usually get at university?

- mostly As
- mostly Bs
- mostly Cs
- mostly Ds
- mostly Es
- mostly Fs
- I don't have any grades from university yet (this is my first semester)

How many of your textbooks and required course readings are in English?

- None
- 1 - 25%
- 25 - 50%
- 50 - 75%
- 75 - 100%

Which of the following best describes your field of study?

- Psychology
- Geography
- Social anthropology
- Archaeology
- Sign language/interpreting
- Other, please specify

Is there anything you would like to add? (optional)

Appendix B

Reading strategies reported being used most (top) and least (bottom) frequently when reading in Norwegian (L1) and English (L2)

Subscale	Reading Strategy – Norwegian	<i>M</i>	Subscale	Reading Strategy – English	<i>M</i>
PROB	Adjusting reading speed	4.11	PROB	Adjusting reading speed	4.19
PROB	Trying to stay focused	4.04	PROB	Trying to stay focused	4.18
PROB	Paying close attention	4.03	PROB	Paying close attention	4.09
PROB	Re-reading difficult text	3.97	PROB	Re-reading difficult text	4.04
GLOB	Setting purpose for reading	3.89	GLOB	Setting purpose for reading	3.78
GLOB	Using prior knowledge	3.69	GLOB	Using text features (tables, figures)	3.76
GLOB	Using text features (tables, figures)	3.57	PROB	Slow and careful reading	3.62
GLOB	Deciding what to read	3.54	GLOB	Using prior knowledge	3.60
SUPP	Taking notes	3.52	GLOB	Deciding what to read	3.59
GLOB	Checking how text fits purpose	3.41	SUPP	Taking notes	3.58
PROB	Slow and careful reading	3.38	SUPP	Underlining, circling information	3.38
GLOB	Checking understanding of new information	3.35	GLOB	Checking understanding of new information	3.37
SUPP	Underlining, circling information	3.34	GLOB	Checking how text fits purpose	3.36
GLOB	Using context clues	3.20	SUPP	Using reference materials (e.g. dictionary)	3.35
GLOB	Preview text before reading	3.19	GLOB	Using context clues	3.27
GLOB	Noting text characteristics	3.13	SUPP	Paraphrasing	3.24
GLOB	Critically evaluating	3.09	GLOB	Noting text characteristics	3.18
SUPP	Paraphrasing	3.08	PROB	Pausing and thinking about reading	3.16
GLOB	Using typographical features	3.06	GLOB	Guessing text meaning	3.15
PROB	Visualising information	3.04	PROB	Guessing meaning of difficult words	3.14
GLOB	Guessing text meaning	3.03	GLOB	Preview text before reading	3.09
PROB	Pausing and thinking about reading	3.01	GLOB	Critically evaluating	3.09
PROB	Guessing meaning of difficult words	2.97	PROB	Visualising information	3.04
SUPP	Using reference materials (e.g. dictionary)	2.94	SUPP	Going back and forth in the text	2.92
SUPP	Going back and forth in the text	2.90	GLOB	Using typographical features	2.89
SUPP	Reading aloud	2.40	SUPP	Asking myself questions	2.48
GLOB	Confirming predictions	2.38	SUPP	Reading aloud	2.47
SUPP	Asking myself questions	2.38	GLOB	Confirming predictions	2.41

Note: GLOB = Global reading strategies, SUPP = Support reading strategies, PROB = Problem Solving strategies

Article 2

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Article 3

Reading Rate of Academic English Texts: Comparing L1 and Advanced L2 Users in Different Language Environments

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Abstract

Slower reading in a second language (L2) has been attributed to lower proficiency and/or to slower language processing. This study investigates the role of linguistic context in L1 and L2 academic reading speed among 295 undergraduate Psychology students who all read English language texts at university. The aim was to compare academic reading among students in a predominantly English-speaking environment (the UK) with those in a parallel language context where both English and the local language are used in teaching (Norway). Three groups were tested: Norwegian students in Norway, and both L1 and L2 English-users in the UK. Participants completed a timed academic reading task, followed by comprehension questions. Although all three groups achieved similar mean scores on the comprehension questions, the L1 and L2 English-speaking students in the UK read the text significantly faster than the Norwegian students. There was no significant difference between reading times for the L1 and L2 readers in the UK, indicating that the difference was not simply a consequence of L2 reading. Additionally, in contrast to previous research on groups with lower L2 proficiency, this study found no significant association between reported extramural English exposure and reading speed among the Norwegian students. The results indicate that advanced L2 readers in a parallel language environment may need more time to read academic texts in L2 compared to L1 readers and L2 readers in an immersion context, which has implications for the time and support needed by these students.

Keywords: reading rate, academic reading, L2 reading, extramural English, advanced L2 users, English as a second language

Introduction

The status of English as an academic lingua franca means that advanced English proficiency is a prerequisite for most non-native English speakers undertaking university education. Students with English as a second language (L2) need to develop the ability to read university textbooks produced primarily with native English-speaking (L1) students in mind (Graddol, 2006) whether they are studying in an English-speaking country or in their own. Reading fluency is an important aspect of skilled reading (Beglar & Hunt, 2014; Grabe, 2009) and can be defined as 'the ability to read rapidly with ease and accuracy' over extended periods of time (Grabe, 2009, p. 291). Reading fluency develops with experience, and reflects processing speed (Grabe, 2009) because it entails the automatization of a number of complex processes, from lower-level linguistic processes such as decoding, to higher-order skills necessary for comprehension (Geva & Yaghouh Zadeh, 2006). Research has found that L2 reading tends to be slower than L1 reading, even for highly proficient L2 readers (Cop, Dirix, Drieghe, & Duyck, 2017; Cop, Drieghe, & Duyck, 2015; Fraser, 2007; Shaw & McMillion, 2011), which means that many university students may struggle to read the required volume of text throughout the course of their studies. Additionally, slower L2 reading may make students less motivated to read difficult texts (Pecorari, Shaw, Malmström, & Irvine, 2011; Ward, 2001). This study aims to investigate L2 reading speed of academic text in a parallel language environment, where both English and the local language are used in university teaching, asking whether the linguistic context affects reading speed in students who can be assumed to be advanced L2 users. Differences in reading speed are generally attributed to lower proficiency in the L2 and/or to slower processing, as will be discussed below.

Proficiency

The relationship between reading speed and comprehension appears to depend on the proficiency of the reader. Among readers with less experience, reading fluency and comprehension are strongly linked (Jackson, 2005), which is thought to be due to limitations on working memory (Biancarosa, 2005) and because cognitive resources are directed to word recognition and other lower level processes instead of overall comprehension (Stanovich, 1980). However, the relationship between fluency and comprehension is much more independent among skilled readers (Jackson, 2005). Gaps in vocabulary and topic knowledge can be overcome using compensatory strategies, but the main cost appears to be time (Walczyk, 2000).

Studies of Swedish university students, who are advanced L2 users and expected to read English texts written for native speakers, have shown that they are able to reach similar levels of comprehension to L1 readers, although they need approximately 25% more time to do so (Shaw & McMillion, 2008, 2011). In time-limited situations such as exams, this slower speed could result in lower comprehension scores, giving the appearance of poorer comprehension (Shaw & McMillion, 2011; Walczyk, 2000).

L2 proficiency is strongly correlated with L2 exposure, and activities outside the classroom (extramural input) have been shown to be very important for L2 acquisition (see, for example, Nation, 2015; Peters, 2018; Sylvén & Sundqvist, 2012). Researchers have recommended practicing reading as a way to improve L2 reading speed (Anderson, 1999; Beglar & Hunt, 2014; Rayner, Schotter, Masson, Potter, & Treiman, 2016) and research shows that extensive reading programs are associated with improved reading speed in lower proficiency L2 readers (Beglar, Hunt, & Kite, 2012; Bell, 2001; McLean & Rouault, 2017; Robb & Susser, 1989), presumably as a result of improving L2 proficiency. However, studies have found that among advanced L2 users, there is no correlation between reading speed and L2 proficiency (Cop et al., 2015; Fraser, 2007), and little is known about the relationship between extramural input and reading speed in advanced L2 readers.

Processing

Slower L2 reading speeds have also been attributed to slower processing in the L2. Reading in L2 is inherently more complex than reading in L1 since both reading ability and L2 proficiency are required, and since there are two interacting languages involved (Carrell, 1991; Koda, 2007). Research has demonstrated that both languages are active in bilinguals during language perception and production, even in situations where only one language is required (Kroll, Gullifer, & Rossi, 2013; Van Assche, Duyck, & Hartsuiker, 2012; Van Hell & Tanner, 2012), and this may slow down processing speed in all bilinguals, especially those who have acquired an L2 learned later in life, since the speed of lexical access depends on both language proficiency and the number of times readers have encountered vocabulary items (Tanabe, 2016).

Syntactic processing has also been found to differ in monolinguals and bilinguals, possibly partly because of difficulties in lexical processing (Hopp, 2016). Differences in processing found even in very proficient L2 speakers compared to monolinguals may stem from different memory

systems underlying L1 and L2 (Paradis, 2009; Ullman, 2001), from L2 speakers not processing syntactic detail the same way that L1 speakers do (Clahsen & Felser, 2006), or from limitations in working memory capacity or lack of automatization (Hahne, 2001; Hopp, 2010; McDonald, 2006). Cunnings (2017) argues that differences may be a result of L2 users experiencing more interference in memory retrieval of information constructed during sentence processing, in particular relying more on discourse-level cues, and that this may in itself be a result of slower reading speed. Thus, slower reading speed may be both a cause of and a result of different syntactic processing in an L2. However, differences in processing have been found even when reading speed was the same in native speakers and L2 users (Felser & Cunnings, 2012).

Differences between L1 and L2 reading can also be seen in eye tracking studies. Cop et al. (2015) found longer sentence reading times, more fixations, shorter saccades and fewer instances of word skipping among L2 readers compared to L1 readers. The authors describe the reading patterns of L2 readers in their study as more 'child-like' than those of the L1 readers, perhaps reflecting a lack of experience in reading in L2 compared to L1. None of these effects were found when the bilinguals were compared while reading in their L1 to monolinguals, implying that these differences between L1 and L2 reading are not a general effect of bilingualism.

There is also evidence that language context affects processing speed. Fraser (2007) tested reading rates in Chinese participants reading in L2 English. She found that participants living in an English-speaking environment read faster in English than those living in China, even though both groups had similar scores on an English proficiency test. This may be at least partly explained by the frequency with which the L2 is used compared to the L1; Linck, Kroll, and Sunderman (2009) found that language learners in an immersed L2 setting were able to more successfully inhibit their L1 and consequently performed better on tasks of L2 verbal fluency and experienced less translation interference than those in a non-immersion setting. Therefore, the extent to which the L2 is used relative to the L1 may also play a role in L2 processing speed.

Reading for university

Text type can affect reading (Alderson, 2000), and academic texts can present particular challenges to fluency, since academic language tends to use complex grammatical constructions and specific vocabulary (Coxhead, 2000; Gardner & Davies, 2014) that can be an obstacle to reading fluency and comprehension in otherwise fluent readers (Snow, 2010). Word-

identification ability has also been shown to predict reading fluency (Kuperman & Van Dyke, 2011), as has the reader's familiarity with the words in the text (Rayner et al., 2016), which means that academic language may also affect reading speed. Problems caused by slow reading compound over time when a lot of reading is required. Although most tests of reading speed have been conducted on short texts (Brysbaert, 2019), eye tracking studies have also found slower reading rates in L2 readers even over the length of an entire novel (Cop et al., 2017; Cop et al., 2015). The difference in reading speed was larger in longer compared to shorter sentences, which Cop et al. (2015) hypothesize may have to do with longer sentences being syntactically more complex. This could imply that L1-L2 differences can be expected to be even larger for academic reading than for reading novels. Pecorari et al. (2011) report that many Swedish university students who study in L2 English find the amount and difficulty of English language textbooks an impediment to learning.

With similar learning expectations for L1 and L2 readers, and a finite amount of time for reading, it is important to gain a better understanding of academic L2 reading in order to identify possible challenges that university students with L2 English may encounter. Research on reading speed has focused mostly on readers with lower L2 proficiency, and while proficiency and reading speed are highly correlated for lower proficiency L2 users, research has shown no correlation between these among advanced L2 readers. Also, although L2 reading has been shown to be slower than L1 reading, and although linguistic context appears to affect reading speed, little is known about how L2 reading in a parallel language environment compares to a monolingual environment, which is important to our understanding of the underlying processing in L2 reading and of the implications of previous research for parallel language situations. While extensive reading has been shown to improve reading speed among lower proficiency L2 learners, little is known about the effects of extramural reading on advanced L2 readers. Furthermore, to the best of our knowledge, no research has directly addressed reading rate of academic text, which is surprising since we know that text type affects reading (Alderson, 2000). The current study aims to contribute towards filling these gaps in our understanding of advanced L2 academic reading by investigating reading rate among advanced L2 users in monolingual and parallel language environments using an authentic academic text to measure and compare their performance with that of L1 student readers of English.

The context for the current study

The current study investigates reading speed and comprehension in Norwegian undergraduate Psychology students compared to native and non-native English speakers in the United Kingdom. Universities in native English-speaking countries generally require non-native English-speakers to prove their English proficiency as part of the admission requirements, whereas Norwegian students are not required to pass any specific tests of English proficiency to be admitted to Norwegian universities, as it is expected that they have the skills they need to read academic texts in English at university upon completing secondary school (Hellekjær, 2009). Given that both Norwegian and English are Germanic languages with many cognates, Norwegians may have some advantages over other L2 English learners with less closely related L1s. Norwegians have some of the highest levels of L2 English proficiency in the world (Bonnet, 2004; Education First, 2020), and learn English from the first year of school until at least year 11. They are also extensively exposed to English through media and other leisure activities, which has been shown to be positively associated with English reading ability (Brevik & Hellekjær, 2018) and vocabulary knowledge (Busby, 2020).

In Norwegian universities, students are generally expected to read texts and to understand lectures in both Norwegian (L1) and English (L2). This is commonly described as ‘parallel language use’ since both languages exist in the same domain and are used in parallel (Hultgren, 2014). Psychology students are relatively representative of the parallel language situation of Norwegian universities. Most Psychology classes in Norway are taught in Norwegian but use English language textbooks and articles in their curricula. Students are expected to read academic journal articles in English by their second year of bachelor level studies. They thus fit McMillon and Shaw’s (2016) description of ‘advanced L2’ users who read at levels close to those of their L1 equivalents and are subject to similar expectations. This study aims to investigate academic English reading rate and comprehension among Norwegian university students in a parallel language environment in relation to those in a predominantly English-speaking environment using an authentic academic text. Specifically, we investigated the following research questions:

1. How does reading speed compare between L1 English students, L2 English students in the UK, and L2 English students in a non-immersion setting?
2. How does reading speed relate to reported extramural English exposure in advanced L2 users in a non-immersion setting?

Methods

Research design

The current quantitative study collected data through an online survey comprising a reading task and a battery of questions about participants' language, education and reading experiences. Participants completed the survey on computers or mobile devices. Focus was on how students with different language backgrounds read academic texts. Therefore, the text for the reading task had to reflect what they would read for university without being too time-consuming. For this reason, the reading task was an extract of an authentic academic journal article rather than an existing test written or modified by researchers.

The project was registered with the Norwegian Centre for Research Data (NSD) and a data processing agreement between the survey provider and the research institution ensured secure handling of information.

The survey comprised 3 sections: the reading task, questions to check the applicability of the task to the students' typical university reading experience, and background questions. These sections are described below.

The reading task

Participants were presented with an extract of a text taken from a scientific journal article entitled "Wild capuchin monkeys adjust stone tools according to changing nut properties" (Luncz et al., 2016). The text was 1,415 words long and discussed monkey behaviour, selected with the aim of being interesting to the participants without requiring prior knowledge or familiarity with subject-specific vocabulary. This text was longer than those used in most studies of reading speed (Brysbaert, 2019) and comprehension (Johnston, 1984; Urquhart & Weir, 1998), which is important for enabling the use of different types of reading strategies (Urquhart & Weir, 1998), for giving a reliable and stable measure of reading speed (Brysbaert, 2019), and for reflecting the type of reading students encounter at university.

The text was presented on three pages of the online survey (555, 464 and 396 words on each page, respectively) to give an impression of realistic text density but enabling the recording of reading time for each page individually. This was recorded by the survey program. Participants were instructed to move to the next page once they felt that they had understood the text and

were told that they would need to answer comprehension questions after reading. Before starting, they were informed that they would not be able to go back and read the text again.

After finishing the text, participants were asked eight multiple-choice comprehension questions (each with four possible responses) to check that they had understood the content. The questions were designed to test understanding of the overall message, inferences about the information in the text, as well as more specific details (some of which were paraphrased). The questions were presented in randomised order, and pilot testing on native and non-native English-speakers ensured that the questions provided a suitable challenge and could not easily be answered without having read and understood the text.

Since familiarity with vocabulary (best indicated by vocabulary frequency) is known to affect reading fluency, the vocabulary levels of the text were analysed in relation to the BNC-COCA list using Lextutor (lextutor.ca). This analysis indicated that that 96.4% of the words in the text were at the 10,000-word level or below, and that 14.2% were off-list (mostly proper nouns and Latin species names, for which common names were also given). The 95% coverage mark occurred at the 7,000-word level and 98% coverage occurred at the 16,000-word level. As expected from an academic text, 10.2% of the words were found on Coxhead's (2000) Academic Word List. Participants were asked to report the extent to which they felt their understanding of the text was hindered by unfamiliar vocabulary on a 4-point scale.

Background data

Background data was collected on participants' language and education, any diagnosed reading difficulties, as well as extramural (English) reading habits. Participants reported on a 7-point scale (Never – Several hours a day) how often they read books, played massive multiplayer online games (MMOGs) or other types of electronic games¹, and read online texts in English in their spare time. They also rated on a 5-point scale how quickly they felt that they read texts for university (very slowly – very quickly), and how easy they found it to understand the language of texts they read for university (very difficult – very easy). The Norwegian students were also asked to report their self-perceived reading speed in English (L2) relative to Norwegian (L1).

¹ Although not all computer games require extensive reading, a strong relationship has been found between English proficiency and gaming in younger Norwegians (Brevik, 2016).

Pilot testing with native speakers of Norwegian and English helped to clarify the wording of some questions.

The study originally aimed to compare reading speed between Norwegian students and a native English-speaking comparison group. Responses from the UK included a group of students with an L1 other than English, which was extremely fortunate but unexpected, and therefore data unfortunately was not collected about their language background or length of residence in the UK.

Procedure and participants

The survey was completed by 367 university students in Norway and the UK, recruited from first- and second-year Psychology classes in order to control for educational background as far as possible. The participants fell into 3 groups based on their responses to the questions of where they were studying (UK or Norway) and their native language. The Norwegian participants were recruited from three Norwegian universities, reported having L1 Norwegian, and did not report having L1 English. The other two groups were based in three universities in the UK; the English group reported having English as a native language and the Other group reported other L1s only. There were 16 different L1s reported in the Other group, the most common of which were Polish (4 participants), Cantonese (4 participants), and Bulgarian (3 participants).

Participants in Norway were informed about the study by the main researcher or their teacher during lectures and on their online learning platforms. UK participants in two of the institutions were recruited through a video by the main researcher and/or a message on their learning platform. Participants in the third UK university were recruited via a research participation scheme and received credits for research participation. Participation was voluntary and a chance to win travel vouchers was offered as incentive for participation.

Because the survey was anonymous and unsupervised, it is impossible to know whether participants read the text carefully before answering the comprehension questions. Therefore, participants who scored less than four out of eight on the comprehension questions were excluded, since this indicated that they had not read carefully or that their reading times did not reflect the amount of time they needed to spend to understand the text. There were also some participants who had extremely high or low reading times which skewed the data (range: 4

seconds to 3616 seconds) and clearly did not reflect realistic reading times. The median absolute deviation (MAD) was used to identify and exclude reading times that fell outside the median deviation of the median. MAD is less sensitive to influence from outliers than measures of deviation based on the mean, such as standard deviation (Leys, Ley, Klein, Bernard, & Licata, 2013). After excluding these data points, a total of 295 responses remained: 72 participants in the Norwegian group, 195 in the English group (179 English monolinguals and 16 bilinguals), and 28 UK-based students whose L1 was not English in the Other group. Table 1 shows the numbers of participants per group and per year of studies.

Table 1: *Number of participants in each year of study by language background. N=295*

	English L1	Norwegian L1	Other L1
1st year	88	40	11
2nd year	100	14	15
3rd year	3	9	2
4th year	3	7	0
4+ years	1	2	0
TOTAL	195	72	28

Participants were predominantly female (English: 85.7%, Norwegian: 73.6%, Other: 85.7%) with a mean age of 20 for the UK-based students and 22 for the Norwegian students.

To check of how well suited the text was to the construct under investigation (academic reading for university), participants were asked about their experience of reading the text compared to what they usually read for their university studies on a 5-point scale (much harder – much easier). Approximately half of the participants in each group rated the survey text as being a similar level of difficulty to their university readings (Norwegian: 46%, English: 49%, Other: 50%). The Other group had the highest percentage of participants who rated the text as easier or much easier than their university readings (50%), compared to the Norwegian (39%) and English (38%) groups. On the whole, this indicates that the text would give a reasonable indication of university reading and that, if anything, students may struggle more with their actual university readings than with this text.

Analysis

The time it took participants to read the pages of text functioned as the dependent variable throughout the analysis. Group means were compared using Analysis of Variance (ANOVA) and Mann-Whitney-Wilcoxon tests. Regression models were used to investigate whether the reported frequency of exposure to extramural English is a predictor of reading speed.

Results

The results are presented below, starting with the comprehension questions and participants' reported experience of reading the text, followed by a between-group comparison of reading speed. Finally, language exposure variables are investigated as potential predictors of reading speed.

Comprehension

The main purpose of the comprehension questions was to check that participants had attempted to read and understand the text, so the questions were designed to prevent guessing. Since comprehension was not the main focus, participants were only asked eight comprehension questions. Participants who answered fewer than four of the comprehension questions correctly were excluded since this suggested that they had not read the text as instructed. Table 2 shows the mean number of correct answers for each group.

Table 2: *Mean comprehension score (out of 8) and standard deviation (in parentheses) for each language group*

	English L1	Norwegian L1	Other L1
Comprehension score	6.56 (1.14)	6.71 (1.05)	6.61 (1.10)

As seen in Table 2, the groups had very similar comprehension scores, and this was not necessarily due to ceiling effects, with mean scores well below 7 out of a maximum of 8. A one-way between-subjects ANOVA confirmed that the comprehension scores were not significantly different between groups.

The vast majority (94%) reported that the information in the text was completely or mostly new to them, which suggests that none of the groups had an advantage in guessing the answers to the comprehension questions without reading the text. Participants reported how easy they found the text on a 5-point scale (very difficult – very easy). The majority of participants (62%) reported that the text was very easy or mostly easy to understand, 15% said it was difficult or very difficult and the rest (23%) were neutral. This varied between groups, with slightly fewer participants from the Norwegian group reporting finding the text easy or very easy to understand (56.2%), compared to the English (64.1%) and Other (64.3%) groups.

Two thirds (67%) reported not understanding parts of the text due to unfamiliar vocabulary. The proportions of participants reporting unfamiliar vocabulary as an obstacle to comprehension varied between groups: The Norwegian group had the highest proportion of participants (83%) who felt hindered by unfamiliar vocabulary, compared to the English (62%) and Other (61%) groups.

RQ 1: Reading speed

The main research question in this study was how the reading speed for Norwegian students compared with that of the native English speakers and the non-native English-speakers living in the UK. Therefore, the mean time spent on each page was calculated for each group, as shown in Table 3.

Table 3: *Mean number of seconds (and standard deviation) spent on each page of the reading text, as well as total reading time, for each group.*

	English L1	Norwegian L1	Other L1
Page 1	170.86 (71.73)	224.35 (63.39)	172.32 (71.58)
Page 2	117.67 (56.16)	165.44 (41.19)	128.75 (64.36)
Page 3	94.41 (47.59)	133.68 (37.34)	103.39 (50.39)
Total	382.94 (158.95)	523.47 (129.94)	404.46 (166.90)

As Table 3 shows, the English group were the fastest readers, followed by the Other group, while the Norwegian group took the longest time to read the text. On average, the English group needed only 73.23% of the time that the Norwegian group took to read the text and the

Other group took 77.25% of the time that the Norwegians used. A density plot was created to show the distribution of reading times, shown in Figure 1.

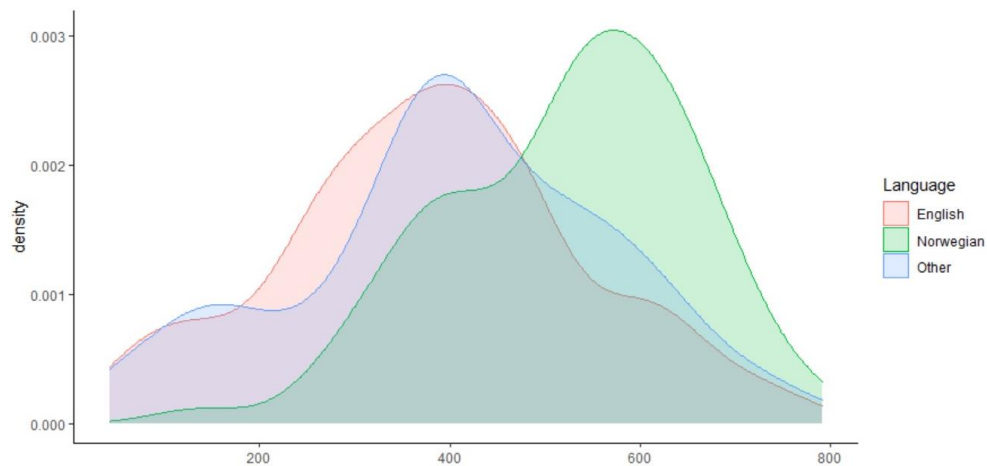


Figure 1: Density plot showing distribution of total reading time (in seconds) for the three language groups

As we see in Figure 1, there is a lot of overlap between groups. The two UK-based groups are almost entirely overlapping, although the Other group are at the slower end of the peak. There is, however, a clear distinction between the Norwegian group and the UK-based groups.

A one-way between-subjects ANOVA showed that mean reading times for the three language groups were significantly different [$F(2, 292) = 22.27, p < .001$]. Post hoc comparisons using the Tukey test showed a significant difference between the Norwegian and English groups ($p < .001$), and between the Norwegian and Other groups ($p = .002$), but not between the English and Other groups ($p = .766$).

For the purposes of comparison to previous studies, reading speed was calculated as the mean number of words per minute for each group, both for each page and in total (Table 4).

Table 4: *Mean number of words per minute for each group*

	English L1	Norwegian L1	Other L1
Page 1	194.90	148.42	193.25
Page 2	236.59	168.28	216.23
Page 3	251.67	177.74	229.81
Overall	221.71	162.19	209.91

As Table 4 shows, the English group read the highest number of words per minute for each page, and the Norwegian group consistently had the lowest number. In all groups, the number of words per minute increased for each subsequent page, presumably as a result of acclimatisation to the task. A meta-analysis of reading rate studies by Brysbaert (2019) demonstrated that average reading speed was 238 words per minute in English for adult native speakers. Overall, the average number of words per minute in the English group is close to this number. The Norwegian group, on the other hand, is clearly below this number for all three pages.

The slower L2 reading was also reflected in how Norwegian participants felt about their reading. Participants who reported having Norwegian as their L1 were asked how fast they felt that they read in English compared to Norwegian. Only 14% said that they felt they read equally fast in both languages and 82% said that they felt English reading was somewhat or very much slower than Norwegian.

Bilingual students in the English group

In the English group, 16 participants reported having a second L1 in addition to English. Since simply being bilingual may affect language processing and, consequently, reading speed, reading times for these 16 participants were compared with the 179 monolingual English speakers in this group. Because of the difference in sample size, the non-parametric Mann-Whitney-Wilcoxon test was used to determine whether these groups differed significantly. This test showed that reading speed scores between the two groups were not significantly different ($W = 1645.5, p = .325$).

RQ2: Effect of extramural English

In light of previous research recommending extensive reading as a method to improve reading speed, exposure to extramural English was investigated as a predictor of reading speed in the Norwegian group. Norwegian participants were asked to report how often they read books, read online, played massively multiplayer online games (MMOGs), and played other electronic games in English on a 7-point scale (never – several hours a day). Their responses can be seen in Table 5.

Table 5: *The number of Norwegian participants who reported reading books, reading online, and playing MMOGs and other games in English in their spare time*

	Reading books	Online reading	MMOGs	Other games
Never	4	0	47	25
Occasionally	21	5	15	20
Monthly	16	3	4	10
Weekly	8	9	3	7
Several times a week	9	7	0	7
Daily	13	34	2	3
Several hours a day	1	14	1	0

As shown in Table 5, all Norwegian participants reported reading English online at least sometimes, and the majority also reported reading books and gaming in English, sometimes even for several hours a day. This demonstrates that all participants were reading in English in their spare time.

A multiple regression model was calculated to investigate these types of extramural input as predictors of reading speed among Norwegian students. The model showed no significant association between these input variables and the time spent on the academic reading task in this study ($F(4, 67)=0.604, p =.661$). Backward elimination of input variables also failed to produce a well-fitting model, indicating that reported frequency of extramural English exposure was not a significant predictor of reading speed in this group.

Discussion

Reading speed

This study compared reading speed of academic text between undergraduate Psychology students with different language backgrounds who are all expected to read academic texts in English. We start by addressing our first research question about reading speed differences in the three groups. For students based in the UK, there was no significant difference in reading speed between L1 and L2 English users. However, the Norwegian L1 speakers in Norway spent significantly more time reading the text than both UK-based groups, and on average the native English-speaking students took only 73% of the time it took the Norwegians to read the text. This is very similar to the findings in Shaw and McMillion's (2011) study comparing Swedish and British undergraduate biology students, although the current study used a longer and more academic text to simulate university reading. The results indicate that the Norwegian students would need more time than students in the UK, even those with L2 English, to read the same volume of text, which does not appear to be simply a product of their L2 status.

One potential explanation for the slower reading among the Norwegian participants is simply that they have lower English proficiency than those based in an English-speaking country, especially since more challenging reading tasks (such as academic reading) require higher language proficiency (Fraser, 2007). Reasons could be the greater opportunities for input in an immersion context, and also that the English proficiency requirements of UK universities mean only students with high proficiency had been admitted, while no such requirement exists for Norwegian students in Norway. This explanation in itself would be noteworthy given the generally high English proficiency in Norway compared to other countries where students may also be required to read largely in English. This underlines the importance of investigating this specific context, and not basing our assumptions about L2 English reading in Norwegian university on either lower-proficiency readers in other countries, or on L2 readers in an immersion setting.

However, given the similarities in scores on the comprehension questions, and the fact that studies have found no correlation between reading speed and L2 proficiency among advanced L2 users (Cop et al., 2015; Fraser, 2007), it is likely that the explanation for the lower reading speed in the Norwegian group is more complex than simply differences in proficiency. As seen in the density plot (Figure 1), the slower average speed among Norwegian students is general, with

the majority reading at slower speed than the majority of the L1 speakers, whereas the L2 speakers in the UK more generally perform within the range of the native speakers.

Extramural input

Our second research question asked about the role of extramural input. In contrast to previous studies of vocabulary in Norwegian university students (Busby, 2020), the present results showed that extramural English exposure was not a significant predictor of reading speed for the Norwegian participants. The role of academic language may be important here, with the types of extramural English examined being unlikely to be particularly academic.

While most participants in all groups reported that the text in this study was similar to or easier than texts they read for university, it is noteworthy that it contains vocabulary items from frequency levels which Busby (2020) found to be problematic for Norwegian university students. The speed of lexical access depends on both language proficiency and the number of times readers have encountered vocabulary items (Tanabe, 2016), so the presence of infrequent vocabulary can be expected to slow down reading. This could imply that the extramural input available to the Norwegian participants does not provide exposure to the relevant vocabulary, which in turn may lead to slower reading. Participants in the UK are likely to use English for more academic tasks, i.e. listening to lectures, discussion in seminars, and their own writing, whereas the Norwegian participants are more likely to perform these tasks in Norwegian, which could account for the differences.

However, taking research on sentence processing in L2 versus L1 into account, the slower reading times in the Norwegian group may not be an effect only of lower proficiency and lack of vocabulary. Important differences in L2 processing have been found between immersed and non-immersed speakers, even when proficiency was similar (Fraser, 2007; Pliatsikas & Marinis, 2013). This might imply that the extramural and university English input in a parallel language situation such as Norway, though relatively massive, is still not sufficient to make up for differences in processing, resulting in slower academic reading speed compared to L2 speakers living in the UK. The faster English reading in the UK-based L2 group may also be a result of more efficient L1 inhibition due to the English-speaking environment (see, e.g. Linck et al., 2009).

Implications of slow reading

If the slower reading in the Norwegian group is a result of their non-immersion context, whether in terms of proficiency or of processing speed, this may have implications for all students currently reading in English for university in non-English speaking communities. The fact that our Norwegian participants presumably use Norwegian for most aspects of their everyday life and, importantly, that their lectures are also predominantly in Norwegian and their use of English is mainly receptive, may mean that such lower reading speeds are an unavoidable effect of academic environments with such parallel language use, even with high L2 proficiency.

Regardless of the underlying cause of slower L2 reading, the fact remains that non-immersed L2 English users seemingly need to spend more time to read a given volume of text, which means they will need to dedicate more time and energy to reading for university. Pecorari et al. (2011) found that Swedish students reported needing to spend a lot more time when reading in L2, meaning that this was less rewarding, and some were unwilling or unable to invest the additional time. Fluent reading of extended texts is a skill that takes time to develop (Grabe, 2009), and the additional demands of L2 processing may also mean that long periods of reading are less sustainable for L2 readers. If it is the case that L2 reading is inherently slower than L1 reading in non-immersion settings, it leads to the question of whether it is reasonable to have the same expectations for such L2 readers as for native speakers, and what can be done to mitigate the effects of slower reading.

Validity and limitations

This study was designed to compare academic reading among students with closely matched educational backgrounds in different language situations. Therefore, only Psychology students were tested, and the results cannot necessarily be generalised to students in other study programs, although similar results have also been found in studies comparing Swedish and L1 English-speaking biology students (Shaw & McMillion, 2008, 2011). Given that this study focused on L2 reading and may therefore have seemed more relevant for the L2 users, it is possible that the English group were less motivated and therefore spent less time on reading. This group did have the highest exclusion rate for low comprehension scores (and very short reading times). However, the similar average comprehension scores indicate that the remaining participants did read the text.

It should also be noted that the comprehension questions were designed to check that participants read the text, and that there were only eight questions which were not validated, only pilot tested. Therefore, we are unable to say with certainty how much participants understood from the text or what they would remember on a post-test. This study did not directly test L2 proficiency, as this is shown to be less strongly associated with reading rate among advanced L2 users (Cop et al., 2015; Fraser, 2007), although this would be interesting to include in future studies. Additionally, more questions about extramural English exposure would have been useful, especially since these questions were only self-reports about how often participants interact with English language materials in the present time rather than how much they may have done in the past, meaning that they are not a measure of cumulative exposure over time.

Conclusion

In the present study, we investigated reading times and comprehension in English in three groups of Psychology students, namely L1 Norwegian speakers studying in Norway, L1 English speakers in the UK, and L1 speakers of other languages studying in the UK. Results indicate that all three groups achieve similar comprehension scores, but that reading times for the Norwegians were significantly slower than for both native and non-native English speakers in the UK. Furthermore, no relationship was found between extramural input and reading speed in the Norwegian group. These results indicate that non-immersed L2 readers can be expected to read more slowly than both L1 and L2 readers in an English-speaking environment, although this may not impede comprehension. Importantly, it seems that it is the non-immersion context and possibly the parallel language use encountered by the Norwegian group which causes the difference compared to native speakers. In an academic world where such parallel language use is common, these findings have important implications for expectations for university reading. Our findings may have consequences for how school systems can better prepare students, for the support which universities need to provide, and for the time students must be prepared to spend on their studies. Further research is needed into academic L2 reading in parallel language environments since this study indicates that students in these environments have different needs and abilities from L2 readers in other contexts and need to be studied in their own right.

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