

Exploring L2 English Proficiency and Translation of Academic English Vocabulary

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Abstract

Knowledge of academic English vocabulary is essential for upper secondary L2 English learners preparing for university studies, yet previous research suggests students in Scandinavian settings may need support to acquire this lexis (Edgarsson, 2017; Henriksen & Danelund, 2015). The abundance of Graeco-Latin cognates between European languages and academic English has been shown to lessen the learning burden of academic English vocabulary for speakers of Romance languages (Cobb, 2000; Petrescu et al., 2017). However, less research has been conducted for speakers of Scandinavian languages who also have appropriate translations of Germanic origin for this vocabulary. Interestingly, previous studies have indicated that proficient Norwegian-speaking students taking tertiary studies made extensive use of Graeco-Latin cognates when translating academic English vocabulary, but research has yet to expand this investigation to upper secondary students and across proficiency levels. Therefore, the current study investigated if Norwegian-speaking students (N= 132) in their first year of upper secondary education produced Graeco-Latin cognates when translating academic English. Findings showed extensive use of L1 Latinate cognate forms to translate the English target words. However, less proficient learners had significantly fewer cognate translations and significantly more untranslated target words than more proficient learners. Findings suggest that in-class instruction raising awareness of Graeco-Latin cognates in academic English may be worthwhile, especially for less-proficient learners.

Keywords

Academic vocabulary, cognates, translation, English language learners, vocabulary knowledge, L2 proficiency, education.

1. Introduction

English language learners in Nordic countries are generally considered highly proficient English users (Bonnet, 2004; Education first, 2021). However, testing research centered on upper secondary students' knowledge of academic English has revealed that many of these learners have surprisingly low levels of academic vocabulary knowledge (Edgarsson, 2018; Henriksen & Danelund, 2015; Olsson, 2016; Skjelde & Coxhead, 2020; Warnby, 2023;). For speakers of Romance languages, research has found that Graeco-Latin cognates between English and students' L1 can facilitate acquisition of this lexis (Cobb, 2000; Petrescu et al., 2017). Yet our knowledge is limited regarding the awareness L2 English learners in Scandinavia have of Graeco-Latin cognates present in academic English. Therefore, the current study explored upper secondary students' number of translations for academic English vocabulary, the number of cognates used for translation, and possible associations with English proficiency.

This study is part of a larger project examining Norwegian-speaking upper secondary and tertiary students' knowledge, conception, and use of academic lexis. The first study examined upper secondary students' receptive knowledge of academic English vocabulary as a predictor of English course grades (Skjelde & Coxhead, 2020). The current study explored the same students' translations of academic English words to investigate if cognates were used to translate academic English words. It could be expected that cognate forms would facilitate translation due to semantic and orthographic similarities with their L1, as was indicated in a study of tertiary students proficient in academic English who took the same translation test (Skjelde, 2022).

The following questions have guided the research reported here:

1. To what extent do Norwegian-speaking upper secondary students translate academic English lexis using Graeco-Latin cognates?
2. What associations are found between English proficiency, the number of cognate translations, and the number of untranslated target words?

The background for this study in relation to previous research is presented in further detail in sections two and three. The background information is followed by a description of

the methods used (section four) and a presentation of findings in section five. Finally, a discussion and implications for L2 pedagogy are provided in section six, and the article closes with a brief conclusion in section seven.

2. Academic Vocabulary in Research and Language Education

Before further discussion of the topic, it is necessary to address how academic vocabulary has been defined. For the current study, the term academic vocabulary refers to lexis that occurs across academic disciplines more frequently than in general English discourse (Charles & Pecorari, 2016; Coxhead, 2000; Gardner & Davies, 2014; Nagy & Townsend, 2012). Not all researchers, however, agree that academic English vocabulary is used similarly in different academic fields (Durrant, 2016; Hyland & Tse, 2007). Even so, vocabulary overlap has been found across subject areas using corpus linguistics and large corpora of academic texts (Browne et al., 2013; Coxhead, 2000; Gardner & Davies, 2014; Paquot, 2010). From this research, lists of academic English words have been constructed which are commonly used for research and pedagogical purposes. Two of the most widely used academic word lists for English are Coxhead's (2000) Academic Word List (AWL) and Gardner and Davies' (2014) Academic Vocabulary List (AVL). Examples of words found on both lists include *evaluate*, *facilitate*, and *symbol*.

The importance of academic vocabulary knowledge in English is made clear both through research evidence and due to the lexical demands placed on L2 English students in many education contexts today. Research conducted with the AWL and the AVL has revealed lexical coverage rates of 10% (Coxhead, 2000) to 14% (Gardner & Davies, 2014) in academic texts (see also Coxhead (2020) and Nation et al. (2016)) meaning that receptive knowledge of this vocabulary is essential for students to reach the 95% and 98% coverage rates recommended for reading comprehension (Laufer & Ravenhorst-Kalovski, 2010). Yet receptive knowledge needed for reading is not enough to reach the learning goals outlined in, for example, the Norwegian curriculum for the English subject. Students taking college preparatory courses here must "listen to, understand and use academic language in working on own oral and written texts" (Norwegian Ministry of Education and Research, 2019, p.12). Also, there is no official definition of *academic language* or *academic vocabulary* and due to the freedom in methodological choices for educators in Norway, it is largely up to individual teachers to define the concepts. Under these circumstances, teachers may fail to recognize the existence of a core academic vocabulary that is necessary for text comprehension and the abundance of Graeco-

Latin cognates that may help facilitate the acquisition of this vocabulary for their students. In addition, concerns have been raised that upper secondary education in Nordic countries fails to adequately prepare students for tertiary study in parallel language contexts that require students to navigate between a majority language and English for a wide variety of subjects (Arnbjörnsdóttir, 2018; Hellekjær, 2019; Henriksen et al., 2019). For these reasons, investigations of cognate words common in academic English could be of value for educational research.

Different tests have been constructed to measure receptive knowledge of academic English vocabulary on the AWL and AVL, such as the Schmitt et al. (2001) Vocabulary Levels Test (VLT) academic sections based on the AWL and the Pecorari et al. (2019) Academic Vocabulary Test (AVT) based on the AVL. The VLT is a test that has been used extensively. It is a multiple-choice diagnostic test that measures receptive knowledge of vocabulary at different frequency levels, including an academic vocabulary level using items from the AWL (Coxhead, 2000). The VLT was first developed by Nation (1990) and later revised by Schmitt et al. (2001), and recently updated by Webb et al. (2017). Though the VLT (Schmitt et al., 2001) has several shortcomings (see Schmitt et al., 2020), it has been widely used by researchers and was administered in the current project as it allows for comparison of results to previous studies because the Webb et al. (2017) version does not contain an academic level. Also, the AVL was not available at the time of data collection. Researchers have made recommendations for signs of mastery for each level. Both the Schmitt et al. (2001) 86.7% and the Webb et al. (2017) 97.6% recommendations have been used for the current study.

The first study conducted in this research project used vocabulary testing to measure receptive recognition knowledge, i.e., students' ability to recognize word form and meaning connections by matching a target word with the correct definition or synonym. Norwegian-speaking upper secondary students (N=134), the same participant group used for the current study, were tested using the academic levels of the VLT versions 1 and 2. The study compared students' mastery of VLT academic levels to English course grades (Skjelde & Coxhead, 2020). Findings revealed that mastery correlated significantly with course grades. Those who showed receptive mastery of academic English vocabulary had between nine- and four-times higher odds of having higher English course grades than those who failed to reach these mastery levels (Skjelde & Coxhead, 2020). Yet most of these Norwegian-speaking students lacked high levels of receptive knowledge of this lexis, which is concerning for several reasons. First, 70% of the VLT academic target words were found to be cognates with Norwegian (Skjelde, 2022), something that has been shown to provide advantages for L2 English learners when testing receptive word

knowledge (e.g., Elgort, 2013). Second, the word knowledge measured is a very basic knowledge of form-meaning recognition (Schmitt et al., 2001), and these students will also need to produce academic English vocabulary during their studies. Finally, the target words tested represented high-frequency academic vocabulary. Because curricular demands for the English subject in Norway include the study of advanced topics such as democracy and citizenship (Norwegian Ministry of Education and Research, 2019), it can be expected that students will also need to master academic vocabulary at lower frequency levels. Therefore, findings suggest that many Norwegian-speaking students will need support to expand their academic vocabulary knowledge (Skjelde & Coxhead, 2020). However, questions about the kinds of support that could be helpful for these L2 English learners remain. The current research provides a preliminary exploration of this topic by analyzing to what extent upper secondary students translated Graeco-Latin cognates present in academic English, to what extent they used cognates during translation, and how these factors were associated with L2 English proficiency.

3. Graeco-Latin Cognates and Cognate Translations

One characteristic of academic vocabulary that has the potential to aid the acquisition of this lexis is the abundance of Graeco-Latin words in academic English and the tendency for these cognates to traverse European languages (e.g., Corson, 1997; Nation, 2013). Historically, cognates are defined as words across two or more languages having a common genealogy and shared semantic, orthographic, and phonological traits (De Groot, 2011; Otwinowska, 2016). The presence of cognates can lessen the learning burden of academic English vocabulary. As Nation's (1990) general principle of learning burden argues, "the more a word represents patterns and knowledge that the learners are already familiar with, the lighter the learning burden" (Nation, 2013, p. 44-45). Cognates may enhance acquisition because shared word forms imply "the learning of relatively few form components," and thus, knowledge of cognate forms is acquired with fewer attempts than for non-cognate translations (De Groot, 2011, p. 119). Coxhead (2000) found that 82% of the words on the AWL were of Graeco-Latin origin, and, as mentioned previously, investigations made for this project showed that 70% of the academic VLT items were cognates of Norwegian (Skjelde, 2022). Examples of Graeco-Latin cognates between English and Norwegian are the complete cognates *element/element*, and partial cognates *demonstrate/demonstrere*. Such cognate advantages for L2 English acquisition have been explored in different ways.

Vocabulary testing studies have indicated that L2 English learners with L1 Romance languages may acquire academic vocabulary more easily due to the presence of Graeco-Latin cognates (Cobb, 2000; Petrescu et al., 2017). Petrescu et al. (2017) tested university students who were speakers of a Romance language (Romanian) and a language less similar to English (Vietnamese) using the academic AWL section of the VLT (Schmitt et al., 2001), and two levels containing low-frequency items. The Romanian speakers answered cognate items more accurately than Vietnamese-speaking students. However, there was an uneven number of cognate and non-cognate task items on the AWL level, and both learner groups were close to reaching a ceiling effect, issues that may have influenced the results. The high percentage of VLT target words that were Graeco-Latin cognates with Norwegian made it less appropriate to use this test to analyze cognate advantages for the L2 English learners in the current study.

Cognate advantages have also been tested with the use of translation tasks. A wide range of psycholinguistic studies investigating lexical processing have used cognate recognition and translation tasks (see De Groot, 2011). These studies have found that language learners name (e.g., Jacobs et al., 2016; Poarch & Van Hell, 2012) and translate cognates (e.g., Kroll et al., 2002) more quickly and accurately than non-cognate task items. In addition, researchers have employed cognate translation tasks for studies conducted within classroom settings for ecological validity that have also provided evidence of cognate advantages (Otwinowska & Szewczyk, 2017; Otwinowska et al., 2020; Rogers et al., 2015). Otwinowska and Szewczyk (2017) found that Polish-speaking university students (N=150) correctly translated general English cognates at rates significantly higher than non-cognates and that orthographic similarity had a positive effect on correct cognate translations, though proficient learners also correctly translated cognates with only moderate similarities. Findings also revealed that less proficient learners acquired fewer cognates than more proficient learners (Otwinowska & Szewczyk, 2017), in contrast to findings from vocabulary testing research using multiple-choice tasks (e.g., Elgort, 2013). Taking this research into consideration, it could be of interest to conduct further cognate studies with the use of translation tasks.

The use of translation tests in classroom studies is complex. It is common for researchers to use concrete target words that are largely translated by one cognate form to help make cognate translation scoring more objective (e.g., Otwinowska et al., 2020; Rogers et al., 2015). Nonetheless, several appropriate translations are often available for each test item, which is especially true for academic vocabulary. To take this complexity into account, Skjelde (2022) constructed a 60-item decontextualized L2-L1 translation test that allowed students to provide

up to three translations or definitions for each target word. The VLT academic levels and the translation test were administered to tertiary students (n=13), and focus group discussions followed the testing. Findings revealed extensive receptive knowledge of high-frequency academic English and extensive use of Graeco-Latin cognates during translation, though some target words were difficult for these students to translate, despite having cognate forms in Norwegian. Also several of these students, who were highly proficient in English, expressed difficulties finding appropriate Norwegian translations though their test scores showed correct translations for over 95% of the target words. Results inferred that “even highly proficient students experienced translating Graeco-Latin cognates ... as cognitively demanding” (Skjelde, 2022, p. 21), something that is surprising because of the large degree of semantic and orthographic overlap between these cognates (see Appendix A). For this study, the number of translated target words and cognate translations was analyzed and compared to English proficiency to indicate younger students’ awareness of Graeco-Latin cognates because these analyses could provide evidence that cognates could also be useful for this learner group. Thus, it should be noted that receptive word knowledge of the target words was not in focus for the current research.

4. Methods

The data gathered for the current study was part of a larger project that made use of several instruments and in-class data collection. This has made it necessary to include a relatively large amount of information for transparency purposes. In the following section, the participant population is presented before data collection procedures are explained. The final two sections provide an overview of the instruments used and analyses conducted.

4.1 Participants

Participants were first-year upper secondary students (N=152) attending college preparatory courses and, therefore, expected to have a high level of English-language competence, though it was also predicted there would be wide variation in proficiency. Participants reporting other first languages besides Norwegian or learning difficulties were excluded from the analyses to lessen the number of variables not directly related to the analyses conducted. Also, two students defined the target words in English and were excluded, reducing the number of participants to 132. Participants were, on average, 15.9 years old. The project followed guidelines set by the

Norwegian Center for Research Data (NSD), and all participants consented to take part in the study. Guardians were also informed of the project and encouraged to co-sign the consent form.

Findings from the previous study reporting on these participants indicated a significant positive relationship between their receptive academic vocabulary knowledge and English course grades. Those showing mastery on the VLT academic levels were more likely to have higher English grades than students who did not demonstrate mastery (Skjelde & Coxhead, 2020). For the current study, learners defined as proficient in English have demonstrated mastery of the VLT academic levels, also an indication of higher English course grades than less proficient learners.

4.2 Procedures

Data for the current study was collected at the same time as the study reported in Skjelde & Coxhead (2020). The research was administered in seven intact classrooms at six schools located in three regions of Western Norway. The schools were in both urban and rural areas, and, as shown in Table 1, participants demonstrated English proficiency comparable to regional and national averages (see also Skjelde & Coxhead, 2020).

Table 1. English End-of-Term Course Grades Compared to National and Regional Exam Averages

Student averages	Course grades
Participant average	4.01 ¹
Regional average	4.10
National average	3.90

The researcher led all sessions to ensure the uniformity of the data collection procedure and to answer student questions directly. Communication was conducted in English unless students expressed a desire for more information in Norwegian at which time the researcher provided follow-up information in Norwegian. The classroom teacher was also present during the data collection process to help students feel more at ease, and so those not taking part in the study would have help to complete their assignments. Participants completed two vocabulary tests and a questionnaire during a 90-minute session of an obligatory English language course, with a 10-minute break between the vocabulary tests and the questionnaire. All materials were answered electronically on laptop computers. Participants were given online access to the

¹ Note: Six is a sign of excellence and one is a failing grade.

vocabulary tests and questionnaire and no time constraints for the completion of these items beyond the 90-minute limit of the entire session. All participants completed the tasks within this time frame.

For both vocabulary tests, students were instructed to answer the target items if they felt they knew the word but not to guess randomly. They were also instructed to turn off spell-check functions and to remain on the links throughout the study. For the translation test, participants were instructed to translate the English target words into Norwegian and were allowed up to three translations for each item (see Figure 2) but were reassured that one translation was sufficient. Definitions were also allowed, and those who asked were encouraged to explain the word in Norwegian if they found it difficult to recall a one-word translation.

The researcher followed the testing but did not monitor students other than being present in the classroom. The terms *academic vocabulary* and *cognates* were not presented or discussed with teachers or participants. Following data collection, all participants were given a code to avoid test results being directly linked to personal information. Finally, the results were manually compiled into one excel file for further analysis.

4.3 Instruments

Three instruments were used for the study, two vocabulary tests and a questionnaire. The first vocabulary test was composed of monolingual English versions 1 and 2 of the academic sections from the VLT (Schmitt et al., 2001), a 60-item, multiple-choice test that measures receptive word knowledge. Results from the VLT were used to group students by proficiency and were thereafter used as a predictor variable for the inferential statistical analyses. As shown in Figure 1, items were presented in an online grid format similar to that used for the revised VLT (Webb et al., 2017). Six words are provided at the top of the grid, and three short definitions are given in the far-left column. Participants are instructed to match the definitions with the correct target word by clicking on the appropriate circle (see Figure 1).

Figure 1. VLT Task Example in the Online Format

	decade	fee	file	incidence	perspective	topic
10 years	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
subject of a discussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
money paid for services	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The second vocabulary task was a 60-item decontextualized English (L2) to Norwegian (L1) translation task designed for the current project. This test was used to explore the number of students' translations of Graeco-Latin cognates present in academic English and the use of Graeco-Latin cognate forms in Norwegian on the translation test. The criteria shown in Table 2 guided the selection of English target words for the translation test (first presented in Skjelde, 2022).

Table 2. Criteria, Rationale, and Procedure for Target Word Selection

Selection criteria	Rationale	Procedure
Present on both the AWL (Coxhead, 2000) and the first 570-word family list of the AVL (Gardner & Davies, 2014).	To provide greater reliability, the target words represented examples of academic vocabulary in English.	List comparisons using Antconc (Anthony, 2014).
Graeco-Latin cognates between English and Norwegian	There is an abundance of Graeco-Latin cognates between English and Norwegian, but little research examining students' knowledge of this vocabulary.	Etymology was defined using three online dictionaries (Oxford University Press, n.d.; Språkrådet & University of Bergen, n.d.; <i>Norwegian Academy Dictionary</i> , n.d.)
Cognate status	Cognateness has been shown to lessen the learning burden of academic vocabulary for speakers of Romance languages.	Verified with the use of <i>Ordnnett Pluss</i> (Ordnnett Pluss, n.d.) and two L1 Norwegian-speaking L2 English educators
A near 3:2:1 ratio of nouns, verbs, and adjectives	Represents word-class dispersion in authentic text and follows target word criteria for the VLT (Schmitt et al., 2001).	Target words were chosen for each word class group with the use of a randomizer.
The most common word forms, as defined on the AWL and AVL, were selected.	To ensure that words likely to be needed for upper secondary and tertiary studies were part of the investigation.	If there was a discrepancy between the lists, the AVL took precedence because frequency is more thoroughly presented there.

Where appropriate, word class was demonstrated with the use of grammatical markers, i.e., infinitive and indefinite markers (see Figure 2). All target words were Graeco-Latin cognates between English and Norwegian, with a high degree of orthographic overlap (see Appendix A). Nine task items were complete cognates with a normalized Levenshtein distance measure of one (1) (Schepens et al., 2012), and the majority of the target words fell between .90 and .70, indicating high cognate overlap. It should be noted that phonetic considerations were taken into account when adapting the Graeco-Latin lexis to Norwegian (Sandøy, 2000). This has resulted in the use of universal changes in spelling between these cognates found in English and Norwegian, e.g., *ph - f* and *-sion/-tion - sjon*, (Sandøy, 2000), which can make the spelling and pronunciation of cognate forms easier despite orthographic differences. Finally, each target word also had at least one other appropriate translation with German or Old Norse origins (see Appendix A).

Figure 2. Format and Example Items from the Translation Task

a contact	
translation 1	<input type="text"/>
translation 2	<input type="text"/>
translation 3	<input type="text"/>
to indicate	
translation 1	<input type="text"/>
translation 2	<input type="text"/>
translation 3	<input type="text"/>
assistance	
translation 1	<input type="text"/>
translation 2	<input type="text"/>
translation 3	<input type="text"/>

To follow practices from previous research and to provide a more nuanced understanding of the results (e.g., Rogers et al., 2015; Webb, 2008), strict and lenient scoring was conducted for cognate translations. For strict scoring, a correct response indicated the correct use of word-class forms and correct spelling; both *Bokmål* and *Nynorsk*² forms were allowed, and the use of infinitive and indefinite markers was not obligatory. Lenient scoring was conducted with the use of principles developed for the study (see Appendix B) but also fell into Barcroft's (2002) Lexical Production Scoring Protocol-Written (LPSP-Written) at the 0.75-point level. After manually scoring the cognate translations, a native speaker of Norwegian was consulted, and any reactions toward the original scoring were discussed and adjusted accordingly.

² Norwegian has two official written languages, *Bokmål* and *Nynorsk*.

The self-report questionnaire sections included for the current study provided background information such as reported L1(s), the amount of English language instruction in Norway, and reported learning difficulties. This information was used to exclude students who had other L1s besides Norwegian and those with reported learning difficulties.

4.4 Analysis

Descriptive statistics were used to calculate the number of participants' cognate translations. The inferential statistical analyses were conducted in RStudio (2019) using non-parametric tests because the data were not normally distributed. Outliers were not removed to maintain an ecologically valid manner of reporting results from classroom settings. A Kruskal-Wallis test, a non-parametric test of variance, was conducted. Participant VLT scores were used as the predictor variable for all analyses. These participant scores were grouped according to the two recommended levels of mastery for the academic sections of the VLT. A Dunn test with adjusted p-values using the Bonferroni method was conducted to provide a more detailed investigation of differences found in the Kruskal-Wallis test. A Wilcoxon Sign-Rank test was conducted to examine the differences between the use of strict and lenient scoring.

5. Findings

The following section will present findings from analyses conducted in answer to the proposed research questions guiding the current study. The first investigation focused on the number of L1 Norwegian cognates with Graeco-Latin origins participants produced when translating academic English vocabulary. Secondly, possible associations between participants' English proficiency, number of untranslated target words, and the number of cognate translations were explored. Findings from the analyses are, therefore, presented in two parts.

5.1 Number of Graeco-Latin cognate translations

All students made some use of Graeco-Latin cognates during the translation test, suggesting that these cognate forms may also be helpful for Norwegian-speaking L2 learners of English. On average, participants provided cognate translations for 67.32% of the target words using lenient scoring and 61.23 % with strict scoring, i.e., the correct use of spelling and word class forms (see Table 3). Examples of cognates most students produced when translating academic English words were *teknisk* for technical, *symbol* (a complete cognate), and *prosess* for process. Nonetheless, the use of cognates varied widely, ranging from a low of 12 to a high of 55 cognate

translations for lenient scoring and minimum and maximum values of 8 and 55, respectively, when strict scoring was used. No participant chose cognate forms to translate all target words, though 13.64% of the participants provided translations for all 60 target words.

Table 3. Mean Number of Cognate Translations

	Lenient		Strict	
	M	SD	M	SD
N=132	40.39 ³	6.43	36.74	6.89

A Wilcoxon Sign-Rank test was conducted to examine if there were significant differences between strict and lenient scoring and for a more detailed investigation of these findings. Results revealed the differences between strict and lenient scores were significant ($z=9.97$, $p<.001$), indicating that allowing for spelling and word class mistakes (see Appendix B) has provided a more nuanced understanding of participants' use of Graeco-Latin cognates when translating academic English.

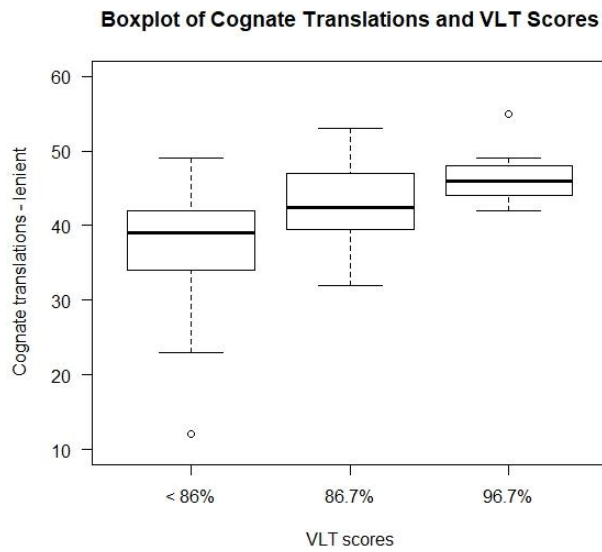
5.2 Number of untranslated target words, cognate translations, and associations with proficiency

Several analyses addressed the second research question regarding associations between participants' English proficiency and the number of cognate translations and untranslated target words. Participant VLT (Schmitt et al., 2001) scores were used as the predictor variable for all analyses of associations. These participant scores were grouped according to two recommended levels of VLT mastery, i.e., 97.6% (Webb et al., 2017) ($n=11$), 86.7% mastery (Schmitt et al., 2001) ($n=45$), and results below 86.7% representing participants who did not achieve recommended mastery levels ($n=78$).

First, possible associations between student English proficiency and the number of L1 cognate translations were explored with the use of a Kruskal-Wallis test. This analysis revealed a difference between the overall number of cognate translations and the participants' proficiency grouped by VLT scores, $H(2) = 27.79$, $p<.001$. Figure 4 shows that students with scores under recommended mastery levels had fewer cognate translations than more proficient students.

³ Maximum of 60 target words.

Figure 4. Number of Cognate Translations and VLT Scores, Using Lenient Scoring



Further analyses were then conducted to determine if there were significant differences between the groups shown in this initial finding. A Dunn test with adjusted *p*-values using the Bonferroni method revealed that participants who achieved 96.7% made significantly higher use of cognate translations than participants who did not reach recommended mastery levels for both strict $z=-4.45, p<.001$ and lenient $z=-4.27, p<.001$ scoring. The results were similar for participants who showed mastery at the 86.7% level compared to participants who did not achieve mastery, $z=-3.71, p<.001$. However, there was no significant difference in the number of cognate translations used between the two groups of participants who mastered the VLT, both for strict, $z=-2.18, p= .09$, and lenient scoring $z=-1.88, p=.18$.

The second part of the investigation of possible associations focused on the participants’ number of untranslated test items. The average participant left 15.40% of the test items untranslated (see Table 4), but there was again wide variation in these scores ($SD = 7.44$). The results in SD show that many students left up to 28.33% of the target words untranslated, even though all target words were cognates with English. Further analyses were therefore conducted to investigate associations between untranslated target words and English proficiency.

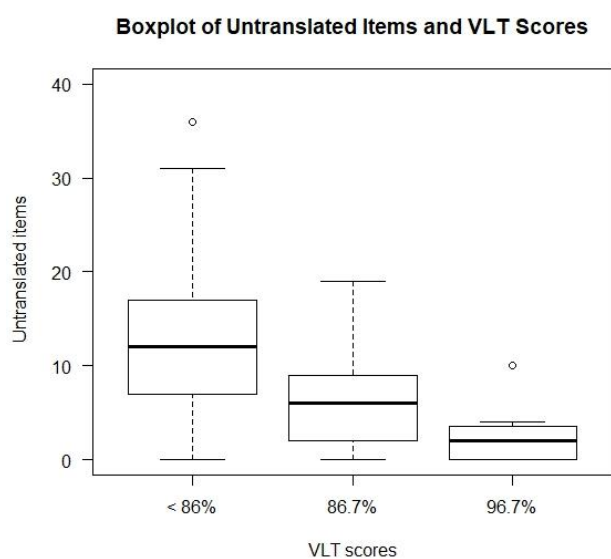
Table 4. Mean Number of Untranslated Target Words

	M	SD
N=132	9.24	7.44

Note: Maximum of 60 target words.

A Kruskal-Wallis test revealed a difference between the number of target words left untranslated and participants' VLT scores, $H(2)=31.035, p<.001$. A Dunn test with adjusted p-values using the Bonferroni method was then conducted to provide a more detailed investigation of relationships at different levels of VLT mastery. Again, findings revealed significant differences between participants with 96.7% mastery ($z=4.35, p<.001$) and 86.7% mastery ($z=4.33, p<.001$) compared to those who did not master the VLT. There was no significant difference between participants who reached mastery levels, $z=1.73, p=.25$. As shown in Figure 5, students with scores under recommended mastery levels had significantly greater numbers of untranslated target words, despite high levels of cognate overlap for these Graeco-Latin cognate task items. These findings revealed a negative relationship between VLT mastery and number of untranslated target words, indicating that proficient learners were more likely to have fewer untranslated test items than less proficient learners.

Figure 5. Associations Between Untranslated Target Words and Participants' VLT Scores



These findings are important because a majority of the participants fell into the category of less proficient students ($n=78$), and this suggests many students failed to draw on semantic similarities for Graeco-Latin cognates to help translate high-frequency academic vocabulary. Implications of the findings will be discussed in detail in the following section.

6. Discussion and implications for L2 pedagogy

The main aim of the current study was to investigate the extent to which Norwegian-speaking students made use of Graeco-Latin cognates when translating academic English lexis as an indication of students' awareness of cognancy traits for this lexis.

Also, associations with the extent of cognate translations and untranslated target words with English proficiency were analyzed to explore if cognancy awareness varied with English proficiency. Results are discussed in relation to implications for L2 pedagogy in the Norwegian education context.

The first research question asked to what extent Norwegian-speaking learners of English translated academic English with Graeco-Latin cognates. Results revealed that over 60% of the participants translated a majority of the 60 target words with Graeco-Latin cognates, indicating that many were aware of Graeco-Latin cognates between Norwegian and English. Thus, Norwegian-speaking upper secondary students may also be supported in their acquisition of academic English vocabulary by the abundance of Graeco-Latin cognates in academic English lexis in a way similar to speakers of Romance languages (Cobb, 2000; Petrescu et al., 2017). However, methodological differences in these studies and the current research do not allow for complete comparisons of results. Nonetheless, findings suggest that teachers could use cognate translation tests in a formative manner by allowing for individual translations before group discussions of their translations of the Graeco-Latin target words. Such an approach would highlight essential academic vocabulary, making it more salient for learners, something worthwhile due to the lack of salience common for this lexis (Coxhead, 2000, 2020). This approach would also encourage students to consider different possible translations of these words, which could increase the task involvement load (Laufer & Hulstijn, 2001) and vocabulary engagement (Schmitt, 2008, 2010), both of which have been shown to enhance vocabulary acquisition (Halici Page & Mede, 2018; Yanagisawa & Webb, 2021). In addition, there is reason to believe that during group discussions, students could scaffold each other's learning and arrive at an enhanced understanding of both academic Norwegian and English lexis, as was shown for tertiary students in Skjelde (2022).

One important difference between the study conducted with tertiary students (N=13) (Skjelde, 2022) and the current research was the wide variation among upper secondary participants' use of Graeco-Latin cognates when translating academic English vocabulary. This variation can be due to age differences between the student groups, 15.9 years versus 24.38 years, or the larger sample size for the current study (N=132). Yet differences could spring from students' English proficiency, as shown in previous research conducted among Polish-speaking students when translating general English cognates (Otwinowska & Szewczyk, 2017). Therefore, findings from the first analyses indicated the need for further investigation into possible connections between students' use of Graeco-Latin cognates and their English proficiency, which was done in answer to the next research question.

The second research question addressed this variation by investigating associations between participants' English proficiency, their tendency to use Graeco-Latin cognates when translating academic English vocabulary, and the tendency to leave target words untranslated. Results revealed that less proficient learners had more untranslated test items than more proficient learners and that these differences were significant. These findings could be expected due to previous research indicating many upper secondary students lack receptive knowledge of academic English vocabulary (Edgarsson, 2018; Henriksen & Danelund, 2015; Skjelde & Coxhead, 2020; Warnby, 2023). However, they are no less important for two reasons. First, the group defined as less proficient learners in the current research represented over half of the participants. Second, curricular demands for the English subject for upper secondary students in Norway requires receptive and productive knowledge of academic English (Norwegian Ministry of Education and Research, 2019). The analysis of Graeco-Latin cognate translations revealed that more proficient learners used significantly higher numbers of Graeco-Latin cognates to translate academic English than less proficient learners. Results inferred that more proficient students had a raised awareness of cognancy in academic English, in line with results from Otwinowska & Szewczyk (2017) in their study of general English.

Findings reiterate the need for support among these upper secondary L2 English learners and suggest that raising awareness of Graeco-Latin cognates can be a useful tool for improving Norwegian-speaking students' knowledge of academic English. Teachers can also support students by choosing target words for translation and discussion from texts they are using during their course studies. The instruction of academic lexis must be situated in both oral and written texts for several reasons. First, to raise students' awareness of the abundance of Graeco-Latin cognates in academic texts. Second, to ensure better text comprehension among students. Third, to provide diverse contexts for students to encounter this lexis and develop their understanding of these words.

One final finding from the current study was the significant difference between strict and lenient scores, indicating that allowing for spelling and word-class mistakes (see Appendix B) also provided a more nuanced understanding of students' translations for the current study. These results lend support to previous vocabulary research (Rogers et al., 2015; Webb, 2008). and suggest the importance of making allowances when data collection is done electronically due to the possibility of typing mistakes. Also, lenient scoring is more in line with education contexts using Communicative Language Teaching (CLT), an approach to L2 language teaching in which English language teachers tend to highlight incidental vocabulary acquisition

(Bergström et al., 2021), emphasizes language learning through communication, and downplays accuracy (Richards & Rodgers, 2014).

There were several limitations to the current study. One limitation was that the sample size of 132 participants was not large enough to make general conclusions. However, the study included students from seven different classrooms and students' English grades aligned with national averages (Skjelde & Coxhead, 2020). Another limitation was that by using electronic data collection, students could have used sources to help with translations, but these were not high-stakes tests, so the incentive to do so would be minimal. Nonetheless, the advantages of using computer programs to organize and analyze data most likely outweighed any disadvantages. A majority of students did not reach mastery levels on the VLT academic levels, a sign that though cheating may have occurred, this did not adversely affect results. The current study was also limited to investigating single-word items and did not examine word chunks that are also common in academic vocabulary (Coxhead, 2020; Schmitt, 2010). Starting with analyses of singular lexical items was deemed appropriate because so few academic vocabulary studies have previously been conducted in the Norwegian context. Finally, it should be noted that when participants did not translate target words with cognate forms, this does not necessarily mean they did not know the cognate words. However, because it was common for students to leave some of these high-frequency academic words untranslated, findings suggest that upper secondary students were not aided by the presence of Graeco-Latin cognates in all cases, a finding also revealed among tertiary students (Skjelde, 2022). Further investigations of how upper secondary students translate cognate target words could provide insight into cognate characteristics related to the target words, such as L1 frequency, abstractness, and polysemy, which might help or hinder students' acquisition of academic English lexis.

7. Conclusion

This study has provided further evidence to support the need for knowledge and awareness of academic vocabulary for upper secondary L2 English learners studying within Nordic education contexts. The study also provides supporting evidence for the usefulness of Graeco-Latin cognates among proficient learners, though these initial findings indicate that less proficient learners may need explicit instruction to make use of the advantages Graeco-Latin cognates present in academic English. Finally, the empirical evidence provided here suggests the need for teachers to recognize the value of a principled approach to enhance their students' academic vocabulary acquisition.

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Appendix A

Translation test items with cognate and Germanic translations

English	Graeco-Latin cog.	Germanic origins	Germanic origins
acquisition	akkvisisjon	erhvervelse	tilegnelse
adapt	adaptere	tilpasse	avpasse
adequate	adekvat	dekkende	
analysis	analyse	granskingsarbeid	
assistance	assistanse	bistand	hjelp
to attribute	attribuere	tillegge	tilskrive
cite	sitere	gjengi	stevne
colleague	kollega	medarbeider	
component	komponent	bestanddel	
concept	konsept	begrep	forestilling
conclusion	konklusjon	sammendrag	
conflict	konflikt	uoverensstemmelse	
contact	kontakt	forbindelse	berøring
cycle	syklus	kretsløp	
to demonstrate	demonstrere	forklare	vise
to derive	derivere	avlede	
dimension	dimensjon	omfang	størrelse
discrimination	diskriminering	forskjellsbehandling	særbehandling
to document	dokumentere	stadfeste	bevise
domain	domene	besittelse	område
to dominate	dominere	fremtre	styre
element	element	grunnstoff	bestanddel
to establish	etablere	anlegge	opprette
to evaluate	evaluere	bedømme	
factor	faktor	forhold	omstendighet
to facilitate	fasilitere	tilrettelegge	
fundamental	fundamental	grunnleggende	
to generate	generere	danne	frembringe
hierarchy	hierarki	rangordning	
hypothesis	hypotese	påstand	
to illustrate	illustrere	belyse	tydeliggjøre
to incorporate	inkorporere	innlemme	innarbeide
to indicate	indikere	angi	anvise
initiative	initiativ	tiltak	
innovation	innovasjon	fornyelse	nyskapning
internal	intern	innvendig	indre
interpretation	interpretasjon	forklaring	fortolkning
to involve	involvere	innebære	innblande
journal	journal	dagbok	tidsskrift
mental	mental	sjelelig	åndelig
migration	migrasjon	forflytning	
mode	modus	innstilling	

norm	norm	rettesnor	
phenomenon	fenomen	hendelse	
to perceive	persipere	oppfatte	forneemme
positive	positiv	bekreftende	
radical	radikal	gjennomgripende	
rational	rasjonell	fornuftsmessig	
relevant	relevant	vesentlig	
resource	ressurs	reserve	hjelpkilde
revolution	revolusjon	omveltning	omdreining
scenario	senario/scenario	fremtidsbilde	
status	status	rang	tilstand
a structure	struktur	oppbygning	sammensetning
strategy	strategi	fremgangsmåte	
symbol	symbol	tegn	
technical	teknisk	fagmessig	
theory	teori	antagelse	
unique	unik	sjelden	enestående
vision	visjon	syn	åpenbaring

Note: These translations were verified with the use of three online dictionaries (Norwegian Academy Dictionary, n.d.; Ordnett Pluss, n.d.; Språkrådet & University of Bergen, n.d.).

Appendix B

Principles for strict and lenient scoring

Translation from English to Norwegian:

- One point for correct answers and no points for incorrect answers.
- Correct answers include the use of lenient scoring (see below).

Strict scoring:

- Target word translations must be spelled correctly and have the correct word class form. Infinitive markers (*å*) or determiners (*ei/en/et*) are not necessary.

Lenient scoring:

- Spelling and word-class mistakes were allowed (for ex. if the target word is a verb and they translate with a noun form)
- Correct if only a cognate form is provided.
- If a correct cognate (see examples in table) is used with an incorrect translation the translation is marked incorrect.
- The infinitive marker (*å*) and determiners (*en/ei/et*) do not have to be provided.
- Definitions were defined as answers having three or more words.

Principles for lenient scoring with examples of strict and lenient translations.

Principles	Examples		
	English	Norwegian cognate translation	
		Strict	Lenient
Misspellings with similar phonetic representations were allowed.	<i>hierarchy</i>	(<i>et/eit</i>) <i>hierarki</i>	<i>hirarki,</i> <i>hierakii</i>
	<i>indicate</i>	(<i>å</i>) <i>indikere</i>	<i>indekere</i>
	<i>hypothesis</i>	(<i>en/ein</i>) <i>hypotese</i>	<i>hypotiase</i>
English forms were allowed when there was a large degree of phonetic overlap.	<i>radical</i>	<i>radikal</i>	<i>radical</i>
	<i>resource</i>	(<i>en/ein</i>) <i>ressurs/resurs</i>	<i>recource</i>
	<i>concept</i>	(<i>et/eit</i>) <i>konsept</i>	<i>consept</i>
Orthographic overlap without clear phonetic overlap was allowed.	<i>revolution</i>	(<i>en/ein</i>) <i>revolusjon</i>	<i>revelusjon,</i> <i>revulisjon</i>
	<i>establish</i>	(<i>å</i>) <i>etablere</i>	<i>etablisere</i>
	<i>discrimination</i>	(<i>en/ei</i>) <i>diskriminering</i>	<i>diskrimering</i>
Typing errors, with no more than two letters missing, added, or inverted, were allowed.	<i>internal</i>	<i>intern</i>	<i>inern</i>
	<i>status</i>	(<i>en/ein</i>) <i>status:</i>	<i>stato, satus</i>
Similar words with different semantic meanings were <i>not</i> allowed.	<i>contact</i>	(<i>en/ein</i>) <i>kontakt:</i>	<i>kontrakt</i>
	<i>adapt</i>	(<i>å</i>) <i>adaptere:</i>	<i>adoptere</i>

Note: First published in Skjelde (2022)