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Exploring L2 English students' knowledge and conceptions of academic vocabulary

Abstract

Parallel language use is widespread in universities today and refers to the use of English language course materials with lectures and classroom activities conducted in a majority language other than English. Concerns have been raised that the cognitive demands placed on students who must navigate between academic languages are not fully appreciated. Previous Nordic research has revealed an increased workload for students when reading academic English texts, and that unknown academic vocabulary could be a common hindrance. The abundance of Graeco-Latin cognates between English and Scandinavian languages could lessen these cognitive demands if students have a clear conception of academic vocabulary as a construct, that is, knowledge of characteristics common to this lexis. Therefore, the current mixed-methods study examined Norwegian university students' (n=13) receptive knowledge and conception of academic vocabulary. Findings indicated that participants had extensive receptive knowledge of high-frequency academic vocabulary. Yet several students expressed difficulty finding appropriate translations for target words that were Graeco-Latin cognates with academic English, and L1 frequency tended to affect translations. Findings also revealed that students recognized common conceptualizations for academic vocabulary as a construct, such as Latin origins, similarities in spelling and pronunciation, and polysemy. However, some conceptualized academic Norwegian as more colloquial than academic English lexis, and insecurity in their conceptualizations was evident. The results suggest that even proficient L2 English students may profit from support to consolidate their conceptions of academic vocabulary and further develop their knowledge of Graeco-Latin cognates present in this lexis.

Keywords: academic vocabulary, L2 English, parallel language use, Graeco-Latin cognates, translation, student conceptions

Utforsking av L2 engelskstudenters kunnskap om og konsepsjon av akademiske ord

Sammendrag

Parallellspråkbruk er utbredt i høyere utdanning i dag og refererer til bruk av engelske kursmaterial samtidig som undervisning og aktiviteter er gjennomført i et

¹ The formatting of Table 2, Table 4, Table 5, and Appendix D have been altered to improve readability. In acknowledgments, emeritus has been corrected to emerita.

majoritetsspråk. Dette har utløst bekymringer om den manglende anerkjennelsen av de kognitive kravene som stilles til studenter som må navigere mellom akademiske språk. Tidligere nordisk forskning har vist en økning i arbeidsbyrden for skandinaviskspråklige studenter som må lese akademiske tekster på engelsk, og at et ukjent vokabular kan være et allment hinder for deres leseforståelse, til tross for et stort antall gresk-latinske kognater. Likheter i akademisk ordforråd mellom engelsk og skandinaviske språk kan imidlertid redusere de kognitive kravene til studentene, dersom de har en klar konsepsjon av konstruktet. Det vil si, kunnskap om karakterisk assosiert med dette vokabularet. Derfor undersøker denne studien, basert på metodetriangulering, studenters kunnskap om og konsepsjon av akademisk vokabular. Funn indikerte at deltagerne hadde ekstensiv reseptiv kunnskap om høyfrekvente akademiske ord. De klarte å gjenkjenne vanlige konsepsjoner for konstruktet, som latinske opprinnelser, likheter i stavelse og uttale, og polysemi. Likevel ga flere studenter uttrykk for at det var vanskelig å finne passende oversettelser for gresk-latinske kognater som finnes i akademisk engelsk, og det var en tendens til at L1-frekvensen påvirket oversettelsene. Funnene viste også at studenter gjenkjente vanlige konsepsjoner for akademisk vokabular som et konstrukt, som for eksempel latinske opphav, likheter i stavelse- og uttalemåter og polysemi. Noen deltakere uttrykte likevel en konsepsjon av akademisk ordforråd på norsk som mer hverdagslig enn engelsk, og det kom tydelig fram en usikkerhet hos studentene knyttet til egne konsepsjoner. Resultatene antyder at selv studenter som er kyndige i engelsk kan ha nytte av støtte til å konsolidere sine konsepsjoner av akademisk vokabular, og til å videreutvikle kunnskapen sin om gresk-latinske kognater i akademiske tekster.

Nøkkelord: akademisk vokabular, engelsk som andrespråk, parallelspråkbruk, gresk-latinske kognater, oversettelse, studenters konsepsjoner

Introduction

Nordic universities follow a policy of parallel language use, in which course materials are largely in English, but activities such as lectures, group discussions, and exams are conducted in a majority language other than English (Arnbjörnsdóttir, 2018b; Henriksen et al., 2019; Kuteeva et al., 2020; Malmström & Pecorari, 2022). As a result, students must navigate between academic discourse in their L1 and L2 English, which requires extensive academic vocabulary knowledge in both languages. For the current study, academic vocabulary has been defined as cross-disciplinary lexis that occurs more frequently in academic texts than in texts such as newspapers or novels (Charles & Pecorari, 2016; Coxhead, 2000, 2020; Gardner & Davies, 2014; Nation et al., 2016). Despite Nordic students' reputation as proficient L2 English learners (Bonnet, 2004; Education First, 2021), concerns have been raised about the lack of recognition of the cognitive demands of parallel language use (Arnbjörnsdóttir, 2018a; Henriksen et al., 2019; Pecorari et al., 2011). Research has also found that Scandinavian students had significantly slower reading rates when compared to native English speakers (Busby & Dahl, 2021; Shaw & McMillion, 2008) and

perceived increased workloads due to the use of English course reading materials (Arnbjörnsdóttir, 2020; Pecorari et al., 2011).

Academic vocabulary knowledge is recognized as an essential component of the language skills needed for tertiary students (Coxhead, 2021; Pecorari et al., 2019). Correlations have been found between academic vocabulary knowledge and reading comprehension (e.g., Hellekjær, 2009, 2019; Laufer & Ravenhorst-Kalovski, 2010; Masrai, 2019) indicating that receptive knowledge of academic English lexis is essential. However, few previous studies have specifically examined academic vocabulary knowledge among tertiary students in Scandinavia; Pecorari et al. (2019) and Busby (2020) are two exceptions.

The nature of academic vocabulary can be of particular importance when investigating student knowledge of this lexis. When constructing academic English word lists, researchers have identified a core academic vocabulary that occurred across academic subjects (Xue & Nation, 1984; Coxhead, 2000; Gardner & Davies, 2014). Coxhead (2000) and Gardner and Davies (2014) found that this vocabulary constituted between 10% to 14% of academic English texts. Besides occurring across academic disciplines, features of academic English vocabulary can also extend across languages. Characteristics include academic lexis occurring at different frequency levels (Gardner & Davies, 2014; Nation et al., 2016), an abundance of words with Graeco-Latin origins, and cognancy between European languages (Corson, 1997). Thus, a more detailed investigation into students' conceptions of academic vocabulary as a construct would be of interest, because such knowledge may help students better navigate between academic languages.

Conception here has been used in the sense of “the action or faculty of grasping or creating a general idea or concept” (Oxford University Press, n.d.) and followed Taber’s (2017) broad definition as “a way of making sense of something - a way of conceptualizing” (p. 122). For the current study, students’ conception of the construct of academic vocabulary is approached through their recognition or conceptualization of features common to this lexis. Conceptualization refers to “the mental process by which fuzzy and imprecise constructs ... are defined in concrete and precise terms” (Bhattacharjee, 2012, p. 43). The current investigation examined tertiary students’ expressed conceptualizations of academic vocabulary. That is, whether they recognized common characteristics associated with academic lexis such as Graeco-Latin origins, cognate status, and polysemous uses of this lexis. Cognates have been defined as translations present in two or more languages with a common genealogy and shared semantic, orthographic, and phonological traits (De Groot, 2011; Otwinowska, 2015).

The current research was conducted as a two-part, mixed-methods study that employed largely quantitative methods to investigate student knowledge of academic vocabulary and qualitative methods to explore students’ conceptions of the construct. The study is part of a larger project examining academic vocabulary knowledge among upper secondary and tertiary students in Norwegian

educational contexts. This research was limited to tertiary students because focus group discussions were only conducted for these participants, due to concerns of test fatigue among younger learners. Data for the mixed methods study was collected with the use of two vocabulary tests, a self-report questionnaire, and audio recordings of focus group discussions.

The following research questions guided the investigation:

1. To what extent do Norwegian-speaking university students demonstrate written receptive knowledge of academic English vocabulary?
2. How do these students conceptualize academic vocabulary?

Frequency and word knowledge

Frequency and word knowledge are two central factors for vocabulary acquisition. Researchers agree that frequently occurring words are often easier for learners to acquire (Nation, 2013). Schmitt and Schmitt (2014) have defined high-frequency English vocabulary as words up to and including the first 3000 word families, mid-frequency from the 4000 to 9000 levels, and low-frequency vocabulary above this. For reading comprehension of academic texts, research has shown a need for student vocabulary sizes between the 8000 - 9000 levels (Nation, 2006; Schmitt & Schmitt, 2014). Importantly for second language acquisition (SLA), academic English words with Graeco-Latin origins often occur at higher frequency levels in Romance languages than in English, making learning easier for speakers of these languages (Cobb, 2000; Lubliner & Hiebert, 2011; Petrescu et al., 2017). A recent quantitative study of 34 Spanish-speaking students has shown word frequency to be the greatest predictor of academic word knowledge, more so than cognate status and word length (Urdaniz & Skoufaki, 2019). These findings are somewhat surprising because previous psycholinguistic research has shown cognates in general English are more quickly and accurately translated (see DeGroot, 2011, for an overview). Also, testing research has revealed cognates are more likely to be answered correctly than non-cognate items (e.g., Elgort, 2013; Laufer & McLean, 2016). The question remains as to whether, due to closeness in language genealogy, academic vocabulary with German or Old Norse origins has a higher frequency than academic English cognates with Graeco-Latin origins for speakers of North Germanic languages. To the best of my knowledge, this has not been researched previously.

The complexity of L1 frequency and Graeco-Latin cognates can be exemplified with the Norwegian academic vocabulary list (AKA list), a frequency list of 750 lemmas commonly occurring across a Norwegian academic corpus (Hagen et al., 2016). In Norwegian, the complete cognate *fundamental* can also be translated with the Germanic *grunnleggende* (Språkrådet & University of Bergen, n.d.). Both words appear on the AKA list; *grunnleggende* is listed as 157

of 750 lemmas compared to *fundamental*, which is ranked at 574 (Johannessen et al., 2015). This could suggest that Graeco-Latin cognates may not always lessen the learning burden of academic lexis for these learners. Nonetheless, *teori* [theory] (38) has a higher L1 frequency on the AKA list than the Germanic translation *antakelse*, (562). The L1 frequency of Graeco-Latin cognates defined as academic English vocabulary has been examined further in this study when examining student translations of academic cognates.

Word knowledge is a complex concept and only the receptive aspect of form-meaning knowledge needed for reading and listening comprehension has been examined here. Receptive knowledge “involves perceiving the form of a word while listening or reading and retrieving its meaning” (Nation, 2013, p.47). The Vocabulary Levels Test (VLT) (Nation, 1990; Schmitt et al., 2001; Webb et al., 2017) is a validated and widely used test of receptive-recognition knowledge. It is a monolingual diagnostic test using a multiple-choice format in which target words are matched to short definitions or synonyms (Schmitt et al., 2001). Four frequency levels and an academic vocabulary level based on Coxhead’s (2000) Academic Word List (AWL) make up the Schmitt et al. (2001) test versions. Schmitt et al. (2001) recommended 86.7% correct answers on each level as a sign of mastery. More recently, Webb et al. (2017) have recommended a 96.7% mastery level for high-frequency vocabulary because these words are essential for proficiency. Busby (2020) found that Norwegian-speaking tertiary students reached 86.7% mastery for the first two VLT sections and the AWL level (Schmitt et al., 2001). However, she also found wide variation in student results with the lowest AWL section score at 66.67%. Her findings are of importance because the target words are largely found within the first 3000 BNC/COCA frequency range (Nation, 2017), meaning that they are high-frequency words (Schmitt & Schmitt, 2014). However, students will also need to comprehend and produce less frequent academic vocabulary than was tested here.

Taking several measures of word knowledge can provide more nuanced findings and receptive knowledge can also be measured at a level of recall, which has been shown to be slightly more difficult than recognition knowledge (Laufer & Goldstein, 2004; Webb, 2008). Recall knowledge is often measured with L2 to L1 translation tests, and the task is “to demonstrate the understanding of the meaning of the L2 word” (Laufer & Goldstein, 2004, p. 406). However, in addition to measuring word knowledge, exploring student discussions of their translations can be important in parallel language contexts. A mixed-methods study of 1081 tertiary students in Iceland (Arnbjörnsdóttir, 2020) found the formation of translation or summary groups was a common learning strategy, but many experienced that the translations made by fellow students were confusing or inaccurate. Also, Arnbjörnsdóttir (2020) found that students often “had not given much thought to how well prepared they were to use academic English” (p. 253), suggesting further research into student knowledge and conceptions of academic vocabulary is warranted.

Conceptualization of academic vocabulary

Features common to academic languages such as Cummins' (2008) distinction between BICS and CALP and Corson's (1995; 1997) descriptions of academic vocabulary provide examples of the conceptualizations of academic vocabulary as a construct. Features common to the conceptualization of academic vocabulary (Corson, 1995; Coxhead, 2000; Cummins, 2008; Nagy & Townsend, 2012) are presented in Table 1.

Table 1 Conceptualization of academic vocabulary as a construct

Characteristic	Description
Frequency	Occurring across word frequency levels.
Graeco-Latin	Academic lexis often has Graeco-Latin origins in European languages.
Cognancy	Graeco-Latin origins result in an abundance of shared cognates between academic English and other European languages.
Polysemy	Some words have multiple meanings, but often they will have a base meaning that transcends different uses of the word.
Lexically complex	Many words contain both suffixes and prefixes, the meaning of which learners may not be familiar with today. Also, root forms can lack transparency due to low frequency in everyday contexts.
Abstractness	Words that are low in imagery.

Graeco-Latin origins and cognancy

Academic vocabulary in European languages largely originated from Greek and Latin, due to the early influence of Latin in religious and educational contexts (Corson, 1997; Sandøy, 2000) and few would contest Corson's (1997) claim that "control of the Graeco-Latin academic vocabulary in English is essential to academic success" (p. 671). However, the presence of Graeco-Latin lexis in academic discourse is also true for other European languages (Cobb, 2000; Hiebert & Lubliner, 2011). In his study of Norwegian vocabulary, Sandøy (2000) outlined the extensive borrowing of academic words from Latin and Greek, that began as early as "when Christianity came to [Norway]" (p.73). Even so, it can be difficult to know if the use of such lexis in Scandinavian languages today reflects a common etymology, or modern influences from English (Jakobsen, 2018, p. 38).

Research related to the construction of academic word lists in English and Scandinavian languages has focused on identifying a core, cross-disciplinary academic lexis, and the tendency for this lexis to occur across different frequency levels (Coxhead, 2000; Gardner & Davies, 2014; Hagen et al., 2016; Jakobsen, 2018; Jansson et al., 2012; Nation et al., 2016). Gardner and Davies (2014) argued that "the statistics can and do point to a narrower list of core academic words that can be focused on by learners, teachers, and researchers" (p. 311). Nonetheless, attention has also been paid to the Graeco-Latin origins of this lexis.

Coxhead (2000) found that 82% of the word families on her AWL were of Graeco-Latin origin, and these origins were also recognized when constructing academic vocabulary lists in Norwegian (Hagen et al., 2016; Johansson et al., 2017), Swedish (Jansson et al., 2012; Johansson et al., 2017) and Danish (Jakobsen, 2018).

The Graeco-Latin influences in academic vocabulary have resulted in an abundance of cognate forms between English and Norwegian. Seventy percent of the VLT academic level test items for versions one and two (Schmitt et al., 2001) have a Norwegian cognate translation (see Appendix A). However, as shown earlier, L1 frequency can be a complicating factor for acquisition among North-Germanic speaking students. Alternative, non-cognate translations with high L1 frequency can influence cognate advantages for Norwegian students.

Polysemy

Another complicating factor for the usefulness of cognates can be the polysemous nature of some academic words. For many cognates found in academic lexis, the different word uses will also translate across languages, making acquisition easier. For Norwegian, one such example is *to demonstrate*, where both meanings, i.e., showing how to do something, and the act of protesting, translate across the two languages. As with this example, there is commonly a base meaning that transcends the differing definitions and can make the acquisition of these uses easier (Nation, 2013). However, *derive* is an example of a cognate that is only used for mathematical or grammatical contexts in Norwegian, unlike the many uses found in English such as, “to trace the origination of (anything) from its source” (Oxford University Press, n.d.). Having knowledge of the nuances in the polysemous nature of some academic vocabulary and when these nuances do and do not transcend languages can be valuable for tertiary students as they move between academic languages. For the current study, frequency, Graeco-Latin origins, cognateness, and polysemy were examined among Norwegian-speaking tertiary students.

Methods

For this study, the research questions were explored with two vocabulary tests, a self-report questionnaire, and audio-recorded focus group discussions. Mixed methods were chosen to provide a general understanding of student vocabulary knowledge, using quantitative test results, and a more in-depth understanding of students' conception of academic vocabulary, using qualitative analyses.

Participants

Thirteen university students, four females and nine males, volunteered for the research project. All participants were L1 Norwegian speakers and had completed

their formal English language instruction in the Norwegian system. At least half of their required reading and 25% of their lectures were in English. Five (38.46%) reported all lectures and reading materials were in English. Ten participants (76.92%) had studied English at the university level and most (76.92%) were enrolled in foreign language studies. The others were enrolled in engineering, philosophy, and physics courses. Their average age was 24.38 years. The project was approved by the Norwegian Center for Research Data (NSD), all participants consented to take part in the study, and pseudonyms have been used for anonymity purposes.

Instruments

The following section presents the quantitative and qualitative instruments used for this study, starting with a presentation of the vocabulary tests and questionnaire, followed by a description of the focus groups.

Receptive vocabulary knowledge was assessed using two vocabulary tests: the academic level from two versions of the updated VLT (Schmitt et al., 2001) and a 60-item translation test constructed for the project. The VLT was chosen because it was a validated test that could be used for comparisons to previous research, and other tests that included less frequent academic vocabulary, such as the Academic Vocabulary Test (AVT) (Pecorari et al., 2019) were not available. For increased validity, test items from both VLT versions were used, doubling the number of target words. Also, scores were examined at two recommended mastery levels of 86.7% (Schmitt et al., 2001) and 96.7% (Webb et al., 2017). The second vocabulary test was a decontextualized L2 English to L1 Norwegian translation test with 60 target words chosen using a fixed set of criteria (see Table 2). To investigate student use of cognates found in academic vocabulary, all target words were Graeco-Latin cognates, and participants were allowed to provide several translations. Also, qualitative data from audio-recorded group discussions of target words from the translation test were analyzed for form-meaning knowledge and student conceptions of the construct. The rationale for the choice of criteria and procedures used to determine target words is outlined in Table 2. Though target words were not determined based on BNC/COCA frequency, most fell between the 2000 and 3000 BNC/COCA levels (Nation, 2017), largely as a result of the overlap between the AWL and AVL. Also, all target words had one or more appropriate translations with German or Old Norse origins (see Appendix C).

Table 2. Criteria, rationale, and procedure for target word selection.

Selection criteria	Rational	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 that 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.; Norwegian Academy Dictionary, 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>Ordnett Pluss</i> (Ordnett 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.

Participants were asked to provide up to three different translations for each item and were allowed to use Norwegian definitions. Spelling and word class mistakes were registered, but the translation test was scored with the use of lenient scoring (see Appendix E), because previous research has shown that allowing for spelling and word-class mistakes can provide more nuanced findings (Rogers et al. 2015; Webb, 2008) and the use of strict one-word scoring was incongruent with students' use of definitions. Because the English target words for the translation test were high-frequency words, it was hypothesized that many items would be translated with a cognate form. However, due to the possibility of differences in L1 frequency, the use of Germanic translations was also expected for less frequent Graeco-Latin words.

The self-report questionnaire items provided information about students' language use and type of education. In addition, one open-ended and seven closed-ended questions pertaining to students' understanding of and attitude toward academic vocabulary were included.

After completion of the individual tests and questionnaire, participants were given a written worksheet that structured the discussions of target words from the translation test and the topic of academic vocabulary (see Appendix B). Focus group discussions were audio-recorded, and participants made brief written notes of their answers which were submitted and included in the study. Ten participants took part in four focus group discussions of approximately 25 minutes. Unfortunately, one of the recordings was damaged and therefore, three focus group discussions, with a total of eight participants form the basis for the qualitative analyses reported here. The discussions were transcribed by transcriptionists and cross-checked by the researcher to ensure they represented a verbatim account of the recorded conversations.

Procedure

All participants completed the digitalized vocabulary tests and questionnaire on their personal computers and were instructed to turn off spell-check and not use online dictionary sources during the testing. Students were not closely monitored, however, because these were not high-stakes tests and in such small groups monitoring could be experienced as very invasive. The individual vocabulary tests provided participants with individual exposure to the terms and topics discussed in the focus groups. It was hoped that this exposure would assist in their ability to take part in the focus group discussions. Data collection was conducted in group rooms on a college campus. There were four different sessions with no more than five participants per session. The groups were free to use either English or Norwegian during the discussions, though all chose to use English. Each group completed the survey and focus group discussions in approximately 90 minutes.

Analysis

Descriptive statistical analyses were used to summarize the questionnaire data, parts of the focus groups' written notes, and the vocabulary test scores. Also, all target words were analyzed for frequency on the AKA list to provide an in-depth analysis of participant translations compared to L1 academic word frequency. A total of 18.33% of the target words were then analyzed for participant translation types. The discussions and written group notes were analyzed with the use of a priori codes developed from the research questions and in vivo codes that emerged from the student discussions (Johnson & Christensen, 2017).

To increase the reliability of the translation test scores, four L1 Norwegian-speaking interraters were charged with scoring 20% of the 60 test items. First, they were given a set of scoring principles (see Appendix E) and asked to correct a smaller set of target words. Their results were then discussed with the researcher

before they scored the final set of target words equal to 20% of the target words. An intrarater percentage agreement was calculated instead of a kappa calculation because the number of interraters and translation points they scored provided a large number of data points for comparison (52 responses for each of the 12 target words) which can strengthen the reliability of the intrarater agreement score. Also, percentage agreement can be directly interpreted, which kappa calculations cannot (McHugh, 2012). The intrarater percent agreement score was 93.45% which indicates that the translation scores were reliable.

Findings

The following section presents findings from this two-part study, first exploring receptive vocabulary knowledge and target word translations of academic vocabulary, and secondly investigating students' conceptions of the construct.

Receptive knowledge

The first research question examined the participants' extent of receptive knowledge of academic English vocabulary. From over 1500 translations provided by participants, there were a total of nine spelling mistakes, such as *et hieraki* [*hierarki*], and eight transitions with incorrect word class form, e.g., *å dokumentere* (verb) [*et document*] (noun). Because the translation test did not limit participants to one correct answer, and also allowed the use of definitions, spelling and word class mistakes were allowed for single word translations (see Appendix E). Findings showed that the average participant had extensive recognition and recall knowledge of these target words, with scores of 94.75% and 94.37% respectively (see Table 3). Because there were few participants, the greater variation in VLT scores shown in the SD was largely due to score variation from one participant.

Table 3. Average scores for the vocabulary tests

	M	SD
VLT academic levels	56.85	6.41
Translation test	56.62	3.71

Note: N=13. Maximum of 60 correct answers for each test.

Closer analyses revealed that five participants (38.46%) answered all VLT items correctly and another 30.77% reached the 96.7% mastery level. Half of the participants (53.84%) translated 96.67% or more of the 60 target words correctly. The analysis thus revealed a ceiling effect likely due to the high frequency of the target words tested, the focus on receptive word knowledge, and the extent of English used for tertiary study by the participants. There was one outlier, but outliers were not excluded from the study because of the use of mixed methods.

To further investigate participants' knowledge of academic vocabulary in English and Norwegian, a more detailed analysis of participant translations was conducted.

In-depth analyses revealed similarities in target word translations. As expected with high-frequency academic words, participants used many Graeco-Latin cognates in their translations. Also, two or three translations per item were common, but the use of definitions was less common, as shown in the examples below (see Table 4 and Table 5). Nearly half (46.67%) of the 60 target words were translated with a Graeco-Latin cognate by all participants, but no target word was only translated with a cognate by all. Finally, a majority (68.97%) of this group of target words were listed on the AKA list, indicating they could also classify as high-frequency academic words in Norwegian (see Appendix D).

Table 4. Number and type of participant translations: target words translated with cognates by all.

Target word	Translation types					
	<i>Two synonyms</i>	<i>Germanic synonym only</i>	<i>Cog. only</i>	<i>Def. only</i>	<i>Incorrect</i>	<i>Blank</i>
<i>hypothesis</i>	hypotese + teori: 3					
	hypotese + antagelse: 2	0	7	0	0	0
	hypotese + påstand: 1					
	hypotese + en tanke: 1					
<i>involve</i>	involvere + å inkludere: 2					
	involvere + engasjere: 1	0	8	0	0	0
	involvere + innebære: 1					
<i>element</i>	element + del: 2					
	element + et aspekt: 1	0	7	0	0	0
	element + en faktor: 1					
<i>demonstrate</i>	demonstrere + å vise: 5					
	demonstrere + illustrere: 2	0	4	0	0	0
<i>analysis</i>	analyse + fordypning: 1					
	analyse + undersøkelse: 1	0	9	0	0	0
	analyses + definisjon: 2					

Note: N=13, though the number of translations per participant can vary. Germanic synonyms indicate either German or Old Norse origins according to etymological descriptions provided in Norwegian online dictionaries (Norwegian Academy Dictionary, n.d.; Språkrådet & University of Bergen, n.d.).

Nonetheless, nine words were translated with cognate forms by 30.77% of the participants or fewer, two of which (22.22%), were on the AKA list (see Appendix D). *Vision* and *adapt* were translated with the use of German synonyms by most participants (see Table 5). The Norwegian cognates *visjon* [*vision*] and *adaptere* [*adapt*] are not on the AKA list, but *syn* and *tilpasse* are ranked 81 and 134 respectively. When translating *adapt*, 53.85% used only the synonym *tilpasse*, while 15.38% used both *adaptere* and *tilpasse*. Interestingly, the verb *facilitate* [*fasilitere*] was incorrectly translated or left untranslated by a majority of participants (61.54%) despite having an appropriate Germanic translation, *tilrettelege*, ranked 316 on the AKA list (see Appendix C). Five participants only defined the target word *acquisition* [*akkvisisjon*] and none of the participants use the cognate form *persipere* to translate *perceive* (see Table 5). Neither *derivere* [*derive*] nor the Germanic translation *utlede* were defined as high-frequency academic vocabulary on the AKA list, which can also explain the difficulties some students had translating this cognate. Findings suggest a tendency for L1 frequency to influence these participants' translation of academic cognates.

Table 5. Number and type of participant translations: target words seldom translated with cognates.

Target word	Translation types					
	Two synonyms	Germanic synonym only	Cog. only	Def. only	Incorrect	Blank
<i>vision</i>	<i>visjon</i> + <i>syn</i> : 9 <i>syn</i> + <i>budskap</i> : 1	<i>syn</i> : 2	1	1	0	0
<i>adapt</i>	<i>adaptere</i> + <i>tilpasse</i> : 2 <i>tilpasse</i> + <i>være fleksibel</i> : 1	<i>tilpasse</i> : 7	1	1	0	1
<i>facilitate</i>	<i>fasilitere</i> + definition: 1 <i>å anvende</i> + <i>å bruke</i> : 1	<i>tilrettelegge</i> : 1	1	2	5	3
<i>perceive</i>	<i>oppfatte</i> + <i>se</i> : 3 <i>å forstå</i> + definition: 1	<i>observere</i> : 1 <i>oppfatte</i> : 2 <i>se</i> : 1 <i>å forstå</i> : 2 <i>å føle</i> : 1	0	1	2	1
<i>acquisition</i>	0	<i>tilegnelse</i> : 1 <i>oppkjøp</i> : 1	2	5	1	3
<i>derive</i>	<i>derivere</i> + definition: 2	<i>utlede</i> : 1	2	3	3	2

Note: N=13, but the number of translations per participant can vary.

Surprisingly, several students who had achieved high translation test scores expressed difficulties finding Norwegian equivalents for the cognate target words. Henrik used cognates to translate 93.33% of the 60 words and had a 100% test score. Jacob used Graeco-Latin cognates for 65% of his translations and correctly translated 96.67% of the target words.

Episode 1

Group 1

Henrik: you're like 'oh I know a different English word for this, but I don't know quite the Norwegian one'

Jacob: I had some issues ... because ... I just can't translate it, so it became like a three or four-segment long thing ... instead of just the Norwegian counterpart. Although I don't know if there is a Norwegian counterpart for all of them ...

Open-ended questionnaire questions also revealed translation difficulties. Henrik commented, "I feel sturdy when it comes to my english [*sic*] skills but when it comes to vocabulary I am at a loss. [When] translating ... my main problem was finding the right norwegian [*sic*] word". Interestingly, he did not associate English proficiency with vocabulary knowledge. Despite using cognates for 81.67% of her translations achieving a test score of 96.67%, Nora stated, "I feel I am more lacking in Norwegian vocabulary."

Students' conceptions of academic vocabulary

The second research question examined participants' conceptions of academic vocabulary. The following section presents examples of participants' discussions of Graeco-Latin origins, cognateness, and knowledge of polysemous uses for target words.

Graeco-Latin origins

As shown in the episodes below, Latin origin was discussed in two groups, and one participant mentioned the importance of French origins for academic English vocabulary. These findings indicated that students recognized etymological features in academic lexis. However, while Henrik was confident in his knowledge about the use of vocabulary with French origins, he did not relate this to possible earlier Latin or Greek origins, and both Nora and Jacob expressed uncertainty in their knowledge.

Episode 2

Group 1

Henrik: whenever you write ... big words ... a lot of ... the English language is French. And a lot of the French words ... is the academic vocabulary.

Episode 3

Group 2

Ella: Yeah? Hm, *to establish*. Yeah, these are a lot alike as well. I feel kinda like the base—well, it's different, but it sounds...

Nora: They were created from the same Latin or whatever word.

Ella: Yeah. I feel like that's the case for a lot of the words, that, you feel like they're coming from a language from an earlier point; a lot of these words have the same base, somewhere, in the past.

Episode 4

Group 1

Jacob: I don't even know where the word *teknologisk* [technological] came from, right? ... is it originally Latin and just brought in through other Germanic influences?

...

Jacob: I guess part of it could be Latin or something because they used it in both like *demo-*

Cognancy

When comparing Graeco-Latin cognates present in academic English vocabulary, participants' written responses from the focus group discussions revealed that all agreed nine of the word pairs were “the same” though none were familiar with the low-frequency Norwegian cognate *persipere* [*perceive*]. When asked to discuss if word pairs were “the same in Norwegian and English” (see Appendix B), Nora was the only participant who conceptualized sameness in terms of both semantics and word form.

Episode 5

Group 2

Nora: I would say ‘yes’ and ‘no’, but it's enough to say ‘yes’.

Ella: Yeah, okay, why would you say ‘no’?

Nora: Um, they have the same base, but like, they end slightly different...

Also, all focus groups discerned characteristics common to cognates such as orthographic, phonological, and semantic similarities. Nora and Ella's discussion was an accurate summary of how sameness was approached in all three focus group discussions.

Episode 6

Group 2

Ella: ... the main word, the base is the same. They end differently. The meaning is pretty much the same in both English and Norwegian ...

Nora: ... it means pretty much the same too ...

...

Ella: ... I feel like you can ... base your interpretation of the meaning ... it's pretty much the same in Norwegian, so you don't have to ... guess what it is ...

Group two's attention to word form later helped Ella recognize the low-frequency Norwegian word *persipere* as a cognate to *perceive*.

Episode 7

Group 2

Frida: But they look kinda similar

Nora: I think, based on the structure, I think the base is the same here too...but I don't know what this word actually means, *persipere*

...

Frida: How do we explain it in English?

...

Nora: To see what is not necessarily apparent [mumbling]?

Ella: I feel ... like it's not necessarily just, like, to see. It has like to do with the senses ... *persipere* is starting to make sense to me now because in psychology we heard about, like, *persepsjon* – *perception*, so it's ... the way you interpret, yeah, your senses and impressions that they receive.

Ella correctly discerned the meaning of *persipere* [*perceive*] when she recognized the more common nominalization *persepsjon* [*perception*], ranked 637 on the AKA list. Also, the discussion revealed the in-depth semantic understanding these students had of high-frequency academic lexis, and the difficulties experienced with low-frequency academic words.

Polysemy

As stated earlier, some academic vocabulary is polysemous, having different semantic uses. All groups recognized the polysemous nature of several words, demonstrated in-depth semantic knowledge of the target words discussed, and were able to explain semantic similarities across languages. The following exemplifies participants' recognition of different word uses.

Episode 8

Group 1

Henrik: It's almost like, *a domain*, I would say it's changed sort of meaning because nowadays you would like, you're connected with the Internet, but before it was more land area.

Element is a complete cognate, i.e., it is spelled the same, pronounced similarly, and has several similar semantic uses. All participants translated *element* using the cognate form. The following discussions showed participants' recognition of polysemous uses for *element*.

Episode 9

Group 3

Sara: “*Et element*” [an element].

Oliver: I mean, a part of something, a sort of, a component—

...

Oliver: A part of a collection, like a set.

...

Filip: You can also of course use it about the, *the* elements, but I suppose—it's like—

Oliver: I mean, like the Periodic Table-sort of elements.

Filip: Yeah, but that's more related to a specific subject than it is generally, I suppose.

Also, two of the three groups recognized that the two different uses had a shared base meaning.

Episode 10

Group 1

Jacob: 'cause it could be *the* elements, but they are still kinda a part of something. So, the meaning is still kinda the same, but it has kind of a different context of use.

Episode 11

Group 2

Nora: It's like the "grunnelementene" [the base elements], ... like silver and iron ...

They're always ... a part of something ...

When defining, *technical/teknisk*, Jacob and Henrik's discussion exhibited their knowledge of ways the adverb and adjective forms may be used in both English and Norwegian.

Episode 12

Group 1

Henrik: I would say *teknisk* is more limited when compared to *technical*.

...

Henrik: ... it's very broad, still, *teknisk* [*technical*], *teknisk sett* [*technically*].

Jacob: I suppose you could say 'a certain way to either do or explain something' ...

Henrik: Well, technically I would ... most use it in a way of explaining how something works; "technically speaking", this is how you should do it ... even though the origin is more that it's engineering related.

Filip recognized differences between general and subject-specific word uses and related these to what he experienced when taking a pedagogy course.

Episode 13

Group 3

Filip: ... we had to remember that quite a lot of the terms ... had a very different meaning in pedagogy than in other fields ... this was explained in Norwegian, but they didn't use the term "general academic vocabulary", but we couldn't use words we thought we knew, because they meant something else within this field, which was kind of ... annoying ...

As shown in Filip's discussion, participants also expressed perceived differences between academic vocabulary in English and Norwegian.

Episode 14

Group 3

Oliver: ... I tend to personally at least use all the English words, but I don't, with Norwegian, I always feel like I simplify my language a little bit.

...

Oliver: 'Cause I feel like Norwegian is way more colloquial.

Episode 15

Filip: ... I was also wondering a bit about the act of demonstrating in the streets, like demonstrating ...

Oliver: Oh, like a demonstration, like a protest?

...

Filip: ... Okay, it does work in both languages in that sense as well, doesn't it?

Oliver: Yeah. You would say a protest more often, I think. I'm not sure, I always hear protest more so than demonstration. I hear demonstration more so than protest here in Norway at least.

Filip: ... I agree, with "å demonstrere" [to demonstrate] it feels more natural than "å protestere" [to protest] ...

...

Oliver: I'm guessing ... as a collective protest, it's more uncommon in English than in Norwegian ...

The conversation again revealed an in-depth understanding of semantics for these terms, though the discussion also suggested a lack of awareness of the academic nature of Norwegian.

When summarizing their focus group discussion, Group 2 had the following comments about academic vocabulary development during their education.

Episode 16

Nora: ... like, from high school, nobody really ever mentions that this is a thing, and you don't really know about academic vocabulary, at least, I get the impression that most people don't. And then, don't really learn the academic vocabulary before you have to use it.

Ella: Yeah, that's true. It could be way better during ... high school, to teach us ... I feel like it's hard ... Because academic writing isn't really natural. At least, to me ...

Discussion

This section will present a discussion of findings for the research questions posed, followed by limitations and suggestions for further research.

The first research question explored to what extent tertiary students demonstrated written receptive knowledge of academic English vocabulary. The quantitative analyses of two vocabulary tests revealed that 92.31% of the participants demonstrated extensive receptive recognition and recall knowledge of high-frequency academic vocabulary, with average participant scores between recommended VLT mastery levels (Schmitt et al., 2001; Webb et al, 2017). These

findings were not surprising due to the high frequency of the test items, and the high level of student exposure to academic English. Findings also support previous VLT scores in the Norwegian tertiary context (Busby, 2020). As with Busby's (2020) study of students enrolled in English, IT, and Sociology, there was also variation in test scores among participants in this study, with 30.77% failing to reach the VLT recommendation for high-frequency vocabulary (Webb et al., 2017). Surprisingly, qualitative analyses revealed that high-performing participants expressed difficulties finding appropriate Norwegian translations for the Graeco-Latin cognate test items. These findings indicate participants found the translation of high-frequency academic vocabulary cognitively demanding and suggest unwarranted insecurity in their word knowledge. One focus group specifically stated they saw the need for explicit instruction on academic vocabulary before starting tertiary studies.

More in-depth investigations of target word translations revealed a tendency for the use of high-frequency L1 translations, regardless of cognate status. The small number of participants for the current study means results only provide initial indications, but these findings are similar to previous research among L1 Spanish-speaking students that found most of the variance in test scores was due to frequency rather than cognancy or word length (Urdaniz & Skoufaki, 2019). Graeco-Latin cognates defined as common in Norwegian academic vocabulary were used widely by all participants. However, when Norwegian cognate forms were of lower frequency, many translated with synonyms of German or Old Norse origin, longer definitions, or were unable to translate the word. As exemplified when no participant used the low-frequency Norwegian verb *persipere* to translate *perceive* (see Appendix D), though all focus groups correctly defined the target word. However, it was more surprising that only one participant was able to deduce the cognate status of *persipere* from a recognition of the more common noun form *persepsjon* [perception]. Their ability to do so may have also been aided by one group member's conception of "sameness" as including word form and meaning, which led to more explicit discussions of orthographic differences than in the other groups. Also, the participant's exposure to the term in a psychology course was a contributing factor. The difficulties participants experienced translating *facilitate* [*fasilitere*] were also unexpected (see Table 5) and suggest the need for further investigations into students' knowledge of academic vocabulary at lower frequencies. Especially since this study only examined written receptive knowledge, and students will also need oral comprehension and productive knowledge of this lexis to cope with the vocabulary demands of their studies.

The second research question examined tertiary students' conceptions of academic vocabulary. Focus group discussions revealed in-depth semantic knowledge of the target words discussed, and that participants expressed recognition of common conceptualizations of the construct (see Table 1). Two participants discussed the target words in terms of Latin origins, though they

expressed insecurity in this knowledge. Importantly, all participants conceptualized the vocabulary using common characteristics for cognates such as orthographic, phonological, and semantic similarities. Focus group discussions also revealed an in-depth understanding of polysemous uses for the target words. Interestingly, differences in academic English and Norwegian vocabulary were also commented on, with one group characterizing Norwegian as more “colloquial”. Despite revealing an excellent understanding of common conceptualizations for academic lexis, focus group discussions provide a preliminary indication that tertiary students in Norway have unclear conceptions of academic vocabulary as a construct, and could profit from more direct attention to academic vocabulary acquisition during their studies.

There are several limitations to the current study. Because there were few participants, findings cannot be used to form generalizations about the broader population. Nonetheless, the detailed descriptions made possible by small-scale studies can indicate areas that merit further research. There are two limitations with the choice to use the VLT (Schmitt et al., 2001) academic sections. First, the AWL words these sections are based on were developed over 20 years ago, and there are other, more up-to-date lists available today, such as the AVL. Secondly, the target words for the VLT academic sections were largely taken from high-frequency academic lexis (Cobb, 2010), which led to a ceiling effect for these participants. Further research using tests that contain academic vocabulary also at lower frequency levels and based on more recently constructed academic word lists would be of interest. One such test is the AVT (Pecorari et al., 2019) which was not available at the time of data collection for the current research. However, the VLT is a validated and widely used test, and there was a need to compare results to previous Norwegian research (Busby, 2020). It should also be reiterated that the target words for the translation test were present in both the AWL and AVL, to ensure their status as academic English words. Further research could include a broader study of academic vocabulary translations among a larger group of L2 learners at different proficiency levels.

This study limited the comparison of frequency to the use of academic vocabulary lists, i.e., the AWL, the AVL, and the AKA list of academic Norwegian. This limitation was made because of the focus on academic vocabulary. However, as suggested by one reviewer, further research could include frequency data from general corpora for these Graeco-Latin cognates, as such a comparison would provide further information related to how often it could be expected learners were exposed to these words outside of academic contexts in their L1.

The use of cognates for the translation test could have limited the form of vocabulary knowledge measured to an assessment of item transfer, i.e., “an underlying similarity of form and an associated, assumed similarity of function or meaning” (Ringbom, 2004, p. 39), which would have made the translation test less cognitively demanding. There are several reasons the use of cognates for the

translation test can be defended. It was used in combination with the VLT, results revealed participants had slightly lower average scores for the translation test, and participants were also asked to demonstrate semantic knowledge in focus group discussions. Further research into upper secondary classroom uses for the L2-L1 translations test could also expand our knowledge of students' conceptions of academic lexis, and could provide valuable insight into how vocabulary testing can be used for formative assessment in communicative contexts.

Finally, participants came into the discussion without being explicitly instructed that the words they had been working with were defined as academic, Graeco-Latin cognates. Follow-up interviews conducted individually could have provided a more detailed understanding of participants' knowledge of the term cognate and the conscious level of students' understanding of Graeco-Latin origins. However, due to the length of the data collection process, performing such interviews was not considered feasible. A large-scale study investigating student and teacher cognition of academic lexis as a construct would be worthwhile.

Conclusion

Though generalizations cannot be drawn due to the small scale of this study, findings provide a preliminary indication that L1 frequency may be an important factor for the usefulness of academic cognates during L2 English vocabulary acquisition. Despite showing extensive receptive knowledge of academic vocabulary, findings indicated that even highly proficient students experienced translating Graeco-Latin cognates present in academic lexis as cognitively demanding. Focus group discussions disclosed that students recognized common academic vocabulary features, and revealed insecurity in the knowledge they had. Therefore, increasing student awareness of academic vocabulary word lists, vocabulary tests, word frequency, and the presence of Graeco-Latin cognates may be ways upper secondary and tertiary educators can help improve their students' ability to cope with the lexical demands they meet during their studies. Seen together, the findings indicate the need for further research into tertiary students' knowledge and conception of academic vocabulary, something that may be especially important in parallel language settings common in Nordic countries.

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Appendix A

VLT task items and cognate translations

English	Norwegian	English	Norwegian
1. convert	konvertere	31. philosophy	filosofi
2. alternative	alternativ	32. <i>achieve</i>	<i>prestere</i>
3. rigid	rigid	33. primary	primær
4. ethnic	etnisk	34. visual	visuell
5. principle	prinsipp	35. financial	finansiell
6. <i>consent</i>	<i>samtykke</i>	36. modify	modifisere
7. link	lenke	37. exclude	ekskudere
8. specify	spesifisere	38. format	format
9. <i>violation</i>	<i>overtredelse</i>	39. <i>fee</i>	<i>honorar</i>
10. method	metode	40. motivation	motivasjon
11. access	aksess	41. <i>gender</i>	<i>kjønn</i>
12. supplementary	supplerende	42. specify	spesifisere
13. minimize	minimere	43. <i>survive</i>	<i>overleve</i>
14. option	opsjon	44. <i>vehicle</i>	<i>kjøretøy</i>
15. correspond	korrespondere	45. contract	kontrakt
16. guarantee	garanti	46. decade	dekade
17. termination	terminere	47. investigation	undersøkelse
18. <i>schedule</i>	<i>timeplan</i>	48. identify	identifisere
19. psychology	psykologi	49. <i>evidence</i>	<i>bevis</i>
20. accumulation	akkumulasjon	50. publish	publisere
21. final	finale-	51. <i>topic</i>	<i>emne</i>
22. <i>alter</i>	<i>endre</i>	52. <i>adjacent</i>	<i>tilgrensende</i>
23. global	global	53. integration	integrasjon
24. <i>highlight</i>	<i>fremheve</i>	54. <i>retain</i>	<i>beholde</i>
25. ultimate	ultimat	55. negative	negativ
26. <i>deny</i>	<i>benekte</i>	56. <i>labour/labor</i>	<i>arbeid</i>
27. <i>anticipate</i>	<i>forutse</i>	57. percent	prosent
28. scheme	skjema	58. technique	teknikk
29. estimate	estimere	59. manipulate	manipulere
30. fund	fond	60. sum	sum

Note: AWL levels of the VLT versions one and two (Schmitt et al., 2001). Non-cognate translations are written in italics. Translations were cross-checked with two online dictionaries (Norwegian Academy Dictionary, n.d.; Språkrådet & University of Bergen, n.d.) and two L1 speakers of Norwegian who are English language educators.

Appendix B

Focus group questions

Group tasks

Names:

Let's talk about the words we use or don't use!

Task 1

1. Look at the following pairs of words and discuss if they are the same in Norwegian and English. Together the group should decide to circle *yes* or *no* for each word pair.

1. discrimination	diskriminering	Yes	No
2. an element	et element	Yes	No
3. to demonstrate	å demonstrere	Yes	No
4. to perceive	å persipere	Yes	No
5. fundamental	fundamental	Yes	No
6. a scenario	et scenario/senario	Yes	No
7. a domain	et domene	Yes	No
8. technical	teknisk	Yes	No
9. a cycle	en syklus	Yes	No
10. to establish	å etablere	Yes	No

2. Have you seen or used these English words? Have you seen or used these Norwegian words? Please write a brief summary of your discussion.

Task 2

1. an element	et element
2. to demonstrate	å demonstrere
3. technical	teknisk
4. to perceive	å persipere

As a group, define/explain the meaning of these four word pairs. You may have several different definitions for one word.

1. Write your definitions here.
2. Discuss how the meanings may or may not be related in translations between the two languages.

Please write a brief summary of the group discussion. One or two sentences for each word pair is enough.

Task 3

Academic vocabulary can be broadly defined as “words that occur regularly in...academic texts” (Coxhead, 2006) and can be both related to one subject or be used across different subjects.

Academic vocabulary used in many different fields of study is often referred to as *general academic vocabulary* (Townsend, Collins, and Biancarosa, 2012).

1. How many in the group have heard the terms *academic vocabulary* and/or *general academic vocabulary*?
2. Do you use *general academic vocabulary* in your studies?
3. If yes, how and when?

4. If no, why not?

References:

Coxhead, A. (2006). *Essentials of Teaching Academic Vocabulary*. Boston: Heinle, Centage Learning.

Townsend, D., Collins, P., Biancarosa, G. (2012). Evidence for the Importance of Academic Word Knowledge for the Academic Achievement of Diverse Middle School Students. *The Elementary School Journal*, Vol. 112, No. 3, pp. 497-518

Appendix C

Translation test items with cognate and Germanic translations and AKA-list frequency

English	Latinate cognate	Germanic origins	Germanic origins
acquisition	akkvisisjon	ervervelse	tilegnelse
adapt	adaptere	tilpasse (134)	avpasse
adequate	adekvat (665)	dekkende (739)	fullgod
analysis	analyse (30)	gransgranskingsarbeid	
assistance	assistanse	bistand	hjelp
to attribute	attribuere	tillegge (364)	tilskrive (554)
cite	sitere	gjengi (339)	stevne
colleague	kollega	medarbeider	
component	komponent	bestanddel	
concept	konsept	forestilling	
conclusion	konklusjon (205)	sammendrag (566)	
conflict	konflikt (142)	uoverensstemmelse	
contact	kontakt	forbindelse (63)	berøring
cycle	syklus	kretsløp	
to demonstrate	demonstrere	forklare	vise
to derive	derivere	avlede	
dimension	dimensjon (262)	omfang	størrelse
discrimination	diskriminering	forskjellsbehandling (61)	særbehandling
to document	dokumentere	stadfeste (746)	bevise
domain	domene	besittelse (733)	område
to dominate	dominere (386)	fremtre (698)	styre
element	element (96)	grunnstoff	bestanddel
to establish	etablere	anlegge	opprette
to evaluate	evaluere (532)	bedømme	
factor	faktor (77)	forhold (2)	omstendighet (523)
to facilitate	fasilitere	tilrettelegge (316)	
fundamental	fundamental (574)	grunnleggende (157)	
to generate	generere	danne (122)	frembringe
hierarchy	hierarki (534)	rangordning	
hypothesis	hypotese (330)	påstand	
to illustrate	illustrere (244)	belyse (148)	tydeliggjøre (468)
to incorporate	inkorporere (702)	innlemme (666)	innarbeide
to indicate	indikere (296)	angi	anvise
initiative	initiativ	tiltak	
innovation	innovasjon	fornyelse	nyskapning
internal	intern	innvendig (616)	indre
interpretation	interpretasjon	forklaring (173)	fortolkning (328)
to involve	involvere	innebære (65)	innblande
journal	journal	dagbok	tidsskrift (354)
mental	mental (329)	sjelelig	åndelig
migration	migrasjon	forflytning	

mode	modus	innstilling	
norm	norm (210)	rettesnor	
phenomenon	fenomen (129)	hendelse (154)	
to perceive	persipere	oppfatte (79)	fornemme
positive	positiv (48)	bekreftende	
radical	radikal	gjennomgripende	
rational	rasjonell (399)	fornuftsmessig	
relevant	relevant (126)	vesentlig	
resource	ressurs (156)	reserve	hjelpkilde
revolution	revolusjon	omveltning	omdreining
scenario	senario/scenario	fremtidsbilde	
status	status (212)	rang	tilstand
a structure	struktur	oppbygning (588)	sammensetning
strategy	strategi (145)	fremgangsmåte (487)	
symbol	symbol (271)	tegn	
technical	teknisk	fagmessig	
theory	teori (38)	antagelse (524)	
unique	unik	sjelden	enestående
vision	visjon	syn (81)	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 D

Number of participants that used cognate translations and AKA-list frequency.

Target word	AKA-list	Cog. Trans.	Cog. only	Target word	AKA-list	Cog.Trans.	Cog. only
technical		13	11	establish	adj. 442	12	8
phenomenon	129	13	10	concept		12	8
analysis	30	13	9	to document		12	7
colleague		13	9	hierarchy	534	12	7
theory	38	13	9	domain		12	7
relevant	126	13	9	norm	210	12	6
resource	156	13	9	initiative		11	9
status	212	13	8	a structure	verb 369	11	7
involve	noun* 672	13	8	mental	329	11	1
dominate	386	13	8	vision		11	1
hypothesis	330	13	7	cite		10	9
element	96	13	7	scenario		10	5
conclusion	205	13	7	cycle		10	3
symbol	271	13	7	mode		9	6
radical		13	7	indicate	296	9	4
dimension	262	13	7	assistance		9	2
conflict	142	13	7	journal		9	3
contact		13	6	fundamental	574	8	4
factor	77	13	6	innovation		8	3
strategy	145	13	6	migration		7	3
evaluate	532	13	6	internal	verb 721	6	4
positive	48	13	5	derive		4	2
component		13	5	incorporate	702	4	1
rational	399	13	5	adapt		3	1
generate		13	5	acquisition		2	2
demonstrate		13	5	interpretation		2	1
revolution		13	4	adequate	665	2	0
unique		13	3	to perceive		0	0
illustrate	244	13	2	to attribute		2	0
discrimination		12	9	facilitate		2	1

Note: A blank in the AKA-list column indicates the words were not on the list.

*The target word is present on the AKA-list with a different word class.

Appendix E

Interrater principles for 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).
- Please feel free to use ordbok.uib.no, NAOB, or Ordnett plus to check translations you are unsure of.
- Also, use a broad interpretation of the definitions because many of the words are abstract.

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.
- Determiners do not have to be provided (å - en/ei/et)
- 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>	(å) <i>indikere</i>	
	<i>hypothesis</i>	(<i>en/ein</i>) <i>hypotese</i>	<i>indekere</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>	(å) <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>	(å) <i>adaptere:</i>	<i>adoptere</i>

Note: Examples are not taken from translations made by this participant sample.