Wrighting in Englesh is harde

An error analysis of Norwegian pupils' L2 English spelling

Amanda Ødegaard Wedge

Master's Thesis in English Linguistics

Department of Foreign Languages

University of Bergen

May 2021

Summary in Norwegian

Denne masteroppgaven i engelsk lingvistikk er en skrivefeilsanalyse som undersøker engelske skrivefeil produsert av norske elever i 10. klasse på ungdomsskolen og 11. klasse på videregående (vanligvis kjent som VG1). Denne oppgaven tar i bruk seks overordnede kategorier for å skille mellom ulike typer skrivefeil for å identifisere *hvilke* skrivefeil norske elever produserer, og videre *hvorfor* de tilsynelatende produserer disse skrivefeilene. Datamaterialet er hentet fra det digitale korpuset CORYL (en samling av nasjonale prøver i engelsk fra 2004/2005), samt et kontrollkorpus (en samling av engelske heldagsprøver) som ble utviklet i sammenheng med dette prosjektet i løpet av høsten 2020 og våren 2021. Ettersom tekstene i CORYL er skrevet for hånd, og tekstene i kontrollkorpuset er skrevet på PC, undersøker denne oppgaven også hvordan bruken av PC påvirker elevenes skrivefeil.

Funnene i oppgaven tyder på at det er flere elementer som ligger bak elevenes engelske skrivefeil. Den tydeligste tendensen er at elevene bruker fonologiske strategier når de skal utlede hvordan et ukjent ord skal staves, og at dette igjen kan føre til at elevene staver ord feil da det ikke er en en-til-en korrespondanse mellom uttale og stavemåte i engelsk. Funnene tyder også på at elevene har et overforbruk av stavemåter som de gjerne anser å være 'typisk engelsk'. Bruken av PC ser ut til å føre til at antall skrivefeil synker, og det antas at stavekontrollen i tekstbehandlingsprogrammet brukt av elevene har bidratt til nedgangen i antall skrivefeil. I tillegg viser funnene at visse typer skrivefeil har høyere forekomst, samt at nye typer skrivefeil oppstår, når elevene skriver på PC.

Ettersom funnene fra denne masteroppgaven er basert på et mindre datagrunnlag, er norske elevers engelske skrivefeil et felt som må forskes på ytterligere før sikre konklusjoner kan trekkes.

Acknowledgements

First and foremost, I would like to give a huge thanks to my supervisor Dagmar Haumann. I am truly grateful to you for reading through and commenting on numerous drafts (again and again), and for being encouraging, incredibly patient and for letting me work at my own pace. A special thanks goes to the teachers and pupils who willingly gave their time and texts to the project. Thank you to Kari Sundet for teaching me how to manage CORYL in the way most efficient to my project, and for corresponding with me throughout this process when questions about CORYL arose. Thank you to my fellow students and members of faculty for insightful comments and suggestions during this process. I would like to thank 3B and 3C at Askøy videregående for being curious, kind, hard-working and, at times, challenging. I could not have asked for better pupils in my first year of teaching. Also, thank you to my wonderful colleagues. Thank you to my mom and Markus for never-ending support and encouragement. A special thanks goes to my dad, you have now (hopefully) proof-read your last paper! And last but definitely not least, thank you to Tage for teaching me how to use Excel, and more importantly for keeping (me) calm and for willingly discussing this project with me, day and night, throughout the past year.

Amanda Ødegaard Wedge

May 2021

Table of contents

List of tables

List of figures

Abbreviations and conventions

AE	American English
CA	Contrastive Analysis
CORYL	Corpus of Young Learner Language
L1	First language
L2	Second language
NIFU	Nordisk institutt for studier av innovasjon, forskning og utdanning
NSD	Norsk Senter for Forskningsdata
RP	Received Pronunciation
SEN	Standard East Norwegian
SLA	Second language acquisition
UDIR	Norwegian Directorate for Education and Training *(Utdanningsdirektoratet)*
UG	Universal Grammar
ZPD	Zone of Proximal Development

Spelling errors are represented in bold, lowercase letters, and target spellings in small capital letters, e.g. **eyelend** for ISLAND.

Unless otherwise mentioned, British English is used for all orthographic conventions, and Received Pronunciation (RP) is used for all English phonology in this thesis.

1. Introduction

This thesis studies one of the skills involved in writing, namely the ability to spell individual words. Learning to spell in a new language poses challenges for any learner, and it is perhaps especially challenging to learn how to spell in English. The field of English spelling is a rich one due to the complex sound-letter relationships in English. As a learner, one is faced with several possibilities when determining how to spell an unknown word.

Spelling errors are by many considered a natural and even unavoidable part of learning how to spell, and several scholars have found spelling errors to be common in the spelling output of both L1 (first language) users and L2 (second language) learners of English (Cook 1997; Bebout 1985; Okada 2005). The study of English spelling errors can reveal what a learner knows about the language, and to what extent the learner is able to use this knowledge. Furthermore, the findings from studies on spelling errors can yield information that may be used to improve the teaching of English as a second language.

The central aim of this thesis is to explore which L2 English spelling errors Norwegian pupils produce. In addition, this thesis seeks to explore possible mechanism behind the production of these errors. The methodological framework of error analysis is applied to identify spelling errors within samples of written learner language. The data for this project was obtained from two learner corpora, CORYL (Corpus of Young Learner Language), developed by researchers at the University of Bergen, and a control corpus compiled for this project. CORYL and the control corpus consist of handwritten and keyboard-written texts respectively, and, therefore, this thesis seeks also to explore how the use of computers effect the pupils' English spelling. The texts in both corpora are written by Norwegian pupils in the 10th grade in lower secondary schools and the 11th grade in upper secondary school.

The research questions and hypotheses for this thesis were developed based on the assumption that spelling errors are a natural part of spelling acquisition, as well as

first-hand experiences as an L2 learner of English and an L2 English teacher. The research questions (Q) and hypotheses (H) are as follows:

Q1: What types of English spelling errors do Norwegian pupils produce?
Q2: Are there patterns behind Norwegian pupils' English spelling errors?
Q3: How does the use of computers effect Norwegian pupils' English spelling?

H1: Pupils are more likely to produce spelling errors when writing by hand.
H2: Pupils produce the same types of spelling errors in handwritten text and in keyboard-written text.

This thesis consists of six chapters including this introduction. Chapter 2 provides the theoretical background, and chapter 3 introduces the methodological framework, error analysis, used for study. Chapter 4 presents the results which form the backdrop for chapter 5 where a selection of the results is discussed in further detail. Finally, chapter 6 concludes the thesis.

2. Theoretical background

This chapter outlines the theoretical background of this study, and presents an overview of previous research on L2 English spelling errors. Section 2.1 introduces the English spelling system. Section 2.2 presents different ways in which spelling has been researched throughout the years. Sections 2.3 covers the area of second language acquisition. Spelling acquisition, and L2 English spelling in particular is dealt with in section 2.4. The final section, 2.5, deals with the teaching of L2 English spelling, the status of English in Norwegian schools, and the treatment of spelling in a selection of coursebooks for the English subject in lower and upper secondary school.

2.1 The English spelling system

The conventions of written language are referred to as *orthography*. English orthography is the alphabetic system of writing conventions used to represent spoken English in written form. Brooks (2015, 1) notes that the English spelling system is much less regular and predictable than any other alphabetic orthography. The over 40 different speech sounds (*phonemes*) are represented by an array of letters and letter combinations (*graphemes*) in the written language, and, consequently, many of the graphemes have more than one pronunciation, and vice versa. Due to the inconsistent correspondence between pronunciation and spelling, the English spelling system is considered a complex and difficult one. In a strictly alphabetic system, there is a one-to-one correspondence between each phoneme and its spelling, which is certainly not the case in English where there are multiple links between sounds and letters. For example, the grapheme <o> corresponds to several phonemes such as /ʌ/ in *love*, /ʊ/ in *good*, /ɒ/ in *cough* and /əʊ/ in *dough*. In addition, the phoneme /əʊ/ corresponds to numerous different spellings, for instance <o> in *cone*, <ou> in *soul*, <au> in *chauffeur* and <oo> in *brooch*. The irregularities of English spelling are, in other words, caused by the use of identical graphemes for the spelling of different phonemes, and by the many different graphemes that can represent one phoneme.

The symbols used in English spelling today are the 26 letters of the Roman or Latin alphabet. This is often referred to as the English alphabet to separate the alphabet from other sets of Roman letters used in writing other languages, such as Norwegian with 29 letters and Italian with 21 letters. Although not strictly alphabetic, the English writing system is considered an alphabetic system as its symbols represent phonemes. Languages can vary in terms of sound-letter (or phoneme-grapheme) correspondence even though they fall under the same category of writing systems. English and Italian are examples of this. Although English and Italian are both alphabetic languages, they differ in the regularity of their correspondence rules. In contrast to English, there is almost always a one-to-one correspondence between phonological and written forms in Italian, with a few exceptions (Bassetti and Cook 2005, 7). Other writing systems include syllabic, consonantal and logographic systems (Bassetti and Cook 2005, 5–10). In a syllabic system, the system of writing represents *syllables* (a single unit of speech, composed of either a vowel or a combination of consonants and vowels), as in certain variants of Japanese. In a consonantal writing system, such as Hebrew, only consonants are represented. Finally, a logographic system uses symbols to represent complete words or *morphemes* (the smallest meaningful unit in a language), as in Chinese.

The English spelling system has developed through a process of major linguistic and social events over the last thousand years, and the difficulties encountered today are consequences of these events (Crystal 2003, 274). In the 5th century, the Angles and the Saxons spoke a set of West Germanic dialects from which the English language evolved. Those dialects, known as Anglo-Saxon or Old English, were, during the Viking invasions, influenced by contact with North Germanic dialects spoken by the Vikings. After the Norman Conquest in 1066, as well as simplified grammar and the use of French orthographic conventions, the language evolved into Middle English. Due to elements of prestige and familiarity, French orthographic conventions replaced the more suitable English orthography (Rohr 2012, 34). It was during this period that the difficulties of the English written language began, due to the many sound changes that occurred since the (unofficial) standardization of English spelling (Van Gelderen 2014, 17). Although London was a dialectal hybrid, patterns of standardization gradually appeared from the area in the mid-14th century, which was a significant factor as London grew to become the social, political and commercial centre of the country. Manuscripts, such as the work of Chaucer, represent the variety of London English. Although Chaucer's writing cannot be called a standard in the strict sense, it undoubtedly added to the prestige associated

with the written form of the London dialect (Crystal 2003, 54). Furthermore, the introduction of the printing press in London in 1476 by William Caxton was an important development towards standardization (Van Gelderen 2014, 18). Caxton, who himself was not interested in standardizing spelling, chose local London speech as the norm and relied on the writing of scribes rather than inventing a new system (Crystal 2003, 54). Another factor that increased the number of irregularities and inconsistencies in English spelling towards the end of the Middle English period was the Great Vowel Shift, which Van Gelderen (2014, 18) describes as the most disruptive of all changes. The Great Vowel Shift is a linguistic sound change that affected the pronunciation of all Middle English long vowels. All but two vowels became closer in quality, and the two vowels which were already as close as they could be became diphthongized. For example, /ɔ:/ became /o:/, and /u:/ changed into the diphthong /ʊu/. Nevertheless, it is apparent that there were several contributing factors to the inconsistencies of the English language. These factors include loan words from other languages that kept their original spelling, as well as gradual changes in pronunciation. Additionally, scribes attempting to normalize the English language introduced changes in spelling that are not reflected in pronunciation. These historical changes shows that English spelling does not follow a single, clear-cut system where every word has always been spelled in a specific way (Upward and Davidson 2011, 6).

In addition to the historical variations illustrated above, English spelling is also subject to geographical variations. These geographical variations, are attested by the different orthographic norms in Great Britain versus the United States of America, exemplified in spellings such as *favour* and *favor,* respectively. Either of these spelling norms, or the Canadian mixture of the two, are adopted by the rest of the English-speaking and English-learning world (Upward and Davidson 2011, 7).

The evidence presented above indicates that English orthography is a fairly inconsistent system, and Van Berkel (2004, 239) deems it no short of a wonder that L2 learners of English are able to learn how to spell under such conditions. However, others argue that the English spelling system is much less irregular than some might consider it. It is estimated that 80% of English words are spelled according to regular patterns, while only 3% are so irregular that they would have to be individually learned (Crystal 2003, 272). As there is no easy way to determine where the regularity of a rule begins, the status of regularity of the remaining 17% is up for debate. However, based on these statistics, Crystal (2003, 272) concludes that one should not exaggerate the size of the problem

when considering English spelling. The question then becomes why many consider English to be such an irregular spelling system when the statistics indicate otherwise. The answer to this is complex. According to Upward and Davidson (2011, 3), the English spelling system *appears* to be very irregular due to the fact that the many of the around 400 most irregular words are also the among the most frequently used words, which creates an impression of irregularity. According to Crystal (2003, 727), the answer also lies in the fact that children are rarely taught how to spell. In addition to this, spelling is regularly tested in educational settings, and few attempts are made at actually explaining what the children have learned. Nevertheless, while the irregularities of the English spelling system should not be exaggerated, they should neither be minimized. Although the majority of English words are spelled according to rules, the confusion caused by the remaining words cannot be disregarded completely. This thesis seeks not to criticize nor commend the state of English spelling. Instead it seeks to explore and describe the issues Norwegian L2 learners may encounter in the face of such a system, which entails considering its origins and development.

2.2 Spelling in error analysis

"The road to literacy is paved with mistakes" (Carney 1994, 111). *Literacy* is the ability to read and to write, and mistakes are unavoidable in the acquisition of literacy in both L1 and L2 (Hendrickson 1980, 216). These mistakes, or errors, are worth careful analysis and consideration if the teaching of literacy is to be improved. The view on L2 learners' language has evolved from being seen as incorrect versions of the target language, to being described as developing systems with their own conventions. Error analysis, the systematic study of L2 learners' errors, developed during the 1970s. It involved detailed descriptions of the errors made by L2 learners, as opposed to predicting which errors they made, and was based on the hypothesis that L2 learner language was a rule-governed and, thus, predictable system (Lightbown and Spada 2020, 42). Error analysis developed as an alternative approach to Contrastive Analysis (CA). The CA hypothesis, which was formulated by Robert Lado in 1957, involved systematic study of a pair of languages to identify their differences and similarities, with the aim of predicting which errors learners would make. The idea behind CA was that errors produced by language learners was a result of negative transfer of elements from the learners' L1 to the target language, and that this, in turn, was caused by the differences between the two languages (Ellis and

Barkhuizen 2005, 52). Errors seemingly caused by *language transfer*, the inference of a learner's L1 in L2 production, will be discussed further in section 2.4.1. CA was later criticized because the errors predicted did not necessarily occur in learner language, while unpredicted errors did (Ellis and Barkhuizen 2005, 52). Researchers began looking for other methods to investigate L2 learning, and error analysis was eventually developed.

Error analysis involves studying *interlanguage*, a term coined by Larry Selinker in 1972, that refers to the learner's current mental version of the target language. Interlanguages result from the attempted production of a target language but deviate from the target language in structured ways (Lightbown and Spada 2020, 43). In error analysis, interlanguage is measured against the target language.

Error analysis, however, is not without its critics. Error analysis is considered theoretically flawed because it takes some target language variety as its point of reference, without being certain of what the learner's point of reference is. For instance, the learner's target may be a non-standard variety (Ellis 2008, 61). This criticism has been met with the notion that learners typically target native-speaker norms in the process of learning an L2 (Ellis 2008, 61). Although error analysis saw a decline in popularity due to its perceived weaknesses, it has seen a revival with the rise of computer-based analysis of learner language. Chapter 3 elaborates on how the methodological framework of error analysis is applied in this study, and it explains how computer-based analysis of learner language is used in error analysis.

2.2.1 The term *error*

Deciding what constitutes an error is an integral part of any error analysis. However, defining the term *error* is not a simple task. Carney (1994, 112) distinguishes between *competence errors* and *performance errors*. Competence errors are fairly consistent erroneous spellings, while performance errors are due to a temporary laps. Differentiating between the two involves monitoring a speller's errors over time. Carney (1994, 113) defines *slips* as examples of performance errors, which are errors that are unintentional and not errors of understanding. As for the decision of what constitutes an error in error analysis, Ellis and Barkhuizen (2005, 56) point to the difficulty of deciding whether *grammaticality* or *acceptability* should be a criterion. While grammaticality involves structured deviations from the target form, acceptability involves the subjective evaluation of the researcher, often in relation to style rather than grammatical judgements.

When defining an error based on grammaticality, one must differentiate between *overt errors,* errors that are apparent when inspecting the context in which it occurs, and *covert errors,* errors that become apparent first when considering a longer stretch of discourse (Ellis and Barkhuizen 2005, 56). Deciding whether to define errors as either *absolute errors*, depending on grammaticality, or *dispreferred forms*, depending on acceptability and subjective judgement, is an essential part of error analysis. Ellis and Barkhuizen (2005, 59) recommend defining errors in terms of absolute errors to minimize the impact of the researcher's subjective judgement, although subjectivity cannot be ruled out entirely when researching spelling errors (see chapter 3.4 and 3.8).

2.3 Acquiring a second language

Second Language Acquisition (SLA) is a linguistic discipline that studies how learners acquire a second language both inside and outside educational settings, and aims at incorporating the findings to better facilitate the practice of language teaching (Ellis 2010, 183). The following sections, 2.3.1–2.3.4, sketch four broad theoretical positions that have sought to explain first language acquisition, i.e. the behaviourist, innatist, cognitive and sociocultural perspectives, and how they account for SLA. In addition, section 2.3.5 explores a selection of individual differences that should be considered when studying SLA.

2.3.1 The behaviourist perspective

The behaviourist perspective, or behaviourism, essentially seeks to explain human behaviour. In relation to language, behaviourism hypothesized that children imitated the language produced around them. In turn, the child received positive reinforcement, for example praise, which would encourage the child to continue to imitate the language around them until they ultimately formed habits of correct language use (Lightbown and Spada 2020, 15). In relation to SLA, behaviourism was especially influential from the 1940s to the 1970s. From the behaviourist perspective, language was seen as the formation of habits, and it was assumed that an L2 learner's habits from their L1 would interfere with the habits needed for L2 development (Lightbown and Spada 2020, 104). Behaviourism was therefore often linked to the CA hypothesis, which set out to predict which errors L2 learners would make based in the similarities, or lack thereof, between their L1 and L2. In other words, language transfer is seen as an essential part of the

behaviourist perspective on SLA. However, as mentioned in section 2.2, errors could not necessarily be predicted based on a learner's L1, which lead to the rejection of the CA hypothesis, along with behaviourism (Lightbown and Spada 2020, 104).

2.3.2 The innatist perspective

The innatist perspective is related to Noam Chomsky's hypothesis that all human languages are based on some innate universal principles, referred to as Universal Grammar (UG) (Lightbown and Spada 2020, 20). Chomsky pointed out that the behaviourist perspective failed to note that children acquired more knowledge on the structure of their language than they could be expected to learn only on the basis of language samples they hear. Furthermore, Chomsky argued that UG "permits all children to acquire the language of their environment during a critical period of their development" (Lightbown and Spada 2020, 104). The innatist perspective is therefore often linked to Critical Period Hypothesis (CPH), proposed by Lenneberg in 1967, which suggests that children are genetically programmed to acquire certain knowledge or skills, such as language, at specific points in life. CPH will be discussed further in connection with individual differences in L2 acquisition (section 2.3.5). UG makes two basic assumptions. Firstly, humans have a highly specific capacity for language learning, and secondly, this capacity is innate and biologically determined (Ellis 2008, 582). While Chomsky made no specific claims on the implications of UG for SLA, others argue that UG offers the best perspective in which to explain L2 acquisition, e.g. White (2003). However, the UG approach has been criticized on the basis of its methodological limitations, for instance problems related to how performance data should be interpreted as evidence of grammatical competence (Ellis 2008, 631). The UG approach has also been criticized for being directed at explaining a fairly restricted phenomenon, thus not fully explaining how 'grammar' is acquired (Ellis 2008, 631).

The Monitor Model by Stephen Krashen, first described in the 1970s, is perhaps the best known model of L2 acquisition based on Chomsky's theory (Lightbown and Spada 2020, 106). The model is described in terms of five hypotheses: (1) *The acquisition/learning hypothesis* which assumes that we acquire a language by exposure to it. While *acquisition* happens without conscious attention to language form, *learning* entails conscious attention to language form and rule learning. (2) *The monitor hypothesis* assumes that the learner draws on what they have acquired. Thus the learner may use

rules and patterns that they have learned as a monitor that allows them to edit and polish what the acquired system has produced. (3) *The natural order hypothesis* is based on the findings that L2 systems are acquired in predictable sequences. (4) *The comprehensible input hypothesis* assumes that acquisition occurs when one is exposed to language that is comprehensible and contains *i + 1*. "The '*i'* represents the level of language already acquired, and the '1' is a metaphor for language (words, grammatical forms, aspects of pronunciation) that is just a step beyond that level" (Lightbown and Spada 2020, 106). (5) *The affective filter hypothesis* assumes that affective factors (e.g. feelings, needs, attitudes etc.) constrains the ability to acquire L2 despite the appropriate input available (Lightbown and Spada 2020, 106). Krashen (1982, 9) notes that the fourth hypothesis, the comprehensible input hypothesis, is especially important as it attempts to answer the question of how we acquire language. Although The Monitor Model has been criticized on the basis of it not being possible to test the hypothesis in empirical research, its development has been influential to the field of L2 teaching.

2.3.3 The cognitive perspective

The cognitive perspective, which was developed in the 1990s, emphasises the role of the general human ability to learn on the basis of experience. The cognitive perspective involves research and theories from cognitive psychology to increase our knowledge of L2 development, and emphasizes how the mind perceives, retains, organizes and retrieves information. This perspective views L1 and L2 acquisition as based on the same processes of perception, memory, categorisation and generalization, but differing with respect to the circumstances of learning, prior knowledge and how this prior knowledge shapes a learner's perception of the L2 in question (Lightbown and Spada 2020, 108). Within the cognitive perspective we find the *information-processing model* that sees L2 acquisition as the building of knowledge that can eventually be called on automatically for speaking and understanding (Lightbown and Spada 2020, 108). According to the information-processing model, the learner will initially use cognitive resources to process new information, for example a word's main message. Through practice and experience, this information gradually becomes easier to process, and the learner will eventually be able to call on this information more quickly or even automatically, freeing up cognitive processing resources to other aspects of language that will, in turn, become automatic (Lightbown and Spada 2020, 109). Another model central to the cognitive perspective of

language acquisition is *the competition model*. The competition model takes into account not only language form, but language meaning and language use in an attempt to explain both L1 and L2 acquisition (Lightbown and Spada 2020). This means that through exposure to language associated with certain meanings, learners come to understand certain 'cues' (external phonological patterns and word order patterns) that signal specific functions and they eventually learn how to use these cues. Although the competition model was not originally based on data from SLA, MacWhinney (1992, 39) notes that due to its crosslinguistic developmental orientation, it seems to be well suited for the area of SLA as well.

2.3.4 The sociocultural perspective

Finally, the sociocultural perspective assumes that language learning, and learning in general, is facilitated through social interaction. "Speaking (and writing) mediates thinking, which means that people can gain control over their mental processes as a consequence of internalizing what others say to them and what they say to others" (Lightbown and Spada 2020, 118). A central figure within the sociocultural perspective is Russian psychologist Lev Vygotsky. Vygotsky argued that a child does not advance to higher levels of knowledge and performance in a vacuum, but in a supportive interactive environment with other interlocutors. Vygotsky used the term Zone of Proximal Development (ZPD) to refer to a metaphorical place where children can do more because of the support (scaffolding) of someone with a higher skill set, for example a teacher or a peer. In terms of L2 acquisition more specifically, this means that through the interaction with an interlocutor within the learner's ZPD, i.e. the zone where the learner can perform with the guidance of another interlocutor more proficient in the L2, the learner can perform at a higher level because of the scaffolding given by the interlocutor.

2.3.5 Individual differences in SLA

As we have seen so far, there is no one complete theory of SLA that incorporates the variety of contexts and factors involved in acquiring a second language. The theories and models presented in relation to the different perspectives above, have all sought to explain the complex processes of L1 and L2 learning. What has yet to be considered in this thesis, however, is the role of individual differences in L2 acquisition, for instance the role of age. The influence of the learner's age on L2 acquisition is an important issue in the field

of SLA research. The Critical Period Hypothesis (CPH) states that there is an optimal time frame for language acquisition, be it L1 or L2. According to this hypothesis, there is a limited time window for language acquisition. In a review of research on age and L2 development, Ioup (2005, 429–430) concluded that child and adult language acquisition are fundamentally different, which is consistent with critical period thinking. Scholars have noted that, while adult L2 learners may initially learn at a faster pace due to cognitive maturity, child L2 learners do better in the long run: "It is generally believed that the observed age-related effects stem from the maturation of the brain" (Lakshmanan 2013, 72). Although much research has been conducted on age and its effect on L2 learning, the matter still attracts debate. A key issue is, for instance, *when* the effect on age starts to decline at *what rate* it declines. Another issue is whether all aspects of language learning are similarly affected by the starting age of learning. In addition, Lakshmanan (2013, 72) lists other factors that have been seen to affect child L2 learning, such as the nature of exposure to the target language, in other words, *how* the child is exposed to the target language. This can vary greatly from naturalistic exposure (i.e. social settings) to more formal exposure (i.e. educational settings). Another factor is to *what extent* the child is exposed to the target language in the home and school environment. These two final points, how and to what extent the learner is exposed to the target language, are especially relevant as this thesis seeks to explore the English spelling errors produced by Norwegian pupils, i.e. in an educational setting. Today, Norwegian pupils are not only exposed to the English language through education. Nevertheless, as this thesis specifically considers written language produced in an educational setting, additional elements need to be considered, for example, the role of the teacher in the language classroom, which will be commented on in section 2.5.

Limiting the factors that can impact the development of L2 only to the age of the learner, the place and degree of exposure to the target language is, however, misleading. There are a number of other influential variables and individual differences that need to be considered when dealing with L2 acquisition. These include, among others the congruence of L1 and L2, motivation, personality, aptitude, the learners' attitudes towards the L2, and the status of the L2 both globally and in the learners' local communitites (Lakshmanan 2013, 72). In the case of the learner's attitudes towards acquiring an L2, for instance, it is difficult to determine whether positive attitudes result in successful learning or if successful learning renders positive attitudes (Lightbown and Spada 2020, 87). Nevertheless, Lightbown and Spada (2020, 87) note that evidence

suggests that there is a correlation between positive attitudes and willingness to keep learning. Other factors that have been seen to effect language acquisition are the different personality traits of the learner. Although it may not be easy to confirm with empirical studies, personality characteristics such as assertiveness and adventurousness are seen as likely to affect L2 learning (Lightbown and Spada 2020, 84).

"It is clear that there are regularities in the ways in which all learners approach the task of learning a second language and that these regularities are reflected in the general trajectory observed in L2 development" (Ellis 2015, 94). The question that then emerges is how the universal tendencies of L2 acquisition impact the individual differences of the learner. This is especially relevant for language teachers who must, to the best of their ability, reconcile the general trajectory of L2 development with the variety of individuals within each language classroom.

2.4 Acquisition of spelling

Literacy is the ability to read and to write, and spelling plays an important role in the development of literacy in both L1 and L2. Simensen (2007, 195), for instance, notes how orthographic accuracy is central to the development of L2 writing skills. In addition to being a key component to the development of literacy, a person's ability to spell can also have meaningful social connotations, as correct spelling is often associated with education and traits of intelligence, and incorrect spelling with the opposite (Cook 1997, 474; Carney 1994, 111). In other words, minimizing erroneous spelling output is often seen as an objective. This can make it difficult to appreciate a writer's spelling errors and what these errors can tell us about the writer's knowledge of language. Nevertheless, several studies have been conducted on the spelling errors of both L1 users and L2 learners of English throughout the years, and they reveal that errors are common in both groups' spelling output (see section 2.4.1). Prior to discussing features that may cause erroneous spellings, we will take a closer look at the development of spelling ability.

Although learning how to spell has not been studied nearly as much as learning how to read, we now know a good deal about the development of spelling ability. The view on spelling acquisition has changed throughout the years, and learning to spell is no longer seen as a mechanistic activity centred around memorisation of a long list of phoneme-grapheme correspondence rules and their exceptions (Anderson 1985, 141). Instead, acquisition of spelling is considered a developmental process involving an array

of complex rules and different strategies for processing English writing (Anderson 1985, 141). The remainder of this section briefly reviews two theories of how children learn how to spell: stage and phase theories, and dual-route theories.

Stage and phase theories of the development of spelling describe children's spelling skills in terms of their ability to map/link sounds to letters, and have played an important role to the research on spelling acquisition (Treiman 2017, 272). According to Cook (2004, 146), "[L1] children develop the English writing system in a fairly consistent way". Cook (2004, 125) organizes children's development of spelling in three phases; *the pre-writing phase*, *the sound-based phase* and *the orthographic phase*, and ends with complete knowledge of spelling. In the first phase, the pre-writing phase, children associate particular signs with meanings, which eventually develops into visual recognition of whole words (Cook 2004, 126). In the sound-based phase, children start to acquire the concept that certain signs correspond to certain sounds. In English, this general principle involves the linking of certain letters of the alphabet to certain sounds. In the third phase, the orthographic phase, "children have to go beyond sound-letter correspondence to tackle the complexity of English orthography" (Cook 2004, 130). Here, spelling is no longer only based on sound-letter correspondence, as in the sound-based stage, but also on spelling patterns and morphological knowledge. It is common to view the development of spelling as a process of at least different three phases/stages. Van Berkel (2004, 240), for instance, differentiates between *the logographic stage*, *the phonetic/alphabetic stage* and *the morphemic/orthographic stage*, which correspond to the pre-writing phase, the sound-based phase and the orthographic phase respectively. Similarly, Treiman (2017, 272) distinguishes between *the prealphabetic phase*, *the partial alphabetic phase* and *the full alphabetic phase*. In addition, Treiman (2017, 272) describes a fourth phase, *the consolidated alphabetic phase*, where children begin to recognize common letter sequences and follow the *graphotactic* conventions, i.e. patterns involving order and arrangement of letters, of their language. Stage models have been important to research showing that learning to spell is a process where children draw on the phonological knowledge they possess, rather than a process of memorization as previously thought. However, stage models such as those presented in this section have been criticized on several accounts. Scholars who view spelling as a more continuous process have critiqued the distinctiveness of the different stages, and that stage models

give little attention to nonphonological knowledge, proposing that such knowledge emerges only in the more advanced phases.

Dual-route theories assume that spelling may be acquired by using a system of rules linking phonemes to graphemes, i.e. *the nonlexical route*, and that spelling may also be acquired by using the spelling of whole words that has been stored in memory, i.e. *the lexical route* (Treiman 2017, 272). In other words, dual-route theories postulate that there are two separate routes, or mechanisms, involved in the acquisition of spelling. Some words are classified as regularly spelled by dual-route theorists, such as *ship*, while others are considered exceptions because they deviate from rules of the nonlexical route, such as *have*. In cases where the spelling of a word is considered irregular, the writer would have to rely on the lexical route to produce target spelling. The lexical route is considered particularly relevant for learners acquiring English, due to the irregular phoneme-grapheme correspondence of the English spelling system. Naturally, dual-route theories have also been criticized on some accounts, for instance that it does not acknowledge the important role of graphotactic and morphology in spelling (Treiman 2017, 273).

Stage and phase theories, and dual-route theories, are two families of theories (among others) of how spelling skills are acquired. Although we now know a good deal about how spelling is developed, further research is required, as "such studies can help us understand what about learning to spell is universal and what is tied to a particular language, writing system, or culture" (Treiman 2017, 273).

2.4.1 L2 English spelling

As already mentioned, learning to spell in a new language poses challenges for any learner, and it is perhaps especially challenging to learn to spell in English. In this section I explore some of the issues involved in acquiring the English writing system as an L2 learner.

By definition, all second language learners have already acquired at least one language. Lightbown and Spada (2020, 42) note that an L2 learner's prior knowledge of language can be seen as both an advantage and a disadvantage when acquiring an L2. On the one hand, the learner knows how their language works and can apply this knowledge in the acquisition of an L2. On the other hand, the learner will inevitably carry over aspects of their L1 into their L2 production, which may lead them to make errors that L1 users would not make. Errors that seem to be caused by interference of a learner's L1 can

be seen as evidence of *language transfer,* in which "L2 learners carry over certain features of their first language to the second, showing up in their vocabulary, grammar or pronunciation" (Cook 2004, 139). Cook (2004, 139) points to several signs of transfer in L2 learners' writing, i.e. the transfer of their L1 writing system to their L2 writing. In speech, the transfer of the learners' L1 phonology manifests itself through their accent (Cook 2004, 141). In writing, learners may show signs of their L1 in the spelling errors they produce. When comparing the spelling of L1 users and L2 learners of English, Bebout (1985) found evidence for how a learner's L1 can affect their L2 spelling. Through a fill-in-the blank task completed by two groups of advanced learners of English and Spanish-speaking adults studying English, about 700 misspelled words were collected for analysis. The study showed both similarities and significant differences between the two groups. One of the accounts where the two groups differed was related to the category of consonant doubling, i.e. failure to double a consonant or unnecessarily doubling a consonant (**litle** for LITTLE or **mee** for ME). The Spanish-speaking subjects made proportionally more errors in this category. Bebout (1985, 583) attributes this difference, firstly, to the rare occurrence of consonant doubling in the Spanish language and that the subjects therefore are not used to paying attention to consonant doubling while writing. Secondly, the difficulties observed in the Spanish subjects in this category were attributed to the fact that, in English, consonant doubling never has any effect on the pronunciation of the consonants, highlighting the issues surrounding phoneme-grapheme correspondence in the English language.

As mentioned above, English spelling is considered notoriously complex and difficult to learn due to the inconsistencies of the system. These inconsistencies have been found to cause difficulty for spellers regardless of whether English is their L1 or their L2. When comparing the spelling errors of adult L2 learners of English with native L1 users, Cook (1997) found that the vast majority of errors produced by both groups involved phoneme-grapheme correspondence. For example, the letters <a>, <e> and <i> were found to cause problems. Cook (1997, 481) concluded that the obvious reason for this was that unstressed vowels in English are usually reduced to schwa /ə/, which in turn means that the sound /ə/ can be spelled in three different ways, i.e. <a>, <e> and <i>. However, not all erroneous usage of <a>, <e> and <i> involved vowel reduction to unstressed schwa, which highlights that fact that one cannot limit the explanation of certain types of spelling errors to a singular reason.

The spelling of vowels has been seen to cause issues also for other L2 learners of English. Deacon (2017) found that Arabic learners of English make significantly more errors than other L2 learner groups. In particular, the studies found that Arabic learners make proportionally more errors involving vowels than errors involving consonants (Deacon 2017, 2). The reason for this was initially thought to be *vowel blindness*, a term coined to describe why Arabic learners struggle with English vowels due to the transfer of L1 habits (Deacon 2017, 2). There are no short vowels in the Arabic writing system, which may result in Arabic learners relying heavily on consonants and giving little attention to vowels. However, the results of the study did not support the vowel blindness hypothesis which specifically assumes that Arabic learners make more vowel omission errors (**intersted** for INTERESTED) than vowel insertion errors (**reasones** for REASONS). This was not the case as no significant difference was found between the frequencies of the two error types (Deacon 2017, 17). Although vowel blindness is considered a valid reason for Arabic learners' English spelling errors, it was not found to be the core problem. Deacon (2017, 21) proposes that the irregular phoneme-grapheme correspondence of the English spelling system may better explain the spelling errors produced by the Arabic learners that did not coincide with the vowel blindness hypothesis. Additionally, Deacon (2017, 21) suggests that Arabic learners may lack the literacy skills to overcome the difficulties caused by irregular phoneme-grapheme correspondence, and that teachers should focus their attention especially on this issue if this conclusion is correct.

The findings presented in this section show that English spelling errors produced by L2 learners do not have a uniform source. Instead, one must consider the array of possible factors that cause learners to produce English spelling errors, e.g. language transfer, irregular phoneme-grapheme correspondence, literacy skills, learning habits, and so on.

2.4.2 Norwegian learners' L2 English spelling

The findings presented in the previous section, point to phonological awareness, i.e. the ability to analyse a word in phonemes and discriminate between phonemes, as playing an important role when learning a alphabetic writing system like English, although phonological strategies alone cannot be said to account for the entirety of the L2 spelling process. Nevertheless, since spelling can be seen as the symbolic representation of sound,

it may be helpful to consider L2 phonology when attempting to explain spelling errors. Additionally, language transfer has been described as a possible cause of L2 spelling errors, which underlines the role of the learner's L1 in L2 production. As this thesis considers the English spelling of Norwegian pupils, it is therefore important to give a few general notes on the phonology and orthography of Norwegian compared to English.

Norwegian is a North-Germanic language spoken in Norway, and while Norwegian has two competing official written norms (*Bokmål* and *Nynorsk*), there is no officially sanctioned way of speaking Norwegian. However, as opposed to Nynorsk, Bokmål in its most common variety is often reflected in speech, and therefore Bokmål *can* be said to have a realized spoken form often referred to as *Standard East Norwegian* (SEN) (Kristoffersen 2000, 7). Having no Norwegian standardized spoken norm stems from the idea that all spoken varieties of Norwegian should have equal status. Because of the lack of such standardized norms, it is somewhat complicated to give an account of Norwegian phonology. This thesis follows the choice of Kristoffersen (2000) who uses Standard East Norwegian as a basis when describing Norwegian phonology.

The alphabet used to realize Norwegian in written form consists of 29 letters. Compared to the English alphabet, the Norwegian alphabet has three additional vowel letters <æ>, <ø> and <å>. In Norwegian, the letters <c>, <q>, <w>, <x> and <z> are considered foreign, and are used in only a few loan words, such as *taxi* and *celle* as in 'cell', but are replaced in most other loan words, such as *seremoni* as in 'ceremony' and *kvart* as in 'quarter' (Kristoffersen 2000, 341). Kristoffersen (2000, 340) notes that when dealing with Norwegian phoneme-grapheme correspondence, one will in many cases be dealing with universal relationships, such as <m> = /m/, <n> = /n/ and <f> = /f/. Although Norwegian phoneme-grapheme correspondence shows higher levels of regularity than English, Norwegian phoneme-grapheme correspondence is not always straight forward. For example, while the relationship between vowel letters and phonemic value shows a high degree of correspondence, the phonemic realization of <e> and <æ> is not 1:1, as <e> can be realized as either /e/, /ɛ/, /ə/ and /æ/, and <æ> can be realized /ɛ/ and /æ/. As for consonants, 'silent consonants' are characteristic of Norwegian spelling. For example, in SEN, <d> is never pronounced word-finally after <l> or <n>, thus *land* and *kald* as in 'cold' are pronounced SEN /lɑn/ and SEN /kɑl/ respectively. The examples given here are for illustration purposes, and, naturally, there are several other exceptions to the universal relationships between phonemes and graphemes in Norwegian. Although this thesis relies on SEN as a phonological basis for describing Norwegian pronunciation, it

should be noted that around half of the data material for this study was collected from the Bergen area. Compared to other Norwegian dialects, the monophthong /e/ is rarely realized by speakers of the Bergen dialect and is replaced in favour of /æ/. However, as this thesis seeks not to explore the differences between speakers of different Norwegian dialects, the differences between the Bergen dialect and other Norwegian dialects is not considered any further.

The relationship between phonology and orthography is an important one when learning to spell in both L1 and L2. According to Nilsen (1989, 3), there are systemic differences between the SEN and RP phoneme systems. These differences may play a role in the spelling of Norwegian L2 learners of English. Of the several differences between SEN and RP, Nilsen (2002, 180–187) lists the following three differences in relation to vowels that seem to cause issues for Norwegian learners:

- SEN has a more complex system of monophthongs while RP has a more complex system of diphthongs
- RP has four central monophthongs, i.e. /ʌ/, /ɪ/, /ʊ/ and /ɜ:/, with no counterpart in SEN[1]
- The frequent distribution of /ə/ in RP and its many possible spellings. Some Norwegian accents have a vowel similar to /ə/ in word final position, but the quality of the final vowel is often too front, closer to /e/

Furthermore, Nilsen (2002, 180–187) lists the following four differences in relation to consonants:

- SEN has no lenis fricatives, i.e. /ð/, /z/, /ʒ/ and /v/[2]
- SEN has no dental fricatives, i.e. /θ/ and /ð/
- SEN does not have the semivowel /w/
- Norwegian spelling is relatively phonemic, and most Norwegian learners of English will apply the same rules when they read English. This, in turn, is

[1] Although RP /ʌ/ does indeed correspond quite well to SEN /a/ and /a:/, Nilsen (1989) found that Norwegian learners struggle with the pronunciation of /ʌ/ and tend to replace it with /ø/ and /ɔ/.
[2] Usually realized as the labio-dental approximant /ʋ/ in SEN.

reinforced by the pre-consonantal and pre-pausal /r/ being produced in *American English* (AE), as opposed to RP

Following the notion of the important relationship between spelling and pronunciation when learning to spell, Norwegian learners' L2 English pronunciation needs be considered. The topic has been researched by, among others, Nilsen (1989) and Rugesæter (2014). Through analysing 136 recordings of 11–16 year old pupils in Norwegian schools, Rugesæter (2014) investigated four phonological contrasts to see which contrasts create problems for the Norwegian learners. The backdrop for this study was the notion of a substantial increase in the learners' passive exposure to the L2, and to find out whether this influences the learners' basic phonological competence. The following four phonological contrasts were investigated in the study: /s-z/, /ɪə-eə/ (/ɪr-er/ in AE), /e-æ/ and /əʊ-aʊ/ (/oʊ/ in AE). The findings show that two sound contrasts in particular create problems for Norwegian learners, namely the distinction between /s/ and /z/, and /ɪə/ and /eə/, while the other two contrastive pairs did not seem to cause the learners any difficulty. When studying the L2 English pronunciation of Norwegian university students, Nilsen (1989) found that the Norwegian students had trouble pronouncing phonemes that do not exist in Norwegian, for example /ʌ/, /ɜ:/, /θ/, /ð/ and /w/. The Norwegian students would often substitute these phonemes with other phonemes from SEN such as /t/ for /θ/ and /d/ for /ð/.

To my knowledge, little research has been conducted on the L2 English spelling of Norwegian learners. In this and the following paragraph, I will present two Master's theses that have studied the English spelling errors of Norwegian learners, more specifically pupils in Norwegian schools. In her Master's thesis, Nygaard (2010) studied the accuracy of Norwegian pupils' written English. Nygaard (2010, 50–51) applied the following nine categories to measure the accuracy of the pupils' written English: spelling errors, concord errors concerning agreement between subject and verb, the wrong verb tense, missing word, the wrong word, the wrong word order, the wrong word form, any kind of punctuation inaccuracies, and upper or lower case letter mistakes. In other words, the study explored an array of elements in relation to L2 English writing. The term mistake and error are used interchangeably in Nygaard (2010), and cover mistakes performed randomly and errors preformed due to insufficient mastery of the target language. The findings show that spelling errors were the most frequent in all groups studied (Nygaard 2010, 59–60). However, Nygaard (2010, 66) does not systematically

categorise the spelling errors recorded, but presents examples of how the spelling errors vary in type. The errors identified include, among others, confusing *to/two/too*, *there/their/they're* and *true/through*. Although these words would be considered correctly spelled in some contexts, when used in the wrong context, they are considered spelling errors. In addition, Nygaard (2010, 60) uses examples like these to illustrate words that were not picked up by the spelling checker on the pupils' computers, a point especially relevant for this thesis that will be discussed more thoroughly in chapter 3. Furthermore, Nygaard (2010, 67) exemplifies other spelling errors that involve more clearly erroneously spelled words than the examples mentioned above, such as **mutch** for MUCH, **fameli** for FAMILY and **engle** for ANGEL. Finally, Nygaard (2010, 67) found that a common type of spelling errors was errors produced by the pupils overgeneralizing their previous knowledge of spelling. For example, the pupils recognize that English words often contain <wh> and <th>, and thus overgeneralize these spelling feature. This resulted in errors such as **thrust** for TRUST and **bather** for BETTER (Nygaard 2010, 68).

In his Master's thesis studying English spelling errors produced by Norwegian pupils, with emphasis on phoneme-grapheme correspondence, Simpson (2019) found visible patterns, and indications of patterns, in the spelling errors the pupils produced. According to Simpson (2019, 77), the most common pattern observed was in relation to the regularity of the grapheme and the error rate of the corresponding phoneme. In other words, pupils were more likely to misspell infrequent graphemes. For instance, Simpson (2019, 71) found that the grapheme <a> for /æ/ was the most frequent and least erroneous, and the graphemes <are> and <ar> for /eə/ were the least frequent but with the highest error rate. These findings are similar to those in Van Berkel's (2004, 239) study of Dutch L2 learners of English: the more frequent and regular spellings are, the fewer spelling errors are produced. Additionally, although the results indicated that L2 learners are more likely to misspell phonemes that are not in their L1, Simpson (2019) could ultimately not confirm this hypothesis as the results were not statistically significant. However, the results yield an interesting insight into a field of research that should be explored in much greater detail in the future.

As pointed out by Lightbown and Spada (2020, 41), "teachers and researchers cannot read learners' minds, so they must infer what learners know by observing what they do". The different phonological and orthographic conventions encountered in English versus Norwegian, and furthermore the specific pronunciation challenges Norwegian learners of English face, may be potential causes of the English spelling errors Norwegian learners

produce. Awareness of these differences and difficulties can therefore uncover essential insight into why Norwegian learners produce certain English spelling errors. The different strategies and procedures to analyse and uncover what underlies the spelling errors produced by L2 learners of English are therefore key to further development of the teaching of literacy. Through error analysis we can study the errors learners make and explore what these errors can tell us about their knowledge of language and their ability to use this knowledge. The findings from these studies can, in turn, be used to improve the continuously evolving field of L2 teaching and guide the educational decisions made by governmental powers, and individual schools and teachers, because, after all, "educational decisions should be based on empirical facts rather than on preconceived ideas" (Treiman 2020, vii).

2.5 Teaching L2 English spelling

Since the overall aim of this thesis is to explore the English spelling errors of Norwegian pupils, this section will explore the field of teaching L2 English spelling. More specifically, it will explore an element that distinguishes natural settings where language learning occurs from classroom settings, namely feedback on errors, or error correction. In addition, section 2.5.1 gives an account of the status of English in Norwegian schools, and section 2.5.2 looks briefly at the treatment of spelling in a selection of English coursebooks.

Through the different perspectives on SLA presented in section 2.3, it was established that L2 learning is not only a result of imitation and practice, but that there are multiple elements involved in learning an L2, and that L2 learning can occur in several different context, one of them being the language classroom. Feedback is a basic element that differentiates the classroom setting from other settings where an L2 is acquired. The classroom is the only place where feedback on errors is frequent, as opposed to outside the classroom where errors that do not interfere with meaning are typically overlooked (Lightbown and Spada 2020, 39). As mentioned in section 2.2, it is virtually impossible to avoid all errors when acquiring an L2, and any language teacher will therefore be faced with the challenge of how to deal with the errors that occur. Several scholars have studied the role of feedback in language learning, and according to Polio (2012, 329), error correction is one of the most widely researched and least understood issues in L2 writing. Hendrickson (1978) studied error correction in foreign language teaching, or L2 teaching.

Hendrickson (1978, 389–395) raises five fundamental question on the role of error correction in acquiring a new language: (1) Should learner errors be corrected? (2) When should learner errors be corrected? (3) Which learner errors should be corrected? (4) How should learner errors be corrected? (5) Who should correct learner errors? Note that these five questions relate to errors in general, in both oral *and* written language, and thereby relate to spelling errors although not exclusively. Although Hendrickson (1978, 396) deems the literature on the correction of L2 errors quite speculative, he is able to draw some overall conclusions to answer the questions on whether, when, which, how, and by whom L2 errors should be corrected. Hendrickson (1978, 396) summarizes the findings as follows: (1) It appears that error correction improves pupils' proficiency in the target-language. (2) Although there is no general consensus on when to correct errors, many educators recognize that correcting every error produced by a pupil is counter-productive. (3) Errors that interfere with meaning, are stigmatized by L1 users, and are frequently produced by the pupil should prioritized for correction. (4) Although no type of correction technique has proven to reduce errors significantly, research indicates that direct types of correction, i.e. where the presence or location of an error is indicated *and* the pupil is provided with tips on how to correct their own error, have proven to be less effective than more indirect approaches. Finally, (5) peer-correction and self-correction are provided as examples of correction strategies in addition to teacher correction, as teacher correction may not be an efficient instructional strategy for every pupil in every language classroom. Overall, the findings presented by Hendrickson (1978) indicate that there is a certain value to the correction of errors, although there are undoubtedly certain nuances to when, which, how, and by whom L2 errors should be corrected that any teacher needs to consider. As these findings relate to language errors in general, a closer look at written errors, and furthermore correction of written errors, is necessary.

Hendrickson (1980) studied the treatment of errors in written work, and whether error correction can benefit language learners. Hendrickson (1980, 216) builds on that there is no universal standard of whether, when, which, how or by whom L2 errors should be corrected. Nevertheless, Hendrickson (1980, 217) presents some considerations that need to be accounted for when correcting errors in written work. Firstly, one should be aware of the pupil's goals for communicating in writing to be able to apply appropriate error correction strategies for writing, for example, a letter to a friend versus a Master's thesis would require different focus in terms of error correction. Secondly, the pupil's level of proficiency in the target-language needs to be considered as it develops, and

correction strategies should develop thereafter. Thirdly, the teacher should be aware of error types and error frequencies and how they relate to the pupil's writing. The fourth and most critical consideration involves the pupils' attitudes towards the nature of their errors and their correction. According to Hendrickson (1980, 217) it is important for teachers to facilitate a classroom where the pupils recognize that errors are not only a natural, but a necessary phenomenon in language learning. Furthermore, Hendrickson (1980, 218–219) reviews a selection of *indirect* correction strategies, where the presence or location of an error is indicated, and *direct* correction strategies, where errors are indicated *and* the pupil is supplied with tips on how to correct the errors. Considering spelling errors in particular, examples of indirect correction strategies are underlining or circling erroneous spellings. Examples of direct correction strategies in relation to spelling are underlining or bracketing an erroneous word and providing a written tip on how to correct the error. Hendrickson (1980, 219) concludes that the two overall correction strategies should be used in combination with one another, but specifies that "experience suggests that what works effectively for one teacher may not necessarily be equally effective for another" (Hendrickson 1980, 220).

In a review of research on the role of feedback on written work, Polio (2012) found conflicting views on the topic. Therefore, Polio (2012, 328) argues that teachers should not feel compelled to address all written errors in all writing produced by pupils, and that writing even without error feedback could be effective in promoting SLA. Nevertheless, most teachers will agree that, regardless of type of feedback, pupils should work directly with the feedback they receive in order to make them aware of the errors they produce (Polio 2012, 328).

To summarize, there is no universal strategy of error correction that is efficient for any pupil and any classroom. However, the findings presented in this section point towards certain principles of error correction in need of further empirical research and investigation. Additionally, these findings point towards the value devoting time to research on errors, thereunder spelling errors, in an attempt to promote the teaching of literacy.

2.5.1 The status of English in Norwegian schools

English is one of the most widely spoken languages in the world. Whether using English for travel, business, in an educational setting, or as an average computer user browsing

the internet, the ability to read and write in English is an important skill. The status of English in Norway has evolved over the years in terms of exposure and formal education. Today, Norwegian learners of English are more in contact with the language than ever before through, for instance, social media, computer games, TV and films. While the English language does not have an official status in Norway, English does indeed have a high status in Norway as a great proportion of Norwegian pupils acquire English as an L2 (Vattøy 2017, 53). In Norwegian formal education English is a mandatory subject throughout primary and lower secondary school, and in upper secondary school it is a core subject for all the education programmes. Norwegian pupils are, in other words, exposed to English outside school, in addition to inside school through most of their primary and secondary education.

The Norwegian Directorate for Education and Training (UDIR) is responsible for the development of kindergarten, and primary and secondary education, as well as ensuring that all children, pupils and apprentices receive the education to which they are entitled. From August of 2020 the National Curriculum for primary, lower and upper secondary education will we replaced, and there will be a transition to a new English subject curriculum (ENG01-04). The new subject curriculum will be introduced to the subject gradually over a period of three years. As the transition will not be finalized until 2023, I will consider the current subject curriculum (ENG1-03) defined in 2013 in this thesis.

UDIR has defined the main subject areas of English as language learning, oral communication, written communication, and culture, society and literature. Furthermore, the national curriculum guidelines list "being able to express oneself in writing" as one of five basic skills that contribute to the development of competence in the subject (Utdanningsdirektoratet 2013). The English subject has competence aims after the second, fourth, seventh and tenth years of primary and lower secondary education, as well as after the first year of the programmes for general education (11th grade) and the second year for vocational education programmes (12th grade) at upper secondary level. After year 2, the aim is for the pupil to be able to "recognize the relation between some English phonemes and spelling patterns". After year 4, the pupil should "understand the relation between English phonemes and letters and put sounds together to form words" and "use some common short words and simple spelling and sentence patterns". The competence aims for after year 7 and year 10 are quite similar in relation to spelling. After year 7, the pupil should be able to "use basic patterns from orthography, word inflection, sentence

and text construction to produce texts". After year 10, the word *basic* is replaced by *central*. After 11th grade for programmes for general studies, and 12th grade for vocational education programmes, the pupil should be able to "use patterns for orthography, word inflection and varied sentence and text construction to produce texts". As seen above, the English subject curriculum mentions spelling/orthography explicitly as part of written communication throughout the competence aims at both the primary and secondary level. The change in wording through *simple*, *basic* and *central* patterns of spelling/orthography, indicates an expected advancement of the pupils' competence as the grade level increases (Utdanningsdirektoratet 2013).

2.5.2 The treatment of spelling in English coursebooks

Although the English subject curriculum mentions spelling/orthography throughout the different grade levels, it does not specify *how* to facilitate the pupils' development of these competences. According to the core curriculum, the school should adapt the teaching so that all pupils have the best possible outcome (Utdanningsdirektoratet 2017). One of the ways in which the school can adapt the teaching is, as stated in the core curriculum, by using various *teaching aids*. In accordance the with regulations to the Education Act § 17–1, subsection 4, a teaching aid is any printed, non-printed and digital resource developed for teaching (Forskrift til opplæringsloven, 2006). This includes printed coursebooks and different digital learning resources.

In 2015, NIFU (Nordisk institutt for studier av innovasjon, forskning og utdanning) conducted a survey on behalf of UDIR to uncover which teaching aids are used across different subjects and grade levels in Norwegian schools. The survey explored which coursebooks are commonly used in the English subject, as well as to what degree they are used. The findings show that *Stages* and *Targets* by Aschehoug are two coursebooks commonly used for English in the 10th and 11th grade respectively (Waagene and Gjerustad 2015). Accordingly, the two coursebook that will be explored in this section are *Stages 10* (Areklett et al. 2019) and *Targets* (Haugen et al. 2013).

Stages 10 is divided into seven chapters which cover a number of topics. The seventh chapter is named *Reference Section*, which, as opposed to the other chapters, deals directly with writing and the elements this entails. English spelling is addressed under the section *Troubleshooting*, i.e. areas where the pupils need to be extra aware (Areklett et al. 2019, 292). The irregular phoneme-grapheme correspondence of English

is commented on as a reason to why English spelling can be difficult, and using a dictionary and reading is brought forward as advice on how to tackle English spelling and improve English spelling skills. In addition, words that are easily confused are listed, e.g. *they're/their/there* and *two/too/to*. In other words, *Stages 10* does consider English spelling albeit briefly. *Targets* follows the same structure as *Stages 10*, with seven chapters, the last of which is called *Reference Section*. Spelling is here mentioned twice, e.g. "English spelling is quite difficult for foreign learners, but practice will gradually make it easier" (Haugen et al. 2013, 298) and "The best way to learn English spelling is by reading and writing. Your spelling will then improve without you noticing it" (Haugen et al. 2013, 318). The difficulties of English spelling are acknowledged also here, and advice on how to improve spelling skills include practice, reading, writing and using a dictionary. Although the two coursebooks tackle the topic of spelling in quite a similar manner, two elements in particular stand out. As opposed to *Stages 10*, *Targets* includes an overview of phonetic symbols and examples of words where these symbols are realized. In addition, the use of word-processing tools to aid spelling is recommended in addition to the use of a dictionary, exclusively in *Targets*. The introduction of new elements in an 11th grade coursebook could be due to the expected advancement of the pupils in relation to orthographic/spelling competence, as commented on in section 2.5.1. Overall, we see that the two coursebooks do comment on spelling in relation to writing skills, although not to the same extent as other topics such as grammar, literary genres and vocabulary. The little attention attributed to spelling in English coursebooks could be considered as an indication that spelling plays a minor role in the English classroom.

2.6 Summary

This chapter has presented the theoretical framework that underlies this thesis. Section 2.1 gave a brief overview of the history of the English spelling system, as well as some opposing views on the regularity of the system. Section 2.2 introduced the development of error analysis, and the difficulties of determining what constitutes an error. Section 2.3 explored SLA through four broad perspectives, i.e. the behaviourist perspective, the innatist perspective, the cognitive perspective, and the sociocultural perspective, as well as individual differences in SLA. Section 2.4 explored spelling acquisition in particular, and took a closer look at L2 spelling acquisition, and considered the differences between English and Norwegian phonological and orthographic conventions. Finally, section 2.5

gave an account of teaching English spelling, more specifically, the role of feedback in in L2 classroom, the role spelling plays in English L2 teaching in Norwegian schools according to the curriculum, and how English spelling is treated in a selection of coursebooks for the 10th and 11th grade.

3. Methodology

The methodological framework for this study is error analysis. Conducting an error analysis involves five distinct steps: (1) collecting a sample of learner language, (2) identification of errors, (3) description of errors, (4) explanation of errors and (5) error evaluation (Ellis and Barkhuizen 2005, 57). Steps 1–3 are considered in this chapter. Step 4, the explanation of errors, involves exploring possible sources of the errors to account for why they occur, which will be covered in chapter 4 and 5. Step 5 goes beyond the process of error analysis and involves the implication of the results of an error analysis on for example, classroom practices. This final step will be commented on in chapter 6. In this chapter, sections 3.1, 3.2 and 3.3 present the samples of data collected for the error analysis. Section 3.4 discusses the identification of errors and presents how the term error is applied in this study. Sections 3.5, 3.6 and 3.7 involve the description of errors through error coding in two different corpora and an error categorisation system. Finally, section 3.8 considers different methodological issues and limitations of this study.

3.1 Corpus research

The first step in error analysis involves collecting a sample of learner language as data. For this thesis, the data was collected from two learner corpora, CORYL (CORpus of Young Learner Language) and a control corpus created for this project (see section 3.2 and 3.3). The definition of the term *corpus* varies slightly in line with different academic disciplines. In corpus linguistics, the term refers to a *large* collection of samples of language use that are *authentic* and *representative* (Stefanowitch 2020, 22). Authenticity, in the case of written language, refers to samples that are collected without the speaker/writer knowing that it will be used in a scientific context (Stefanowitch 2020, 24). In other words, authentic language is not produced for the purpose of linguistic analysis. A corpus sample is seen as representative when the population represented in the sample is identical to the population as a whole regarding the distribution of the phenomenon under investigation (Stefanowitch 2020, 28). While there is no magic

number that decides how large a linguistic corpus must be, Stefanowitch (2020, 37) notes that sample size correlates with representativeness to some extent, although not entirely. In addition to the characteristics of authenticity, representativeness and size, corpora often involve different types of annotations that indicate, for instance, different linguistic features (spelling errors, grammatical errors etc.) and information about the producers of the language sample (age, gender, education etc.).

There are a number of advantages to corpus linguistics. Annotated corpora may facilitate a more efficient and detailed analysis of specific linguistic phenomena by a specific population. Also, the fact that the data is stored in electronic format greatly facilitates the access to and analysis of the corpus data. As mentioned, the data for this study was collected from two learner corpora. Learner corpora allow for the study of L2 learners' language use and, as with corpus linguistics in general, learner corpora provide collections of authentic data gathered from a large and diverse number of informants (Callies 2015, 35). As learner corpora include the same characteristics commonly attributed to corpora in general, the only difference between corpora and learner corpora is that the data comes from language learners in the latter (Granger 2008, 1).

3.2 CORYL

CORYL is a learner corpus compiled by researchers at the University of Bergen, and consists of English texts written by pupils in Norwegian schools. The texts that make up the current corpus were collected randomly from pupils in the 7th and 10th grade in lower secondary school, and the 11th grade in upper secondary school during the course of the National Tests of English writing in 2004 and 2005. The corpus was compiled with the aim of enabling researchers to study learners' interlanguage, i.e. "the learner's current mental version of the target language" (Hasselgreen and Sundet 2017, 198).

The texts in CORYL are annotated for gender and approximate age of the pupils (11–12 years: 7th grade, 15–16 years: 10th/11th grade). To allow researchers to uncover patterns in the language use of the group, the texts are annotated, or tagged, for all errors using a coded classification system. CORYL also contains corrected versions of all spelling errors (from here *target word* or *target spelling*) in order for researchers to be able to search for words without being dependent on correct spelling in the original texts. The error code tags used to annotate CORYL include the tag SP, which stands for spelling

error. As the main focus of this thesis is to identify and categorise actual, misspelled words, the code tag SP was used for most corpus searches.

Although there is no information available on the L1 of the pupils, Hasselgreen and Sundet (2017) assume that most of the pupils have Norwegian as either their L1 or their L2.

3.3 Control corpus

As the CORYL corpus is a relatively small one (129 420 words), Hasselgreen and Sundet (2017, 212) warn that absolute conclusions cannot be drawn on the basis of CORYL alone. Rather, they argue, the data and findings based on CORYL should be supplemented by other experimental research. This study, therefore, builds on both CORYL and a control corpus that I compiled during the autumn of 2020 and spring of 2021. This control corpus comprises English texts written by pupils in the 10th grade in lower secondary school and 11th grade in upper secondary school and amounts to a total of 66 079 words. The texts that make up the control corpus were collected through a reach out to several teachers in the Bergen area.

Before the collection of the control corpus data could start, the project had to be approved by NSD (Norsk Senter for Forskningsdata), which is the Data Protection Official for all the Norwegian universities, as well as other research institutes. When conducting any project that gathers, processes and/or stores information about individuals (i.e. personal data), one is required by NSD to fill out a notification form to be submitted to the Data Protection Official for Research. For this project, the data/information collected about individual pupils were the school they attended and their assumed age according to their grade. After some correspondence, the limited amount of data/information that was to be collected about the pupils resulted in NSD giving the project an anonymous assessment (*anonym vurdering*). As anonymity of the pupils could be ensured, neither the pupils' nor the parents' consent were necessary to access the pupils' texts. Together with their classes, the teachers agreed to submit the texts from the first written assessment they were to conduct that semester. In line with advice from NSD, a document with information on the project was distributed to the pupils in September of 2020. The document includes a general introduction to the project, as well as the assurance that no sensitive personal data/information would be collected or used in this project (see Appendix I and II). In addition, the pupils were informed that if they did not

wish for their text to be submitted to the project, it would be sufficient to give their teacher this message orally, and that this would have no implications on their grade or their relationship to the school. In these cases, their teacher would ensure that their text would simply not be forwarded along with the others. As the participation in this study was indeed voluntary, a possible limitation to the representativeness of the findings arises, namely the risk that only pupils confident in their English writing would submit their texts. According to the teachers, however, none of the pupils opted out and in the end 85 pupil texts were submitted for analysis.

Although Hasselgreen and Sundet (2017, 199) stress the importance of combining corpus research with experimental research in, for example, the language classroom (see e.g. Simpson, 2019), the decision was made to stay in the field of corpus research. There are several reasons behind my choice. As Bebout (1985, 570) notes, data gathered outside the 'spelling list format' is uncommon in error analysis. Although studying spelling errors through data collected by, for instance, dictation can be an efficient way of investigating which words cause spellers difficulty, the method has some drawbacks. In addition to being time consuming which can limit the number of words that enter into analysis, the words that *are* obtained depend highly on the researcher administering the dictation. This may, in turn, result in the subject being required to spell words that are not in their vocabulary, and the subjects' perception of the word will depend on the speaker's pronunciation. One can argue that corpus research minimizes the drawbacks of spelling list data.

When collecting a sample for error analysis, it is essential that the researcher is aware of how the nature of the sample can influence the nature and distribution of the errors observed (Ellis and Barkhuizen 2005, 57). Authenticity is a key objective when conducting corpus research. Following the definition proposed by Stefanowitch (2020) of authenticity as writing samples collected after the fact without the speaker/writer knowing that their language will be under scientific observation, the authenticity of the data from the control corpus can be viewed as distorted. As mentioned above, the pupils were introduced to the project prior to producing the texts that comprise the corpus. While the exact aim of the project - exploring spelling errors - was not specified, the pupils were made aware of the project as a linguistic study exploring Norwegian pupils' English written language. Although this inevitably introduces some degree of inauthenticity, it does not mean that the data cannot be used, but that it must be used with the limits of authenticity in mind.

I argue that there is a key difference when it comes to the authentic nature of the texts that make up CORYL and the texts that make up the control corpus. The texts in CORYL are authentic in that the "pupils were given free hand as to the actual language they used" (Hasselgreen and Sundet 2017, 198), and were limited only by the prescribed genres and themes of the different tasks, such as *Write a postcard* or *Describe what you see in the picture*. As this thesis seeks to explore the English spelling errors of Norwegian *pupils*, it became central that parts of the data were collected from 'real' educational settings, i.e. from written assessments in the English subject. In all four classes that submitted their texts, the written assessments were carried out as all-day tests/mock exams where the pupils were given a selection of tasks and asked to write one/two short answer tasks and/or one long answer task. The teacher would then grade the pupils' texts on a scale of grades from 1 to 6, where 6 is the best grade. The results contributed to creating the basis for the pupils' mid-term and final assessments in the English subject. In contrast, the National Tests of English did not affect the pupils' mid-term and final assessments in the subject. Instead, The National Tests are carried out in Norwegian schools each year with the objective of increasing the schools' knowledge of the pupils' basic skills in, for instance, English. Although the data from the control corpus reaches approximate authenticity at best, in an educational setting, language produced as part of an assessment is here considered natural language use.

However, creating a control corpus to complement CORYL is not without problems. The challenges are primarily related to the compatibility of the two corpora. The original texts that comprise the CORYL corpus were handwritten and had to be typed in manually. In contrast, the texts that comprise the control corpus were written by the pupils on their own laptop computers. This immediately creates a weaker basis for direct comparison between data from the two corpora, as other influential elements need to be considered in relation to the control corpus, such as the differences between writing on a computer keyboard and writing by hand (see section 3.3.1).

Finally, as the pupils' texts were collected from different schools and different grade levels, the pupils whose texts make up the control corpus have not completed the same written assessment tasks. However, the fact that the pupils have not completed the same tasks can contribute to a greater variation of words that enter into analysis. The pupils who have written the corpus texts were prescribed certain tasks and genres by those who administered the National Tests (CORYL) or their teacher (control corpus). This, in turn, leads to certain words having higher frequency compared to others. In CORYL

words such as *picture* and *fish* are highly frequent due to tasks such as *Describe what you see in the picture.* In the control corpus the words *text*, *multiculturalism*, *country* and *immigration* have an unusually high frequency. This is due to tasks like *Analyse the text 'Multiculturalism has won the day. Let's move on'. Explain what the main message is* and *Should the US make it easier for illegal immigrants to legally live and work there?* It is worth noting that while the pupils' texts are indeed collected from different schools and different grade levels, the overall themes of the tasks prescribed by the individual teachers bear similarities. Themes such as *Language* and *Global issues* are common themes throughout the texts. This can be attributed to the competence aims of the English subject that include common themes across different grade levels. However, the high frequency of certain words in both corpora has little impact on this study. Firstly, this study seeks to explore the spelling errors of Norwegian pupils, and in an educational setting it is common for the teachers to provide the pupils with certain tasks and/or themes for written assessments that may require the pupils to write words that aren't usually in their vocabulary. Secondly, the high frequency of certain words does not necessarily result in a high frequency of a certain spelling error. For example, the word MULTICULTURALISM is spelled erroneously in several different ways, such as **multiculturalisme** and **multicultual**. Although the target word is the same, these instances require separate analysis.

3.3.1 The use of computers in L2 writing

In 2019, SINTEF[3] conducted a study on behalf of UDIR to map the use of digital resources in Norwegian kindergartens and schools. The study showed that both pupils and teachers report an increased usage of digital resources, including computers, compared to findings from 2013 and 2016 (Fjørtoft, Thun, and Buvik 2019). The increased digitalization of Norwegian schools is facilitated partly through the accessibility of different digital tools in the educational setting. It is obligatory for pupils in upper secondary school in Vestland County Municipality to have their own computers. The pupils can choose to either use their own computers, or buy a computer subsidized through agreements between Vestland County Municipality and local computer dealers

[3] Previously *Selskapet for industriell og teknisk forskning ved Norges tekniske høgskole,* now just SINTEF.

(Vestland Fylkeskommune n.d.). As part of *Plan for Smart Oppvekst i Bergen*, a strategic plan for digitalization and innovation within kindergartens and primary and lower secondary schools in Bergen County, every pupil has received their own computer since the autumn of 2019 (Bergen Kommune 2021). In other words, all the pupils in the classes that submitted their texts to this study have their own computer on which they conduct written assessments and exams in the English subject. For the English subject exams, all aids are allowed except translation tools and tools that can be used for communication (Utdanningsdirektoratet 2020). Furthermore, this means that the pupils have the option to use correction programs and dictionary programs during the English subject exams. These tools can either be downloaded prior to the exam, and/or the pupils can use standard spelling and grammar checkers included in their computers' word-processing programs (in for example Microsoft Word and Google Docs). This highlights one of the key differences between the two corpora, namely that the pupils writing the texts that comprise the control corpus had access to a spelling checker through the word-processing program on their computers.

The use of digital tools has undoubtedly become increasingly common in L2 learning and teaching, and scholars have debated whether writing on a computer is exclusively beneficial during L2 learning. Mangen et al. (2015, 229) note how handwriting and writing on a computer keyboard differs on several different levels. For instance, it differs on a physiological and ergonomic level as keyboard writing typically involves using both hands, and handwriting usually only one hand. On a cognitive level, handwriting and keyboard writing differs in terms of visual attention. Skilled keyboard writers tend to focus their attention on the screen where the text appears, as opposed to less skilled writers who may focus their attention mostly towards the keyboard. During handwriting, writers typically focus their visual attention close to the tip of the pen, which may lead to a more continuous writing process compared to keyboard writing. In terms of the physiological aspects of handwriting and keyboard writing, the differences between the two is perhaps most prominent in the frequency of *technical errors* (Mangen et al. 2015, 229). For example, when writing on a keyboard the writer may be more likely to add erroneous characters (letter and/or other characters) to a word relative to the target spelling, such as **p*roblem** for PROBLEM.

Rather than use a dictionary, learners increasingly use computer-based spelling and grammar checkers (from here *spelling checker*) for their spelling corrections (Beatty 2010). The support of a spelling checkers, and autocorrect functions, is one of the

potential advantages of writing on a computer, or word-processor, compared to handwriting (Morphy and Graham 2012, 642). This can, in turn, be an argument in favour of using computers for writing in L2 learning. In addition, Morphy and Graham (2012, 642) present several other possible advantages to computer-based writing, for example, software for formatting text, speech recognition, and the rate at which key strokes can produce typed letters. However, Beatty (2010) points out several downsides, or pitfalls, to the use of word-processing programs, specifically in L2 learning. Firstly, most word-processing programs are designed for business environments where learning is not necessarily an objective. Thus, the generic spelling checker is not necessarily well suited for language learners' needs (Flor et al. 2015, 108). Secondly, word-processing programs do not necessarily offer any feedback or definitions to learners reviewing their errors, and L2 learners in particular often choose the first correction offered by the program, without any further consideration. Additionally, autocorrect functions may correct errors automatically while the pupil is typing also without any need for further consideration from the pupil. Finally, Beatty (2010) writes how word-processing programs allow for the user to add new words to the programs' standard dictionary, words that may themselves be spelled erroneously. It should be mentioned, however, that some word-processing programs indeed offer a spelling checker that lets the writer review their errors, and Microsoft Word, a word-processor developed by Microsoft, will here be used for illustration. If the program finds an error, a dialogue box appears with the error and includes a comment on why it is considered an error. The writer can chose to either ignore the error, add the word to the dictionary, or change it. However, Microsoft Word's spelling checker provides comments such as *Not in the dictionary* or *Double check spelling here* and does not provide any further feedback.

Although L2 writing on a computer has its downsides, having a spelling checker available when writing may reduce the number of superficial errors produced by the learners. The possible effects of writing in an L2 on a computer will be explored in chapter 4 and discussed in chapter 5.

3.4 Defining errors

The second step of error analysis involves the identification of errors. It is important to have precise notions of what constitutes an error when tagging a corpus. Ellis and Barkhuizen (2005, 59) comment on the benefits of restricting the analysis to *absolute*

errors over *dispreferred forms* to minimize the researchers' subjective judgement of the error acceptability. In line with Hasselgreen and Sundet (2017, 642), who use the term *error* to describe absolute errors that do not involve subjective judgement, the term *error* in this thesis is used to describe deviations from the target spelling. Although examples of errors involving grammar, punctuation, etc. occur in the corpora, they will not be considered in this thesis.

There are undoubtedly certain differences between handwriting and keyboard writing (see section 3.3.1), and this introduces another element that needs to be considered when deciding what constitutes an error, i.e. typographical errors (typos). Flor et al. (2015, 108) consider errors typographical "when it is assumed that the writer/typist knows the correct spelling but simply makes a motor coordination slip". In other words, errors that are assumed to be caused, not by a lack of knowledge by the writer, but by a slip as a result of the co-ordinational aspects of typing on a keyboard, are considered typographical errors. However, it is difficult, or even impossible, to differentiate typographical errors from other errors in this study. As mentioned in chapter 2.2.1, Carney (1994, 112) divides spelling errors into two major types, *competence errors* and *performance errors*. Competence errors refer to fairly consistent misspellings, while performance errors refer to a temporary lapse which leads to the erroneous spelling of a word. Typographical errors would be considered performance errors. As CORYL and the control corpus were collected at one specific point in time, it is not possible to differentiate between the two types of errors. Any words spelled erroneously were selected for analysis and categorised (see section 3.5 below).

3.5 Error categories

The third step of error analysis is describing the errors; this step involves describing how the error produced by the learner differs from the target-form. An error categorisation system was developed to describe and analyse the spelling error types that are characteristic for Norwegian learners of English. One of the advantages of developing an error categorisation system is the practical applicability that can, in turn, facilitate further research and testing. Although there is not one single generally used set of categories for describing spelling errors (Carney 1997, 57), the error categorisation system developed for this study overlaps with other systems, such as Bebout's (1985) and Cook's (1997). Bebout (1985, 575) attributes the overlap of error categories across different studies to

"the nature of the alphabetic writing system, the English language, and human minds". The main categories of the error categorisation system developed for this thesis are based on other categorisation systems of which this one overlaps. The subcategories are corpus-informed as they were derived from the data of this study and developed during the categorisation process.

The errors identified were classified into six major error categories. Furthermore, each major category consisted of between one and four subcategories in which the errors were placed.

3.5.1 Insertion

The first category is letter insertion (I), which involves adding unnecessary letters to a word. The errors classified into this category were placed into one of three subcategories: (I1) vowel insertion (**whay** for WHY), (I2) consonant insertion (**beatch** for BEACH), or (I3) insertion of a cluster (two or more) of letters (**bougther** for BOTHER).

3.5.2 Omission

The second category is letter omission (O), which involves leaving out necessary letters. As with insertion, the omission errors were subcategorised into either (O1) vowel omission (**befor** for BEFORE), (O2) consonant omission (**tis** for THIS), or (O3) omission of a cluster of letters (**shod** for SHOULD).

3.5.3 Doubling

The third category is letter doubling (D). The reason to include doubling as an error category of its own rather than a subcategory of insertion/omission is twofold: first, to be able to include both failing to double a letter and unnecessary doubling of a letter under one category, and second, to facilitate a more detailed categorisation and analysis. Errors identified as doubling were placed in one of four subcategories: (D1) failing to double a consonant (**writen** for WRITTEN), (D2) failing to double vowel (**seing** for SEEING), (D3) unnecessary doubling of a consonant (**womman** for WOMAN) and (D4) unnecessary doubling of a vowel (**soo** for SO).

3.5.4 Substitution

The fourth error category is letter substitution (S), which involves replacing a letter with another, non-target letter. This category includes the following three subcategories: (S1) consonant substitution (**wisit** for VISIT), (S2) vowel substitution (**thay** for THEY) and (S3) cluster substitution (**thru** for THROUGH).

3.5.5 Transpositioning

The fifth category is transpositioning (T). Transpositioning typically involves two adjacent letters (**freind** for FRIEND). However, I have broadened the scope of the term to include all instances where the letters of the target spelling are included, but are 'shuffled' around, for example **uclen** for UNCLE. Instances that involve two adjacent letters were categorised under subcategory T1, and instances that involve transpositioning of any other letters (two or more) within a word fall under subcategory T2.

3.5.6 Unclassifiable

The category unclassifiable (U), was added to include all items that do not fit into any of the other categories and does not involve subcategorisation. This category also covers instances where neither the erroneous word itself, nor the context of the erroneous word indicated which target word the pupil was aiming to write.

3.6 Error coding in CORYL

A simple search for the error code tag SP (spelling) in CORYL (for the age group 15–16) yielded 1999 hits. The search string (1) was used to identify every spelling error by the pupils between the ages of 15 and 16:

(1) [type = "SP" & !<>] \ <> :: age = "15/16"

The first command (type = "SP") retrieves all words that are tagged with the spelling error tag, and the second command (!<>) matches the search only to word(s) contained within the tag, not the tag itself. The final command (age = "15/16") narrows the search to the age group in focus, i.e. pupils in the 10th and 11th grade.

Not all SP-tagged words in CORYL were included in the final data set. Separation, or compounding, errors, such as **heartattack** for HEART ATTACK and **alot** for A LOT,

were omitted as they do not include spelling errors that fall under any of the six major categories mentioned in section 3.5. However, the word **alott** for A LOT would be included as it involves unnecessary doubling of a consonant <t>. In other words, **alott** is classified within the error category doubling. Also excluded are words that include no other error than a missing or misplaced apostrophe, for example **whats** for WHAT'S and **i'ts** for IT'S, which were also omitted from the final data set. Another important note is that spellings such as **over sleapt** for OVERSLEPT yielded two results in CORYL but count only as one result in the final data set for this project. In other words, only **sleapt** for SLEPT is included as an erroneously spelled word, and *over* is not considered. In the end, 19 words were excluded, which leaves 1980 erroneously spelled words to enter into analysis from CORYL.

Finally, it is important to distinguish the number of erroneously spelled words from the number of spelling errors. Any word spelled erroneously is tagged SP in CORYL, regardless of the nature of the spelling error. Following the definition of a spelling error used in this thesis (deviations from target spelling) a single erroneously spelled word can include more than one spelling error, i.e. an erroneously spelled word may fall into more than one error category. For example, the word **vaite** for WAIT occurs in both the error categories substitution (<w> is substituted by <v>) and insertion (adding an unnecessary <e>). In all, 2206 spelling errors were identified from the 1980 words that entered into analysis from CORYL.

3.7 Error coding in the control corpus

As mentioned in section 3.3, 85 pupil texts were collected for the control corpus. Other than the pupils' names being removed, the texts appeared as they were when submitted by the pupils to their teachers at the end of their written assessment. The texts were submitted by the individual teachers as documents in Microsoft Word, and this was the format in which the erroneously spelled words were identified and pulled for analysis. Microsoft Word marks potential spelling errors with a red underline. Although this could streamline the process of identifying spelling errors in a longer coherent text, it cannot be relied on entirely for this study. Firstly, words that are spelled erroneously in a given context, but would be considered target spellings in a different context, are not necessarily

marked with an underline. For example, erroneous spelling of the word FROM as **form**[4] occurred two times in the control corpus texts:

(1) Many people **form** the UK want …
(2) I would consider John Smith over Mark **form** the beginning …

Neither example (1) nor example (2) were marked with a red underline. In other words, relying entirely on the spelling checker in Microsoft Word would result in certain errors being overlooked. Secondly, the red underline used by Microsoft Word to indicate spelling errors does not coincide with the use of the term spelling error for this study. This study considers only words that differ from target spelling and not grammatical errors, punctuation errors, capitalization errors, etc. Erroneously capitalized words are indicated by a red underline in Microsoft Word (*norwegian/Norwegian* and *uk/UK*), as well as words with a misplaced or missing apostrophe. This, again, illustrates how not all words marked by the spelling checker could without further consideration be entered into analysis from the control corpus.

The words identified as spelling errors in the pupil texts were transferred into an Excel spreadsheet and eventually categorised into the appropriate error category/categories. As mentioned in section 3.6, an erroneously spelled word can include more than one spelling error. The 361 erroneously spelled words found in the control corpus texts, correspond to 428 spelling errors.

I have summarized the distribution of errors in CORYL and the control corpus according to the six major categories in Table 3.1 below. The table is here presented for illustration purposes only; it will be discussed in detail in chapter 4:

[4] Although not considered erroneous spelling in all contexts, all words spelled erroneously according to the context are entered in bold.

Table 3.1: *Distribution of errors by major error category, per corpus*

	CORYL		**Control Corpus**		**Total**	
	n	%	n	%	n	%
Omission	675	30.6	133	31.1	808	30.7
Substitution	628	28.5	116	27.1	744	28.2
Doubling	457	20.7	57	13.3	514	19.5
Insertion	339	15.4	69	16.1	408	15.5
Transpositioning	100	4.5	40	9.3	140	5.3
Unclassifiable	7	0.3	13	3.0	20	0.8
Total	**2206**	**100**	**428**	**100**	**2634**	**100**

3.8 Methodological issues and limitations

In addition to the practical applicability of the error categories from this study, the aim of categorising spelling errors is to facilitate possible further testing of the results and hypotheses. However, systematic categorisation of spelling errors is not unproblematic. It is inevitable that the subjective judgement of the researcher will affect the outcome of the categorisation to some degree and therefore cannot be entirely ruled out. Other than comparing the erroneous spelling to the target spelling of a word, it is difficult, and often impossible, to pinpoint with certainty what lies behind the pupils' erroneous spelling of a word. Based on a categorisation system such as the one used for this study, one can group together the spelling errors that bear similarities. The subjective judgement of the researcher becomes especially prominent in cases where a certain spelling error seems to fall into either of two categories without there being a clear indicator as to which of the two is more fitting. Note that while an erroneously spelled *word* can fall into more than one category, the individual *errors* within the erroneously spelled word cannot fall into more than one category. For example, according to the error categories used for this study, **cupple** for COUPLE can be categorised in one of two ways. On the one hand, it can be viewed as an omission error (omission of <o>) and a doubling error (unnecessary doubling of <p>). On the other hand, it can be viewed as a substitution error (substitution of <o> with <p>). Eventually, the choice was made to categorise the spelling as an omission and a doubling error. Accordingly, this study interprets the error **cupple** for COUPLE as attempted phonological spelling. In English, *couple* is realized /kʌpl/, i.e. <ou> is realized as the monophthong /ʌ/, which may have caused the pupil to reduce <ou> to <u>. This, however, does not mean that every erroneous word similar to the one under consideration should be categorised in the same way. Another example, the error **creapy**

for CREEPY, can be categorised in two ways either as a doubling error (failing to double <e>) and an insertion error (insertion of <a>), or as a substitution error (<e> substituted by <a>). In this case, the error **creapy** for CREEPY was eventually considered a substitution error, applying <ae> instead of <ee> for /iː/. The use of phonological strategies as a possible explanation for the production of certain spelling errors will be revisited and explored thoroughly in chapter 5. Instances such as **cupple** for COUPLE and **creapy** for CREEPY illustrate how one cannot rely entirely on the categories and their definitions, and that the researcher must make subjective judgements in some cases.

Another possible limitation to this study is in relation the accuracy of the corpus data annotations. One possible weakness of using data from annotated learner corpora is that any researcher must bear in mind that annotations are indeed 'interpretive', i.e. they are the result of someone's analysis of the data (Somers 2005, 148). The annotation, or tagging, of CORYL was carried out by a native speaker of Norwegian with high levels of English competence (Hasselgreen and Sundet 2017, 199). As for the control corpus texts, the spelling errors were identified through close reading carried out by myself. This inevitably introduces the possibility of human error, e.g. incorrect or inconsistent tagging, and/or the fact that certain spelling errors may have been overlooked in the tagging process. Although certain measures were put into place to minimize the likelihood of human error in the annotation process of the CORYL texts, i.e. the annotations were checked by a native speaker of English with good knowledge of Norwegian, one cannot entirely rule out the possibility of human error. Due to the limited scope of this thesis, the tagging of spelling errors in the control corpus was not checked by a second party.

As previously mentioned, there are certain limitations to the degree of authenticity of the data materials for this study. Another potential weakness of the study is in relation to sample size and representativeness. CORYL is indeed a relatively small corpus. Of the 129 420 words that make up CORYL, 65 079 were written by pupils in the 10th and 11th grade, i.e. the group in focus for this study. The 1980 erroneously spelled words that were eventually entered into analysis amount to only 3.0% of the corpus items produced by 10th/11th graders. The 85 pupil texts that comprise the control corpus have a combined word total of 66 079, and the 361 erroneous words therefore amount to 0.5%. I make no claims of answering any complex questions surrounding L2 spelling, nor that the findings from this study represent the entirety of the Norwegian L2 learners of English population. Nevertheless, however minor the findings from this study are, they can hopefully contribute to the topic of Norwegian pupils' English spelling and perhaps give an insight

into the mechanisms behind the spelling errors they produce, and create a basis for further research on the topic.

3.9 Summary

This chapter has presented the methodology of this thesis, more specifically, how the methodological framework of error analysis is applied in this thesis. The texts written by Norwegian pupils in the 10th and the 11th grade, which form the empirical base of my analysis, are drawn from the CORYL corpus complied by researchers at the University of Bergen, and from a control corpus developed for this study. An error categorisation system with six major error categories (insertion, omission, doubling, substitution, transpositioning and unclassifiable) was developed to describe how the errors produced by the learners differ from the target-form. The data materials' authenticity and size are brought forward as issues that might limit the representativeness of the study, and these limitations must be kept in mind when discussing the implications of the findings in chapter 5. The following chapter presents and discusses the results of my empirical study.

4. Results

This chapter presents the results of my empirical study. The distribution of errors across the six major spelling error categories (omission, substitution, doubling, insertion, transpositioning and unclassifiable) are dealt with in separate sections, 4.1.1–4.1.6. The types of spelling errors considered are exemplified by corpus data through the sections, and each section presents the distribution of errors by subcategory. In relation to each subcategory, the single letter/cluster involved in the highest number of errors will be commented on. These errors will be discussed and explained in detail in chapter 5 which deals more directly with the fourth step of error analysis (i.e. explaining the errors).

4.1 Corpus data results

This section presents the corpus data results. First, the ratio of erroneously spelled words identified in each data set is considered:

Table 4.1: *Distribution of erroneously spelled words per corpus*

	Total word count	**Erroneously spelled words**	
	n	n	%
CORYL	65 079	1980	3.0
Control corpus	66 079	361	0.5
Total	131 158	2341	1.8

As Table 4.1 illustrates, 1.8% of the total word count were identified as erroneously spelled words. There is a notable lower rate of erroneously spelled words in the control corpus compared to CORYL: of the 65 079 words in CORYL, 1980 (3.0%) were identified as erroneous, while of the 66 079 words in the control corpus, only 361 (0.5%) were identified as erroneous.

As mentioned in chapter 3, an erroneously spelled word may contain more than one spelling error. An erroneous word can, thereby, occur in more than one spelling error

category. To give a general impression what errors were identified in the sample, Table 4.2 presents the distribution of spelling errors by major error category across the two corpora (raw frequencies are included):

Table 4.2: *Distribution of errors by major error category, per corpus*

	CORYL		**Control Corpus**		**Total**	
	n	%	n	%	n	%
Omission	675	30.6	133	31.1	808	30.7
Substitution	628	28.5	116	27.1	744	28.2
Doubling	457	20.7	57	13.3	514	19.5
Insertion	339	15.4	69	16.1	408	15.5
Transpositioning	100	4.5	40	9.3	140	5.3
Unclassifiable	7	0.3	13	3.0	20	0.8
Total	**2206**	**100**	**428**	**100**	**2634**	**100**

As seen in Table 4.2, 2634 spelling errors were identified from the 2341 erroneously spelled words in the corpus data. The total error distribution by major error category is summarized in Figure 1:

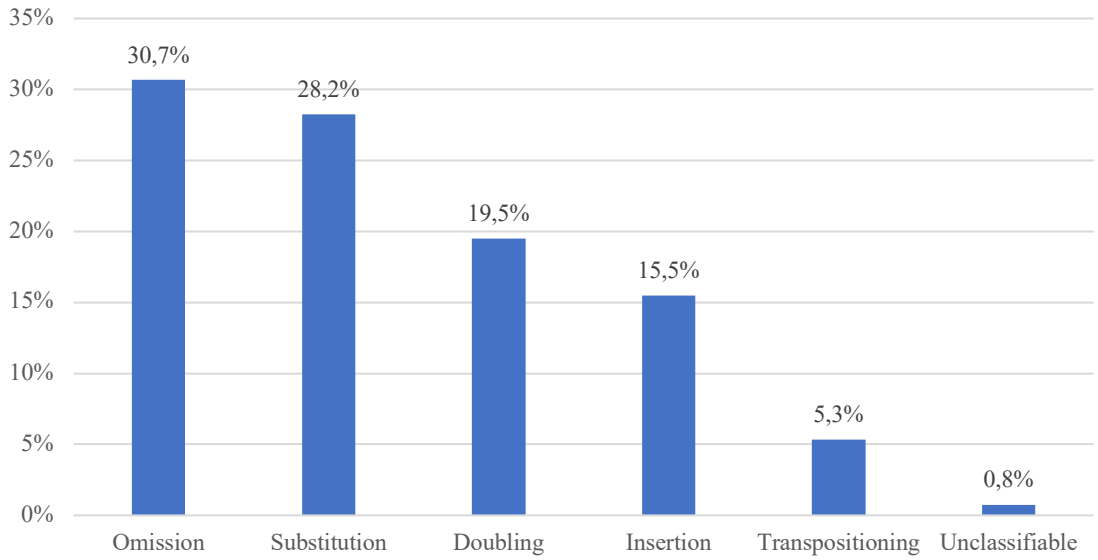

Figure 4.1: *Total distribution of errors, by major error category, from high to low*

Figure 1 shows that omission (30.7%) is the largest of the six major error categories, closely followed by substitution (28.2%). Doubling (19.5%) and insertion (15.5%) are the third and fourth largest categories respectively, and transpositioning (5.3%) and

unclassifiable (0.8%) the two smallest categories. Figure 1 gives an overview of the error distribution across the entire data set used for this study. However, a closer look is necessary, as the frequencies of doubling, transpositioning and unclassifiable errors differ considerably across the two corpora, i.e. CORYL and the control corpus. Figure 2 shows the total distribution of errors by major error category *and* by corpora:

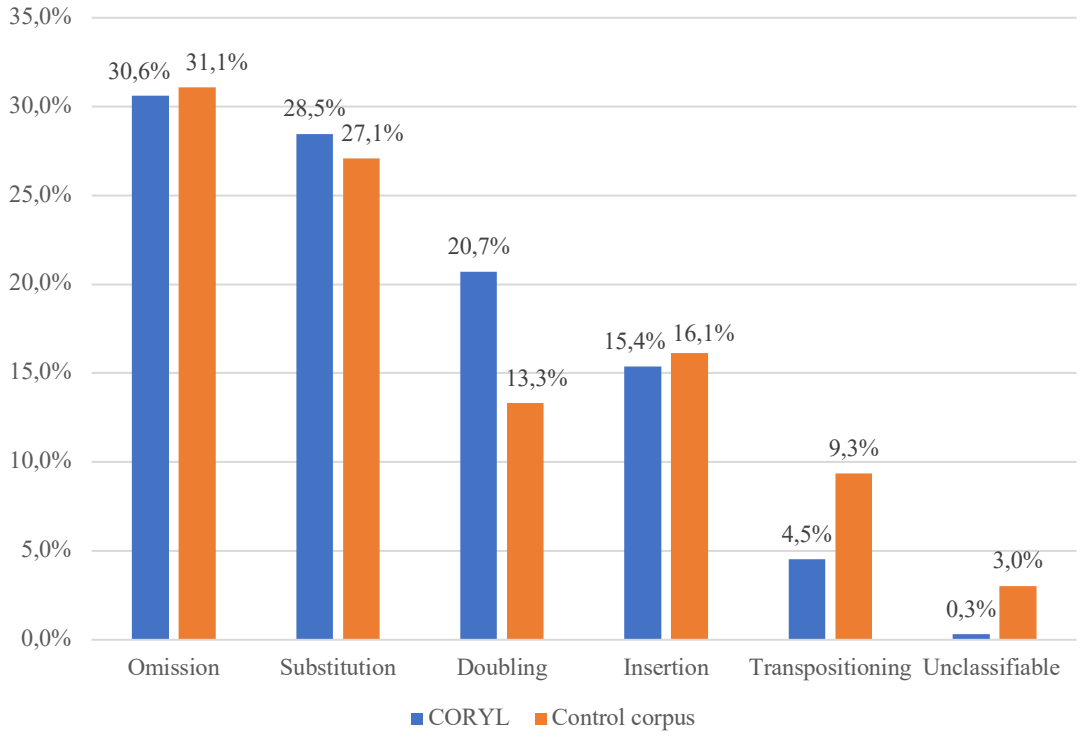

Figure 4.2: *Total distribution of errors per corpus and major error category*

As Figure 2 illustrates, the percentages correlate quite well across the three categories omission, substitution and insertion. As for the remaining three categories, doubling, transpositioning and unclassifiable, there is a more noticeable difference between the two corpora in the error rate. Doubling is the category with the biggest observed difference in error rate in CORYL (20.7%) and in the control corpus (13.3%). In addition, there is a higher rate of transpositioning errors in the control corpus (9.3%) compared to CORYL (4.5%). Finally, the rate of unclassifiable errors is also higher in the control corpus (3.0%) compared to CORYL (0.3%).

The following sections, 4.1.1–4.1.6, present the results of each major error category and their subcategories.

4.1.1 Omission errors

Omission errors make up 30.5% of the total number of errors and thereby constitute the largest error category. As seen in Figure 2, omission was not only the largest error category overall, but the category with the highest frequency of errors in both CORYL and the control corpus. Omission errors were placed in one of three subcategories: vowel omission (**abut** for ABOUT), consonant omission (**wy** for WHY) and cluster omission (**shod** for SHOULD). Table 4.3 presents the omission errors by subcategory across the two corpora:

Table 4.3: *Distribution of omission errors by subcategory, per corpus*

	CORYL		**Control corpus**		**Total**	
	n	%	n	%	n	%
Vowel omission	372	55.1	80	60.2	452	55.9
Consonant omission	281	41.6	41	30.8	322	39.9
Cluster omission	22	3.3	12	9.0	34	4.2
Total	675	100	133	100	808	100

The results presented in Table 4.3, show that vowel omissions were the most frequent omission errors (55.9%) and consonant omission the second most frequent (39.9%), while cluster omissions were the least frequent (4.2%) and thus the smallest omission subcategory. Two letters in particular stand out in the omission category, namely the single letter <e> and the single letter <h>. In relation to vowel omission, omission of <e> was observed in 237 instances, which amounts to 29.5% of the entire omission category. Omission of <e> occurred in either word final position (**favorit** for FAVORITE) or in any other position (**cloths** for CLOTHES). 134 of the 237 items involved omission of the letter <e> word final, while the remaining items involved omission of <e> from any other position. As for consonant omission, the letter <h> was omitted in 102 instances, for example **everywere** for EVERYWHERE. The 102 instances of omission of <h> is 12.7% of the entire omission category. Cluster omissions, the smallest of the three subcategories, do not follow any distinct patterns.

4.1.2 Substitution errors

At 28.5%, substitution is the second largest error category. As with omission, substitution errors were analysed into one of three subcategories: vowel substitution (**wurst** for

WORST), consonant substitution (**sigars** for CIGARS) or cluster substitution (**garbitch** for GARBAGE). Table 4.4 presents the substitution errors by subcategory across the two corpora:

Table 4.4: *Distribution of substitution errors by subcategory, per corpus*

	CORYL		**Control corpus**		**Total**	
	n	%	n	%	n	%
Vowel substitution	291	46.3	40	34.5	331	44.5
Consonant substitution	212	33.8	50	43.1	262	35.2
Cluster substitution	125	19.9	26	22.4	151	20.3
Total	628	100	116	100	744	100

As shown in Table 4.4, the overall largest substitution subcategory is vowel substitution (44.5%), followed by consonant substitution (35.2%) and finally, cluster substitution (20.3%). The distribution of vowel and consonant substitution errors differs across the two corpora. In CORYL, vowel substitution is the largest subcategory at 46.3%, as opposed to the control corpus where consonant substitution is the largest subcategory at 43.1%. In both corpora, cluster substitution was the smallest subcategory. The single letter <a> and the single letter <c> were the two letters substituted at the highest frequency in the vowel substitution subcategory and the consonant substitution subcategory respectively. Substitution of <a> was observed in 106 instances, in for example **thet** for THAT (<a> substituted by <e>) and **worm** for WARM (<a> substituted by <o>). The letter <a> was indeed most commonly substituted by <e>, however, the **worm** for WARM example illustrates that a substitution errors does not follow a one-to-one pattern, as a letter/cluster can be substituted in several different ways. As for consonant substitution, substitution of the single letter <c> was the most frequent (61 items), e.g. **kan** for CAN (<c> substituted by <k>) and **choise** for CHOICE (<c> substituted by <s>). These examples also illustrate how substitution of one specific letter does not necessarily lead to another specific letter. As opposed to the two other subcategories where the same single letters (<a> and <c>) appeared to be the most frequent in both corpora, the most common cluster substitution varied across CORYL and the control corpus. In CORYL, the most common cluster substitution was <ie>, in for example **citys** for CITIES, and in the control corpus, the most common cluster substitution was <ough>, observed in the three

examples **thru** for THROUGH, **tho** for THOUGH and **enuf** for ENOUGH. In each of the three examples, <ough> is substituted by a single letter (<u>, <o> or <f>).

4.1.3 Doubling errors

Doubling errors account for 19.5% of the total number of errors, and they make up the third largest of the six major error categories. Errors identified as doubling were subcategorised into one of four subcategories: failing to double a consonant (**gras** for GRASS), failing to double a vowel (**seing** for SEEING), unnecessary doubling of a consonant (**legg** for LEG), or unnecessary doubling of a vowel (**soo** for SO). Table 4.5 presents the distribution of doubling errors by subcategory and across the two corpora:

Table 4.5: *Distribution of doubling errors by subcategory, per corpus*

	CORYL		**Control corpus**		**Total**	
	n	%	n	%	n	%
Failing to double consonant	171	37.4	20	35.1	191	37.2
Failing to double vowel	101	22.1	10	17.5	111	21.6
Unnecessary doubling of consonant	164	35.9	22	38.6	186	36.2
Unnecessary doubling of vowel	21	4.6	5	8.8	26	5.1
Total	457	100	57	100	514	100

As opposed to omission and substitution errors where vowels seem to cause the learners more difficulty, consonants appear to be more challenging in relation to doubling errors. As shown in Table 4.5, doubling errors involving consonants amount to nearly three quarters (73.4%) of the entire doubling category. Consonant errors were quite evenly distributed between either failing to double a consonant (37.2%) and unnecessary doubling of a consonant (36.2%). In both corpora, the letter <l> was the most frequent letter involved in doubling errors. Of the 377 items involving consonant doubling, 150 instances involve either failing to double the letter <l> (**totaly** for TOTALLY) or unnecessarily doubling of <l> (**allmost** for ALMOST).With an error rate of 26.7%, vowel doubling seems to pose less of a challenge. As opposed to the consonant doubling where the errors are quite evenly distributed across the two subcategories, failing to double a vowel has notable higher percentage (21.6%) than unnecessary doubling of a vowel (5.1%). However, the same letter, <o>, stands out in both vowel doubling subcategories. 99 items involve either failing to double the letter <o> (**loks** for LOOKS) or unnecessary doubling of the letter <o> (**to** for TOO). What makes the doubling category stand out is

that one word in particular seems to cause the pupils to produce doubling errors, namely the word *too*. The pupils confuse the homophones *too* and *to* at quite a high rate in terms of doubling, although writing **to** for TOO, occurs more often than **too** for TO.

As mentioned in section 4.1, doubling is one of the categories where there is a notable difference in the frequency of errors between the two corpora. In CORYL, 20.7% of errors were doubling errors, and in the control corpus, 13.3% were doubling errors.

4.1.4 Insertion errors

15.2% of the errors were categorised as insertion, making this category the fourth largest category. The insertion category included three possible subcategorisations, i.e. vowel insertion (**againe** for AGAIN), consonant insertion (**alwso** for ALSO) and cluster insertion (**bought** for BOTH). The distribution of insertion errors by subcategory across the two corpora is presented in Table 4.6:

Table 4.6: *Distribution of insertion errors by subcategory, per corpus*

	CORYL		**Control corpus**		**Total**	
	n	%	n	%	n	%
Vowel insertion	200	59.0	35	50.7	235	57.6
Consonant insertion	131	38.6	32	46.4	163	40.0
Cluster insertion	8	2.4	2	2.9	10	2.5
Total	339	100	69	100	408	100

As Table 4.6 illustrates, inserting unnecessary vowels seems to be more common than inserting an unnecessary consonant or a cluster of letters. Overall, 57.6% of insertion errors involved vowel insertion. In relation to vowel insertion, one letter in particular stands out, namely the single letter <e> inserted in either word final position (**worke** for WORK) or any other position (**cares** for CARS). In total, 174 of the 233 instances of vowel insertion involved insertion of <e>, amounting to 43.3% of the entire major category of insertion. 40.0% of insertion errors involve consonant insertion. In relation to consonant insertion, the letter <h> stands out, with 53 occurrences, which amounts to 13.3% of the entire major category. While insertion of <e> appeared in both word final and other positions, insertion of <h> followed a quite distinct pattern in relation to placement. The single letter <h> occurred only after <w> (**whas** for WAS), <t> (**wather** for WATER) and <s> (**shure** for SURE). Cluster insertion, or insertion of a cluster of adjacent letters, did not seem to cause the spellers much difficulty as it amounts only to 2.5% of all insertion

errors. However, in the few instances observed, the cluster <gh>, in for example **wright** for WRITE,[5] is the most common cluster insertion.

4.1.5 Transpositioning errors

Transpositioning errors account for 5.3% of the spelling errors identified in the data and is thus the second smallest of the six major categories. Transpositioning errors were placed into one of two subcategories: transpositioning of two adjacent letters (**becuase** for BECAUSE) or transpositioning of any letters within a word (**whit** for WITH). Table 4.7 presents the distribution of transpositioning errors by subcategory across the two corpora:

Table 4.7: *Distribution of transpositioning errors by subcategory, per corpus*

	CORYL		**Control corpus**		**Total**	
	n	%	n	%	n	%
Transpositioning of two adjacent letters	49	49.0	24	60	73	52.1
Transpositioning of any letters	51	51.0	16	40	67	47.9
Total	100	100	40	100	140	100

As Table 4.7 illustrates, transpositioning errors are quite evenly distributed across the two subcategories. Overall, 52.1% involve transpositioning of two adjacent letters, while 47.9% involves transpositioning of any letters within a word. In CORYL, there is a near even distribution between the two subcategories (49.0% and 51.0%), while there is a bigger difference between the subcategories in the control corpus (60.0% and 40.0%). No particular word nor cluster stand out as challenging in relation to transpositioning of two adjacent letters. Interestingly, though, the transpositioning of two adjacent letters most commonly involves transpositioning of one vowel and one consonant (**tabel** for TABLE), as opposed to transpositioning two consonants (**figthing** for FIGHTING) or two vowels (**luaghing** for LAUGHING). In relation to transpositioning of any letters within a word, the word *with* seem to cause the pupils most difficulty. The spelling **whit** for WITH (<ith> occurs in non-target order) was observed 39 times across the two corpora.

[5] Note that the erroneous spelling **wright** for WRITE includes two errors (insertion of <gh> and omission of <e>) and is therefore categorised within two categories. The number of errors within a word will from here not be specified unless relevant to the topic of discussion.

In addition, this is one of the categories with a notable difference between the error rate in the two corpora. In CORYL, 9.3% of the errors were categorised as transpositioning errors, compared to 4.5% in the control corpus.

4.1.6 Unclassifiable errors

Errors that could not be categorised into any of the five major categories mentioned above, where categorised as unclassifiable. Table 4.8 presents the distribution of unclassifiable errors across the two corpora:

Table 4.8: *Distribution of unclassifiable errors, per corpus*

	CORYL		**Control corpus**		**Total**	
	n	%	n	%	n	%
Unclassifiable errors	7	35.0	13	65.0	20	100
Total	7	100	13	100	20	100

As seen in Table 4.8, 20 errors were categorised as unclassifiable. In total, this amounts only to 0.8% of the total number of spelling errors, undoubtedly making this the smallest of the six major error categories. As seen in the table above, there is a higher frequency of unclassifiable errors in the control corpus compared to CORYL, despite the higher overall error frequency in CORYL. One account where the unclassifiable errors differ between the two corpora is the occurrence of errors where neither the word itself nor the context of the word indicates which target-word the pupil was aiming to write, in the control corpus. None of the unclassifiable errors in CORYL involved an unknown target word, as opposed to four instances in the control corpus. These four instances were **ijeif**, **eejfijf**, **eideijd**[6] and **e**. To illustrate, example (3) and (4) below presents these four spelling errors in the context they occurred:

(3) … they could teach other people about other cultures. **ijeif eejfijf eideijd** Trump also stated that …

(4) One of the **e** paragraphs in the text …

[6] Note that while the unclassifiable errors **ijeif**, **eejfijf**, **eideijd** are all produced by the same pupil and occur immediately after one another, they are counted as three spelling errors as opposed to one, because they are separated by a space.

As no clear target spelling could be derived in relation to these errors, it could be argued that these instances should not be considered spelling errors in the first place. What makes these items interesting, however, is that they exclusively occur in the control corpus. As this thesis seeks, among other things, to explore the differences between spelling errors produced in handwritten text (CORYL) and spelling errors produced in keyboard-written text (control corpus), the choice was made to consider the examples **ijeif**, **eejfijf**, **eideijd** and **e** as spelling errors. Two other errors from the control corpus stand out in this category, namely **workw/ers** for WORKERS and **p*roblem** for PROBLEM. These two errors involve insertion of the excessive characters / and *, and at first glance, these could be considered insertion errors. However, the choice was made to limit the insertion category to the insertion of *letters* (either a single letter or a cluster of letters), which is why the occurrence of an excessive character is considered an unclassifiable error.[7]

4.2 Summary of main findings

This chapter has presented the corpus data results. As seen in Table 4.1, the rate of erroneously spelled words is lower in the control corpus (0.5%) compared to CORYL (3.0%). As for the distribution of spelling errors, omission errors are the most common errors produced by the pupils, closely followed by substitution errors. Doubling errors make up the third largest category, followed by insertion, transpositioning, and, finally, unclassifiable errors. Omission, substitution and insertions errors seem to occur at an even rate between the two corpora, while there is a larger observed difference in the occurrence of doubling, transpositioning and unclassifiable errors. In the omission, substitution and insertion category, vowels seem to cause spellers more difficulty than consonants, while in the doubling category, errors involving consonants are the most common. More often than not, transpositioning errors involve one vowel and one consonant.

[7] The example **workw/ers** for WORKERS is, however, included in the insertion category due to the insertion of the single letter <w>.

5. Discussion

Chapter 4 presented the central results of my analysis. These results form the backdrop for the discussion in this chapter, which aims to explore the possible mechanisms behind the English spelling errors produced by Norwegian pupils, and thereby covers the fourth step of error analysis (i.e. explaining the errors). The discussion takes as a point of departure the research questions, Q1, Q2 and Q3, and the hypotheses, H1 and H2:

> Q1: What types of English spelling errors do Norwegian pupils produce?
> Q2: Are there patterns behind Norwegian pupils' English spelling errors?
> Q3: How does the use of computers effect Norwegian pupils English spelling?
>
> H1: Pupils are more likely to produce spelling errors when writing by hand.
> H2: Pupils produce the same types of spelling errors in handwritten text and in keyboard-written text.

Both hypotheses are directly linked to Q3, as Q3 considers the use of computers in English L2 writing and which effect, if any, this has on Norwegian pupils' spelling. Although the main objective of this thesis is to explore which English spelling errors Norwegian pupils produce, the effects of using computers in English L2 writing, i.e. Q3, will be discussed first for structural purposes. This is because several of the findings from both corpora correlate quite well and should be discussed simultaneously. Therefore, the following section will consider Q3 and both hypotheses, while section 5.2 will consider Q1 and Q2.

5.1 The effects of using computers in English L2 writing

This section considers Q3 and its hypotheses. Section 5.1.1 considers H1, which assumes that pupils are more likely to produce spelling errors when writing by hand, and sections

5.1.2–5.1.4 consider the error categories where there is a noticeable difference in error frequency between CORYL and the control corpus. In other words, they deal with H2, which assumes that pupils produce the same types of spelling errors in handwritten text and in keyboard-written text.

5.1.1 Lower error rate

Chapter 3 presented the main similarities between CORYL and the control corpus, i.e. the age of the pupils (15/16), as well as the main differences, i.e. time of collection (2004/2005 versus 2020/2021) and the nature of the tasks (National Tests in English versus written assessment). The one additional difference that is here considered paramount is the format in which the texts were produced. The texts in CORYL were handwritten, and the texts in the control corpus were written on the pupils' own computers. i.e. on a keyboard. H1 assumes that the pupils are more likely to produce spelling errors when writing by hand as opposed to writing on a keyboard, and as illustrated in Table 4.1, there was a higher frequency of erroneously spelled words in CORYL (1980 items) compared to in the control corpus (361 items). Although the lower error rate cannot be entirely attributed to the element of handwriting versus keyboard-writing, a closer look at the differences between the two sets of results is necessary.

As mentioned on several accounts in chapter 3, the pupils writing the texts that make up the control corpus had access to their computers' standard word-processing programs. Exploring the use of different word-processing programs, for example Microsoft Word versus Google Docs versus standard note-taking apps, and how this may affect the production of spelling errors, is beyond the scope of this thesis. Thus, for the purpose of my thesis, I make the assumption that most of the pupils used Microsoft Word to produce their texts. Furthermore, the pupils had access to the word-processing program's standard spelling checker. In short, Microsoft Word's spelling checker indicates errors (both spelling, grammar and otherwise), with a red underline, and in turn offers correction suggestions. The pupil is given a number of options when faced with a red underline, they can choose to ignore the error, add the erroneous spelling to the program's standard dictionary, or select one of the new suggestions offered by the word-processing program. These options do have some downsides, for example that the pupil can add an erroneous spelling to the program's standard dictionary, or that the pupil without further consideration chooses the first correction offered by the word-processing

program although it might not be the intended target spelling. However, the lower error frequency in the control corpus compared to CORYL could indicate that the standard spelling checker in the word-processing program used by the pupil has helped the pupils avoid certain errors.

It is, however, interesting to note that writing on a keyboard with a standard spelling checker available, does not eliminate spelling errors completely. Although the pupils produced proportionally fewer erroneously spelled words, they still produced 361 erroneously spelled words, and furthermore 428 spelling errors in the control corpus data, that need to be considered. There are several possible reasons why writing on a computer does not completely eliminate spelling errors. Firstly, the spelling checker in Microsoft Word does not pick up all spelling errors (see chapter 3.7). Secondly, one cannot assume that because the pupils have a word-processing program with a spelling checker available, the pupils necessarily utilize these tools. The spelling checker may for example be deactivated, or perhaps the pupil has set the default language of the word-processing program to Norwegian and not the target-language, i.e. English. Thirdly, and perhaps more interestingly, as seen in the error rates of the different major error categories, the types of spelling errors produced often coincide quite well between the two corpora, especially in relation to omission, substitution and insertion (see Figure 2). This may indicate that the same mechanisms lie behind the production of different spelling errors as these types of errors occur in both handwritten texts and keyboard-written texts. However, differences were observed across the two corpora in relation to the error frequency of doubling, transpositioning and unclassifiable errors.

The following sections take a closer look at these three categories and seek to explain why the error rates deviate from one another in these instances. Note that the following sections look towards the differences between writing on a keyboard and writing by hand, and the elements this entails, in an attempt to explain the deviance in error frequencies across the two corpora. Sections 5.1.2–5.1.4 do not, however, seek to explain in detail other possible mechanisms behind the errors, as this will be explored section 5.2.

5.1.2 Doubling errors

The first category with a marked difference in the error rate in CORYL compared to the control corpus is doubling. The pupils produce doubling errors more frequently in

CORYL (20.7%) compared to the control corpus (13.3%). Although the production of doubling errors, or lack thereof, cannot exclusively be attributed to one factor, this section will in particular highlight the use of a word-processing program as a contributing factor.

As part of the standard spelling checker, Microsoft Word has an autocorrect function that automatically corrects spelling and formatting as one types. This includes correcting several doubling errors automatically, without indicating the error with a red underline. In other words, the autocorrect function will, for example, automatically correct **swalow** to the target spelling SWALLOW, and **hitt** to the target spelling HIT, while the pupil is typing. This may explain why the doubling error frequency is lower in the control corpus compared to CORYL. However, one must look towards other explanations when trying to explain the 57 doubling errors that do occur in the control corpus, i.e. errors that were produced and were not automatically corrected by the autocorrect function. As mentioned, there is no guarantee that the pupils utilize the tools available to them through the word-processing program. In addition, there may lie certain mechanisms behind the production of doubling errors unrelated to the use or non-use of word-processing tools, which will be explored further in section 5.2.

5.1.3 Transpositioning errors

Transpositioning is the second error category where there is an observable difference in the error rate in CORYL (4.5%) compared to the control corpus (9.3%). What makes the results of this category stand out especially is the fact that the pupils make proportionally more transpositioning errors in the control corpus texts, as opposed to the CORYL texts, although the overall error rate in CORYL is higher. As opposed to doubling errors where parts of the explanation for the lower error rate in the control corpus may be related to the use of a spelling checker/autocorrect function, other factors need to be considered in the case of transpositioning errors. Here the differences between the process of hand-writing and keyboard writing is drawn upon in an attempt to explain the different transpositioning error frequencies.

As mentioned in connection with the brief review of differences between handwriting and keyboard writing in chapter 3.3.1, there are certain physiological, ergonomic and cognitive differences between the two ways of writing. Handwriting is, for example, described as a more continuous writing process where the writer focuses their attention at the tip of the pen. In contrast, keyboard-writers can focus their attention

either on their hands on the keyboard, or directly on the computer screen. I argue that the co-ordinational aspects of handwriting versus keyboard writing play a role here and might be part the explanation for the high frequency of transpositioning errors in the control corpus texts. For example, the errors **lest** for LETS, **og** for GO, and **from** for FORM (and vice versa), bear the similarity that they include all the letters of the target spelling, but the letters are placed in non-target order. In these cases, it seems that one can rule out possible confusions caused by irregular phoneme-grapheme correspondence, as <f>, <r>, <o> and <m> in the target spelling FROM, for instance, correspond to /f/, /r/, /ɒ/ and /m/, respectively. It may be that the pupils are aware of the target order in which the letters should appear, and simply do not hit the target keys on the keyboard in target order, i.e. a typographical error. As mentioned in chapter 3.4, errors are considered typographical when it is assumed that the writer knows the target spelling but makes a motor co-ordination slip. However, I do not assume that the different co-ordinational aspects of handwriting versus keyboard writing presents the entirety of the reason behind the production of transpositioning errors in the control corpus texts. Other transpositioning errors than the examples given illustrate that there likely are other mechanisms at work as well. For example, the erroneous spelling **whit** for WITH accounts for errors in both CORYL (34 items) and the control corpus (6 items). This indicates that while this error might be attributed to the pupil hitting the target keys in non-target order in the control corpus items, other possible explanations need be considered as this does not exclusively occur in keyboard-written text (see section 5.2).

5.1.4 Unclassifiable errors

The unclassifiable category is the third and final category with a difference between the error frequency in CORYL (0.3%) and the control corpus (3.0%) as well. As with the transpositioning category, the error frequency is higher in the control corpus compared to CORYL. As mentioned in chapter 4.1.6, a few errors stand out in this category particularly because the target-word cannot be identified from the error itself nor from the context of the error. In addition, these errors stand out because they occur exclusively in the control corpus. These errors are as follows: **ijeif**, **eejfijf**, **eideijd** and **e**. Although it is impossible to point to the exact reason behind the occurrences of these errors, I argue that the exclusivity of the errors points towards a possible explanation. As handwriting is often considered a more continuous writing process, the writer, in this case pupil, may

struggle to get an overview of the entirety of the text they are producing. In relation to the first three errors (**ijeif**, **eejfijf** and **eideijd**), the pupils may, for example, have simply typed a random selection of letters as a reminder to return to this part of the text and revise, but forgot to remove it, i.e. the pupil intentionally produced the 'error'. Then again, the pupil may have unintentionally produced the error by for example hitting the keys on the keyboard without knowing. These suggestions are supported by the fact the letters involved in the errors are in close proximity of one another on a computer keyboard. The letters <d>, <f> and <e> (left hand) are connected on the keyboard, as well as <i> and <j> (right hand), assuming that the pupil was typing with both hands. In other words, both the cognitive and physiological differences between handwriting and keyboard-writing, i.e. overall visual attention, and the continuity of the two writing processes, could perhaps be at play here. In addition, a few other errors, also exclusive to the control corpus, point towards an explanation rooted in the differences between handwriting and keyboard-writing. The following errors, **workw/ers** for WORKERS and **p*roblem** for PROBLEM, are exclusive in that they include an erroneous character (/ and *), an error type that did not occur in the CORYL data. According to Mangen et al. (2015, 229), technical errors, i.e. the insertion of an erroneous character relative to the intended letter and word, occur more frequently in keyboard-writing. Mangen et al. (2015, 229) attribute this to keyboard writing being less motorically controlled and monitored compared to handwriting, and that insertions of erroneous characters are where these differences are the most apparent. By the same line of reasoning, the error **e** could be accounted for. However, it is important to note that errors such as the ones used for illustration in this section are indeed rare also in the control corpus. A much larger data set of keyboard-written text would be needed to make any specific claims about the nature of these errors, and the claims made in this section therefore become no more than speculation. Nevertheless, I argue that the exclusivity of these errors is what makes them worth mentioning, and that it gives a slight but perhaps interesting insight into new issues that the pupils may encounter when writing on a keyboard as opposed to by hand.

5.2 Error types

This section considers Q1 and Q2. In an attempt to answer Q1, which asks what types of English spelling errors Norwegian pupils produce, Figure 1 and Figure 2 from chapter 4.1 must be considered. Omission errors were the most common error across the board.

Vowel omissions, as opposed to consonant omissions and cluster omissions, account for the majority of the omission errors. The omission category was closely followed by the substitution category, where also vowels seem to cause the spellers more difficulty than consonants and clusters. As opposed to the omission and substitution category, errors involving consonants are more frequent in the doubling category, which is the third largest category. The insertion category follows the doubling category, and here errors involving vowels are the most frequent. Most transpositioning errors involve one vowel and one consonant, as opposed to two vowels or two consonants. All but 20 errors could be categorised as either omission, substitution, doubling, insertion or transpositioning, while the remaining were considered unclassifiable.

Furthermore, Q2 asks if there are any patterns behind the production of the English spelling errors produced by the Norwegian pupils. As mentioned in chapter 3.8, subjectivity played a role in deciding how to categorise some of the errors produced by the pupils. However, more often than not, the errors followed patterns that streamlined the process of categorisation. This could indicate that there are certain mechanisms behind the production of these errors, though it is difficult, or even impossible, to say exactly why a pupil has produced a particular error by looking only at the error itself. Nevertheless, I argue that it is possible to systematize the spelling errors by taking a closer look at the categories and exploring the tendencies that seem to appear. In the following, I highlight some observed tendencies in both CORYL and the control corpus, including phonetically accurate spelling (see chapter 2.4), and the overgeneralization of certain English spelling features, and use a selection of findings from chapter 4 to illustrate these tendencies. Moreover, I point towards the irregular phoneme-grapheme correspondence of English, and L1/L2 discrepancy as possible reasons to why the pupils produce certain errors and why certain error patterns seem to emerge. The discussion below is presented by error type rather than by tendency. This is because each section and their illustrative examples draw on several different elements in an attempt to explain the different errors observed. Attributing an error only to one clear cut explanation, for example the overgeneralization of typical English spelling features, would be misleading. In the following sections, possible mechanisms involved in the production of different spelling errors will be discussed in relation to the following error types: Omission and insertion errors involving <e> (5.2.1), omission and insertion errors involving <h> (5.2.2), substitution errors involving <a>, <e> and <i> (5.2.3), substitution errors involving <c>,

<s> and <k> (5.2.4), substitution errors involving different clusters (5.2.5), as well as different doubling errors (5.2.6) and transpositioning errors (5.2.7).

5.2.1 Omission and insertion errors involving <e>

One of the tendencies that seem to appear, is that the pupils' spelling errors often coincide quite well with the pronunciation of the target-word, i.e. the errors are phonetically accurate. This may be attributed to the irregular phoneme-grapheme correspondence in English, where one grapheme can correspond to several different phonemes, and vice versa. In this section, phoneme-grapheme correspondence will be explored in relation to the omission and insertion of <e>. However, this particular feature will be drawn upon several times throughout the rest of the discussion as well.

The letter <e> is involved in a number of errors across different categories, including the omission category and insertion category. 237 items involved omission of <e>, making <e> the letter involved in the highest number of omission errors. Of these items, 134 involved omission of <e> from word final position. In English spelling, word final <e> is almost never realized in pronunciation (Brooks 2015, 454). This is often referred to as silent final <e> or 'the magic e rule'. The silent final <e> seems to have caused the pupils some difficulty. Of the 134 items involving omission of <e> in word final position, 131 involved the omission of a silent final <e>, in for example **notic** for NOTICE (realized as /nəʊtɪs/) and **wors** for WORSE (realized as /wɜːs/). In other words, in the majority of errors involving omission of <e> word final, the omitted <e> is not realized in pronunciation. In the remaining items involving omission of <e> from any other position (103 items), <e> was frequently omitted before and from the suffixes, e.g. before <ly> (**completly** for COMPLETELY) and before <d> (**burnd** for BURNED), i.e. words where <e> is not realized in pronunciation, as *completely* is realized /kəmpliːtli/, and *burned* is realized /bɜːnd/. Of the errors that did not involve omission of <e> from neither word final position nor from the suffix of a word, the pupils' erroneous spellings were also phonetically accurate in several of the cases. For instance, a common error was compounds involving *every*, for example **evrybody** for EVERYBODY, **evryone** for EVERYONE, **evrything** for EVERYTHING, and **evrywhere** for EVERYWHERE. Also here, the omitted <e> is not realized in spelling as *every* is realized /ɛvri/. In all examples presented thus far, the pupils' errors correspond to the pronunciation of the target-word,

which indicates that the pupils use a phonological strategy, i.e. they look to the pronunciation of a word, when inferring how words should be realized in spelling.

Overall, silent <e> is a common feature of English spelling that seems to cause issues for the pupils. In addition to the omission of <e>, <e> was also the most frequently inserted letter in either word final position or in any other position. As silent <e> is common in English spelling, the Norwegian pupils may tend to overgeneralize, or hypercorrect, this feature. In relation to spelling specifically, hypercorrection is the non-target usage of a certain spelling features caused by an erroneous analogy of the feature's standard usage in an attempt to produce target spelling, which may have caused the pupils to insert an unnecessary <e> to words, e.g. **aboute** for ABOUT, and **fare** for FAR. Furthermore, the overgeneralization of typical English spelling features will also be drawn on in several of the following paragraphs when discussing the possible mechanisms behind certain other errors and error types.

It is particularly interesting to see how certain orthographic and phonological features do not exclusively affect the erroneous distribution of certain letters in one particular way, as seen in the frequent omission *and* insertion of <e>. As shown in this section, <e> is perhaps omitted as a result of the pupils using a phonological strategy when they spell, i.e. <e> is omitted where it is not typically realized in pronunciation. Furthermore, this may be a result of the irregular phoneme-grapheme correspondence of the English written language. However, the distinctiveness of English silent <e> (in word final position and any other positions) seemingly has the opposite effect in some cases as the pupils frequently tend to insert an unnecessary <e> when spelling English words. A similar effect is observed in relation to the frequent omission and insertion of the letter <h> which will be discussed in the following section.

5.2.2 Omission and insertion errors involving <h>

As seen in section 5.2.1, the vowel involved in the most omission and insertion errors is <e>. This section explores omission and insertion errors in relation to the consonant involved in the highest number of errors, namely <h>. Firstly, omission errors involving <h> will be considered. In nearly all instances, <h> was omitted after <t> (**trow** for THROW), <s> (**finised** for FINISHED), <w> (**wen** for WHEN), and <g> (**thoug** for THOUGH). As for the reason behind the high frequency of these error types, the possible explanation is complex.

Overall, omission of <h> from <th> was a common error (30 items). As the use of phonological strategies when deriving how to spell English words has already been established as a possible reason for spellings errors, we look at the differences between English and Norwegian pronunciation in trying to explain the occurrence of this certain type of error. As mentioned in chapter 2.4.2, SEN (Standard East Norwegian) does not have the dental fricatives /θ/ and /ð/ which is a common realization of <th> in words such as *think* and *this*, realized /θɪŋk/ and /ðɪs/ respectively. In addition, Norwegian students were by Nilsen (1989) found to have trouble pronouncing phonemes that are not in their L1, among them /θ/ and /ð/ which were commonly substituted with phonemes from SEN such as /t/ and/or /d/. The unfamiliarity of these phonological realizations may have caused the pupils to produce this certain omission error, e.g. **ting** for THING and **tis** for THIS.

As for the omission of <h> from <wh> (39 items) and <gh> (17 items), the pupils have perhaps considered the pronunciation of the words in the spelling process also here. In every item involved in this error type, <h> is not realized in pronunciation. The erroneous spelling **were** for WHERE (realized /wɜ:/) illustrates this point as <h> is not realized in the word's pronunciations. In other words, the pupils have spelled the words phonetically accurate.

Of the selection of omission errors involving <h> presented in this section, the omission of <h> from <sh> was the least common (7 items). Again, the pupils' familiarity of certain phonemes is drawn upon in an attempt to explain why omission of <h> from <sh> occur at a lower rate. In English, <sh> is usually represents the postalveolar fricative /ʃ/, and SEN does indeed have /ʃ/. In other words, the pupils are perhaps more accustomed to /ʃ/ and its possible spellings than to other phonemes that SEN does not have. The pupils' familiarity with certain graphemes and phonemes could explain why <h> is omitted from <sh> at a much lower frequency than from <th>, <wh> and <gh>. However, this possible explanation relates only to why omission of <h> after <s> occurs at a lower rate than the other errors presented in this section thus far, and does not explain why the pupils *do* show some difficulty in spelling <sh>. A possible explanation is explored in relation to errors involving the insertion of <h> after <s> further down.

Secondly, we move on to consider insertion errors involving the consonant <h>. As seen in section 5.2.1, the same vowel, <e>, accounted for the highest number of omissions and insertions. The same pattern is observed in relation to the consonant <h> which accounts for most consonant omissions and consonant insertions. Errors involving

the insertion of <h> follow a quite distinct pattern similar to the one seen with the omission of <h>. The consonant <h> was inserted *only* after <t> (**loth** for LOT), <w> (**whe** for WE) and <s> (**shure** for SURE). The possible explanations behind the production of these errors are also complex.

As for the errors involving the insertion of <h> after <w> and <s>, they might be attributed to confusion caused by the irregular phoneme-grapheme correspondence of the English language. The basic phoneme used to realize <wh> in pronunciation is /w/, which is 80% regular (Brooks 2015, 335). This means that <h> is usually not realized in pronunciation after <w>. The pupils are perhaps aware of the fact that <h> often occurs after <w> in certain English words but is not necessarily realized in pronunciation, causing them to insert <h> knowing that this likely will not affect the pronunciation of the word. In relation to the erroneous insertion of <h> after <s>, we look at the specific examples previously used for illustration, namely **shure** for SURE, which accounts for all insertion errors where <h> is inserted after <s> (4 items). The word *sure* is realized /ʃʊə/ in pronunciation. However, the most common realization of /ʃ/ in spelling is <sh>. This may have led to some confusion for the pupils when spelling *sure* as they were perhaps aware of the common pronunciation of <sh> as /ʃ/. This confusion may also account for the omission of <h> from <sh>, as the pupils recognize that /ʃ/ can be spelled both <s> and <sh>. The patterns observed in relation to the insertion of <h> after <w> and <s> indicates confusion caused by irregular phoneme-grapheme correspondence.

Another factor that needs to be considered in relation to these errors is the overgeneralization of typical English spelling features. The pupils may recognize the spellings <wh>, <sh> and <th> as typical features of English orthography, and therefore overuse these features to make a word 'look more English'. The overgeneralization of typical English spelling features becomes particularly prominent in the case of insertion of <h> after <t>. As mentioned, <th> is realized as either /ð/ (88% regular) or /θ/ (12% regular), and exceptions to this main system account for less than 1% (Brooks 2015, 329–330). This means that in nearly all cases, the erroneous insertions of <h> after <t> will result in non-target pronunciation, in for example **wather** for WATER and **thrust** for TRUST, indicating overuse of <h> as opposed to the use of phonetic strategies.

Several of the omission and insertion errors are classified as homophone-related. Homophones are words that are pronounced the same but are semantically different. Initially, I included homophones as a category of their own, i.e. in addition to the six major categories. However, as the errors within words that are considered homophones

fit quite well into the other major error categories for this study, I decided against a separate category. Homophones were kept track of within the categories they occur by means of a colour coding system in the Excel spreadsheet. A common homophone related error was the confusion of *to/too/two*. For example, the error **to** for TOO (44 items) involved failing to double <o>, the error **to** for TWO (10 items) involved omission of <w>. This example illustrates how words that are homophones can also be categorised within the six major error categories. It also illustrates how words that are pronounced the same seem to cause issues for the pupils, furthering the idea that the irregular phoneme-grapheme correspondence in the English language may play an important role in the production of English spelling errors by Norwegian pupils. In instances where the pupils have confused different homophones, they may have relied on the phonological property of a word rather than contextual or syntactic meaning.

5.2.3 Substitution errors involving <a>, <e> and <i>

Vowel substitution was the most common substitution error. The three vowels most frequently involved in substitution errors were <a>, <e> and <i>. Interestingly, in line with the findings of Cook (1997) and Bebout (1985), the majority of the vowel substitution reflect exchanges *between* <a>, <e> and <i>. To illustrate, <a> is almost exclusively substituted by <e> (**breakfest** for BREAKFAST), <e> by <a> (**goels** for GOALS) and <i> (**papir** for PAPER), and <i> by <e> (**terrebly** for TERRIBLY) and <a> (**horrable** for HORRIBLE). Cook (1997, 481) deems the reason for these exchanges obvious, and points to irregular phoneme-grapheme correspondence. It is possible to link all three letters to the reduced vowel /ə/, and, in turn, /ə/ can be spelled with all three letters. This is not to say that *all* substitutions of either <a>, <e> and <i> can be attributed to /ə/ and its many possible spellings.

5.2.4 Substitution errors involving <c>, <s> and <k>

A similar pattern of substitution errors where there is no one-to-one phoneme-grapheme correspondence, is observed in relation to consonants. Here, substitutions involving the consonants <s>, <c> and <k> stand out in particular. The consonant most frequently substituted is <c>, and with few exceptions <c> is substituted either by <s> (**polise** for POLICE) or <k> **perfekt** for PERFECT). The letter <c> is in most cases realized as either /s/ or /k/, which can explain why the letter is substituted by <s> and <k>. In addition, /k/

can be spelled both <k> and <c>, which can lead to erroneous spellings such as **perfekt** for PERFECT and **kramp** for CRAMP. Another frequent substitution error involves the substitution of <s> by <c> (**pleace** for PLEASE). This may be for the exact reason that both <c> and <s> can be realized /s/ which may lead to confusion. In addition, <c> is considered a foreign letter in Norwegian and used only in a few loanwords (see chapter 2.4.2). The unfamiliarity of the letter can perhaps lead to the pupils considering it a typical English spelling feature. This may, in turn, lead to them substituting the more familiar target letter <s> for <c>. As mentioned in chapter 4.1.2, the substitution of a specific letter does not necessarily lead to another specific letter. Keeping phoneme-grapheme correspondence in mind, the issues presented in this section, as well as section 5.2.1, could indicate why there is not a one-to-one correspondence between the substitution of letters. In other words, the fact that, for instance, /ə/ can be spelled both <a>, <e> and <i>, and /s/ can be spelled both <s> and <c>, highlights the many possibilities a speller is faced with when writing in English, and may explain why the field of English spelling can be difficult to navigate.

5.2.5 Cluster substitution

Overall, 151 items were categorised as involving cluster substitution. Although the items in this category varied greatly, one tendency stands out, namely that the pupils spell words phonemically accurate, either entirely or approximately. For example, <ph> was often substituted by <f>, e.g. **telefone** for TELEPHONE and **catastrofic** for CATASTROPHIC. Here the pupils are indeed spelling according to the phonetic realization of the words *telephone* and *catastrophic*, because both <ph> and <f> can be realized /f/ in pronunciation. Other examples where the pupils seem to be spelling the words according to pronunciation is the erroneous spelling of **thru** for THROUGH. Although this particular error could be seen as an omission error (omission of <o> and <gh>), I have chosen to categorise it as a substitution error (<ough> substituted by <u>). This is because in pronunciation, *through* is realized /θruː/. In other words, <ough> is in this case represented by the single phoneme /uː/, which means that the pupil's spelling could be considered phonetically accurate.

5.2.6 Doubling errors

Overall, vowels cause the pupils more difficulty than consonants. However, the pupils made more errors involving consonants in the doubling category. Some of the most common consonant doubling errors were **realy** for REALLY (20 items) and **comming** for COMING (7 items), although the different consonant doubling errors varied greatly and amounted to 377 items in total. Note that consonant doubling errors include both failing to double a consonant and unnecessary doubling of a consonant. As seen thus far in this chapter, the findings indicate that the pupils' erroneous spellings often coincide quite well with the pronunciation of the word. This, in turn, indicates that the pupils confer with the pronunciation of certain word when deriving how a to spell them. However, in the case of doubling errors they cannot necessarily use this strategy, because according to Bebout (1985, 583) "any learner (or any writer, for that matter) of English must wrestle with the fact that the consonant doubling never has any effect upon the pronunciation of the consonant(s) and often has no effect upon the surrounding vowels". In other words, the pupils typically cannot look towards the pronunciation of a consonant or any surrounding vowels to get an indication of whether the consonant should be doubled or not. The doubling of consonants has been seen to cause difficulty for both L1 users and L2 learners of English (Bebout 1985). According to Brooks (2015, 109) knowing whether to double or not to double a consonant is "the main bugbear for English spelling" that even L1 users struggle with. Furthermore, it seems only natural that L2 learners of English would struggle with this as well.

5.2.7 Transpositioning errors

The final error types that will be considered in this thesis are transpositioning errors, although the errors in this category account only for 5.3% of all the errors identified. As mentioned in section 5.1.3, the differences between handwriting and keyboard writing cannot account for the entirety of the errors categorised within the transpositioning category. Firstly, transpositioning errors occurred in both CORYL and the control corpus, and secondly, the same transpositioning errors occurred across both corpora. An error type that stands out particularly in this category, is transpositioning errors within words that include the letter <h>, e.g. **whit** for WITH, **withe** for WHITE, **wath** for WHAT, **rigth** for RIGHT and **nigth** for NIGTH. What is characteristic with these errors is that they include all target-letters but the letters are placed in non-target order. More specifically,

the <h> is placed in non-target position. Placing <h> in non-target position was an error common in the findings of Nygaard (2010, 68) as well. A possible explanation here is that the pupils are perhaps aware that the target spelling does indeed include an <h>, but they are unsure of its target-position. This could be attributed to the irregular phoneme-grapheme correspondence related to <h> where it affects pronunciation in some positions, for example after <t> (/θ/ and /ð/), but does not in other positions, for example after <w> (/w/). In addition, the possible overgeneralization of the common English spellings <wh> and <th> mentioned in section 5.2.2, may also be an influential factor here.

5.3 Summary

This chapter has highlighted a selection of the spelling errors identified in the corpus data in an attempt to explore and explain the possible mechanism that lie behind the production of these errors. Section 5.1 dealt directly with Q3 and discussed the error categories where there was a noticeable difference between the error rates in the two corpora, i.e. doubling, transpositioning and unclassifiable. The differences between writing on a computer versus writing by hand were considered as possible explanations to the different error rates between CORYL and the control corpus overall, as well as to the differences in the error rates of certain error categories. Section 5.2 dealt with Q1 and Q2 and highlighted three tendencies in particular that seem to have caused the pupils difficulty, i.e. the irregular phoneme-grapheme correspondence of the English language, as well as the possible overgeneralization of typical English spelling features, and L1/L2 discrepancy, although these tendencies typically cannot be considered independent of one another.

6. Conclusion

This thesis has explored which English spelling errors Norwegian pupils produce, as well as the possible mechanisms behind the productions of these errors. Therefore, this thesis has sought to answer the following research question:

Q1: What types of English spelling errors do Norwegian pupils produce?
Q2: Are there patterns behind Norwegian pupils' English spelling errors?

The empirical base of this thesis was a sample of learner data provided by two corpora, CORYL, developed by researchers at the University of Bergen, and a control corpus, developed for this study. Both corpora consist of English written work by pupils in the 10th and the 11th grade in Norwegian schools. One of the main differences between the two corpora was the format in which they were produced, mainly that the CORYL data was handwritten and the control corpus data was keyboard-written. The differences between the two corpora introduced another element to be explored, namely how the use computers effects the English spelling of Norwegian pupils. Therefore, I sought also to explore a third research question in this thesis:

Q3: How does the use of computers effect Norwegian pupils English spelling?

To address Q1 and Q2, I identified and categorised the spelling errors within CORYL and the control corpus, and used these findings to discuss the patterns of errors that emerged and the possible mechanisms behind the production of these errors. To address Q3, I have compared the errors identified in the CORYL data and the control corpus data to identify possible differences in the errors produced across the two corpora.

To answer the first research question, Q1, I categorised the spelling errors identified within the two corpora into the six major error categories: insertion, omission,

doubling, substitution, transpositioning and unclassifiable. The categorisation revealed that omission errors are the most frequent, closely followed by substitution errors. Following these are doubling errors, insertion errors and transpositioning errors, and finally unclassifiable errors.

The second research question, Q2, sought to identify and explain any patterns behind the spelling errors. To answer this research question, I analysed the spelling error patterns that emerged within the major error categories and presented different possible explanations to these patterns. The findings show that there are several visible patterns in the pupils' English spelling errors, and that there are indications of other patterns as well. One of the most notable findings was that the pupils likely use a phonological strategy when deriving how to spell English words, and that this does not necessarily result in target spelling due to the irregular phoneme-grapheme correspondence of the English language. Other factors identified as possibly contributing to the production of English spelling errors are the differences between L1 and L2, here Norwegian and English, and the pupils' tendency to overgeneralize spelling features they consider to be typical English features, for example silent final <e>, resulting in spelling errors such as **aboute** for ABOUT and **tripe** for TRIP.

The third and final research question, Q3, involved comparison of the errors rates between the two corpora to uncover any differences between them. In relation to Q3, two hypotheses were presented: H1, which assumes that the pupils are more likely to produce spelling errors when writing by hand, and H2, which assumes that the pupils produce the same types of spelling errors in handwritten and keyboard-written text. The findings indicate that keyboard writing introduced new elements to the spelling process that in turn affected the error rates. As the pupils produced fewer erroneously spelled words when writing on a keyboard compared to writing by hand, H1 is seemingly confirmed. The spelling checker is assumed to be one of the main explanations to the lower error rate of the keyboard-written control corpus texts, as opposed to the handwritten CORYL texts. As for H2, three of the six major error categories (omission, substitution and insertion) were found to correlate quite well across the two corpora, while differences were observed in relation to the remaining three categories (doubling, transpositioning and unclassifiable). The differences between handwriting and keyboard writing were drawn upon in an attempt to explain the different error rates. The findings indicate that keyboard writing also introduced new complicating factors to the spelling process, seemingly caused by the different co-ordinational, physiological and cognitive aspects of keyboard

writing compared to handwriting, resulting in higher rate of transpositioning errors in the control corpus, as well as certain errors that were exclusive to the control corpus text. However, with few exceptions, the pupils seem to produce the same types of spelling errors across the two corpora, although at different rates, and consequently, H2 is partly confirmed.

6.1 Error evaluation and didactic implications

This and other studies have established that spelling errors are to a varying degree prominent in Norwegian pupils' written English. This section deals with the fifth and final step of error analysis, i.e. error evaluation, and considers which didactic implications the findings from this error analysis can have on classroom practices. In other words, keeping the limitations of this study in mind, this section considers how the findings from studies such as this one can, perhaps, be useful to the field of language teaching.

As previously mentioned, spelling bears meaningful social connotations as high-level spelling ability is often seen as a sign of education and intelligence, while non-target spelling is seen as a sign of the opposite. Nevertheless, as presented throughout this thesis as well as in other projects that study spelling errors, avoiding L2 spelling errors completely is virtually unattainable. Furthermore, one could raise the question of whether avoiding spelling errors entirely should be an objective at all as spelling errors are indeed a natural part of acquiring an L2. In addition, L2 spelling errors can yield important information on a learner's level of literacy. Therefore, neither teachers nor pupils should underestimate the value of the spelling errors that occur in L2 writing. In other words, teachers should strive towards creating learning environments that facilitate the idea that making errors is a natural and, indeed, necessary phenomenon in the process of language learning (Hendrickson 1980, 217).

In addition to the importance of teachers' and pupils' attitudes towards spelling errors, I argue the importance that teachers be aware of different spelling error types. Although avoiding spelling errors should not necessarily be an objective in the first place, it is natural to work towards minimizing spelling errors as orthographic accuracy is central to the development of L2 literacy. By monitoring the spelling errors each pupil makes over a longer period of time, the teacher can differentiate between competence errors and performance errors, i.e. consistent erroneous spellings and erroneous spellings caused by a temporary lapse. Furthermore, the teacher can decide how to deal with these errors

based on the error type. Although it is not possible to distinguish between competence and performance errors in this particular study, one could argue that the high frequency of some errors indicate that they are more likely to be competence errors and should therefore be paid attention to by the teacher. Going beyond the general distinction between competence and performance errors, the teacher can use systematic categorisation of spelling errors, similar to the categorisation used in this study, to monitor pupils' error production. Although the use of systematic categories when differentiating between different spelling error types has its weaknesses (see section 3.8), awareness of different error types can yield information that can improve the instruction and feedback on English spelling. In addition, findings from studies such as this one can contribute to teachers' awareness of spelling patterns that they themselves follow implicitly, and, furthermore, enable them to provide valuable instructional information so that the pupils themselves can internalize these patterns (Treiman 2017, 271).

As mentioned, the findings from this thesis indicate that phonology plays an important role in the process of L2 English spelling. Accordingly, there may be a certain value in incorporating phonology into the teaching of English spelling. Teachers could, for example, facilitate learning activities that encourage pupils to explore the relationship between written and spoken language, and thus uncover the inconsistencies of English spelling on their own. Chapter 2.5.2 presented an example of how pupils are made aware of the inconsistencies of English in a selection coursebooks. Teachers could perhaps consider going beyond presenting English as an innately difficult system, and attempt to explain *why* English by many is considered difficult to learn. This could be tied to other broad topics set forth by the subject curriculum, such as the English-speaking world and English as a global language.

Naturally, incorporating new practices to L2 teaching is easier said than done. While suggesting possible changes to improve English teaching practices is simple, actually implementing these changes is considerably more difficult. Any teacher must wrestle with the fact that they are limited by the constrains of the subject curriculum, as well as a set number of lesson hours per year: 222 hours across 8th to 10th grade, and 140 hours in 11th grade (Utdanningsdirektoratet 2013). These practical limitations, along with the variety of individual preconditions in any given classroom, are most likely only few of the challenges language teachers are faced with. Nevertheless, I argue that one should not shy away from suggesting new practices of language teaching, as such suggestions might contribute to further improve an ever evolving field.

6.2 Further research

The L2 English spelling errors of Norwegian pupils, and learners in general, is a field in need of further exploration. In relation to this study in particular, there are a number of possible improvements and extensions. A longitudinal study, for instance, of the English spelling errors of Norwegian pupils could yield information of which this thesis lacks, such as the ability to differentiate between competence errors and performance errors. By differentiating between these kinds of spelling errors, one could with a higher degree of certainty determine what seemingly causes spelling issues for Norwegian learners.

As this study has applied the methodological framework of error analysis, it has exclusively focused on what the pupils *cannot* do. Combining the findings of this error analysis with findings on what the pupils actually *can* do, could yield more reliable results and a more complete picture of Norwegian pupils' L2 English spelling competence.

In terms of the spelling error categories used for this study, another possible extension is to further develop the categories based on findings of error analyses such as this one. There is indeed a certain value to using broad categories in the process of spelling error categorisation, such as the practical applicability of the categories to other spelling error analyses. However, developing a more comprehensive system of categorisation, perhaps particularly a more comprehensive system of subcategorisation, might uncover additional patterns in the L2 English spelling errors of Norwegian pupils that are not revealed in this thesis. Furthermore, comprehensive systems of categorisation could also contribute to making the process of corpus annotations more detailed.

As for further research relating directly to the English classroom, a longitudinal study could uncover teachers' and pupils' attitudes towards spelling errors, as well as the effect of feedback on spelling errors.

The findings from this study can hopefully inspire future and more thorough research on the topic of Norwegian pupils' L2 English spelling errors.

APPENDIX I

Information document distributed to the teachers and pupils (Norwegian version)

Informasjon om forskningsprosjekt tilknyttet engelsk språk

Som en del av min masteravhandling ved studiet lektorutdanning med master i fremmedspråk (engelsk, fransk eller tysk) ved Universitetet i Bergen ønsker jeg undersøke engelske elevtekster fra 10. trinn på ungdomsskolen og 1. trinn på videregående skole. Dette innebærer at etter din klasse har gjennomført en heldagsprøve/skriveøkt sender din lærer elevteksten din til meg. Navnet på elevteksten vil bli fjernet før den sendes til meg. Jeg vil ikke vite hvem som har skrevet teksten jeg leser, og jeg skal kun undersøke enkeltord i teksten din. Dersom du ikke vil at din tekst skal sendes til meg, kan du gi muntlig beskjed om dette til din lærer. Mitt prosjekt har ingen tilknytning til skolen du går på eller din karakter i faget.

Dersom du har noen spørsmål kan jeg kontaktes på e-post: awe017@uib.no.

Med vennlig hilsen,
Amanda Ødegaard Wedge (masterstudent ved Universitet i Bergen)

APPENDIX II

Information document distributed to the teachers and pupils (English version)

Information about research project on English language

As part of my Master's dissertation and teacher training program at the University of Bergen, I wish to explore English texts written by pupils in the 10th grade in lower secondary school and the 1st grade in upper secondary school. This entails that after your class has completed an all-day test/mock exam, your teacher will send your text to me. Your name will be removed before the text is sent to me. I will not know who has written the text that I am reading, and I will explore only single words in your text. If you do not wish for your text to be submitted, you can give an oral notice to your teacher. My project has no connection to your school or your grade in the subject.

If you have any questions, I can be contacted per e-mail: awe017@uib.no.

Best regards,
Amanda Ødegaard Wedge (Master's student at the University of Bergen)

List of references

Anderson, Kristine F. 1985. "The Development of Spelling Ability and Linguistic Strategies." *The Reading teacher* 39 (2): 140–147.

Areklett, Kristin Måge, Synnøve Pettersen, Felicia Røkaas, and Hilde Tørnby. 2019. *Stages 10*. Skien: Aschehoug.

Bassetti, Benedetta, and Vivian J. Cook. 2005. "An Introduction to Researching Second Language Writing Systems." In *Second Language Writing Systems,* edited by Vivian J. Cook and Benedetta Bassetti. Clevedon: Multilingual Matters.

Beatty, Ken. 2010. *Teaching & Researching: Computer-Assisted Language Learning*. New York: Routledge. https://bookshelf.vitalsource.com/books/9781317862871.

Bebout, Linda. 1985. "An Error Analysis of Misspellings Made by Learners of English as a First and as a Second Language." *Journal of psycholinguistic research* 14 (6): 569–593. https://doi.org/10.1007/BF01067386.

Bergen Kommune. 2021. "Digitale verktøy i skolen." Accessed 14 February. https://www.bergen.kommune.no/innbyggerhjelpen/skole/grunnskole/grunnskoleopplaring/digitale-verktoy-i-skolen.

Brooks, Greg. 2015. *Dictionary of the British English Spelling System*. Cambridge: OpenBook Publishers.

Callies, Marcus. 2015. "Learner corpus methodology." In *The Cambridge Handbook of Learner Corpus Research*, edited by Sylviane Granger, Gaëtanelle Gilquin and Fanny Meunier, 35–56. Cambridge: Cambridge University Press.

Carney, Edward. 1994. *A Survey of English Spelling*. London: Routledge.

Carney, Edward. 1997. *English spelling*. London: Routledge.

Cook, Vivian J. 1997. "L2 Users and English Spelling." *Journal of multilingual and multicultural development* 18 (6): 474–488. https://doi.org/10.1080/01434639708666335.

Cook, Vivian J. 2004. *The English Writing System*. London: Routledge.

Crystal, David. 2003. *The Cambridge Encyclopedia of The English Language*. 2nd ed. Cambridge: Cambridge University Press.

Deacon, Robert Joel. 2017. "The Causes of Spelling Errors by Arabic Learners of English." *Eurasian journal of applied linguistics (Online)* 3 (2): 1–22.

Ellis, Rod. 2008. *The Study of Second Language Acqusition*. Oxford: Oxford University Press.

Ellis, Rod. 2010. "Second language acquisition, teacher education and language pedagogy." *Language teaching* 43 (2): 182–201. https://doi.org/10.1017/S0261444809990139.

Ellis, Rod. 2015. *Understanding second language acquisition*. 2nd ed. Oxford: Oxford University Press.

Ellis, Rod, and Gary Barkhuizen. 2005. *Analysing Learner Language*. Oxford: Oxford University Press.

Fjørtoft, Siw Olsen, Sylvi Thun, and Marte Pettersen Buvik. 2019. *Monitor 2019: En deskriptiv kartlegging av digital tilstand i norske skoler og barnehager.* SINTEF https://www.udir.no/contentassets/92b2822fa64e4759b4372d67bcc8bc61/monitor-2019-sluttrapport_sintef.pdf.

Flor, Michael, Yoko Futagi, Melissa Lopez, and Matthew Mulholland. 2015. "Patterns of misspellings in L2 and L1 English: a view from the ETS Spelling Corpus." *Bergen language and linguistics studies* 6. https://doi.org/10.15845/bells.v6i0.811.

Forskrift til opplæringsloven. *Forskrift til opplæringsloven*. 30 June 2006. https://lovdata.no/dokument/SF/forskrift/2006-06-23-724

Granger, Sylviane. 2008. "Learner corpora." In *Corpus linguistics. An International Handbook*, edited by A. Lüdeling and M. Kytö, 259–275. Berlin, New York: Walter de Gruyter.

Hasselgreen, Angela, and Kari Sundet. 2017. "Introducing the CORYL Corpus: What it Is and How We Can Use it to Shed Light on Learner Language." *Bergen language and linguistics studies* 7. https://doi.org/10.15845/bells.v7i0.1107.

Haugen, Hellevi, Eva Haugum, Julia Kagge, Cheryl Ann Ljones, Astrid Myskja, and Audun Rugset. 2013. *Targets*. Skien: Aschehoug

Hendrickson, James M. 1978. "Error Correction in Foreign Language Teaching: Recent Theory, Research, and Practice." *The Modern language journal (Boulder, Colo.)* 62 (8): 387–398. https://doi.org/10.1111/j.1540-4781.1978.tb02409.x.

Hendrickson, James M. 1980. "The Treatment of Error in Written Work." *The Modern language journal (Boulder, Colo.)* 64 (2): 216–221. https://doi.org/10.1111/j.1540-4781.1980.tb05188.x.

Ioup, Georgette. 2005. "Age in Secong Language Development." In *Handbook of research in second language teaching and learning*, edited by Eli Hinkel. Mahwah, NJ: Erlbaum.

Krashen, Stephen D. 1982. *Principles and Practice in Second Language Acqusition*. New York: Pergamon Press.

Kristoffersen, Gjert. 2000. *The Phonology of Norwegian*. Oxford: Oxford University Press.

Lakshmanan, Usha. 2013. "Child Second Language Acquisition." In *The Routledge encyclopedia of second language acquisition*, edited by Peter Jake Robinson, 71–75. New York: Routledge.

Lightbown, Patsy M., and Nina Spada. 2020. *How Languages are Learned*. 4th ed. Oxford: Oxford University Press.

MacWhinney, Brian. 1992. "The Competition Model and Foreign Language Aqusition." In *Intelligent Tutoring Systems for Foreign Language Learning*, edited by M. L. Swartz and M. Yazdani. Berlin: Springer.

Mangen, A., L. G. Anda, G. H. Oxborough, and K. Brønnick. 2015. "Handwriting versus keyboard writing: Effect on word recall." *Journal of writing research* 7 (2): 227–247. https://doi.org/10.17239/jowr-2015.07.02.1.

Morphy, Paul, and Steve Graham. 2012. "Word processing programs and weaker writers/readers: A meta-analysis of reasearch findings " *Reading and Writing* 25: 641–678. https://doi.org/10.1007/s11145-010-9292-5.

Nilsen, Thor Sigurd. 1989. "Do You øndəʃtænd? An Error Analysis of Norwegian Students' Pronunciation of English."

Nilsen, Thor Sigurd. 2002. *British and American English pronunciation*. 2nd ed. Oslo: Universitetsforlaget.

Nygaard, Anne-Marie. 2010. An investigation of accuracy in the written English of upper secondary vocational school students. MA thesis, University of Stavanger.

Okada, Takeshi. 2005. "A Corpus-based Study of Spelling Errors of Japanese ELF Writers with Reference to Errors Occurring in Word-initial and Word-final Position." In *Second Language Writing Systems* edited by Vivian J. Cook and Benedetta Bassetti. Clevedon: Multilingual Matters.

Polio, Charlene. 2012. "The acquisition of second language writing." In *The Routledge Handbook of Second Language Acquisition*, edited by Susan M. Gass and Alison Mackey. London: Routledge.

Rohr, Jasmyn. 2012. *All About Standard English, English Spelling & History of the English Language*. New Delhi: World Technologies.
Rugesæter, Kåre Nitter. 2014. "Difficult contrasts: an analysis of phonemic distinctions in the English of young Norwegian learners seen against the backdrop of incidental foreign language learning." *Acta didactica Norge* 8 (1): 10. https://doi.org/10.5617/adno.1102.
Simensen, Aud Marit. 2007. *Teaching a foreign language: principles and procedures*. 2nd ed. Bergen: Fagbokforlaget.
Simpson, Haakon Valen Hume. 2019. The spelling of phonemes - An Error Analysis of Norwegian pupils' L2 English spelling with emphasis on phoneme–grapheme correspondences. MA thesis, The University of Bergen.
Somers, Harold. 2005. "Learner Corpora and Handwriting." *Second Language Writing Systems,* edited by Vivian J. Cook and Benedetta Bassetti. Clevedon: Multilingual Matters.
Stefanowitch, Anatol. 2020. *Corpus linguistics: A guide to the methodology*. In *Corpus linguistics*. Berlin: Language Science Press.
Treiman, Rebecca. 2017. "Learning to Spell Words: Findings, Theories, and Issues." *Scientific studies of reading* 21 (4): 265–276. https://doi.org/10.1080/10888438.2017.1296449.
Treiman, Rebecca. 2020. *Beginning to spell: a study of first-grade children*. New York: Oxford University Press.
Upward, Christopher, and George Davidson. 2011. *The History of English Spelling*. 2nd ed. Bognor Regis: Wiley-Blackwell.
Utdanningsdirektoratet. 2013. "English subject curriculum (ENG1-03)." https://www.udir.no/kl06/ENG1-03.
Utdanningsdirektoratet. 2017. "Core curriculim - values and principles for primary and secondary education." https://www.udir.no/lk20/overordnet-del/?lang=eng.
Utdanningsdirektoratet. 2020. "Nasjonale føringer for nettbaserte hjelpemidler til eksamen i videregående." Accessed 14 February. https://www.udir.no/eksamen-og-prover/eksamen/nasjonale-foringer-for-nettbaserte-hjelpemidler-til-sentralt-gitt-skriftlig-eksamen-i-videregaende/.
Van Berkel, A. J. 2004. "Learning to spell in English as a second language." *International review of applied linguistics in language teaching, IRAL* 42 (3): 239–257. https://doi.org/10.1515/iral.2004.012.
Van Gelderen, Elly 2014. *A History of the English Language*. Revised ed. Amsterdam: John Benjamins Publishing Company.
Vattøy, Kim-Daniel. 2017. "Learning English in Norway." *Language Issues: The ESOL Journal* 28 (2): 51–53.
Vestland Fylkeskommune. n.d. "Elev-PC." Accessed 14 February. https://www.vestlandfylke.no/utdanning-og-karriere/elev/elevpc/.
Waagene, Erica, and Cay Gjerustad. 2015. "Valg og bruk av læremidler". https://www.udir.no/globalassets/filer/tall-og-forskning/forskningsrapporter/nifuarbeidsnotat2015-12-aller-siste.pdf.
White, Lydia. 2003. *Second language acquisition and universal grammar*. Cambridge: Cambridge University Press.