

How Accurately do English for Academic Purposes Students Use Academic Word List Words?

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Abstract

Previous corpus research on English for academic purposes (EAP) writing has analyzed how often additional language (L2) writers use words from the Academic Word List (AWL) (Coxhead, 2000), but few studies to date have explored how accurately those words are used. Therefore, the current study investigated how accurately and appropriately EAP writers ($N = 409$) use AWL words in their argumentative essays. The 230,694-word corpus was analyzed to identify AWL word families that occurred with at least 20 tokens. All tokens were then coded as being accurately used, or as containing a morphosyntactic or collocational error (or both). The findings showed that the EAP students' overall accuracy rate was high (67%) and that collocational errors occurred more frequently than grammatical errors. Pedagogical implications for EAP programs are discussed.

Introduction

International student enrolment at Canadian universities for long-term studies (more than six months) has more than doubled since 2008, posting an annual growth rate of 10.9% between 2008 and 2016 (Statistics Canada, 2017). In British Columbia, for example, approximate enrolment rates for international students in both undergraduate and graduate degree programs range from 25% (University of British Columbia and Simon Fraser University) to 21% (University of Victoria) and 16% (Thompson Rivers University). In addition to the university sector, international K-12 student enrolment has increased by 50% in the past five years, with approximately 20,000 students attending public and private schools in British Columbia (Zeidler, 2017). Reflecting the importance of academic literacy for these students in secondary and post-secondary settings, English for academic purposes (EAP) programs provide instruction that focuses on the English language needs and practices associated with academic settings (Hyland & Hamp-Lyons, 2002). Their overarching goal is to help students develop the communicative behaviours needed in academic settings, such as interacting with peers and instructors, comprehending lectures, reading academic texts, and producing text-responsible writing that accurately reflects source text information (Leki & Carson, 1997). Although EAP programs have been traditionally associated with university settings, they are relevant for students at all levels of formal schooling (Hyland & Hamp-Lyons, 2002). University-level EAP programs follow a variety of models, including intensive programs that students complete prior to beginning their degree courses (e.g., UBC English Language Institute's EAP program), bridging programs that

combine intensive language study along with one or two disciplinary courses (e.g., UBC Okanagan's English Language Foundation Program), and simultaneous enrolment in EAP and sheltered undergraduate degree programs (e.g., UBC's Vantage College). In the current study, EAP students took credit-bearing EAP courses at the same time as disciplinary courses related to their undergraduate degree programs at a large public university in the province of Québec.

Background

Regardless of their educational level or program type, EAP students face a major challenge in learning the academic vocabulary that will allow them to both comprehend and produce academic texts throughout their study programs. To facilitate the principled study of academic vocabulary, Coxhead (2000) developed the Academic Word List (AWL) to identify key academic words across disciplines, thereby making them more salient to students and providing instructors with a focus for vocabulary study. Since the AWL's first publication, it has featured prominently in English learner's dictionaries and EAP teaching materials (Coxhead, 2011). Both proponents of the AWL (e.g. Coxhead, 2000; Nation, 2013) and EAP material developers drawing on the list (e.g. Douglas, 2018; Schmitt & Schmitt, 2005) have argued that by drawing on the AWL, instructors can help their students develop their academic vocabulary effectively and efficiently.

The long list of EAP materials and dictionaries cited by Coxhead (2011) clearly points to the popularity and wide spread use of the AWL. However, the AWL is not without its critics. One criticism of the AWL concerns the way that it was originally compiled. Coxhead (2000) relied on the General Service List (GSL) (West, 1953) when preparing the AWL and excluded words frequently occurring in the academic corpus if they appeared on the GSL. This resulted in high-frequency GSL academic words, such as *exchange*, *interest*, or *rate*, not being included on the AWL (Gardner & Davies, 2013). Furthermore, since the GSL is based on a corpus from the first half of the 1900s, its word frequencies may not reflect current usage (Hancioğlu, Neufeld, & Eldridge, 2008). Second, despite Coxhead's (2000) claim that the AWL is relevant for all academic disciplines, the list has been criticized for not being as general as one might assume. Although Hyland and Tse (2007, 2009) agreed with the pedagogical principles underlying the creation of the AWL, they also argued that the AWL creates the illusion of a uniform academic vocabulary that is used in a similar fashion across the disciplines when this is actually not the case. Their claim is also supported by research projects that devised academic word lists for specific disciplines ranging from agriculture (Martínez, Beck, & Panza, 2009) and applied linguistics (Khani & Tazik, 2013) to environmental studies (Liu & Han, 2015), medicine (Lei & Liu, 2016, Wang, Liang, & Ge, 2008), and nursing (Yang, 2015). These discipline-specific lists all diverge from the AWL and differ from each other in terms of the most frequently used words, or at least in the order in which words appear on these different lists, which raises questions about the relevance of the AWL across disciplines.

Despite these criticisms, the AWL is still a useful tool for EAP instructors who teach students from a variety of academic disciplines in general EAP courses rather than discipline-specific English for Specific Purposes (ESP) courses. It offers instructors a more practical approach to focused vocabulary study than the specialized lists advocated by Hyland and Tse (2007, 2009). The discipline-specific academic vocabulary lists assume that instructors teach

homogenous classes with students belonging to only one academic discipline. However, this is not the case in all EAP contexts as instructors may have students not only from different majors within a faculty but also from different faculties (e.g., natural sciences, social sciences, business, and fine arts). The rationale for these general EAP classes is to provide students with foundational academic writing skills that can later be refined in discipline specific ESP or content courses (Hyland, 2006). The AWL is a useful tool in a general EAP course since instructors can meet their students' needs by focusing on common underlying academic vocabulary rather than trying to anticipate the discipline-specific vocabulary that their students may encounter in their academic content courses (Eldridge, 2008).

Academic vocabulary use has been investigated using corpus-based tools to investigate a range of issues in EAP writing, such as comparing English first language (L1) and additional language (L2) students' language use (Chen & Baker, 2010; Hinkel, 2002; Paquot, 2010), describing the lexio-grammatical features of EAP students' writing over time (Crosthwaite, 2016) or by L1 background and genre (Staples & Reppen, 2016), identifying the occurrence of multi-word or formulaic constructions (Liu, 2012; Simpson-Vlach & Ellis, 2010), and exploring the lexical threshold for entry-level undergraduate writing (Douglas, 2013). However, these corpus-based studies did not evaluate the accuracy or appropriateness of the words identified through the analysis, instead assuming that the writers used the words correctly and appropriately. When appropriateness has been examined through a learner corpus, the goal was to understand the reasons for incorrect lexical choices in a context where all learners shared the same L1 (Hasselgren, 1994) rather than assess the writers' overall accuracy. Similarly, when collocations or lexical bundles have been examined, the purpose was to describe rather than assess the appropriateness of learners' use of collocations (Paquot, 2010).

To our knowledge, corpus research has not examined whether AWL words are used accurately or appropriately. However, some corpus studies have examined L2 academic writers' lexical accuracy by focusing on multi-word units. For example, in their comparative study of English L1 and L2 academic writing, Liu and Shaw (2001) classified different usages of the verb *make*, including their judgement of collocational errors in which the verb was incorrectly placed in a larger phrasal unit (e.g., **make him to angry*). Although the L2 writers' error rate was relatively low (6.1-7.9%), their errors involved the use of *make* with a variety of word combinations, including verb + noun, verb + object and complement, and verb + object and infinitive. Taking a similar approach, Nesselhauf (2003) examined the accuracy of the verb + noun combinations (e.g., **give a solution to*) produced by L2 English writers. Based on native speaker corrections of the verb + noun combinations, the most frequent error types were the use of the wrong verb (e.g., **carry out races*), wrong noun (e.g., **close lacks*), and usage errors where the combination does not exist or was used incorrectly (e.g., **hold children within bounds*). Also targeting collocational accuracy, Crossley and colleagues (Crossley, Salsbury, & McNamara, 2014) analyzed a small corpus of L2 written texts from different proficiency levels using computation tools and analytic ratings. They operationalized collocation accuracy in terms of whether multi-word units were acceptable and expected, and reported that collocation accuracy was predictive of analytic judgements of lexical proficiency. Although these studies did not focus specifically on AWL words, they provide insight into difficulty that even advanced L2 writers face with collocational accuracy.

In addition to collocational accuracy, L2 writers may also experience difficulty with morpho-syntactic accuracy when using academic vocabulary. Research on lexical errors has examined learner's knowledge of derivational affixes and their relation to the stem word. Studies have shown that learners are able to produce all the derivational forms for only a limited range of words (Schmitt, 1999) with their derivational knowledge skewed towards nouns and verbs as opposed to adjective and adverbs (Schmitt & Zimmerman, 2002). Furthermore, the inability to produce a derivational form may indicate that acquisition of a word and of its derivations may be two separate yet connected systems (Ward & Chuenjundaeng, 2009). While knowledge of a base word may facilitate recognition of its derivational members, it remains to be seen if this knowledge transfers to accurate written production.

In summary, previous corpus-based studies of academic vocabulary have typically compared the frequency of AWL words in texts from (a) different academic disciplines, (b) L1 and L2 writers, or (c) different genres. In these studies, the level of accuracy and appropriateness of the writers' word choices was generally not examined. Although the percentage of AWL words occurring in a corpus is interesting, the question arises as to how meaningful that number is without any information about how accurately and appropriately the words are used. Whereas the collocational and morpho-syntactic accuracy of L2 writers' vocabulary has been examined, those studies have not focused specifically on AWL words despite their prevalence in EAP instructional materials. Therefore, the purpose of the current study was to explore how accurately EAP writers use AWL words in terms of both collocational and morphosyntactic accuracy. The research question was as follows: How accurately do EAP writers use AWL words when writing argumentative essays?

Method

Instructional Setting and Participants

The argumentative essays were written by English L2 students ($N = 409$) at an English-medium university in Québec. The students were taking the second of two EAP reading and writing courses offered in a department of education. Whereas the first EAP course focuses on paragraph-level writing, the second course targets source-based essay writing. At this university, English L2 students are admitted to their degree programs without any further EAP requirements if they have a TOEFL iBT score of 90 or an IELTS score of 7. However, if their TOEFL iBT score ranges from 75 to 89 or equivalent, they are required to take an in-house, integrated writing placement test. Based on their performance, they are exempted from further EAP instruction or placed into one of the two EAP courses. While taking EAP courses, the students are simultaneously completing disciplinary courses for their undergraduate degree programs, which contrasts with the pre-admission EAP program described by Keefe and Shi (2017) in which students only had conditional admission to a university program, and had to first complete the EAP requirements before taking specific courses in the arts, sciences, or applied sciences. In addition, the students' credits from the EAP courses at the research site count toward their degree requirements, and their EAP course grades are included in their overall grade point average.

The English L2 students who wrote the argumentative essays were adults with a mean age of 22.7 years ($SD = 4.1$). They spoke a total of 30 different first languages, with Mandarin

(47%), French (18%), and Arabic (12%) the most frequently reported. They were studying degree programs in business (53%), arts and sciences (27%), engineering (16%), and fine arts (4%). In terms of proficiency, students reported mean standardized proficiency scores of 6.2 for IELTS ($SD = .3$) and 80.8 for TOEFL iBT ($SD = 9.1$). The students in the EAP course were recruited over four semesters, which was taught by a variety of instructors using the same curriculum, textbook, and exams. The students were required to complete two writing midterm exams (summaries and cause/effect essays), as well as the argumentative essays analyzed here, which were written as their final exams. The participants agreed to give the researchers access to their essays after the EAP course ended.

The students' EAP course materials consisted of a course pack with reading texts and vocabulary activities from the following two sources: *Learning English for Academic Purposes* (Williams, 2012) and *Focus on Vocabulary: Mastering the Academic Word List* (Schmitt & Schmitt, 2005). It contained five units tailored to the three instructional goals of the class: to improve the students' theme-based academic reading skills, to build their knowledge of academic vocabulary and sentence structure, and to help develop their academic writing skills. Each theme-based unit contained academic texts that presented different perspectives or angles on the theme. AWL words were presented in context in the reading passages and developed further through vocabulary exercises (e.g., fill-in-the-blank, matching, creating definitions, and writing short sentences) from selected chapters in the Schmitt and Schmitt textbook (2005). Some AWL words also appeared in subsequent chapters, either in the same form, a form within the same word family, or as part of a collocation.

Procedure

The students wrote the argumentative essays as a three-hour final exam following the assessment procedures designed and implemented by the EAP program. As part of these procedures, approximately two weeks prior to the final exam the students received a list of six readings in the EAP course pack that were relevant to the exam topic. They were allowed to prepare for the exam by taking notes about the six readings and by bringing their notes to the exam (one page of notes per reading). At the examination, students received two writing prompts related to those readings and selected which one they preferred to write about. Across the dataset, the essays were written in response to prompts that addressed ways of alleviating poverty and hunger ($n = 249$) or reducing economic inequality ($n = 160$). Students had three hours to write the essays by hand, during which time they could consult a paper-based monolingual English dictionary and their notes.

Analysis

The students' handwritten argumentative essays were typed, verified, de-identified, and saved as Microsoft Word files. Minor spelling errors were corrected so that the words could be recognized by the software program. The electronic files were submitted to Cobb's (2016) Classic Vocabulary Profiler, Version 4 (<https://www.lex Tutor.ca/vp/eng>), but any AWL tokens that occurred in direct quotations were excluded from the analysis. To ensure that the accuracy coding was based on sufficient tokens, AWL word families with fewer than 20 tokens in the student essays were excluded. All phrases containing the 60 AWL word family items that met

the inclusion criteria (4369 tokens) were classified as being accurately used or containing an error based on the third author's native-speaker judgements. Following several rounds of pilot coding of essays not included in the dataset, discussions, and revisions to the coding criteria by all three researchers working collaboratively, errors were further coded by the third author into three types: collocation, morphosyntax, or both morphosyntax and collocation errors (see Table 1 for examples). Collocational errors included incorrect lexical chunks or collocations, missing or incorrect function words and prepositions, and contextually inappropriate use (i.e. a word with related, but not completely overlapping meaning would have been more appropriate). Morphosyntactic errors included incorrect use of inflectional and derivational morphology on the AWL tokens, such as missing or oversupplied plurals, tense/aspect features, and word form errors. Phrases with AWL tokens that had both error types were coded as morphosyntactic and collocational errors. A subset of the essays (10%) was coded by the second author for interrater reliability. Interrater reliability was .88 as assessed using a two-way mixed average-measures interclass correlation coefficient.

Table 1

Accuracy Coding for Phrases with AWL Tokens in the Student Essays

Sentence	Error type
We cannot DENY it's still the most effective way to reduce poverty.	None
Although increasing funding cannot stimulate economic growth rapidly, it slowly ALTER the social conditions of capitalism.	Morphosyntactic
Direct investment can help starved REGION overcome difficult of geography to against hunger.	Morphosyntactic
Obviously increasing funding can alter the social structure and benefit VIRTUALLY equal across all income groups.	Collocation
However, the top PRIORITY of alleviating poverty is to increase public services.	Collocation
People can't avoid the CONTRIBUTE of microcredit, but it still can't solve the basic social problem	Morphosyntactic & collocation
Microcredit cannot ENSURED for reach every poor people, and really improve their lives.	Morphosyntactic & collocation

Note. AWL tokens have been capitalized.

Results

The students' argumentative essays ($N = 409$) had a mean length of 567 words ($SD = 112$) and yielded a corpus with a total size of 230,694 words. There were 202 AWL word families with 5390 tokens in the students' argumentative essays. The number of AWL word families per essay ranged from 7 to 62, with a mean of 25.5 families ($SD = 8.6$). The percentage of AWL use ranged from 2.1 to 14.9 per essay, with a mean of 7.6% ($SD = 2.3$). Because the students' EAP course materials targeted AWL words, we also checked to see how many of the AWL word families in the essays were also in the course pack. There were 236 AWL word families in the EAP course pack, of which 86% (202/236) appeared in the students' essays. The students produced more than 100 tokens for only 11 word families, with *invest* and *benefit* most frequent (444 and 403, respectively).

The research question asked whether students used AWL words accurately when writing their argumentative essays. As described previously, the accuracy analysis focused on all tokens of the 60 AWL word families that occurred at least 20 times in the students' essays, which accounted for 82% of all the AWL tokens (4434/5390). In other words, less than one thousand tokens were excluded from the accuracy analysis because a word family failed to meet the inclusion criteria. As shown in Table 2, the students' accuracy rate was high, with 67% of the AWL tokens used correctly without any type of error. Collocation errors were more frequent than morphosyntactic errors (18% versus 11%, respectively) and errors involving both collocational and morphosyntactic issues were rare (4%).

Table 2

AWL Accuracy and Error Rates

	Sum	Percentage
Accurate	2990	67
Collocation error	799	18
Morphosyntactic error	487	11
Both error types	158	4

The students produced five AWL word families without any errors: *nevertheless*, *select*, *priority*, *subsidy*, and *outcome*. At the opposite end of the continuum, families with the lowest accuracy percentages were *diminish* (17%), *factor* (43%), and *aid* (43%). For *diminish*, 46/55 (84%) of the errors were collocational, specifically contexts where a synonym (e.g., *reduce*, *lower*, *decrease*) would have been more appropriate. For example, although its core meaning is correct in the sentence *to diminish poverty, governments try to solve it using microfinance*, a synonym would have been more appropriate, such as *to reduce poverty*. Collocational errors were also frequent for *factor* (64/79 or 81%), such as sentences like *also, sustainable redistribution is the major factor to make the poor be lazy*, where a tensed clause would have been more appropriate than the infinitive. However, for *aid*, morphosyntactic errors were more frequent (72/126 or 57%). The most frequent morphosyntactic error was the oversuppliance of the plural -s morpheme, as in the sentence: *no matter how much aids the government gets it cannot make full use of them*. Although tokens with both collocational and morphosyntactic errors were rare, they occurred most frequently with *invest* and *benefit*. For example, the following sentence has a collocation error (missing *in*) as well as a morphosyntactic error (*invest*) *by invest factories or manufactures in third world countries, those companies help reduce poverty*.

Discussion

To summarize the findings, these EAP writers' use of AWL words was mostly accurate, with 67% of their tokens used correctly. In terms of error types, students made more collocational errors than morphosyntactic errors. In other words, students were able to insert the AWL words into the grammatical structure of the sentence using correct derivational forms. However, they appeared to struggle with the subtler aspects of word knowledge, such as supplying the correct preposition or function word and choosing the most appropriate word when several words can have similar but not entirely overlapping meanings. Even frequently used word families followed

this pattern, with six of the 11 words with at least 100 tokens (*factor, aid, issue, invest, stable, benefit*) having relatively low accuracy rates, ranging from 43% to 59%. With the exception of *aid*, tokens with collocational errors were the most frequent, accounting for more than half up to three-quarters of all errors. For example, incorrect preposition use (*for* instead of *of*) created a collocational error with *benefit* in the following sentence: *Even though the benefits for investment to poor are obsessed, I still doubt for the poor's culture values.* Similarly, this student struggled to incorporate the word *invest* into her sentence: *We must admit that the poor cannot manage money and are less willing to invest them in long-term projects.* In sum, the findings extend those of previous studies that reported the persistence of collocational errors in L2 writing (Liu & Shaw, 2001; Nesselhauf, 2003) by demonstrating that AWL word families also pose collocational challenges for L2 writers.

Although accuracy rates were generally high (67%), one-third of all the AWL tokens in the students' essays had morphosyntactic or collocational errors (or both). The prevalence of these errors raises questions about the typical research approach of reporting AWL word frequency without considering whether students use those words accurately and appropriately. Comparative studies of L1 and L2 writers may overestimate L2 writers' ability to use AWL words by not considering accuracy. Similarly, comparative genre studies (i.e., comparing summary and argumentative texts) may not capture challenges with academic writing by failing to consider whether students are equally accurate across genres. By comparing the frequency of different error types across genres or over time, researchers can provide instructors with more fine-grained information about the developmental progression of EAP writers' vocabulary use. Having more information about when to emphasize specific aspects of word knowledge can help instructors design more effective instructional materials.

This study has several pedagogical implications for teaching vocabulary in EAP courses. First, the study sheds light on which vocabulary words EAP teachers might focus on with their students. When making choices about which AWL words to include on target vocabulary lists, instructors may want to highlight words that are relevant for the students' writing topics. These EAP students frequently used AWL word families that were closely linked to their writing topics (such as *benefit, aid, invest, distribute*), but their accuracy rates were relatively low. It is possible that students recognized the importance of the key words, which led them to use them often in their essays, but they could not successfully incorporate them into their texts in ways that avoided errors, especially collocational errors. When working with AWL words in EAP courses, instructors could highlight AWL words that have direct semantic links to writing topics, but focus on collocational accuracy rather than core word meaning or derivational forms.

Second, the data reveal that beyond mastering the meaning and form of new target vocabulary words, the students in this study also faced a challenge in mastering usage of these words. Many of the EAP course pack's vocabulary activities stem from Schmitt and Schmitt's (2005) book. The activities in each chapter are categorized into three groups and include the following diverse range of exercise types:

Word Meaning

- Matching target words with provided definitions
- Choosing the correct meaning of a target word in context

- Choosing the correct target word to fill a gap in isolated sentences or texts
- Identifying incorrect synonyms
- Explaining the meaning of target vocabulary words in own words

Word Families

- Choosing the correct form of a target word
- Identifying and correcting errors in word forms

Collocations

- Choosing the correct collocations of three choices for the target word to fill a gap
- Writing sentences with one of three collocations for the target word
- Matching target words with right collocations

Based on the findings from this study, the exercises on word meaning and word families appear to be very successful in teaching students about these aspects of vocabulary knowledge as shown by the fact that the AWL words were never used completely inaccurately. However, one area that students clearly need more help with is the usage of the target words in the context of a sentence where students have to pay attention to function words and a broader range of collocation information. They also face challenges with determining meaning and usage boundaries between target words and other words with a similar or related meaning. As previously discussed, the most frequently used word, *invest*, was often inserted into sentences where more appropriate alternatives could have been used. Likewise, the use of *issue* was strongly tied to its collocation with the word *poverty*. In both cases, students opted to overuse familiar words and collocations over less frequent alternatives.

To support students in addressing these difficulties in usage, teachers and EAP material developers should perhaps consider including example sentences written by students with these types of errors so that students can practice identifying these subtle mistakes in vocabulary usage. It might also be worthwhile to contrast these problematic example sentences with examples from the Corpus of Contemporary American English or the British National Corpus to allow students to appreciate the differences in use between advanced L2 students and more proficient users of English. Future research would have to investigate whether such exercises would help students improve their level of mastery in using target AWL words in the context of their own texts. Furthermore, because prior studies have shown that university L2 writers consult dictionaries and concordance tools for different purposes, such as using a dictionary to check the form of a word but using concordance tools to search for usage examples (Lai & Chen, 2015), additional research should also compare the effectiveness of corpus-based and traditional approaches for teaching collocations (e.g., Daskalovska, 2015; Li, 2017).

It is important to note, however, that the current study has a number of limitations that may limit its generalizability. First, the study only provides information about the students' use of the 202 AWL target words from the EAP textbook that they decided to use; there is no information in the data about the remaining 34 target words that the students did not use in their essays. For example, it is possible that they failed to use these words because they were not relevant to the assigned source texts and essay topic. Alternatively, it is also possible that the students avoided them due to a lack of knowledge about their meaning, form, or usage. If the

latter possibility is true, then the students' ability to use the textbook's target AWL words may not be as strong as the findings reported here suggest. Second, the students had a certain level of support when they were writing their essays. Not only did they have access to monolingual English dictionaries while writing the essays, but they were also allowed to draw upon the notes they had taken about the readings. If students prepared diligently before the exam, they may have had the support of key vocabulary in their notes, which may or may not have included some of the target AWL words focused on in this study.

Conclusion

In conclusion, the study has found that EAP students use AWL words with a relatively high accuracy rate (67%), largely avoiding morphosyntactic and collocational errors. However, the prevalence of collocational errors highlighted avenues for improving the pedagogical effectiveness of EAP instructional materials for promoting AWL learning. Our future research aims to clarify whether including more usage-focused vocabulary activities, recycling target words across textbook chapters, and emphasizing collocational knowledge of topic-specific AWL words will help EAP students become more proficient at using AWL words. By carrying comparative experimental studies that assess developmental outcomes, our goal is to identify which types of instructional interventions are most effective at helping EAP students use AWL words accurately and appropriately in their own texts.

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