PREDICTORS OF SECOND-LANGUAGE READING PERFORMANCE

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Abstract. This study identified individual, instructional and socio-cultural factors that are reliable predictors of limited-English-proficiency (LEP) children's reading performance in English. The reading comprehension section of the Metropolitan Achievement Test was used to assess the reading skills of 91 LEP students (K-12) with different linguistic backgrounds in a U.S. school system. Information about the independent variables was gathered from a special questionnaire. The data were analysed by means of multiple regression analysis.

The results of this regression analysis showed that in this sample, grade, Vietnamese language background, percentage of English spoken at home, higher level paternal occupation, and a relatively high number of students in the English-as-a-second-language class had positive effects on the reading skills of the subjects. With these data it was impossible to separate the impact of length of U.S. residence from length of ESL instruction in U.S. Intensity of ESL instruction showed a statistically significant negative effect on the reading scores. There were several predictors which did not have a significant effect on reading performance: gender, number of siblings and sibling position, hours of television watching, number of public library visits, length of parents' stay in the U.S., parents' levels of education and social status, and mother's staying at home.

A central theme of this study is that single-variate approaches are inadequate to study the causes of reading performance; rather, several predictors should be employed to measure true relationships between L₂ reading performance and independent predictors.

I. Introduction

1. Background

Researchers and practitioners involved in the education of limited-English-proficiency (LEP) students agree that various factors enter into the English

school performance of the LEP student. Several researchers have advocated studies that would examine the interaction of these various explanatory variables. Among others Tarone, Swain & Fathman (1976), in a review of L₂ research studies, called for research examining the effects of individual, social, and environmental variables on L₂ learning. Specifically related to bilingual education programmes for LEP students, Tucker (1977) and Saville-Troike (1978) recommended research looking at the effect of intervening background variables on students' linguistic as well as academic performance. More recently, Cummins (1979 : 6) discussed the 'central role of the *interaction* between socio-cultural, linguistic, and school programme factors in explaining the academic and cognitive development of bilingual children'. He further criticised results from evaluations of bilingual education programmes because they have 'failed to incorporate the possibility of interaction between educational treatment and child input factors into their experimental designs' (1979 : 7). In another article Cummins (1980) further explained the importance of differentiating between *cognitive/academic language proficiency* (CALP) and *basic interpersonal communicative skills* (BICS). Cummins defines CALP to be closely related to the development of literacy skills in L₁ and L₂. According to Cummins, both linguistic and socio-economic factors enter into CALP. It is the CALP skills, specifically reading skills in L₂ of LEP students, that is the major interest of this paper.

It is a well-known fact that LEP children in the U.S. need to learn to read in English in order to succeed in school settings, whether or not they are enrolled in bilingual education or English as a second language programmes. Nevertheless, little is known about individual, instructional and socio-cultural factors that may affect LEP students' reading performance in English. The effects of these various linguistic and socio-cultural background variables should be considered when students are assigned to programmes and evaluated both for diagnostic and achievement purposes.

This paper is a report of an experiment which was designed to identify individual and environmental predictors of LEP students' reading skills in English. Multiple regression analysis was used in order to be able to examine the independent contributions of several predictors of L₂ reading performance.

2. Predictors

At present, there is no established separate theory concerning L₂ reading acquisition which would lead to an unambiguous formulation of a model. Therefore, the approach was to rely on *a priori* reasoning. The reasoning came from two major areas of study: (1) research on factors related to native English-speaking children's reading skills (sex differences, number of siblings, and sibling position, and parents' socio-economic level) and (2) research on factors related to LEP children's spoken English (L₁ background, length

of residence in the United States, and amount and nature of English-as-a-second-language (ESL) instruction). The choice of the predictors was affected by two additional factors: (1) the author's own practical experience with and research on LEP students' reading skills and (2) the access of information concerning these predictors. The predictors in this study are examined in three categories: (1) individual characteristics of the learner, (2) predictors related to successful L₂ acquisition/learning and (3) predictors related to socio-cultural characteristics. A complete review of the literature is included in Connor (1978) and Connor & Connor (1980). The predictors incorporate variables that have been studied under three closely overlapping disciplines, namely psycholinguistics, second-language acquisition research and sociology. Thus each of the three groups of variables provides support for theories studied by researchers in these three fields. Table 1 contains information about the predictors, their abbreviations and what these predictors are intended to measure. A brief description of the predictors follows.

Individual predictors: Generally, these predictors, presented in Table 1, are 'background' variables specific to the students as persons, not as members of a certain family, social class or school programme of instruction. First-language background, sibling number and position, and sex are matters set at birth; length of residence in the U.S. largely measured the individual student's informal exposure to English in months.

Predictors related to language acquisition/learning: These predictors were chosen to represent (1) total amounts of time of formal language learning in the native country and U.S. (2) intensity and type of formal ESL instruction (hours of ESL instruction in the U.S. per week and number of students in the ESL class) and (3) motivation to improve reading skills in L₂ through out-side-of-school readings.

Socio-cultural predictors: Among the socio-cultural predictors, familiarity with L₂ among family members and parents' educational and job levels were chosen as indicated in Table 1.

II. Study

1. Subjects

The subjects were 91 LEP students in the Madison, Wisconsin Public Schools. This sample represented 75% of the total population of students in the Madison English-as-a-Second-Language (ESL) Program. The subjects were in grades 2 through 12; 55% were in elementary schools while the percentages in middle and high schools were 15 to 30, respectively. The subjects spoke 21 different first languages (for a more detailed description of the sample, see Connor 1978 : 68-75).

Table 1 Predictors used in the analysis of reading skills, their abbreviations, and what they purport to measure.

Predictor	Abbreviation	What predictor purports to measure
<i>Individual predictors</i>		
Grade	GRADE	Age
Length of residence in U.S. in months	MONTHUS	Informal exposure to English
Sex	SEX	Gender
First language background	SPAN, VIET, INDOEUR	Linguistic differences among Spanish, Vietnamese, Indo-European or others.
Number of siblings	NOSIBL	Family characteristics
Sibling position	SIBLPOS	Family characteristics
<i>Predictors related to L₂ acquisition/learning</i>		
Months of ESL in native country	NCESL	Formal exposure to English
Months of ESL in U.S.	USESL	Formal exposure to English
Hours of ESL instruction per week	HRSESL	Intensity of ESL instruction
Number of ESL students in class	NOS	Groups vs. individual instruction
Hours of TV watching per day	HRSTV	Informal exposure to English
Library visits per month	LIB	Motivation to read
<i>Sociocultural predictors</i>		
Percentage of English spoken at home	HOMENG	Informal exposure to English
Length of Parents' stay in U.S. in months	PARSTAY	Parents' L ₂ skills
Father's occupation	FOCCU	Parents' job skill levels ^a
Mother's occupation	MOCCU	Parents' job skill levels
Father's years of education	FED	Parents' educational levels
Mother's years of education	MED	Parents' educational levels
Father's occupational status	FUNCAN	Parents' social status ^b
Mother's occupational status	MUNCAN	Parents' social status
Mother working at home	MHOME	Exposure to L ₁

^a These two predictors are explained in (Featherman, Sobel & Dickens 1975). The code number decreases as the training or education required for the occupation increases. Based on the results of research with native English-speakers, the prediction in this study was that socio-economic status would be positively correlated with the MAT scores, the dependent variable. Therefore, this predictor was expected to have a negative relationship with the MAT scores.

^b Occupational Status Code was employed to code these two predictors (see Featherman, Sobel & Dickens 1975). Since it is nearly the reverse of the occupational code, a positive relationship between the status code and the MAT scores was expected.

Table 2 Distribution of students taking one of the four forms of the MAT test by grade level.

Grade level	MAT Form			
	Primary 1	Primary 2	Elementary	Intermediate
2	10	3		
3	2	6		
4	1	8	2	
5	1	5	5	3
6	1		4	
7			1	3
8				3
9	1	1	2	6
10		2		5
11			1	4
12		2	4	5
	16	27	19	29

2. Measurement instruments

To measure reading comprehension skills of the students, the following reading subtests from the *Metropolitan Achievement Test* (MAT) were used: Primary I, Primary II, Elementary and Intermediate. The choice of a particular form was based partly on the ESL teachers' estimations about their students' reading ability, and partly on the students' grade-level placement. Table 2 presents the distribution of students taking each form by grade level. The investigator, following the directions given in the manual, conducted the MAT testing with individuals and with groups of 2 to 13 students.

A questionnaire was used to gather information about the independent predictors related to L_2 reading. This form, written in English, was designed to be filled out by the author who presented the questions to the students, parents and/or ESL teachers.

3. Analysis of data

For the data analysis, the independent predictors were divided into three categories as presented in Table 1: individual predictors, predictors related to L_2 acquisition/learning, and socio-cultural predictors. In this analysis, predictors have an independent but additive effect on the dependent variable. The model employed is of the form $y = a + b_1 \times x_1 + b_2 \times x_2 + \dots + b_n \times x_n$. The method assumes that each of the n predictors are independent of each other. The effect of each x_i (where $i = 1, 2, \dots, n$) is revealed by the estimated regression coefficients b_i and the statistical significance (from zero) of an effect is determined by performing 't' tests on each regression coefficient. If the test sample is representative of the population and if no important x_i are omitted, then the b_i are efficient, unbiased estimates of the true relationship b_i . The statistical programme that was used is Regan 2, a part of the STATJOB series developed by the Madison Academic Computing Center at the University of Wisconsin, Madison.

In order to make the exposition as orderly and instructive to the reader as possible, the effects of three distinct groups of related predictors are considered separately. First, the personal or individual predictors in the study are examined. In this category are grade, length of residence in the U.S., sex differences, first language background, number of siblings, and sibling position, and hours of Television watching per day. Second, predictors related to English language acquisition/learning, both formal and informal exposure to English are considered. Third, there is an examination of socio-cultural background of the students and their families. The final model takes all three groups of predictors and considers their simultaneous effects on reading performance.

III. Results

1. Individual predictors

The estimated least squares regression equations are shown in Tables 3 through 6. In each table the names of the predictors are shown in the heading, and under the names are the estimated coefficients (b_i) with their associated 't' values in parentheses. The 't' statistic tests the null hypothesis that $b_i = 0$. For each model two summary statistics are provided. The coefficient of multiple determination, R^2 , measures the 'goodness of fit' of the model to the data, with 1.00 indicating a perfect fit. The probabilities associated with the F ratios indicate the probability that all of the regression coefficients could be simultaneously equal to zero (i.e. it tests the null hypothesis that $b_1 = b_2 = b_3 = \dots = b_n = 0$).

A selection of four of the more revealing regression results of the effects of individual predictors on reading levels is given in Table 3. In all the models shown the predictor GRADE is included to adjust for the age of the student; this predictor may also capture the experience the student may already have had in learning reading skills in his first language or in other non-ESL classes. It has a positive and highly significant impact on the MAT score, as expected; the estimated coefficient of GRADE indicates that MAT scores rise by 0.3 points for each grade increase.

The length of residence in the U.S. in months has an unexpected negative influence on reading proficiency in the models in which it is included, though it is never significant. A high proportion of the long-term residents are Spanish-speakers, so when the variable SPANISH is also included in the equation (as in 3.1), the coefficient of MONTHUS becomes almost zero. In this sample population length of stay in the U.S. is closely correlated with being a Spanish-speaker and any acculturation that takes place among these ESL learners does not help them learn English reading skills. In other research situations there may be a linguistic group that has been in residence significantly longer than other linguistic groups. Thus, other researchers must be wary of using length of residence as a predictor because its estimated relationship will be confounded with socio-cultural characteristics of the long residence linguistic group.

Three models include first-language variables (SPANISH, VIETNAMESE and INDOEUROPEAN). The only predictor that is consistently significant is SPANISH. Thus, having a Spanish first-language background in this sample reduces a subject's MAT score by nearly one point on average. Comparing the Vietnamese students with all others in the sample shows that they achieve significantly higher MAT scores (Model 3.). In Model 3.3, the best fit is obtained, but only two predictors are significant (GRADE and SPANISH) when the sample is divided into four language groups

Table 3 Results from the regression analysis of 5 individual characteristic predictors of reading performance among 91 English-as-a-second-language learners.

Model No.	Raw score regression coefficients and associated <i>t</i> ratios (in parentheses) for predictors				Statistics of goodness of fit		
	Constant	GRADE	Length of res. MONTHUS	SPANISH	VIETNAMESE	INDO-EUROPEAN	<i>R</i> ² <i>F</i>
3.1	2.41	0.27** (5.20)	-0.001 (-0.26)	-0.89** (-2.28)			0.31 13.26**
3.2	1.99	0.28** (5.35)	-0.006 (-1.45)		0.97** (2.14)		0.31 12.97**
3.3	2.41	0.28** (5.31)		-0.97** (-2.40)	0.41 (0.80)	-0.60 (-1.16)	0.34 10.92**
							0.30 12.31**

NOTE: Asterisks indicate 10 per cent (*) and 5 per cent (**) levels of significance.

Table 4 Results from the regression analysis of 5 L₂ acquisition/learning predictors of reading performance among 91 English-as-a-second-language learners

<i>Model No.</i>	<i>Raw score regression coefficients and associated t ratios (in parentheses) for predictors</i>					<i>Statistics of goodness of fit</i>			
	<i>Constant</i>	<i>GRADE</i>	<i>HRSESL</i>	<i>NOSTUD</i>	<i>USESL</i>	<i>NCESL</i>	<i>MONTHUS</i>	<i>R²</i>	<i>F</i>
4.1	2.61	0.23** (3.93)	-0.011** (-2.61)	0.06* (1.44)					13.04** 0.31
4.2	2.44	0.26** (4.84)	-0.06* (-1.47)		0.03 (1.16)		-0.015 (-1.28)	0.31	9.52**
4.3	2.60	0.24** (4.03)	-0.07* (-1.62)			0.005 (0.69)	-0.004 (-0.82)	0.30	9.22**
4.4	2.43	0.22** (3.52)	-0.06 (-1.25)		0.035* (1.51)	0.009 (1.19)	-0.023* (-1.71)	0.32	7.94**

NOTE: Asterisks indicate 10 per cent (*) and 5 per cent (**) levels of significance.

Table 5 Results from the regression analysis of 4-socio-cultural predictors of reading performance among 91 English-as-a-second-language learners.

<i>Model No.</i>	<i>Raw score regression coefficients and associated t ratios (in parentheses) for predictors</i>					<i>Statistics of goodness of fit</i>		
	<i>Constant</i>	<i>GRADE</i>	<i>HOMENG</i>	<i>PARSTAY</i>	<i>FOCCU</i>	<i>MOCCU</i>	<i>R²</i>	<i>F</i>
5.1	1.71	0.30** (5.90)	0.02** (2.83)	-0.0009 (-1.55)			0.33	13.99**
5.2	2.46	0.27** (5.02)		-0.0004 (-0.74)	-0.0008* (-1.58)		0.28	11.50**
5.3	2.44	0.30** (5.67)		-0.0006 (-1.02)		-0.0006 (-1.26)	0.28	11.10**

NOTE: Asterisks indicate 10 per cent (*) and 5 per cent (**) levels of significance.

Table 6 Results from the regression analysis of 8 best predictors of reading performance among 91 English-as-a-second-language learners.

Model No.	Raw score regression coefficients and associated <i>t</i> ratios (in parentheses) for predictors								Statistics of goodness of fit			
	Constant	GRADE	VIET	HOMENG	MONTHS	HRSESL	USSESL	NOS	FOCCU	R ²	F	
6.1	2.31	0.23** (4.23)	1.26** (2.92)	0.025** (3.25)		-0.10** (2.37)	-0.015* (-1.75)	0.056* (1.48)		0.43	10.55**	
6.2	2.29	0.25** (5.10)	1.24** (2.82)	0.026** (3.47)	-0.007* (-1.68)				-0.0011* (-1.97)	0.42	12.48**	
6.3	2.46	0.22** (3.93)	1.24** (2.81)	0.025** (3.29)	-0.006 (-1.39)	-0.07* (-1.36)		0.055* (1.45)	-0.0008* (-1.35)	0.44	9.41**	

NOTE: Asterisks indicate 10 per cent (*) and 5 per cent (**) levels of significance.

SPANISH, VIETNAMESE, INDOEUROPEAN, AND OTHERS). These results may reveal more about cultural or motivational factors than linguistic influences.

Predictors representing gender, number of siblings, sibling position, and other personal characteristics had no significant relationships with the MAT scores.

2. Predictors related to L₂ acquisition/learning

The estimated regression equations in Table 4 show the effect of instructional predictors, both formal and informal exposure to English, on reading proficiency. Each model explains 30% or more of the variation in MAT scores.

Grade level here, as in Table 3, is always positive and highly significant. In this context this result implies that grade placement (which is determined primarily by the student's grade in his native country) is fairly accurate in this school system. The second predictor included in all these models is hours of ESL per week (HRSESL). It has a negative impact on reading proficiency. Thus, ESL teachers are correctly assigning more hours of instruction per week to learners who are less adept at reading than their classmates.

In model 4.1 we see that the larger the class size, the higher the reading scores of ESL learners. Apparently, a group learning environment leads to mutual reinforcement of reading skills. However, in interpreting these results it should be mentioned that (1) the largest ESL class size is only 12 students and (2) class size rises somewhat with grade in the ESL programme being studied.

Models 4.2 to 4.4 add variables that capture three different sources of exposure to English: months of formal ESL instruction in Madison (USESL), months of ESL instruction in the student's native country (NCESL) and informal exposure through months of U.S. residence (MONTHUS). None of the three predictors are significant, but the signs of their coefficients are consistent in all three models. Formal ESL instruction always raises MAT scores, with U.S. instruction having the stronger effect. Three years of ESL classes in the U.S. raises the MAT score by over 1 point on average. Somewhat surprising, however, was the consistently negative sign of MONTHUS. This predictor essentially differentiates permanent residents from students whose families are visiting the U.S. only for a year or two. It does not appear to measure a student's informal experience with English as expected. As will be seen in the next section, informal exposure to English within the immediate family does have a significant, positive effect on reading achievement.

Two other predictors related to L₂ acquisition/learning were hours of Television watched per day (HRSTV) and number of library visits per month (LIB). HRSTV was consistently negative in its effect on reading levels, but never quite significantly so; LIB also had no significant influence.

3. Socio-cultural predictors

Table 5 displays regression results showing the effect of socio-cultural predictors on reading performance. As before, GRADE is included to remove the effects of grade level from the MAT test scores.

The only predictor of any consequence is the percentage of English spoken at home. In general, students with families which converse 50% of the time in English at home will score one point higher than those where no English is spoken. The parents' length of residence in the U.S. has no significant effect on reading attainment.

Higher level paternal occupation (FOCCU) has a positive effect on reading levels. Predictors representing the parents' educational levels and the social status associated with their occupations were unrelated to reading achievement. Finally, it should be mentioned that whether the mother was at home also had no significant association with reading performance.

4. The combined model

This section demonstrates the combined effects of the individual, L_2 acquisition/learning, and socio-cultural predictors on reading levels. The three previous sections discussed the results of regression models that could explain approximately 28 to 34% of the variation in MAT scores. The models developed in this section will each explain more than 40% of that variation. A backward stepwise regression algorithm was used to identify the best combination of explanatory predictors blocking few predictors that were known to be highly correlated. The three models are close alternative models. All could be regarded as the best, but contain slightly different combinations. For example, the only difference among the models shown in Table 6 is that in the first two models one predictor (MONTHUS and HRSESL, respectively), which was significant above, is prevented from entering the model as a predictor. Comparisons among these regression results will illustrate some of the limitations of previous quantitative research on L_2 learning that has relied on limited data sets and simple correlation models.

Model 6.1 shows what may happen in an analysis that has information on the length of time a group of students has been enrolled in a formal second language teaching programme, but does not simultaneously consider the effect of the length of U.S. residence. As before, the variables GRADE, VIETNAMESE, percentage of English spoken at home and number of students in class are positive, and highly significant; hours of ESL per week (HRSESL) is negative. By excluding length of residence in the U.S. in months (MONTHUS), the variable months of ESL in the U.S. (USESL) turns out to have an unexpected negative sign, the reverse of what was found in Table 4. The reason for this paradoxical result is that the length of ESL instruction and the length of U.S. residence are highly correlated ($r = 0.94$ in our sample). In model 6.3, however, of the two only MONTHUS

enters the model, and it is not quite significant using a two-tail test (note that HRSESL, NOS and FOCCU use a one-tail test).

Model 6.3 explains 44% of the variance in MAT scores. Three factors, GRADE, VIETNAMESE and percentage of English spoken at home (HOMENG), are significant ($p < 0.05$). Having a Spanish or other Indo-European first language had no significant effect on reading achievement. MONTHUS was negative, but not significant. Two instructional variables, HRSESL and number of students in class (NOS), survive in the final model. Finally, only one socio-economic variable is retained, father's occupation (FOCCU), but it is relatively weak when HRSESL and NOS are included (compare models 6.2 and 6.3).

IV. Conclusion

The results of this regression analysis of English reading performance show that in this sample, grade, Vietnamese language background, percentage of English spoken at home, higher level paternal occupation and high number of students in the ESL classroom had positive effects on the reading skills of the subjects. With these data it was impossible to separate the impact of length of U.S. residence from length of ESL instruction in the U.S.; however, when used in separate models they each had a negative effect on reading scores. These two factors are likely to be colinear in most data sets. Intensity of ESL instruction showed a statistically significant negative effect on the reading scores.

There are several predictors which, according to this study, do not have a significant effect on reading performance: gender, number of siblings and sibling position, hours of television watching, number of public library visits, length of parents' stay in the U.S., parents' levels of education and social status, and mothers' staying at home.

The results must, of course, be interpreted within the limitations of the study. The test sample was fairly small and represented children in one school system which only had an ESL programme for these students at the time of the testing.

A second limitation involved the measure of reading comprehension, a standardised test developed for native English-speakers. Yet, since LEP learners in the U.S. schools are typically evaluated by means of standardised tests developed for native speakers, the use of the standardised measure seemed justified here. Third, the information about independent variables was gathered through school records and interviews with parents, students and teachers. While the questionnaire was essential, its very nature provided no means for determining how valid the elicited responses were.

Another serious limitation is that, if any significant predictors affecting reading skills were omitted, the regression estimates may be biased. For

example, it is reasonable to expect that reading skills in the second language are related to reading skills in the first language. Actually this variable was originally considered; the subjects' L_1 reading skills were designed to be measured through cloze tests in the native language. Unfortunately, there were only 14 students out of the total 91 who were able to read the translated cloze passage in their first language. Of these, 8 (of the total of 33) were Spanish-speaking and 6 (of the total of 15) were Vietnamese-speaking. A calculated correlation coefficient (-0.28) indicated no relationship between the reading measure of L_1 and L_2 . This finding is suspect to criticism due to a small sample size and lack of control of individual and environmental factors. Still, it is worth noting that all the Spanish-speaking students who were able to read in their L_1 were students who had been in this country for less than six months, were children of educated parents and planned to stay in this country for only a couple of years. None of the Spanish-speaking students in the sample whose parents were either immigrants or residents in this country were able to read the cloze test translated into Spanish. The Vietnamese students who were able to read in L_1 were all high school students. The rest of the Vietnamese students had not continued reading in L_1 during the two or more years in this country even though most of them were introduced to reading in Vietnamese while still in their native country.

Despite the limitations, the results have several implications for the language education of LEP students. First, the results indicate the significance of *socio-cultural factors* rather than purely *linguistic factors* in predicting the reading performance of children. Based on the contrastive analysis of linguistic theory we would expect that learning to read in English would be easier for a Spanish-speaker than for a Vietnamese-speaker. The opposite was true in our sample. There may be a socio-cultural explanation for this finding which was not specifically tested in this study: motivation to acculturate in the new L_2 environment. It seems that the Vietnamese immigrants in this country have generally adjusted well and learned English fast. One is tempted to draw an analogy between the Vietnamese learners in this study and the English-speaking children in the French immersion programmes (Lambert & Tucker, 1972; Tucker, 1975) in which the socio-cultural status is noted to be one significant positive factor in L_2 acquisition/learning. Another analogy could be made between the Spanish-speaking subjects in this sample and the Franco-Ontarian children in Manitoba, Ontario where children's socio-ethnic status was a predictor of more unsuccessful language learning (Cummins, 1981).

Second, the results suggest that we should consider the effect of L_1 literacy skills on the development of L_2 reading skills. Cummins (1979) among other researchers and educators, maintains the view that L_1 and L_2 reading skills are interdependent, manifestations of a common underlying proficiency. In this sample, the Vietnamese-speakers were able to read in their L_1 , while the Spanish-speakers lacked these skills in their L_1 . As was pointed out earlier, the Vietnamese children were recent immigrants while most Spanish-

speaking subjects were long-term residents in the U.S. whose education had been in English-only programmes.

Third, related to L₂ instruction, the results of this study cast doubt on recommendations made in a previous study concerning the discontinuation of ESL instruction based upon simple correlation results. This previous study (Hale & Budar, 1970) found students with lowest scores receiving the most ESL instruction and interpreted this as a causal relationship. Intensity of ESL instruction in the present study, also, showed a negative effect on the reading scores. I interpret this finding to mean that ESL learners who need extra instruction actually receive it. It is possible that the effect of instruction may be more obvious on reading skills than on interpersonal-communication skills. Children may pick up second-language structures on their own in informal situations, as has been claimed by Fathman (1975) and Krashen (1976) among others, but I maintain that CALP-related literacy skills need to be taught. In any case, today ESL programmes, such as the programme of this sample population, teach all the skills.

Fourth, the results showed that the amount of English spoken at home has a significant effect on L₂ reading skills. This finding does not warrant us to recommend that LEP students and their families speak only English at home. Nevertheless, even if recommendations for increased L₂ use may not be appropriate for all occasions, knowledge of this relationship will help teachers understand that differences in LEP students' performance are due to many individual and socio-cultural factors.

Finally, this study should, of course, be replicated with a larger sample of students from different kinds of educational programmes in the United States. If repeated experiments showed similar direct relationships between independent variables and second-language reading performance, a more satisfactory theory of second-language reading would be gained. This improved theory could offer recommendations for L₂ literacy policy.

Despite the limitations of the study, it is obvious from the findings that the effect of various predictors should be considered simultaneously if true relationships between L₂ reading performance and these predictors are desired. A multivariate statistical analysis, regression analysis in this study, appears to be a usable tool in research of this type. This study was able to statistically verify relationships identified by previous research as well as identify other independent variables which should be considered in L₂ reading programmes.

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Notes

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Appendix A

A matrix of simple correlations of the variables in the regression models

	GRADE	MONTHUS	SPANISH	VIETNAMESE	INDOEUR	RES	NCESL	USES	HRSESL	NOS	HOMENG	FOCCU	MOCCU
GRADE	1.00												
MONTHUS	-0.25	1.00											
SPANISH	-0.09	0.47	1.00										
VIETNAMESE	-0.13	0.03	-0.36	1.00									
INDOEUR	-0.08	-0.23	-0.32	0.19	1.00								
RES	-0.37	0.89	0.56	-0.13	-0.20	1.00							
NCESL	0.37	0.38	0.12	-0.39	-0.04	0.31	1.00						
USES	-0.20	0.94	0.37	0.25	-0.25	0.79	0.27	1.00					
HRSESL	-0.17	0.47	0.25	0.09	-0.19	0.47	0.08	0.38	1.00				
NOS	0.37	0.11	-0.21	-0.06	-0.12	0.17	0.28	0.08	0.35	1.00			
HOMENG	0.01	0.36	0.01	-0.00	-0.16	0.31	0.35	0.33	0.06	0.09	1.00		
FOCCU	-0.25	0.45	0.32	0.31	-0.30	0.44	-0.16	-0.20	0.55	0.09	0.10	1.00	
MOCCU	0.03	0.27	0.29	0.05	*	*	0.00	0.27	0.20	-0.12	-0.08	0.38	1.00
MAT (=	0.51	-0.25	-0.29	0.13	-0.09	-0.29	0.17	-0.18	-0.28	0.22	0.23	-0.28	-0.10
dependent variable)													

* not available