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Harry Potter and the Prisoners of Vocabulary Instruction: Acquiring Academic Language at Hogwarts

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Abstract

Several researchers have claimed that low-achieving students, especially second language students, need explicit academic vocabulary instruction to "catch up" with their age peers (e.g., Nagy & Townsend, 2012). Two possible paths to vocabulary growth – free reading and explicit vocabulary instruction – were compared in terms of their *efficiency* (Mason, 2007) in words acquired per minute by analyzing data from a large corpus (1.1 million words) of young-adult novels taken from the *Harry Potter* series (Rowling, 2016), and from seven large-scale academic vocabulary intervention studies.
The *Harry Potter* novels contain 85% of all the words on the Academic Word List (AWL), which is thought to include the most important word families needed for success in school. Reading all seven *Harry Potter* novels is predicted to result in the acquisition of between one-fifth and one-half of these AWL words. This vocabulary gain is 1.6 to four times more efficient than what has been achieved so far through explicit instruction.

***Keywords*:** vocabulary acquisition, academic language, pleasure reading, efficiency, explicit instruction

Pleasure reading is an important source of vocabulary growth for first and second language acquirers. Correlational studies have found that pleasure reading is associated with larger vocabularies among both schoolchildren (Cunningham & Stanovich, 1991) and adults (Stanovich & Cunningham, 1992). Experimental studies have shown that students who do self-selected pleasure reading in sustained silent reading (SSR) or extensive reading programs for part of their instructional day do as well as, and usually better than, those in traditional language arts classrooms on measures of vocabulary and reading comprehension (Jeon & Day, 2016; Krashen, 2004a; Krashen & Mason, 2017).

Despite this evidence, several researchers (Crosson et al., 2019; Nagy & Townsend, 2012; Snow et al., 2009) have argued that low-achieving students, including many language minority and second language students, need explicit instruction in academic vocabulary in order to prevent them from falling behind their age peers at school. Academic vocabulary intervention studies to date, however, have not included direct comparisons to self-selected reading in terms of their respective instructional *efficiency* as measured by the rate at which new words are acquired (Mason, 2007).

In this paper, I use a corpus analysis to calculate the likely efficiency in words per minute of acquiring academic vocabulary by reading seven novels from the most popular adolescent fiction series in recent years, *Harry Potter* (Rowling, 2016). I then summarize the efficiency of explicit instruction of academic vocabulary from seven previously published reports, and compare the efficiency of word acquisition from reading versus instruction.

Literature Review

Corpus studies of vocabulary acquisition

Previous corpus analyses have classified word families as "acquired" based on the number of repetitions of that family in the corpus (Cobb, 2007; Dang, 2019; McQuillan, 2019a; Nation, 2014; Rolls & Rodgers, 2017). This approach is supported by studies showing that, in general, the more an unknown word occurs in a text, the more likely it is to be acquired (Hulme et al., 2019; Webb, 2007). This is not to say frequency is the only variable of importance. Contextual support for unknown words, for example, has been found to be important in word acquisition in some studies (Webb, 2008), although not in all (e.g., Nagy et al., 1987). Contextual diversity – encountering words in different contexts – has also been found to affect word acquisition, especially when acquisition is measured by lexical decision tasks (Berger et al., 2019).

More repetitions of a word will of course increase the likelihood of encountering the word in more informative and contextually diverse contexts, so most previous corpus studies have used word repetitions when making (admittedly rough) estimates of word acquisition from reading and listening.

The thresholds for classifying a word as acquired are usually taken from "read-and-test" studies (e.g., Brown et al., 2008; Pellicer-Sanchez & Schmitt, 2010; Saragi et al., 1978; Webb, 2007). In read-and-test studies, students read a text with unknown words, and are then given a surprise vocabulary test on these target words. We can then examine the percentage of words acquired by number of repetitions in the text to find a reasonable threshold beyond which it is likely unknown words will be acquired incidentally.

Nation (2014), for example, used a cut-off point of 12 occurrences in his corpus analysis of adult-level texts to determine if an unknown word family would likely be acquired through reading. Cobb (2007) and McQuillan and Krashen (2008) used a much lower cut-off point of six repetitions. In most corpus studies of this type, researchers count as potentially acquirable words those that occur above a certain 1,000 word family level, usually what is required for at least 98% vocabulary coverage of the texts in question. No attempt has been made to isolate the effects of reading on academic vocabulary acquisition.

Academic vocabulary. Academic vocabulary (sometimes referred to as "sub-technical" vocabulary) are words that appear frequently in scientific journals, textbooks, and lectures, and are considered some of the most important for understanding texts across a wide range of disciplines. Coxhead (2000) analyzed written academic texts, including some fiction (1.4% of

the corpus), to create an "Academic Word List" (AWL) of 570 word families that occur frequently and that were thought to be essential for academic literacy. An analysis by Greene (2008, cited in Coxhead et al., 2010) of middle school science texts reported just under six percent (5.98%) of the tokens were from AWL word families. Coxhead et al. (2010) found a slightly higher percentage of AWL words (7.05%) in high school science textbooks, with 5.9% from a "science-specific" academic word list developed by Coxhead and Hirsh (2007).

Ming-Tzu and Nation (2004) determined that these AWL word families tended to be fairly similar in meaning across disciplines, such that acquiring a word family in one scientific domain would be beneficial in other fields as well. More recently, Gardner and Davies (2014) proposed a longer list (the Academic Vocabulary List), based on lemmas rather than word families.

By definition, these academic words appear less frequently in fiction and non-scientific expository texts, especially for younger readers. But they do occur. Using an "Academic High Frequency Words" list derived from the University Word List (Xue & Nation, 1984), Gardner (2004) reported academic vocabulary comprised 0.7% of the tokens in a corpus of juvenile fiction, and 2.7% of the tokens in middle-school expository texts. Rolls and Rodgers (2017) examined adult science fiction texts and found that 92% of "science words" (taken from Coxhead and Hirsh (2007), which excludes those in Coxhead's (2000) AWL) occurred at least once in a corpus of one million words, with 44% occurring 10 or more times.

Acquiring academic vocabulary through reading. Krashen (2010) argues that reading fiction, including popular series books, can make an important contribution to academic vocabulary acquisition. His "Bridge Hypothesis" posits that light fiction serves as a path or conduit to academic language. Readers of fiction acquire both general and academic vocabulary, which in turn lowers the vocabulary load of the texts they encounter in school.

Gardner (2004) thinks that this "conduit" effect is unlikely. Although academic vocabulary occurs in fiction, Gardner concludes that the "overlap" between the kinds of words in fiction and in expository texts is too low for fiction reading to contribute meaningfully to comprehending school texts. He found that 7% of the academic words were repeated 10 or times in both his fiction and expository text samples. From this he concludes that the amount of shared academic vocabulary was low.

Gardner is asking the wrong question, and answering it with the wrong data. Knowing how many academic words are repeated 10 or more times in *both* the fiction and expository registers doesn't fully capture the effect of reading fiction on the comprehension of expository texts. Words that are acquired via fiction reading may still contribute to comprehension of expository texts even if they occur there fewer than 10 times, depending on other factors (e.g., contextual support).

The more relevant question is: How many academic words that appear in both registers are acquirable from *fiction*? Gardner never asks this question. We don't know how often academic words occurred in his fiction corpus a sufficient number of times (10 or more, using his cut-off point) to be acquired. And since the size of his expository corpus was less than half that of the fiction corpus (400,000 vs. 1,000,000 words), even the 7% shared figure is likely to be

misleading. His smaller expository sample restricts the number of word types than can appear more than 10 times in both registers.

The data that Gardner does report are consistent with Krashen's Bridge Hypothesis. Gardner's results (Table 7, p. 91) show that more than half (56.4%) of the academic words in his corpus were shared between fiction and expository texts (occurring at least once), with 79.8% shared general high frequency vocabulary. This is an impressive amount of overlap, and would give fiction readers a considerable leg up when it came time to read their textbooks.

A more recent corpus analysis supports this view. McQuillan (2019a) looked at a large corpus (1 million words) of 22 young adult series books and found that 85% (484) of the AWL word families occurred at least once in his corpus. AWL words constituted 1.02% of the tokens, slightly higher than that found in Gardner (2004). Unlike Gardner, McQuillan tested different thresholds for AWL word family acquisition, at 12, 20, and 25 repetitions. He estimated that readers would acquire incidentally somewhere between 113 word families (using the 25 repetition cut-off) and 213 word families (using 12 repetitions) after reading one million words of juvenile fiction.

McQuillan's (2019a) data show that a reader could acquire somewhere between 20 and 37% of the academic vocabulary needed for comprehending expository texts after as little as a million words of fiction reading. While fiction alone may be insufficient to acquire all the academic vocabulary needed, these findings suggest that it has the potential to make a substantial contribution to academic language development.

Academic vocabulary instruction

Researchers in both first and second language reading have recommended that teachers use lists such as Coxhead's AWL as the basis for explicit vocabulary instruction (Coxhead, 2011; Nagy & Townsend, 2012; Nation, 2007; Snow et al., 2009).

In Snow et al. (2009), for example, the researchers developed the *Word Generation* curriculum, designed to teach 120 academic words. Most of these words were taken from the Coxhead's (2000) AWL. Snow and colleagues targeted a large group of middle school students, which included a high percentage of language minority and English as a second language students. The approach used in *Word Generation* was guided by the following factors (Snow et al., 2009, p. 327):

- Encountering words in semantically rich contexts within motivating texts;
- Frequent exposure to the word in different contexts;
- Opportunities to use the word orally and in writing;
- Explicit instruction in word meaning; and
- Explicit instruction in word learning strategies.

Several other studies have used a similar approach in instructing students in academic vocabulary. Townsend and Collins (2009), for example, taught a group of English language learners (ELLs) using after-school tutoring. Some programs, such as Snow et al. (2009), have

integrated vocabulary instruction across the curriculum so that math, science, and social studies teachers also teach the target words.

To date there have been several large-scale evaluations of the *Word Generation* curriculum and similar programs aimed at low-achieving middle school and high school students, including ELLs. One weakness of these academic vocabulary evaluation studies is that treatment groups are typically compared to "business as usual" control groups, in which teachers use the regular school curriculum. Little description is provided about what goes on in these comparison classrooms, but it appears from at least one large study that students in the comparison groups devoted little time to free reading. Lesaux et al. (2010) studied the effects of an academic vocabulary intervention among a group of middle school students ($N = 476$) and found that teachers in their control classes spent less than 3% of their instructional time on independent reading (Table 9, p. 219). Corpus analysis can provide a reasonable proxy for these "missing" free reading comparison groups.

Time efficiency in instruction

Many vocabulary interventions appear to "work" based on the number of new words students learn compared to comparison groups. Elleman et al. (2009) found in their meta-analysis of vocabulary studies a large effect size ($d = .97$) favoring explicit vocabulary teaching over comparison groups on researcher-created tests, although a much smaller and insignificant effect on standardized vocabulary measures ($d = .10$).

The rationale for many vocabulary teaching programs aimed at low-achieving students and ELLs is that they will help students "catch up" to their age peers. This is an especially critical issue for ELL middle school students, who have limited time to improve their English language proficiency in order to comprehend grade-level texts. Lawrence et al. (2014) claim that without proper vocabulary interventions, "low-skilled students are likely to fall further behind their more skilled peers in academic domains" (p. 77). Crosson and colleagues (2019) assert that it is not sufficient for ELLs and other language minority students "to increase vocabulary knowledge at comparable rates [as English-only students] in order to close the gap," but rather we need "interventions designed to *accelerate* vocabulary learning" (p. 495, emphasis added).

Despite the urgency that these researchers express in helping language minority students, few studies have evaluated explicit vocabulary teaching in terms of the *time efficiency* of the instruction. Faw and Waller (1976) proposed more than 40 years ago that researchers should distinguish between *absolute performance* and *efficiency of performance* in education. Absolute performance would include measures such as the number of words gained from pretest to post-test, a typical dependent variable in vocabulary intervention studies.

Efficiency of performance measures are those that take the absolute gains and divide them by the time needed for the intervention, yielding a gains-per-time estimate. For example, a program that successfully taught students 10 new academic words over the course of 600 minutes (10 hours) of instruction could be said to have a time efficiency of .016 words learned per minute (10/600). Faw and Waller note that teaching methods that have greater absolute gains may in fact be *less* efficient than other approaches. In an ideal world of unlimited time and resources, absolute gains

would be the preferred metric of success. Given that instructional time is limited, however, a focus on efficiency is necessary.[1]

Only a few studies have reported efficiency estimates in vocabulary acquisition. Krashen (1989) calculated time efficiency estimates for a set of explicit vocabulary teaching studies. Mason (2007) provided time efficiency estimates for her intervention study with adult second language learners. McQuillan (2016b) re-analyzed several second language vocabulary studies to compare time efficiencies of reading-only and reading plus explicit instruction conditions.

Research Questions

While few intervention studies offer direct comparisons of explicit vocabulary teaching and vocabulary acquisition from free reading, it is possible to make a rough comparison based on both the intervention studies themselves and a corpus analysis that estimates the expected number of words that will be acquired incidentally through free reading. We can then compute the number of words acquired in a common metric (words per minute).

McQuillan (2019a) compared this efficiency using texts from multiple authors of adolescent fiction. The present study seeks to partially replicate and extend those findings. By using a single author rather than a variety of authors, we examine whether "narrow reading" in a single series can provide the same benefits to vocabulary acquisition as wider reading, represented by McQuillan's (2019a) analysis.

The study is organized around three research questions:

1. What is the efficiency of academic vocabulary acquisition as a result of reading fictional texts that are popular among middle school students?
2. What is the efficiency of academic vocabulary instruction in large-scale, long-term vocabulary instruction programs for middle school students?
3. What is the *relative* efficiency of free reading and academic vocabulary instruction in acquiring new words?

Efficiency of Word Acquisition from Pleasure Reading

While first and second language students have available a large variety of texts to read, the most popular books for middle and high school students are series books (Scholastic, 2015a; 2015b; Ujiie & Krashen, 2006). There is an ample number of such series at differing levels of vocabulary difficulty (McQuillan, 2016a), making them a good source for compiling a corpus to analyze. As noted above, fiction books may seem at first an unlikely source for academic vocabulary acquisition. Nevertheless, series books do contain such vocabulary and are read widely by this age group.

For this analysis, I choose one of the most popular fiction series aimed at children and adolescents in recent years, the *Harry Potter* novels (Rowling, 2016). Choosing a single fiction

series such as the *Harry Potter* novels allows us to see if they supply a sufficient range and repetition of AWL word families in order to give students a reasonable chance at acquiring academic vocabulary. "Narrow reading" has often been advocated as a strategy for improving vocabulary and reading comprehension (Krashen, 2004b; Gardner, 2008). Series books tend to be easier to comprehend since they allow readers to use their background knowledge developed through reading several works about the same characters.[2]

Method

Seven *Harry Potter* novels were used to create a 1.1 million-word corpus, using an electronic copy of the books (Rowling, 2016). The corpus was analyzed using the software *AntWordProfiler* (Anthony, 2012). *AntWordProfiler* uses both the British National Corpus (BNC) and the Corpus of Contemporary American English (COCA) to provide a breakdown of English word families into frequency bands of 1,000-word families (i.e. the first 1,000 most commonly used words, the second 1,000 most commonly used words, etc.). For additional details on the methodology used with such software, see McQuillan (2016a) and especially Nation (2014), who also discusses the rationale for using the COCA and BNC corpora.

We first estimated the "vocabulary coverage" for each of the seven novels. Vocabulary or lexical coverage refers to the percentage of word families in a text that the reader is likely to know. In order to read with good comprehension, readers typically need to know at least 98% of the words in the text (Hu & Nation, 2000; Schmitt et al., 2011; but see also McQuillan, 2016a, footnote 1). Nation (2014), for example, estimated that in order to read most adult-level texts with 98% coverage, a reader would need to know the 9,000 most frequently occurring word families in English.

Previous corpus analyses on vocabulary acquisition have set as the target words those families that appeared above the 98% vocabulary coverage threshold (e.g., Nation, 2014). For example, if a text had 98% vocabulary coverage at 6,000 word families, all the word families at and beyond the 7,000 word family level would be analyzed. Since we are interested in academic vocabulary, we restricted the potentially unknown words in this analysis to Coxhead's (2000) Academic Word List (AWL) rather than by 1,000 word family levels.

The AWL was chosen over a more recent list by Gardner and Davies (2014) in order to make the results more directly comparable to the seven instructional interventions, all of which used the AWL as the source of their instructional vocabulary. To give a sense of how the use of AWL word families compares in the vocabulary interventions and the *Harry Potter* corpus, I have provided in the Appendix definitions and sample sentences for 10 randomly selected AWL word families that occur in both places.

Results

Table 1 reports the percentage of cumulative vocabulary coverage for our corpus, beginning with the 3,000 most frequently occurring word families up through the 9,000-word-family level. If

readers know the first 3,000 most frequently occurring words in English, they'll know 95.5% of the words in the first *Harry Potter* novel (Table 1, row 2, column 2). If they know the first 4,000 most frequently occurring word families, they'll know 96.8% of the words (row 2, column 3), and so on.

The bolded figures in Table 1 indicate the level at which the 98% vocabulary coverage is achieved for each novel. Readers need to know between 5,000 and 6,000 of the most commonly occurring word families for adequate comprehension of the *Harry Potter* novels. This is slightly higher than 5,000-word-family estimate reported by McQuillan (2016a). McQuillan's analysis, however, only included the first book of the *Harry Potter* series. As seen in Table 1, the series gets slightly more difficult after the first novel.

Table 1
Vocabulary profiles of the Harry Potter *novels*

Novel	3K	4K	5K	6K	7K	8K	9K
1 – The Sorcerer's Stone	95.5	96.8	**98.0**	98.5	98.8	99.15	99.4
2 – The Chamber of Secrets	94.2	95.9	97.4	**98.1**	98.5	98.8	99.2
3 – The Prisoner of Azkaban	94.8	96.4	97.6	**98.4**	98.8	99.1	99.4
4 – The Goblet of Fire	94.6	96.2	97.9	**98.3**	98.7	98.9	99.3
5 – The Order of Phoenix	94.7	96.3	97.4	**98.1**	98.6	98.9	99.3
6 – The Half-Blood Prince	94.8	96.3	97.4	**98.1**	98.5	98.8	99.2
7 – The Deathly Hallows	94.4	96.1	97.3	**98.0**	98.4	98.8	99.3
All Novels	94.7	96.3	97.5	**98.2**	98.6	98.9	99.3

In Table 2, we report the total number of AWL word families that appear at least once in the *Harry Potter* corpus (column 3, final row). There are 486 word families that appear, or 85% of the entire AWL. Academic words make up 1.04% of the total number of words (tokens) in the text.

In order to estimate how many of these word families would likely be acquired from reading the novels, I tested four assumptions: Cobb's (2007) threshold of six repetitions, Nation's (2014) cut-off point of 12 repetitions, and much more conservative thresholds of 20 and 25 repetitions. Since there is no clear threshold for repetitions that ensures acquisition in all conditions, we provide different cut-off points to indicate the increasing likelihood that word acquisition will occur, consistent with the results of read-and-test studies.

The number of word families that occur at these frequencies are listed in Table 2, columns 3 to 8. Since we are interested in the effect of word repetition across the seven novels, cumulative totals are provided for each novel. The estimates for the second novel include occurrences in the first

and second novel, and so on. Reading three novels, for example, is predicted to result in the acquisition of 84 words at the 12-repetition cut-off point. The number of tokens found in each novel is found in column 2 of the table.

Table 2
Estimates of the number of academic words likely to be acquired from reading the Harry Potter *novels*

		AWL Word Occurrences (Cumulative)				
Book Title	**Total Tokens**	**Once**	**6 times**	**12 times**	**20 times**	**25 times**
1 – The Sorcerer's Stone	80,718	95	18	7	3	2
2 – The Chamber of Secrets	88,622	188	39	17	10	7
3 – The Prisoner of Azkaban	111,554	378	170	84	47	32
4 – The Goblet of Fire	197,557	412	213	128	75	57
5 – The Order of Phoenix	266,052	424	227	143	90	71
6 – The Half-Blood Prince	175,027	444	266	171	124	95
7 – The Deathly Hallows	204,795	486	297	204	146	123
Total	**1,124,325**	**486**	**297**	**204**	**146**	**123**

The average reading rate for both intermediate ESL adults and U.S. fourth graders is approximately 150 wpm (McQuillan & Krashen, 2008; Spichtig et al., 2016). Reading all seven *Harry Potter* novels (1,124,325 words) at that average rate would require approximately 7,500 minutes, or 125 hours. Younger students reading the *Harry Potter* novels 20 minutes per day in class during sustained silent reading (SSR) time could finish them in about two 180-day school years. Reading 30 minutes per day outside of school, readers could finish them in well under one year (7,500 minutes/30 minutes a day = 250 days).

Cobb's (2007) cut-off point for acquisition of six repetitions predicts that readers would gain 297 academic words from the novels. This works out to be .039 words per minute (wpm) (297 words/7,500 minutes). Using Nation's (2014) cut-off point of 12 repetitions, it is predicted that readers would acquire 204 academic words, or .027 wpm. At the 20-repetition threshold, the total words acquired would be 146 at a rate of .019 wpm. For 25 repetitions, a total of 123 words would be acquired at a rate of .016 wpm.

Efficiency in Explicit Instruction of Academic Vocabulary

Method

McQuillan (2019a) identified seven recent academic vocabulary interventions focused mainly on AWL words. All seven interventions were with middle and high school students, and most took place in large, ethnically and linguistically diverse urban school districts with substantial numbers of ELLs and language minority students. All but Mokhtari and Velten (2015) had a large number of subjects (more than 1,000), with a total of 16,253 students across all seven interventions. All the studies used by McQuillan (2019a) were carried out in U.S. middle schools (grades 6 to 8), and all focused on low-achieving children, typically from low-income families and/or language minority families.

The quality of the studies included in McQuillan (2019a) was high. Most used some form of random assignment for the treatment and control groups. All had reliable researcher-created measures, standardized literacy measures, at least some fidelity checks on intervention instruction, and appropriate statistical analysis for large, multi-classroom studies of this nature (e.g., hierarchical linear modeling). Given the quality and the large sample size of these studies, McQuillan's (2019a) list was used as the basis for our efficiency comparison.[3]

Vocabulary instruction in the interventions was intensive. Teachers spent on average 10 to 20 minutes per day on vocabulary teaching, or between 20% and 40% of a typical 50-minute class. Each intervention used a wide range of vocabulary teaching techniques, similar to the principles noted above for effective vocabulary instruction, and attempted to teach a significant number of target words over the course of the study (range: 70 to 120). In Lesaux et al. (2014), for example, students were given at least 10 hours of instruction on *each* of the following word learning strategies: semantic mapping, use of context clues, dictionary definitions, the use of "productive representations" of words (e.g., drawings), morphological analysis, and mock interviews using the target words.

To calculate efficiency, I followed McQuillan's (2019a) approach of dividing the gain scores (average number of words correct on post-test minus the average number of words correct on the pretest) by the total number of minutes in the intervention. This yielded the efficiency estimate in words learned per minute.

Results

The results from these studies are summarized in Table 3, which shows the intervention's instructional time in minutes, grade level, number of words learned calculated by subtracting pretest from post-test scores, and instructional efficiency in words learned per minute.

Table 3
Efficiency of explicit academic vocabulary instruction in seven studies

Study	Sample Size (Grade Level)	Instructional Time In Minutes	Total Words Learned	Efficiency in Words Learned Per Minute
Lawrence et al. (2012)	1,665 (7, 8)	1800	12.6	.007 wpm
Lawrence et al. (2014) (Year 1)	1,518 (6 – 8)	1800	12.9	.007 wpm
Lawrence et al. (2015)	1,554 (6 – 8)	1800	5.8	.003 wpm
Lawrence et al. (2016)	8,382 (6 – 8)	1800	7.1	.004 wpm
Lesaux et al. (2014)	2,082 (6)	4095	9.6	.002 wpm
Mokhtari & Velten (2015)	36 (6)	2040	12.5	.006 wpm
Snow et al. (2009)	1,016 (6 – 8)	1800	13.3	.007 wpm
Average (SD)	**2,322**	**2,162**	**10.54 (3.07)**	**.005 wpm (.002)**

Note. Adapted from McQuillan (2019a), Table 1

On average, students learned the meaning of new academic words at a rate of .005 wpm, or about one new word every 3.3 hours of explicit instruction.

Efficiency Comparison of Free Reading and Explicit Instruction

One way to compare the efficiency of the two approaches is to divide the free reading efficiency rates reported above by the average explicit instruction rate found in Table 3. So if six occurrences of an unknown word family were needed for acquisition, free reading would be eight times more efficient than explicit instruction (.04 wpm for free reading/.005 wpm for explicit instruction). For 12 occurrences, reading would be 5.4 times more efficient than instruction. For 20 repetitions, free reading would be 3.8 times more efficient than instruction. For 25 repetitions, free reading would be 3.2 times more efficient.

An objection to this approach is that the method used to calculate the number of words acquired as a result of explicit instruction is not equivalent to that used for free reading. McQuillan's

(2019a) calculation and ours of gains in the direct instruction interventions takes pretest knowledge of the target words into account, while the corpus estimates do not. In many of the explicit instruction studies shown in Table 3, students knew close to half of the words to be taught even before the intervention began. Part of the inefficiency of explicit instruction, it could be argued, was due to an inappropriate selection of words to be taught.

This kind of inefficiency, however, is a feature, not a bug, of most direct instruction programs. With any planned curriculum, a certain number of students will already know parts of the material on the first day of the course. Note that this is much less of a problem with self-selected reading. When readers select their own books, they are likely to choose books that more closely match their current language proficiency, and hence are more efficient for vocabulary acquisition.[4]

Still, our corpus analysis assumed that students didn't know *any* of the AWL word families before reading, an overly pessimistic assumption. To provide a better comparison to the results of explicit instruction, in which students typically begin an intervention knowing about half of the target words, we also reduced by half the four efficiency rates reported above for free reading, so that the efficiencies for six, 12, 20, and 25 repetitions are estimated to be .02 wpm, .014 wpm, .01 wpm, and .008 wpm, respectively.

Even under these stricter assumptions, free reading is still more efficient than explicit instruction: four times more efficient for six repetitions, 2.8 times more efficient for 12 repetitions, twice as efficient for 20 repetitions, and 1.6 times more efficient for 25 repetitions.

Discussion

The *Harry Potter* novels contain 85% of the academic vocabulary thought to be important for school as represented by the AWL. In about one year's time, a fourth grader or intermediate ESL student reading *Harry Potter* novels could acquire somewhere between 123 and 297 AWL words, or about one-fifth to one-half of the entire list. If that same amount of time were spent in explicit instruction, and giving students credit for the AWL words they already knew before instruction begins, students would know only 75 AWL words, less than 15% of the list.

If our assumptions about incidental word acquisition are correct, reading is clearly much more efficient for acquiring new vocabulary than explicit instruction. Even when teachers spend relatively large amounts of classroom time teaching words, the number of new words learned per minute is far less than what students are likely to have acquired through self-selected reading.

These results are consistent with McQuillan's (2019a) corpus analysis. As discussed previously, that study used a corpus of one million words from 22 popular young adult series books to determine the number of AWL words that could be acquired from reading them. In his efficiency analysis, McQuillan determined that free reading was two to six times more efficient than explicit instruction interventions.

McQuillan's (2019a) analysis, however, did not take into account prior knowledge of the AWL words for free reading, as we have done here. We can reduce by half his efficiency estimates to make them more comparable to the intervention studies. Doing so does not change his basic conclusion: Free reading would still be three times more efficient using a 12-repetition model, twice as efficient using a 20-repetition model, and as efficient as explicit instruction using a 25-repetition model.

Any apparent "tie" between free reading and explicit instruction is really a win for reading. Free reading is more pleasurable for the student (McQuillan, 1994) and easier for the teacher than direct instruction. Reading also aids in the acquisition of spelling, grammar, writing style, and general knowledge of the world (Krashen, 2004a), all with no additional time or effort.

Our results are also consistent with other corpus analyses that examined both general and academic word acquisition. McQuillan (2019b) reviewed 14 short-term explicit vocabulary interventions and found that those lasting up to 10 hours had an efficiency rate for vocabulary learning of .01 wpm. (Treatments lasting more than 10 hours had even lower efficiencies.) We can compare this .01 wpm estimate to the results of Nation's (2014) corpus analysis on general vocabulary acquisition. Nation found that readers at the 3,000 to 8,000 word family level (approximately the level of middle and high school texts) are likely to acquire new words at an average rate of .12 wpm. Compared to general vocabulary instruction, free reading is up to 12 times more efficient than direct instruction.

Experimental studies that provide direct comparisons of reading and explicit vocabulary instruction have reached similar conclusions to those found in the corpus analyses. Mason (2007), Mason and Krashen (2004), and Clarke (2019), for example, all found that, for adults studying a second language, listening to and reading stories was more efficient for vocabulary acquisition than doing extra "activities" or explicit instruction. McQuillan (2016b) looked at seven studies comparing reading versus reading plus explicit instruction in adult second language classrooms and concluded that reading was typically more efficient for word growth than explicit teaching. McQuillan (2019c) examined studies of explicit teaching of words during storybook reading for preliterate children. He found simply reading the story to the children was 66% more efficient in acquiring new words than explicit instruction in those words within the context of storybook reading.

Pedagogical Implications

Relatively few reading researchers consider free reading as a possible path to academic language proficiency. Krashen (2012) proposes that school encourage a two-step approach to developing academic language. The first step is to promote voluminous reading of fiction, which builds both general vocabulary and part of what is needed for academic vocabulary. This can be done with extensive reading and SSR programs (Krashen, 2004a). The second step is to encourage students to do free reading in an academic topic that interests them. Reading expository texts narrowly about a favorite topic will contribute both to their knowledge of that subject and to their broader academic language proficiency.

Some surveys of school-age readers have found that while most children read for pleasure at least a few times per week, only a minority do so daily (Clark & Teravainen, 2017). Relying on free reading to improve academic vocabulary may require additional effort by teachers and schools to promote pleasure reading. Fortunately, there is evidence that even reluctant and low-achieving language minority and English-only students can develop and maintain a daily reading habit in SSR or extensive reading programs (McQuillan et al., 2001; Shin & Krashen, 2008). These programs substitute part of the traditional language arts curriculum with free reading time (Pilgreen, 2000). Given time to read in class, nearly all students have been found to take advantage of the opportunity in such programs (Von Sprecken & Krashen, 1998).

I do not argue that a free reading program is the *only* intervention students may need to acquire academic vocabulary. But given the differences in efficiency and the limits of classroom time, teachers should at least consider that option as part of their curriculum. Students need only regular reading time, lots of books to choose from, and a little guidance and encouragement from the teacher (Krashen, 2004a).

Notes

1. Faw and Waller (1976) provide the following analogy to explain the importance of time efficiency measurement:

> It is absurd to think that psychologists and educators can be content with improving subjects' learning and retention of textual materials if the altered performance is simply a function of augmented study time. This would be analogous to attributing the increased length of a skier's jump to superior coaching when, in fact, the coach had simply provided a steeper and longer hill from which the jump could be made. (p. 703)

2. Macalister (2019) reported that he had the difficulties as a self-described “intermediate” in French when reading the *Harry Potter* novels in that language. He did not present any detailed data on his own vocabulary knowledge level nor how that level compared to the vocabulary levels found in the French *Harry Potter* translations. The assumption here, as in previous corpus studies, is that the person reading the text knows at least 98% of the words, and that *98% coverage is sufficient for good comprehension*. The most likely cause of Macalister’s difficulties was that he chose a text that was too hard for him, a situation easy to remedy by selecting an easier book.

Webb and Macalister (2013) and Macalister and Webb (2019) argued that children’s literature contained too high of a “vocabulary load” to be useful to intermediate ESL students. However, as McQuillan (2019d) pointed out, the texts used for that determination were not typical of those actually read by and popular with children (McQuillan, 2016a).

3. One anonymous reviewer noted that I excluded three studies (Konopak et al., 1987; Hulstijn, 1992; and Peters et al., 2009) that show the superiority of explicit instruction over incidental acquisition. None of these studies looked at free reading as a source of incidental acquisition, and all were very brief (1-2 classroom or laboratory sessions).

Hulstijn (1992) wasn't a classroom instructional study, but a series of short computer-based experiments on how different types of marginal glossing (e.g., synonyms, translations, multiple-choice questions, etc.) affected word acquisition. No efficiency scores can be calculated for the Hulstijn experiments, however, since there was no measure of time provided by the researcher.

The other two studies did not clearly show that instruction was more efficient than just reading. Konopak et al. (1987) gave two groups of 11-grade students a short social studies passage. The incidental group simply read the passage, which took about 15 minutes. The instructed ("intentional") group read the text and then was given a "redefinition" task lasting an additional 15 minutes. Efficiency estimates were essentially the same for both groups (incidental: .44 wpm, intentional: .43 wpm; calculated from the "Definitions" results in Table 1, p. 14).

In Peters et al. (2009), adult L2 students were divided into four groups: "intentional only" (warned they would be tested on vocabulary after the passage, but no instruction), "incidental only" (no warning given and no instruction), "intentional plus" (warning and extra instruction), and "incidental plus" (no warning, but extra instruction). The "plus" vocabulary instruction took about 10 minutes (p. 127), while reading and answering the comprehension questions done by all four groups took an average of 37 minutes.

Immediate and two-week delayed word retention post-tests were administered, including presenting the words in isolation and in context. Word retention scores on the delayed post-tests indicate that instructed students (the "plus" conditions) had identical efficiency scores as non-instructed students (the "only" conditions) on the words in isolation test: (.08 wpm, from Table 10, p. 134). On the words in context measure, scores for the instructed "plus" group were only slightly higher than the "only" groups without instruction (Instructed: .18 wpm, Non-instructed: .165 wpm; from Table 12, p. 136). As I note in my Discussion below, in any "tie" between the efficiency of free reading and instructed conditions, free reading should be preferred, since it is both easier for teachers and doubtless more enjoyable for students (McQuillan, 1994).

4. Carver (1994) speculated that children will self-select only books for which they have nearly 100% vocabulary coverage, and thus will pick up very few new words during free reading. But in surveys of representative samples of schoolchildren in the U.S. and Australia, Scholastic Publishing (2015a, 2015b) found that the vast majority of the students said they selected at least some of their books *above* their grade level (U.S.: 77%; Australia: 81%), with about a third of students picking most of their books that way (U.S.: 28%; Australia: 33%). Further evidence that pleasure reading is not "easy" reading can be found in Krashen et al. (2018), who report that elementary school children reading in Mandarin Chinese selected progressively harder texts as they moved through grades three to six. This result is consistent with previous studies with English language readers (LaBrant, 1958; Schoonover, 1938; Southgate et al., 1981).

An anonymous reviewer speculated that if students chose books "above" their current reading levels, they'd be too *difficult* for them to acquire new vocabulary, the opposite problem posed by Carver. Books need to contain some new words for readers to acquire, while still being comprehensible to the reader. I think it is more likely that when students claim to read books "above" their current level, they mean ones that are still comprehensible enough to acquire

vocabulary from. No reader would persist long-term in selecting and attempting to read books for pleasure that were too difficult for him or her to comprehend.

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Appendix

To give a sense of how the AWL words are used in the instructional intervention programs compared to in the *Harry Potter* novels, I selected 10 words at random from the 120 AWL word families that appear in both the most popular academic vocabulary intervention program, *Word Generation* (Snow et al., 2009), and in our corpus. *Word Generation* was used by six of the seven instructional studies listed in Table 2.

In the table below, I give the word, its definition with a sample sentence as found in the *Word Generation* lesson plans, and a sentence using that AWL word chosen from its occurrences in the *Harry Potter* corpus.

In most cases, the meanings of the words in the instructional programs overlap considerably with the meaning found in the fiction corpus, although clearly that may not be the case for every use of the word in academic texts or in the novels.

Definition and use of AWL Words in Word Generation *lesson plans and in* Harry Potter

Word Generation Definition	**Word Generation Sample Sentence**	***Harry Potter* Examples**
acknowledge *(verb)* to recognize; to accept	My teacher finally **acknowledged** that my way of solving the math problem was just as good as hers.	The goblin looked slantwise at Harry, and the lightning scar on Harry's forehead prickled, but he ignored it, refusing to **acknowledge** its pain or its invitation.
contradict *(verb)* to argue against; to deny	Critics argue that these actions **contradict** statements by tobacco companies that they are trying to prevent kids from smoking.	"And the best bit is," whispered Hermione gleefully as they left the library, "they can't **contradict** you, because they can't admit they've read the article!"
despite *(preposition)* even with, in spite of	Andrea won the spelling bee **despite** the fact that she has a learning disability.	For a split second Harry thought he had done magic without meaning to, **despite** the fact that he'd been resisting as hard as he could.
inevitable *(adjective)* unavoidable	It's **inevitable** that you will disagree with your friends sometimes, but it's important to respect their opinions.	It had just occurred to him that Mr. and Mrs. Weasley would want to know how Fred and George were financing their joke shop business when, as was **inevitable**, they finally found out about it.
justify *(verb)* to show or prove to be right; to defend	Some people argue that helping humans does not **justify** animal testing.	"I just can't **justify** taking more time off at the moment," he told them.
modify *(verb)* to make changes to	Siya decided to **modify** the look of her room with some new paint and a small rug.	Mr. Weasley was forced to **modify** several memories before he could escape from the policemen . . .
priority *(noun)* item of high importance	Some people believe that the government should make asthma prevention a **priority**.	"I know that your top **priority** is to be well-rested for your lessons tomorrow."
release *(verb)* to let go; to set free	Anthony Ray Hinton was **released** from prison after spending 30 years on death row.	Harry stepped up to Madam THE, the referee, who was standing ready to **release** the balls from the crate.
status *(noun)* rank, position, or standing	In certain places, young people are considered adults only after completing a rite of passage to mark their change of **status**.	He was waiting for the moment when Ron's labeled dot would reappear in the corridors of Hogwarts, proving that he had returned to the comfortable castle, protected by his **status** of pureblood.
substitute *(noun)* an object or person used in place of something or someone else, a replacement	There is no **substitute** for a good night's sleep in preparing for a test.	"Why was he now happy to let a **substitute** go on?"