

## THE EFFECTS OF PRINT ACCESS AND PRINT EXPOSURE ON ENGLISH VOCABULARY ACQUISITION OF LANGUAGE MINORITY STUDENTS

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### Abstract

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This study examines the relationship among access to reading materials, print exposure, and vocabulary acquisition among language minority (LM) students in United States. Access to print, print exposure, and English vocabulary knowledge were measured through the use of surveys and signal-detection checklists with a group of Spanish/English bilingual high school students (N = 133). Results indicated that LM students had significantly less access to reading materials than their English-only peers. Print exposure and print access were both found to be related to English vocabulary knowledge, although there appears to be a "threshold" effect below which variations in print access have less of an impact on differences in vocabulary knowledge.

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### Introduction

Second language researchers have encouraged the use of "free voluntary reading" among their students (Krashen, 2004). Literacy studies have found that exposure to print through wide and voluminous reading contributes to several aspects of both first and second language literacy acquisition (Elley, 1991; Nagy, Herman, & Anderson, 1983). Access to print, although it has received less attention, has also been shown to be an important factor influencing students reading behavior by inducing students to read more (McQuillan, 1998a; Krashen, 2004). This study examines the relationships among access to print, print exposure, and vocabulary acquisition among a group of adolescent language minority (LM) students.

### Background

#### The importance of print exposure

Reading has been found to contribute significantly to language acquisition among first and second language acquirers in both experimental and correlational studies. Nagy, Herman, and Anderson (1983) conducted a number of "read and test" studies that found that even a single exposure to an unknown word during reading contributed a small but significant gain in vocabulary acquisition. Nagy et al. calculated that the typical gain for a student in vocabulary knowledge over a year's time could be explained by this incidental vocabulary acquisition via reading. The same relationship has also been found among second language (L2) acquirers. Pitts, White, and Krashen (1987) gave a group of adult ESL learners a novel (*The Clockwork Orange*) that contains several Russian slang terms. They found that students who did not have access to the glossary in the back of the book still acquired a significant number of the Russian words found in the story. Dupuy and Krashen (1993) conducted a "read and test" experiment with French foreign language students at the university level. Students read film scripts that contained words in French they were unlikely to know. Students made significant gains in vocabulary knowledge even after a very short exposure to the texts. Several other researchers

have found this relationship between L2 print exposure and vocabulary development (Elley, 1991; Elley & Mangubhai, 1983; McQuillan, 1998a; 1998b).

The amount of free voluntary reading has also been found to correlate with content knowledge, spelling, and grammatical knowledge. McQuillan (1998a) reviews several first language (L1) studies in which measures of content knowledge, vocabulary knowledge, and print exposure have been found to be strongly related. This relationship holds among second language acquirers as well. Lee, Krashen, and Gribbons (1996) found that free reading correlated with grammaticality judgments on the use of the relative clause among a group of Korean ESL adults. Constantino, Lee, Cho, and Krashen (1997) reported that free reading correlated with TOEFL scores, controlling for both formal study and length of residence. Stokes, Krashen, and Kartchner (1998) examined the acquisition of the present subjunctive among L2 Spanish students, and found that free reading correlated with the student's level of acquisition, controlling for formal study and length of residence in a Spanish speaking country.

Researchers have used several methods to measure print exposure and vocabulary acquisition. A promising development in this area has been the use of signal detection checklists (Zimmerman et al. 1977). In a signal detection checklist, participants simply indicate whether or not they recognize the word or item from a list presented to them. Real items are mixed with false items to correct for guessing. These recognition checklists have the advantage of being easy to administer and tend to be relatively free from social desirability effects often found with surveys or other self-reports on print exposure. West, Stanovich, and Mitchell (1993) found that recognition checklists measuring vocabulary knowledge and print exposure correlated with objectively observed reading behavior of adults, demonstrating the validity of such an approach.

Second language researchers have also employed the use of recognition checklists. Meara and Buxton (1987) found that vocabulary checklists for college ESL students correlated well with traditional multiple-choice reading comprehension measures. Kim and Krashen (1998) used print exposure recognition checklists and a vocabulary recognition checklist with a group of Korean high school students studying English as a foreign language. Words in the vocabulary recognition test came from those words used in textbooks and in free reading materials read by the students. Kim and Krashen found, consistent with previous research, that students who read more had higher levels of vocabulary knowledge.

Experimental research on the use of free voluntary reading among first and second language acquirers has supported the causal link between print exposure and literacy development. Krashen (2004) reviews 54 comparison studies of sustained silent reading versus traditional, skills-oriented instruction, concluding that, when implemented properly, increased opportunities to read lead to greater literacy development than did traditional skill-building approaches. McQuillan (1998b) found a similar relationship in his review of second and foreign language sustained silent reading studies (see also Mason & Krashen, 1997).

While most researchers and teachers accept the relationship between print exposure and language acquisition, there is also growing evidence that access to reading materials is another critical variable to be considered. Several studies have found that easy access to reading materials encourages students to read more, leading to higher levels of literacy acquisition (Elley, 1991, 1992, 1998; Elley & Mangubhai, 1983; Krashen, 1995; Lance, Welborn, & Hamilton-Pennell, 1993; McQuillan & Au, 2001; McQuillan, 1998a; Rucker, 1982; Worthy, 1996; Worthy, Moorman, & Turner, 1999). Ramos and Krashen (1998) found that this relationship between access and print exposure was particularly strong among those LM students who were the most socio-economically disadvantaged. The researchers found that even a single

opportunity at greater access to print (a trip to the public library) led to increased interest in reading and print exposure among LM students.

Language minority students constitute an increasing proportion of K-12 students in United States (Tse, 2001), yet have often lagged behind their English-only peers in academic achievement. Understanding the correlates of literacy achievement can contribute to the narrowing of that gap. The present study seeks to replicate and extend the findings of previous studies with regards to the link between access to print, print exposure, and literacy acquisition, focusing on LM adolescents in an urban setting. Specifically, two research questions are addressed:

1. How much access to reading materials do LM adolescents have?
2. What is the relationship between their access to reading materials, their print exposure, and their literacy development?

## **Current Study**

### Subjects

Participants ( $n = 133$ ) for this study were drawn from a low income, urban high school in southern California. Students were participating in a special Title I program aimed at the remediation of low literacy achievement. Students were placed in the Title I program based on standardized test scores falling below the 25th percentile in reading. All participants were either advanced English as a second language students with Spanish as their first language, or fluent English proficient students bilingual in Spanish. An initial sample of 147 students took part in the study; however, several students failed to complete one or more of the surveys and tests, reducing the number to 133.

### Instruments

Three measures were used in the study. They were administered over a period of three days and took less than 15 minutes each to complete.

Vocabulary Recognition Test. A Vocabulary Recognition Test consisting of 112 items selected from words appearing in students' current, self-selected reading material was administered (see Appendix 1). This list was derived by asking each student to write down two words from their current pleasure reading book that they didn't know the meaning of (excluding proper nouns). The researcher then selected the most frequently occurring of these words for the recognition checklist. By this method, words from the independent reading level of the group as a whole could be used, while ensuring some variability in word difficulty. The Vocabulary Recognition Test consisted of 85 real words (27 nouns, 28 verbs, 21 adjectives, and 9 adverbs), as well as 27 distracters or pseudo-words to correct for guessing. Pseudo-words were taken from a similar vocabulary checklist developed by Zimmerman et al. (1977), and all had the same average length, number of syllables, and letter frequency as a random selection of English dictionary words. Tests were scored using a formula provided by West, Stanovich, and Mitchell (1993) and used in similar checklist studies, where the proportion of "false alarms" (incorrect answers) was subtracted from the number of "hits" (correct answers). The test had high reliability (Cronbach's  $\alpha = .95$ ). The results of the vocabulary checklist were also found to correlate well with the student's standardized reading comprehension test scores from the end of the previous school year ( $r = .68$ ), supporting the construct validity of the measure.

Author Recognition Test. Pilot testing indicated that print exposure checklists used in previous studies of adolescents were too difficult for this population, and thus a new test, the Author Recognition Test (ART), was constructed using authors from the collection of books

available to students in the classroom and school libraries (see Appendix 2). There were 25 total items on the ART, 16 real author names taken from books available to students in their classroom and school libraries, and seven false names taken from the editorial board of *Applied Psycholinguistics*. As with the Vocabulary Recognition Test, the final score was determined according to the formula used by West, Stanovich, & Mitchell (1993). Reliability of this measure proved to be acceptable (Cronbach's alpha = .72).

A Title Recognition Test based on a similar set of books used for the author recognition test was also developed in a pilot phase of the study. However, it was found that reliability on the instrument was unacceptably low (Cronbach's alpha = .39), and it was thus not used in final phase of the study.

Literacy Experiences Survey. Students were given a survey to gather their demographic information as well as additional data on their out of school literacy experiences. Students were asked their grade level, gender, the number of minutes they read per day outside of school, the number of books they owned, and the number of total books in their home.

## Results

Table 1 shows the descriptive statistics from the three instruments used. The majority of students participating in the study were freshmen or sophomores (69%), with an approximately equal number of boys and girls. While the mean and median scores for the vocabulary recognition test were near 50%, scores on the Author Recognition Test exhibited definite floor effects, even though the instrument was drawn from a list of books the students had available in their classroom libraries. The mean score on the ART was only 15%, with a median score of 12%. The average number of minutes per day students self-reported reading outside of school was 26.

The number of reported books owned and total number of books in the home was low. Students reported owning only an average of 17 books, with the median being a mere 8 books. The total number of books in the home was 51, with a median of 25. There was considerable variation in these measures as indicated by the standard deviations shown in Table 1.

Table 1  
Descriptive Statistics for Language Minority Students (N = 133)

Variable	Mean	Median
Grade Level	9: 51 10: 42 11: 21 12: 19	
Gender	Boys: 69 Girls: 64	
Vocabulary Recognition	48% (21)	47%
Author Recognition	15% (16)	12%
Minutes Read Per Day	26.0 (35.4)	20.0
Books Owned	16.9 (22.7)	8.0
Books in the Home	51.2 (75.8)	25.0

Table 2 shows the correlation among all the main variables. Despite problems of clear floor effects in the print exposure and access measures, print exposure as measured by the Author Recognition Test still correlated significantly with the measure of vocabulary knowledge, and even with the reported number of books owned and total number of books in the home. The vocabulary measure did not correlate with the number of self-reported minutes of out-of-school reading. As noted above, self-reported measures tend to suffer from social desirability effects. In this case, it appeared that students tended to report 20 minutes for the a number of minutes they read outside of school, since this was the recommended number of minutes they were encouraged to read by their teachers.

Table 2  
Correlations Among Variables (N = 133)

	<b>Vocab.</b>	<b>ART</b>	<b>Books Home</b>	<b>Books/Own</b>	<b>Minutes Read Day</b>
Vocabulary Recognition	--				
Author Recognition	<b>.43<sup>a</sup></b>	--			
Books at Home	<b>.20<sup>b</sup></b>	.10	--		
Books Owned	<b>.21<sup>b</sup></b>	.03	<b>.68<sup>a</sup></b>	--	
Minutes Read/Day	.12	.15	.01	.10	--

a=  $p < .01$ , b =  $p < .05$

As an additional comparison, a split sample was created for students who were high scorers and low scorers on the Vocabulary Recognition Test, using a median split to divide the groups. As can be seen in Table 3, t-tests comparing the split sample showed significant differences on both the print exposure and print access measures, with the exception of the self-reported number of minutes of reading per day. Even when the range of scores was restricted, as was the case with this sample, significant differences emerged between the high- and low-scorers on the vocabulary test.

Table 3  
High Versus Low Scoring Vocabulary Groups

<b>Variable</b>	<b>High Scoring</b>	<b>Low Scoring</b>	<b>T-test</b>
Author Recognition	20%	10%	3.856**
Minutes Reading/Day	28.86	23.09	.938
Books at Home	63.85	38.04	2.010*
Books Owned	22.02	11.60	2.740**

\* $p < .05$ , \*\* $p < .01$ . High: N = 68, Low: N = 65.

Since it was suspected that the relationships between print access and print exposure were not linear, the data were further explored by splitting the sample up into quartiles and plotting bivariate relationships. Table 4 shows the results of this analysis. Variations in print exposure and access to books did not make a significant impact on vocabulary recognition scores until the fourth or highest quartile. Until students passed that threshold (here, having more than 56 books in the home), there was little change in their vocabulary scores. The quartile analysis shows that,

while the measures of print exposure and access are correlated to vocabulary knowledge, the relationship is subject to a threshold below which variations are less important.

Table 4

Print Access and Print Exposure by Vocabulary Knowledge Quartile

<b>Vocabulary Quartile</b>	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	<b>3<sup>rd</sup></b>	<b>4<sup>th</sup> (Highest)</b>
Author Recognition Test	9%	11%	13%	28%
Total Books in Home	39	36	46	84
Books Owned	11	11	20	24

## Discussion

The results of the present study confirm and extend the findings of previous research on print access and literacy achievement. It was found that the amount of access LM students have to print outside of school was relatively low (average = 51, median = 25), a figure consistent with findings by Ramírez et al. (1991) in his survey of LM students. By comparison, Elley (1994) found that the average number of books in the home of U.S. ninth graders was 147. The present study found that language minority students have a little more than one-third the access to print compared to their English-only age peers. Given such poor access to print outside of school, the importance of school and community literacy resources becomes all the more critical. Previous research has demonstrated that access to print via the school and public libraries is an important component in print exposure and literacy development (see Krashen, 2004, and McQuillan, 1998a, for reviews). Unfortunately, schools serving language minority students tend to have poorer services and fewer books than those serving other populations (Di Loretto & Tse, 1999; Pucci, 1994; Pucci & Ulanoff, 1996; Tse, 2001). This was also the case for the participants in the present study. The school library for the students had only 8 books per student, compared with the national average of 15 books per student at the high school level (McQuillan, 1998a). This is in fact the typical situation faced by U.S. students who come from homes with limited print access—their schools and communities also lack books (Krashen, 2004; McQuillan, 1998a). The solution is obvious: schools with low-achieving students need above average quality libraries to compensate for this lack of books in the home.

As with previous studies by Stanovich and others, the signal detection checklist measure of print exposure correlated significantly with the measure of vocabulary knowledge. The vocabulary measure also correlated significantly with the number of books owned and the number of books at home. This is consistent with previous research showing that the number of books at home encourages students to read more (Halle et al., 1997). The split-half analysis further confirmed that students from homes with more print access had higher vocabulary scores than those with less access. In fact, high-scoring students had nearly twice as many books at home than low-scoring students.

The quartile analysis of the relationship among print access, print exposure, and vocabulary development revealed that only after students passed a certain threshold of print access and print exposure was there a noticeable difference in vocabulary knowledge observed. In the current study, the number of books in the home was fairly stable (36-46) for the first three quartiles of vocabulary knowledge. When we reach the fourth and highest quartile, the number of books reported in the home nearly doubles, to 84. It would appear, then, that a certain number

of books in the home are needed to have an impact on print exposure and achievement. Lacking such exposure, of course, students need to have that access in a school or community library.

Attempts to use vocabulary and author recognition tests from previous research were not successful, leading to the conclusion that measurement of vocabulary knowledge and print exposure among low-achieving students needs to be very specific to their prior reading experiences. This is a methodological issue that should be kept in mind when doing research among groups of low-performing students, where standard measures may show pronounced floor effects. In order to be sensitive to differences in print exposure among students, authors and titles for recognition checklists must be selected from among those students are likely to be familiar with.

### References

Constantino, R., Lee, S., Cho, K.S., & Krashen, S. (1997). Free voluntary reading as a predictor of TOEFL scores. Applied Language Learning, 8, 111-118.

Di Loretto, C., & Tse, L. (1999). Seeing is believing: Disparity in books in two Los Angeles area public libraries. Public Library Quarterly, 17(3), 31-36.

Dupuy, B., & Krashen, S. (1993). Incidental vocabulary acquisition in French as a foreign language. Applied Language Learning, 4, 55-63.

Elley, W. (1991). Acquiring literacy in a second language: The effect of book-based programs. Language Learning, 41, 375-411.

Elley, W. (1992). How in the world do students read? The IEA study of reading literacy. The Hague, Netherlands: International Associations for the Evaluation of Educational Achievement.

Elley, W. (Ed.) (1994). The IEA study of reading literacy: Achievement and instruction in thirty-two school systems. Oxford: Pergamon.

Elley, W. (1998). Raising literacy levels in third world countries: A method that works. Culver City, CA: Language Education Associates.

Elley, W., & Mangubhai, F. (1983). The impact of reading on second language learning. Reading Research Quarterly, 19, 53-67.

Halle, T., Kurtz-Costes, B., & Mahony, J. (1997). Family influences on school achievement in low-income, African American children. Journal of Educational Psychology, 89, 527-537.

Kim, H., & Krashen, S. (1998). The Author Recognition and Magazine Recognition Tests and Free Voluntary Reading as predictors of vocabulary development in English as a Foreign Language. System, 26, 515-523.

Krashen, S. (1995). School libraries, public libraries, and the NAEP reading scores. School Library Media Quarterly, 23, 235-237.

- Krashen, S. (2004). The power of reading. 2<sup>nd</sup> edition. Englewood, CO: Libraries Unlimited.
- Lance, K., Welborn, L., & Hamilton-Pennell, C. (1993). The impact of school library media centers on academic achievement. Castle Rock, CO: Hi Willow Research and Publishing.
- Lee, Y., Krashen, S., & Gribbons, B. (1996). The effect of reading on the acquisition of English relative clauses. ITL: Review of Applied Linguistics, 113-114, 263-273.
- Mason, B., & Krashen, S. (1997). Extensive reading in English as a foreign language. System, 25, 91-102.
- McQuillan, J. (1998a). The literacy crisis: False claims, real solutions. Portsmouth, NH: Heinemann.
- McQuillan, J. (1998b). The use of self-selected and free voluntary reading in heritage language programs: A review of research. In S. Krashen, L. Tse, & J. McQuillan (Eds.), Heritage Language Development (pp. 73-87). Culver City, CA: Language Education Associates.
- McQuillan, J., & Au, J. (2001). The effect of print access on reading frequency. Reading Psychology: An International Quarterly, 22, 225-248.
- Meara, P., & Buxton, B. (1987). An alternative to multiple choice vocabulary tests. Language Testing, 4, 142-151.
- Nagy, W., Herman, P., & Anderson, R. (1983). Learning words from context. Reading Research Quarterly, 20, 233-253.
- Pitts, M., White, S., & Krashen, S. (1987). Acquiring second language vocabulary through reading: A replication of the Clockwork Orange study using second language acquirers. Reading in a Foreign Language, 5, 271-275.
- Pucci, S. (1994). Supporting Spanish language literacy: Latino children and free reading resources in school. Bilingual Research Journal, 18, 67-82.
- Pucci, S., & Ulanoff, S. (1996). Where are the books? CATESOL Journal, 9(2), 111-116.
- Ramirez, S., Yuen, S., Ramey, D., & Pasta, D. (1991). Final report: Longitudinal study of structured English immersion strategy, early-exit, and late-exit bilingual education programs for language minority students, Vol. 1. San Mateo, CA: Aguirre International.
- Ramos, F., & Krashen, S. (1998). The impact of one trip to the public library: Making books available may be the best incentive for reading. The Reading Teacher, 51(7), 614-615.
- Rucker, B. (1982). Magazines and teenage reading skills: Two controlled field experiments. Journalism Quarterly, 59, 28-33.

Stokes, J., Krashen, S., & Kartchner, J. (1998). Factors in the acquisition of the present subjunctive in Spanish. ITL: Review of Applied Linguistics, 121-122, 19-25.

Tse, L. (2001). Why don't they learn English? Separating fact from fallacy in the U.S. language debate. New York: Teachers College Press.

West, R., Stanovich, K., & Mitchell, H. (1993). Reading in the real world and its correlates. Reading Research Quarterly, 28, 34-50.

Worthy, J. (1996). Removing barriers to voluntary reading: The role of school and classroom libraries. Language Arts, 73, 483-492.

Worthy, J., Moorman, M., & Turner, M. (1999). What Johnny likes to read is hard to find in school. Reading Research Quarterly, 34, 12-27.

Zimmerman, J., Broder, P.K., Shaughnessy, J.J., and Underwood, B.J. (1977). A recognition test of vocabulary using signal-detection measures and some correlates of word and non-word recognition. Intelligence, 1, 5-13.

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## Appendix 1

### Vocabulary Recognition Checklist

adversity	animate	cumalink	battered
bipaster	chiless	convergence	awkward
defray	desperate	distract	fixchen
heady	incessantly	induce	swiftly
insane	manifestations	neotatin	ominous
ornate	perk	persistent	prominent
proportionate	puncfight	stram	ineffity
abundance	confide	debacle	dismal
dropant	emphasis	ethical	exasperation
frantically	glanced	handman	impassive
implicated	indulgently	irritate	lordgly
menacingly	omission	persavort	reluctant
reply	retrieval	sabowtra	scoff
snaptor	synthesize	tacit	tradured
atrocitiy	blaze	reveal	chamber
chuckle	clump	corkny	dune
exclaim	falfold	flaunt	flutter
footage	frequently	gaze	hazy
intellectual	disler	moul	multitude
passed	pertain	reluctant	roam
aptitude	shrug	sigh	sparkhouse
amateur	appetite	bashed	bitterness
brave	burst	climb	compliment
cop	madden	episode	harsh
hostile	hould	paubub	image
britching	reweat	scoop	seeve
slightly	stroll	suddenly	wool
though	turmoil	urgent	thimmery

**Appendix 2**Author Recognition Test

Isaac Asimov  
James Clavell  
Andrew Greeley  
Louis L'Amour  
Nancy Roser  
J.R.R. Tolkien  
Bob Woodward

Isabel Beck  
Gerald Duffy  
John Guthrie  
Isabelle Liberman  
Sidney Sheldon  
Richard Venezky

P.E. Bryrant  
Ian Fleming  
Dean Koontz  
James Michener  
Danielle Steel  
Irving Wallace

Barbara Cartland  
Stephen J. Gould  
Judith Krantz  
Keith Rayner  
Robert Tierney  
Joseph Wambaugh