AN EXPLORATORY STUDY OF THE RELATIONSHIP BETWEEN THE FORMAL STUDY OF GREEK AND ENGLISH LANGUAGE ARTS AMONG GREEK BILINGUAL STUDENTS IN NEW YORK CITY

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1. Introduction

Prior research on Greek-American schooling has documented the strengths and weaknesses of an educational system under pressure due to social and linguistic forces (Spiridakis, 1994). This line of research examining the factors of Greek bilingual schooling, particularly in the City of New York, support similar efforts in Canada, the United States, and other countries in creating "immersion" or "partial immersion" approaches in teaching heritage or world languages (Costanakos & Spiridakis, 1997).

The impetus of this research is due to the seminal research of Peal & Lambert (1962) and Cummins (1991, 1976) pertaining to the beneficial cognitive effects of bilingualism on one's thinking. More recently, Thomas & Collier (1997) have proposed their PRISM model to explain and synthesize the research on bilingualism and second language acquisition in formal school contexts (2003).

This conceptual model identifies four "components" of language acquisition in school settings: (1) Socio-cultural, referring to social and cultural processes occurring through everyday life within the student's past, present, and future, e.g., self-esteem or other affective factors; (2) Language development, meaning the conscious and subconscious aspects of language development, e.g., oral and written systems of the student's first and second languages; (3) Academic development which includes school work in language arts, mathematics, the sciences, and social studies for each grade

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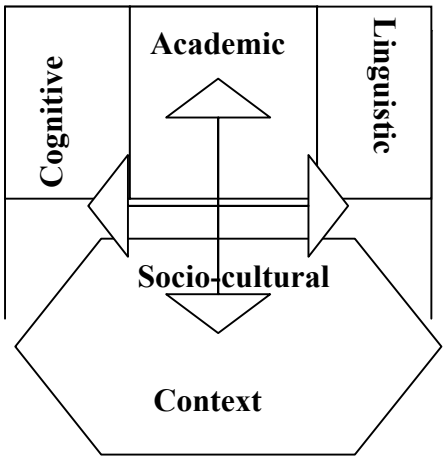
level; and (4) Cognitive development, or the natural, subconscious process that occurs developmentally from birth to the end of schooling and beyond (Ovando *et al*., 2003). Ideally, these components are realized in the student's primary and second language.

According to these authorities, the components of the PRISM model are to be viewed as interdependent and developmental. Based on this model, they predict that if one component is developed without the support of the other three components, a student's overall growth and future success may be hampered. For instance, an "English-only" position to minority language schooling, while emphasizing rapid language development in the second language, submerses the student's primary language, thereby affecting the individual's cognitive and academic development.

In our exploratory study of Greek schooling, we adapted their model in the following way. Instead of four components, we have placed the three components of cognitive (C), academic (A), and linguistic (L) within the socio-cultural (S) context. Our reasoning is that the socio-cultural dimension is better viewed as the larger environment in which individual students enact their lives in formal schooling. In addition, we view the remaining components (C, A, L) as functional units that are continuously interacting within the larger, socio-cultural context, thereby conveying the complex and possible relationships that are implied in this model. Figure 1 is a representation of this interactive, relational model (S→ C, A, L). Each component is influenced by and influences the larger context. Within this functional and formal system, as the socio-cultural context undergoes significant change, so do the components; likewise, as the components change, so will their functions.

Figure 1 depicts our adaptation of the interactive and relational nature of the components and the socio-cultural context. The arrows are meant to convey the relational aspect occurring between components and functions. We believe the intent of their PRISM model is maintained while at the same time, our modification conveys the dynamic and complex nature of the relationships that the model attempts to identify and explain.

Figure 1. Adaptation of PRISM Model of Second Language Acquisition for School.



2. Purpose of study

Given this theoretical background about the functional components of learning a second language within schools, several analyses were carried out to explore the relationships among selected components of the PRISM model, in particular, the academic and linguistic (A, L). The major focus of these exploratory studies was to identify and examine possible relationships between studying Greek in a formal classroom setting and knowledge of English among students of Greek and non-Greek heritage. Secondary questions included a comparative analysis of various New York State Regents scores (English Language Arts) among St. Demetrious, comparable Greek Schools in New York City, and District 30 public schools, respectively.

A brief description of the Greek schools in our study will provide the reader with relevant background information The William Spyropoulos School, located in Flushing, Queens, currently has 479 students. It has a maintenance bilingual program where all students are Greek Orthodox. Every child is bilingual, whether they speak or do not speak Greek fluently. The students are required to study the Greek language for one period each day. They are divided into three groups per grade level in order to accommodate their non-Greek, fluent, and average classmates. This grouping begins in the first grade and continues through grade eight. Pre-kindergarten and kindergarten grades are grouped heterogeneously. While all students are bilingual, 50 percent are fluent, 35 percent can understand the Greek language, and 15 percent learn Greek as a second language in school.

St. Demetrios is a Greek-American school located in Jamaica, Queens. Currently, it has 136 students including pre-kindergarten. The instructional program is a maintenance bilingual program where about 55 percent of the students are of Greek origin and the remaining 45 percent are from other ethnic backgrounds such as Romanian, Korean, Indian, and Middle Eastern. Students are learning to read, write, and speak in both Greek and English simultaneously. Although most of the Greek background students are bilingual, some are more fluent in Greek than others.

With this background material, these research questions guided our analyses:

1. To what extent does the formal study of Greek at various grade levels contribute to students' increasing knowledge of English language arts? (This question was motivated by our adapted version of the PRISM model.).
2. What rank does St. Demetrios occupy within comparable Greek parochial schools in Mathematics and English, respectively? This question was posed to locate the academic standing of St. Demetrios in these subject areas.
3. How does St. Demetrios compare with District 30 public schools in these same subjects? This question was raised to supplement the findings of question two.

3. Sources of data

Seventh and 8th grade final Greek exams for the first and second quarters along with English Language Arts scores (ELA) for the same period of time for 16 students at St. Demetrios were collected and analyzed. Teacher grades were used as the metric for the Greek exams and New York State Regents raw scores were used for the ELA. Since the sample from St. Demetrios was small at these grade levels, it was decided to combine them in the analysis.

Once the descriptive data about these students' academic achievement were collected, regression analysis techniques were applied to the data. This statistical technique enabled us to investigate functional (statistical) relationships among the variables of interest in this part of the study, thereby allowing us to ascertain the extent to which two or more variables are linked. Furthermore, regression techniques can be used to estimate, or predict, the values of one variable when the values of a correlated variable are known. It was reasoned that the data yielded from standardized test scores on the ELA and teacher grades for formal Greek study would best be analyzed using

these regression techniques. Systat software was used in the data analysis phase (Wilkinson, Blank & Gruber, 1996).

A second data set included 8th grade final Greek exam scores, Greek Regents scores, and ELA data for 47 students at William Spyropoulos School. A third set of 4th grade final Greek test scores (letter grades) matched with ELA scores for 36 students at the same school were subjected to further analysis. We reasoned that this kind of replication at different grade levels and different schools would lend support to the major focus of our inquiry –the functional relationship between the study of Greek and English in formal classroom settings.

4. Findings

With regard to the question about the extent to which the formal study of Greek at various grade levels contributed to students' knowledge and acquisition of English language arts, results of regression analyses are reported in Tables 1 and 2. (Another way to ask the same question is: How much variation in ELA scores is accounted for by the formal study of Greek?).

Table 1. Summary Statistics for First Data Set for 7th and 8th Grade Greek Students.

Dependent Variable: English Language Arts (n=16)	Multiple R: 0.639	Squared Multiple R: 0.409	Adjusted Squared Multiple R: 0.261	Standard Error of estimate: 5.71		
Effect	Coefficient	Std.Error	Std Coefficient Tolerance	Tolerance	t-test result	P(2-tailed)
Constant	52.92	15.45	0.0		3.43	0.01
Greek Exam	0.37	0.15	0.61	0.77	2.40	0.03
Years Studying Greek	2.49	1.09	1.01	0.25	2.29	0.04
Years in Greek School	-1.63	0.67	-1.03	0.27	-2.44	0.03

Analysis of Variance Results.

Source	Sum-of Squares	DF	Mean-Square	F-Ratio	P value
Regression	270.20	3	90.07	2.77	0.09
Residual	390.74	12	32.56		

Table 1 summarizes the statistical results for the 16 pupils at St. Demetrios which included Greek exam scores, ELA scores, number of years in formal Greek

study, and number of years studying in a Greek school. Table 1 can be explained as follows. The multiple R co-efficient shows the strength of the relationship among selected variables. In this study, the multiple R was .639. The squared multiple R on the right side of the first line is .409. This multiple R-square indicates the proportion of variance in the dependent variable (ELA scores) that can be accounted for or explained by the independent variables in the regression model (Greek exam scores, years studying Greek, and years in a Greek school).

According to Wilkinson *et al*. (1996: 152), when a regression model has few cases, this statistic "tends to be an optimistic estimate of how well the model fits the underlying population". For this reason, the adjusted R-square corrects the multiple R-square to more closely reflect the fit of the regression model in the population. In the case of Table 1, the adjusted R-square is 26.1%. This means that the independent variables account for 26% of the variance in the dependent variable of English Language Arts. The analysis of variance data provide a test of the overall significance of the regression model. In the case of the first data set reported in Table 1, the results were not statistically significant, due most likely to the small number of students in the study. This is one reason why we carried out subsequent analyses with larger samples.

Table 2 reports summary statistics for 34 students in the 8th grade at William Spyropoulos which included final Greek exam scores, Greek Regents scores, and English Language Arts scores from New York State.

Table 2. Summary Statistics for Second Data Set for 8th Grade Greek Students.

Dependent Variable: English Language Arts (n=34)	Multiple R: 0.588	Squared Multiple R: 0.345	Adjusted Squared Multiple R: 0.303	Standard Error of estimate: 42.53		
Effect	Coefficient	Std.Error	Std Coefficient Tolerance	Tolerance	t-test result	P(2-tailed)
Constant	436.06	97.33	0.0		4.48	0.001
Greek Regents	1.16	1.32	0.16	0.65	0.88	0.03
Final Greek Grade	2.53	0.95	0.48	0.65	2.67	0.001

Analysis of Variance Results.

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P value
Regression	29571.40	2	14785.70	8.17	>0.01
Residual	56072.13	31	1808.78		

As explained previously, due to the relatively few students in this sample, the adjusted R-squared was use to determine the overall fit of the regression model. The result was 0.303, which meant that the formal study of Greek accounted for 30.3% of the variance in English. Furthermore, this finding was statistically significant, resulting in a t value of 2.67, p>.01. This can be interpreted as follows: the independent variable of the study of Greek was strongly related to one's acquisition and knowledge of English.

Table 3 summarizes the statistics for 36 students in the same school for 4th graders. Final Greek test scores (letter grades) were matched with ELA scores.

Table 3. Summary Statistics for Third Data Set for 4th Grade Greek Students.

Dependent Variable: English Language Arts (n=43)	Multiple R: 0.323	Squared Multiple R: 0.104	Adjusted Squared Multiple R: 0.082	Standard Error of estimate: 19.65		
Effect	Coefficient	Std.Error	Std Coefficient Tolerance	Tolerance	t-test result	P(2-tailed)
Constant	641.84	11.48	0.0		55.93	0.001
Final Greek Grade	10.83	4.96	0.32	1.00	2.18	0.001

Analysis of Variance Results

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P value
Regression	1838.73	1	1838.73	4.76	0.03
Residual	15824.25	41	385.96		

Simple linear regression was applied to the data in Table 3. While the adjusted R-squared was 0.082, statistical significance was reached for Greek exam scores, yielding a t value of 2.18, p=.03.

Combining these regression results over the three data sets, support for the formal study of Greek as a second language is warranted since it contributed significantly to students' success in English Language Arts.

It should be pointed out that these regression findings demonstrate that other variables are operating which future research, based on the PRISM model, can examine.

For the question about which rank St. Demetrios occupied within comparable Greek schools in Mathematics and English, respectively, these findings were made. For 4th grade mathematics, it ranked 4th out of 10 comparable schools; for 8th grade

mathematics, it ranked 5th. In English Language Arts, it occupied 4th place among comparable schools.

For the question about how St. Demetrios compared with other District 30 public schools in mathematics and reading, Table 4 summarizes the findings.

Table 4. Mean Scores of St. Demetrios and District 30 on Mathematics and Reading.

School	Mathematics: 4th Grade	Mathematics: 8th Grade	Reading: 8th Grade
St. Demetrios	651.4	714.2	709.9
District 30	645.8	703.5	704.1

These data provide evidence that St. Demetrios students outscored District 30 students.

5. Discussion

In this exploratory study about the relationships among the components of the PRISM model, a definite pattern emerged from the results of our regression analyses. Although the samples were small and non-experimental, the findings lend support to the interdependence between the academic and linguistic components. Greek students at various grade levels, through the formal study of Greek, enhanced their acquisition and knowledge of English at the same time. This result provides further empirical support to the interdependence hypothesis of Cummins as well as others who have made similar claims about the benefits of bilingualism (Hakuta, 1986; Wong Fillmore & Valadez, 1986; McLaughlin, 1992).

Our findings have implications for the on-going debate about the benefits of learning two languages in school settings and the acquisition of English. Recently, Cummins (1999: 26) argued persuasively against a type of research that admits only "methodologically acceptable studies." Usually, they are program evaluations consisting of treatment and control groups that are formally compared to attribute outcome differences to the treatment instead of other, extraneous factors. Instead of this "extremely limited" orientation to research on bilingual education, Cummins advocates a scientific orientation whereby knowledge is generated by

> […] observing phenomena, forming hypotheses to account for the observed phenomena, testing these hypotheses against additional data, and gradually refining the hypotheses into more comprehensive theories that have broader explanatory and predictive power. (Cummis, 1999: 30)

On a small scale, the results of our exploratory study exemplify this "research-theory-policy" paradigm recommended by Cummins whereby theory is gradually refined to explain and predict phenomena. In the case of our study, an adaptation of the PRISM model fostered this scientific approach.

6. Conclusions

For the three data sets that posed the question about the relationships among formal Greek study and English proficiency, a general pattern emerged about the empirical relationship between the study of Greek as a second language and success on the ELA exam. In all three instances, statistical significance was reached with probabilities of .03. Except for the 4th grade data set, the amount of variance accounted for in the ELA ranged from 20% to 30%. One can conclude that the formal study of Greek contributed significantly to one's success on this standardized measure. This finding lends support to Konstantellou's (1990) observation about the teaching of Greek:

> […] at the present moment in its history with immigration from Greece decreasing to a near halt and with new generations of Greek Americans increasingly losing touch with their Greek heritage there is an acute awareness that community survival depends on education. (Konstantellou, 1990:125)

Using the PRISM model with its interdependent components as the overarching framework, these analyses lend some support to the relationship between the linguistic and academic components of that model. (ELA scores reflected the academic while the study of Greek represented the linguistic component.) What about the remaining 70-80% of variation that is not accounted for? Additional research is warranted, in particular, the functional aspects of the cognitive component of the PRISM model.

Bibliographical references

Costantakos, C. & J. Spiridakis (1997). "Greek in New York". In O.Garcia & J. Fishman (eds.), *The multilingual apple*: *Language in New York City*. New York: Mouton de Gruyter, 143-66.

Cummins, J. (1976). "Linguistic interdependence and the educational development of bilingual children". *Review of Educational Research* 49, 222-51.

Cummins, J. (1991). "Interdependence of first- and second language proficiency in bilingual children". In E. Bialystok (ed.), *Language processing in bilingual children*. Cambridge: Cambridge University Press, 78-89.

Cummins, J. (1999). "Alternative paradigms in bilingual education research: Does theory have a place?" *Educational Researcher* 28(7), 26-32.

Hakuta, K. (1986). *Mirror of language*: *The debate on bilingualism*. New York: Basic Books.

Konstantellou, E. (1990). "The futuristics of Greek American." *Journal of Modern Hellenism* 7, 45-66.

McLaughlin, B. (1992). *Myths and misconceptions about second language learning*: *What every teacher needs to unlearn*. Santa Cruz, CA: National Center for Research on Cultural Diversity and Second Language Learning.

Ovando, C., V. Collier, & M. Combs (2003). *Bilingual and ESL classrooms*: *Teaching in multicultural contexts*. Boston, MA: McGraw Hill Companies (3rd edition).

Peal, E. & W. Lambert (1962). "The relation of bilingualism to intelligence". *Psychological Monographs* 76 (546), 1-23.

Spiridakis, J. (1994). "The pursuit of Greek bilingual education." *Journal of Modern Hellinism* 9, 19-33.

Thomas, W. & V. Collier (1997). *School effectiveness for language minority students*. Washington, D.C.: NCBE.

Wilkinson, L., G. Blank & C. Gruber (1996). *Desktop data analysis with systat*. Point Richmond, CA: Systat Software.

Wong Fillmore, L. & C. Valadez (1986). "Teaching bilingual learners." In M.C. Witrock (ed.), *Handbook of research on teaching*. New York: Macmillan (3rd edition).