

CULTURALLY EMBEDDED MAPPING OF STUDENTS ANSWERS IN PIRLS ITEMS

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Abstract

This paper examines fourth-grade Greek students' reading literacy in relation to their social background. The data used in this study are derived (a) from IEA' Progress in International Reading Literacy Study (PIRLS), and (b) from interviews with fairly highly qualified primary school teachers. Teachers were asked to assess each of the items included in PIRLS according to the difficulties that students would face while answering them. The analysis compares student achievement ("true-false" answer in each item) between the higher and the lower social groups, based on two different groupings, especially important for the use of PIRLS in Greek educational system. In the first grouping, the items are selected according to IEA's categories (e.g., retrieve information, make inference, interpret ideas and information and evaluate content). In the second, the items are grouped according to the categories derived from the teachers interviews based on Bernstein's theoretical formulations.

BACKGROUND

The definition of reading literacy adopted is that stated in PIRLS, as follows: "the ability to understand and use those written language forms required by society and/or valued by the individual. Young readers can construct meanings from a variety of texts. They read to learn, to participate in communities of readers and for enjoyment" (PIRLS, 2000).

Purpose

The purpose of this paper is to examine issues related to students' reading literacy achievement at fourth grade in Greece. The achievement of students is examined in relation to their social origin and some characteristics of the 2001 IEA Progress in International Reading Literacy Study (PIRLS) items.

Achievement in language courses and specifically reading comprehension ability is considered fundamental for educational success as it is the basis for the process of university entrance exams, the cornerstone of the Greek system of education.

Recently, there has been a lengthy discussion regarding the purpose and worth of using international tests for assessing the abilities of Greek students. This work, therefore, aims at reframing the research of PIRLS in order to relate Greek students' achievement to culturally embedded investigation of the items involved. This is coupled with an exploration of the relationship between achievement and social origin, which is an important concern.

THEORETICAL FRAME WORK

The study of students' school achievement in relation to their social origin, as well as the role of the school as state apparatus and its contribution to social reproduction, have a history of about forty years. An extensive systematic attempt to explore issues related to educational inequality and its social basis was made in the mid 1960's by Coleman in the USA (Coleman, 1966). From this point on, multiple research projects have been undertaken and many theories were elaborated in order to reveal the ways in which school excludes socially disadvantaged students from educational success. From a Marxist perspective, Bowles and Gintis stressed the role of schooling in preparing and reproducing an obedient labor force for the needs of capitalist economy (Bowles and Gintis, 1976). The elaboration of the two major theories of cultural reproduction by B. Bernstein and P. Bourdieu in the 1960's and mainly 1970's had a great influence on social and educational research. Over period of more than thirty years Bernstein developed his theory of cultural reproduction in education through the transmission of linguistic codes as well as other crucial concepts, such as the classification and framing of educational knowledge (Bernstein, 1971, 1975, 1990). Bourdieu, over a similarly long period, dealt with the reproductive role of education by developing his central concepts of habitus and the three forms of capital (Bourdieu and Passeron, 1964, 1977; Bourdieu, 1979).

In the modern world, a literate population is essential for a nation's social and economic development (PIRLS, 2000). However, as being weak in reading comprehension is closely connected to school failure and determines the future social and professional development of every person (Fijalkow, 1998), it is very important to explore the social basis of reading literacy.

In Greece, according to the Ministry of Education, the general aim of language courses is to "teach the child to use the Modern Greek language in the best possible way: to understand, to speak, to read and to write with ease" (Ministry of National Education and Religious affairs, 2001). However, many studies in the Greek social and educational context indicate that not all children have the same opportunities for a successful school career and that students' achievement is closely related to their social origin. (Labiri-Dimaki, 1974; Tsoukalas, 1977; Baslis, 1988; Papoulia, 2001; Papakonstantinou, 1981; Polydorides, 1995).

The theoretical perspective of this study is twofold, corresponding to two distinct analyses involving two distinct typologies of the PIRLS items.

In the first case, IEA's categories, as developed and used in PIRLS, constitute the frame-typology for examining the Greek students' answers to each item of the study. The test questions or items were designed to measure the four major processes of reading comprehension, which are (Mullis et al., 2003):

- a) Focus on and Retrieve Explicitly Stated Information (presented as "RI" in the tables). Students needed to recognize the relevance of the information or ideas presented in the text in relation to the information sought, but looking for specific information or ideas typically involved locating a sentence or phrase.
- b) Make Straightforward Inferences (presented as "SI" in the tables). Based mostly on information contained in the texts, usually these types of questions required students to connect two ideas presented in adjacent sentences and fill in a "gap" in meaning. Skilled readers often make these kinds of inferences automatically, recognizing the relationship even though it is not stated in the text.
- c) Interpret and Integrate Ideas and Information (presented as II in the tables). Students needed to process the text beyond the phrase or sentence level. Sometimes they were asked to make connections that were not only implicit, but also needed to draw on their own knowledge and experience.
- d) Examine and Evaluate Content, Language and Textual Elements (presented as EC in the tables). These questions required students to draw on their own knowledge of text genre and structure, as well as their understanding of language conventions and devices.

The second analysis aims to reposition the IEA test-items in relation to Greek school practices in order to facilitate the creation of culturally embedded categories. In this case the concepts of Restricted and Elaborated codes (presented as R and E, respectively, in the tables) developed by Bernstein (1971, 1990) are used. These are elaborated based on the perception of teachers regarding convergence and divergence of the dichotomous Restricted/Elaborated codes with the "requirements" emerging from each item-question in the PIRLS tests. Teachers characterize all items in terms of the linguistic code that students should have acquired in order to be able to answer correctly. By justifying their assessment, it is possible to explore teachers' perceptions of the role they give to students' socio-cultural origin as well as issues related to student achievement and the role of the Greek social and educational context.

As the analysis is of exploratory character, no systematic comparison is attempted between the findings from each typology adopted. In fact, the intention is to use only the IEA's and the teachers' perceptions derived analyses to shed some light on the concerns prevailing in the country.

METHOD

The data used in the *first* analysis are derived from PIPLS and consist of:

- a) Students' social origin, consisting of relevant data such as type of community they live in, language spoken at home, number of books at

home, objects at home (student questionnaires). Students are grouped taking into account the profiling of social subjects with respect to social origin variables presented above (Kontogiannopoulou-Polydorides et al., 2003). Students in group 1 are considered to be at the top of the social hierarchy, while students in group 5 are considered to be in the more disadvantaged social stratum. Students in groups 1 and 5 are included in the present analysis, as they represent the two extreme groups in the social hierarchy. Students in group 3 are not included, while groups 2 and 4 are examined occasionally to the extent such examining sheds light on the issues at hand.

b) Data on the achievement of students on each individual item in the PIRLS reading test. For the comparison of students' achievement in each social group, we used the "correct-incorrect" answer in each item and the mean percentage of students who answered correctly as ordinal variables.

c) The typology of items according to PIRLS' categories, as described above.

The data used in the second analysis are derived primarily from PIRLS as in (a) and (b) above. Furthermore, a new classification (c') is constituted on the basis of Bernstein's codes and interviews with primary school teachers.¹ More specifically, four teachers were asked to assess the items in terms of the linguistic code (Bernstein's codes) that students should have acquired in order to answer these items, and justify their assessing. The teachers were asked to evaluate each item in the eight passages of PIRLS. Each teacher proceeded in a four-hour-long-interview, during which each item of the passages was examined. These teachers are qualified with MA's in Anglo-Saxon and/or Anglo-Saxon influenced postgraduate-programs.

This second classification is inevitably the result of a fusion of Bernstein's linguistic codes and teachers' interpretations of them. This fusion results in culturally embedded "categories", the outcome of teachers' interpretations of Bernstein's codes, based on their own everyday practice and experience in the Greek school. The passages used in the present analysis are six out of the eight passages of PIRLS; for these passages, there is agreement among the four teachers-assessors as to the classification of each item.

The passages are:

- a) The upside-down mice,
- b) Hare heralds the earthquake,
- c) The nights of the puffins,
- d) Leonardo Da Vinci,
- e) River trail, and
- f) Introducing Antarctica.

The first two passages test students' reading literacy for literary purposes, while the other passages test students' reading literacy for acquiring and using information (PIRLS, 2000).

Chi-square statistical tests are applied to test the significance.

Sample

The target population for PIRLS 2001 consists of the students enrolled in the upper of the two adjacent grades that contained the largest proportion of 9-year-olds students at the time of testing (Mullis et al., 2003). For Greece, the target population is found in the fourth grade. Testing took place according to the framework set forth in the design of the international study (Foy et al., 2003). Thus, 2494 students from 145 public and private schools were tested in Greece, resulting in an overall 83% participation rate. For more detailed data on participation rates and sample characteristics see Joncas (2003).

RESULTS

The Upside - Down Mice

In this passage, which tests reading for literary purposes, an old man named Labon gets rid of mice by fooling the mice into thinking the ceiling is the floor. This makes the mice do things upside down so that they become dizzy and fall to the floor (see the passage and the items in Mullis et al., 2003).

Table 1 presents the IEA categories for each item as well as the teachers' classification according to Bernstein's codes and the percentage of students from the examined groups who answered correctly. When there is a gap in the teacher classification, it means that teachers did not agree. In terms of IEA categories, the achievement of students in groups 1 and 5 does not differ in the items requiring the retrieval of explicitly stated information. However, in three items that require making straightforward inferences and in almost all the items requiring the "higher" process of comprehension (that is, the interpretation of ideas or information and the evaluation of content and language), the achievement of students in groups 1 and 5 differs.

In terms of the teacher classification of PIRLS items, students should possess the elaborated linguistic code in order to correctly answer almost all the questions requiring higher process of comprehension. Student achievement in groups 1 and 5 also differs in the items that require making straightforward inferences, although teachers assessed them as restricted.

Teachers pointed out at the outset that the plot of the story was too complicated. It seems that indeed students of low socio-cultural origin had difficulty in understanding the story, especially Labon's trick. As a result, in nine items of the passage, the achievement of students in groups 1 and 5 differs.

Hare Heralds the Earthquake

In this passage, which tests reading for literary purposes, a big fruit fell right next to a hare and the shaking of the earth was such that the hare was deceived into believing that it was an earthquake. The hare was trying to convince everyone to leave the place until a lion explained to him what had really happened (see the passage and the items in Mullis et al., 2003).

Table 1: Percentage of Correct Answers in Mice Items and Student's Grouping

| items | IEA's categories | teacher's classification | | Student's grouping | | | | | | | |
|-------|------------------|--------------------------|-------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | | CCI | | CC2 | | CC4 | | CC5 | |
| | | | | Count | Col % | Count | Col % | Count | Col % | Count | Col % |
| 1 | SI | R | correct | 68 | 92.7 | 111 | 94.9 | 100 | 89.1 | 86 | 85.3 |
| 2 | RI | R | correct | 70 | 95.9 | 113 | 96.8 | 98 | 87.8 | 97 | 96.2 |
| 3 | SI | R | correct | 58 | 79.4 | 83 | 71.0 | 72 | 64.3* | 62 | 61.9* |
| 4 | II | E | correct | 38 | 51.5 | 58 | 49.8 | 34 | 30.7* | 14 | 14.3* |
| 5 | RI | R | correct | 65 | 88.8 | 108 | 92.1 | 100 | 89.0 | 89 | 88.5 |
| 6 | II | R | 1/2 correct | 11 | 15.2 | 30 | 25.4 | 32 | 28.5 | 41 | 40.7 |
| | | | correct | 58 | 79.7 | 74 | 63.1 | 49 | 44.0* | 28 | 28.0* |
| 7 | SI | R | correct | 62 | 84.4 | 92 | 78.6 | 81 | 72.7* | 55 | 54.8* |
| 8 | EC | E | correct | 50 | 67.6 | 75 | 64.4 | 53 | 47.0* | 29 | 28.6* |
| 9 | SI | | correct | 66 | 89.4 | 97 | 83.4 | 86 | 76.9* | 67 | 67.1* |
| 10 | RI | R | correct | 62 | 85.2 | 110 | 93.9 | 100 | 89.0 | 94 | 93.9 |
| 11 | II | R | correct | 32 | 43.6 | 42 | 35.7 | 27 | 23.7* | 15 | 15.1* |
| 12 | II | E | 1/3 correct | 26 | 35.2 | 43 | 36.5 | 44 | 39.6 | 41 | 41.2 |
| | | | 2/3 correct | 23 | 31.3 | 47 | 40.1 | 37 | 33.1 | 31 | 30.8 |
| | | | correct | 22 | 30.4 | 23 | 19.4 | 14 | 12.3* | 10 | 9.9* |
| 13 | EC | R | correct | 72 | 98.0 | 109 | 93.5 | 98 | 87.3* | 91 | 90.3* |
| 14 | EC | E | correct | 44 | 60.7 | 82 | 69.8 | 63 | 56.4 | 49 | 48.3 |

* statistically significant differences at .05 when compared to CCI

According to the IEA categories presented in table 2, the achievement of students in groups 1 and 5 differs in four questions, two of which require interpretation of ideas (10,11), one question requires making straightforward inferences (7) and the last one requires evaluation of content (3).

According to the teacher classification of PIRLS items, only three items (9, 10, 11) require that students possess the elaborated linguistic code. It is important to note that question 10, which asks students to describe and explain how the lion and the hare are different, was assessed as the most difficult question of the passage. Teachers argued that it is very difficult for students with restricted code to describe and, even more difficult to compare personalities. In question 11 students were asked to find the main message of the story. It is common practice for teachers to characterize questions-items that require finding the main message of a passage as very difficult. It is necessary to point out that such common practice exists without justification sometimes.

In general, teachers assessed the whole passage as familiar to all students and, regardless of their assessment for each item separately, they expected a relatively high achievement from all students. Indeed, the mean percentage of students from all the groups who answered correctly is the highest compared to all the other examined passages.

Table 2: Percentage of Correct Answers in Hare Items and Student's Grouping

| items | IEA's categories | teacher's classification | | Student's grouping | | | | | | | |
|-------|------------------|--------------------------|-------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | | CCI | | CC2 | | CC4 | | CC5 | |
| | | | | Count | Col % | Count | Col % | Count | Col % | Count | Col % |
| 1 | RI | R | correct | 53 | 95.2 | 97 | 91.2 | 113 | 96.3 | 80 | 87.1 |
| 2 | RI | R | correct | 54 | 98.2 | 101 | 94.8 | 113 | 96.3 | 85 | 92.8 |
| 3 | EC | R | 1/2 correct | 26 | 46.6 | 54 | 50.7 | 56 | 47.7 | 38 | 41.1 |
| | | | correct | 23 | 41.8 | 33 | 31.0 | 15 | 12.7* | 21 | 22.8* |
| 4 | RI | R | correct | 45 | 81.9 | 89 | 84.3 | 88 | 75.7 | 68 | 74.2 |
| 5 | SI | R | correct | 51 | 93.2 | 93 | 87.7 | 100 | 85.3 | 78 | 85.4 |
| 6 | II | R | correct | 44 | 79.0 | 79 | 74.7 | 77 | 65.9 | 60 | 65.7 |
| 7 | SI | - | 1/2 correct | 16 | 28.1 | 36 | 33.5 | 36 | 31.1 | 46 | 49.7 |
| | | | correct | 34 | 60.8 | 58 | 55.0 | 58 | 49.8 | 36 | 39.4* |
| 8 | II | - | correct | 35 | 62.8 | 70 | 66.4 | 59 | 50.9 | 54 | 59.2 |
| 9 | II | E | 1/2 correct | 12 | 22.4 | 23 | 21.8 | 24 | 20.4 | 20 | 22.3 |
| | | | correct | 41 | 74.3 | 79 | 74.3 | 83 | 71.5 | 61 | 66.1 |
| 10 | II | E | 1/3 correct | 4 | 7.1 | 7 | 6.7 | 9 | 7.4 | 10 | 11.4 |
| | | | 2/3 correct | 39 | 70.4 | 68 | 64.0 | 72 | 61.6 | 48 | 52.6 |
| | | | correct | 11 | 19.4 | 18 | 17.4 | 11 | 9.1* | 12 | 13.2* |
| 11 | II | E | correct | 52 | 94.8 | 91 | 85.4 | 95 | 81.3* | 69 | 74.8* |

* statistically significant differences at .05 when compared to CCI

The nights of the Puffins

This passage, which tests reading for acquiring information, refers to a kind of sea bird, the puffins, and describes the efforts of children in Iceland to protect and save them when they are born (see the passage and the items in Mullis et al., 2003).

According to the IEA categories presented in table 3, the achievement of students in groups 1 and 5 differs in only one question (13) that requires evaluation of content.

In terms of the teacher classification of PIRLS items, students should possess the elaborated linguistic code to answer the questions requiring higher process of comprehension. Teachers considered question 13 difficult, pointing out students' difficulties in justifying their feelings based on the passage. Teachers also argued that question 12 is very difficult for the students of low socio-cultural capital, because they have to describe and explain feelings. Although student achievement does not differ, indeed, the percentage of students across the five groups that answer correctly is relatively low.

It is important to note that some teachers pointed out that the whole passage is very difficult as its content is not familiar to Greek students. They argue that this could cause students many difficulties in dealing with the items of the passage. Indeed, in

Table 3: Percentage of Correct Answers in Puffins Items and Student's Grouping

| items | IEA's categories | teacher's classification | | Student's grouping | | | | | | | |
|-------|------------------|--------------------------|-------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | | CCI | | CC2 | | CC4 | | CC5 | |
| | | | | Count | Col % | Count | Col % | Count | Col % | Count | Col % |
| 1 | RI | R | correct | 47 | 85.7 | 86 | 80.6 | 87 | 74.1 | 66 | 72.5 |
| 2 | RI | R | correct | 43 | 77.7 | 76 | 71.6 | 77 | 65.5 | 60 | 65.5 |
| 3 | RI | R | correct | 51 | 92.0 | 96 | 90.6 | 101 | 86.3 | 83 | 91.1 |
| 4 | II | - | correct | 41 | 75.0 | 76 | 71.5 | 78 | 66.7 | 61 | 66.6 |
| 5 | RI | R | correct | 41 | 74.8 | 74 | 69.3 | 66 | 56.7* | 56 | 61.1 |
| 6 | II | E | correct | 30 | 54.3 | 48 | 44.8 | 41 | 35.3* | 45 | 49.1 |
| 7 | II | R | 1/2 correct | 16 | 28.4 | 44 | 41.5 | 25 | 21.8 | 42 | 45.7 |
| | | | correct | 19 | 34.7 | 27 | 25.0 | 31 | 26.5 | 22 | 23.98 |
| 8 | II | E | 1/2 correct | 32 | 58.1 | 63 | 59.4 | 57 | 48.9 | 55 | 60.3 |
| | | | correct | 12 | 21.9 | 21 | 19.4 | 18 | 15.3 | 12 | 13.6 |
| 9 | RI | R | correct | 45 | 81.1 | 87 | 81.6 | 87 | 74.6 | 80 | 87.8 |
| 10 | SI | E | correct | 17 | 30.7 | 31 | 29.6 | 38 | 32.9 | 28 | 31.1 |
| 11 | II | - | correct | 27 | 48.4 | 44 | 41.5 | 43 | 36.4 | 32 | 34.8 |
| 12 | II | E | 1/2 correct | 15 | 26.8 | 40 | 37.9 | 38 | 32.6 | 33 | 35.9 |
| | | | correct | 26 | 47.3 | 35 | 33.2 | 41 | 35.4 | 28 | 30.9 |
| 13 | EC | E | correct | 50 | 90.9 | 86 | 80.7 | 72 | 61.5* | 59 | 64.7* |

* statistically significant differences at .05 when compared to CCI

many questions the percentage of students across the five groups that answer correctly is very low. Furthermore, the mean percentage of students in groups 1 and 2 with correct answers is the lowest compared to all the other passages.

Leonardo Da Vinci

This passage, which tests reading for acquiring information, is a short historical biography of Leonardo Da Vinci.

According to the IEA categories presented in table 4, the achievement of students in groups 1 and 5 differs in various types of items and in all questions requiring interpretation of ideas.

In terms of teacher classification PIRLS' items, students should possess the elaborated code to answer the questions requiring interpretation of ideas. The teachers assessed question 6 as very difficult because it requires drawing on experience and knowledge. In such a question, although differences in achievement are not statistically significant, the percentage of students across the five groups that answer correctly is relatively low. Teachers pointed out that regarding question 10 many students with restricted linguistic code might not understand what the phrase "Leonardo was ahead of his time" means. Studies on reading suggest that a great number of words even in the schoolbooks are unknown to students of the lower

Table 4: Percentage of Correct Answers is Leonardo Items and Student's Grouping

| items | IEA's categories | teacher's classification | | Student's grouping | | | | | | | |
|-------|------------------|--------------------------|-------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | | CCI | | CC2 | | CC4 | | CC5 | |
| | | | | Count | Col % | Count | Col % | Count | Col % | Count | Col % |
| 1 | RI | R | correct | 58 | 100.0 | 96 | 100.0 | 115 | 95.7 | 99 | 99.0 |
| 2 | SI | E | correct | 38 | 64.9 | 54 | 56.4 | 44 | 36.9* | 40 | 40.4* |
| 3 | RI | R | correct | 49 | 85.0 | 70 | 73.6 | 79 | 65.2* | 56 | 56.4* |
| 4 | II | E | 1/3 correct | 20 | 33.9 | 32 | 33.3 | 45 | 37.2 | 31 | 31.3 |
| | | | 2/3 correct | 20 | 33.9 | 45 | 46.7 | 41 | 34.3 | 37 | 37.2 |
| | | | correct | 11 | 19.2 | 16 | 16.3 | 11 | 9.4 | 7 | 6.9* |
| 5 | SI | R | correct | 54 | 93.1 | 83 | 86.8 | 79 | 65.9* | 63 | 62.7* |
| 6 | SI | E | correct | 26 | 44.6 | 48 | 49.8 | 42 | 34.6 | 44 | 44.5 |
| 7 | II | E | correct | 49 | 83.7 | 40 | 41.3 | 49 | 40.8* | 39 | 39.5* |
| 8 | SI | E | 1/2 correct | 27 | 46.6 | 52 | 54.0 | 49 | 40.6 | 48 | 47.7 |
| | | | correct | 19 | 33.5 | 20 | 20.9 | 16 | 13.5* | 20 | 20.0 |
| 9 | RI | R | correct | 55 | 94.0 | 87 | 91.0 | 100 | 82.7 | 85 | 84.7 |
| 10 | II | E | 1/2 correct | 19 | 32.8 | 33 | 34.7 | 39 | 32.6 | 34 | 34.1 |
| | | | correct | 22 | 37.8 | 25 | 26.1 | 13 | 10.7* | 9 | 9.3* |
| 11 | EC | R | correct | 38 | 64.6 | 70 | 72.9 | 72 | 60.1 | 57 | 57.2 |
| 12 | EC | E | 1/2 correct | 26 | 45.0 | 46 | 47.7 | 46 | 38.4 | 45 | 44.8 |
| | | | correct | 14 | 24.2 | 19 | 19.6 | 12 | 9.9* | 10 | 10.0* |

* statistically significant differences at .05 when compared to CCI

social strata (Graves, 1986). Indeed, the percentage of students of low socio-cultural origin that were given full credit was very low.

In the selection of texts for of PIRLS the potential for cultural bias was considered, and among the criteria used for the final selection were fairness and sensitivity to gender, racial, ethnic and religious considerations (PIRLS, 2000). It is important to note that teachers argued that this passage offers a cultural advantage to students of high socio-cultural origin. Such texts are characterized as "culture-loaded" (Satterly, 1989). Indeed, the mean percentage of students in group 5 that answered correctly is the lowest for all passages except the "river trail".

River Trail

The "river trail", which tests reading for acquiring information, is a recreational leaflet (see the passage and the items in Mullis et al., 2003).

This is the most typical passage as far as the social class gap in reading literacy achievement is concerned. All items, regardless of IEA categories, indicate a difference in achievement between students in groups 1 and 5 (table 5).

In terms of teacher classification of PIRLS' items, items 1-5 and 8 require students' possession of the restricted linguistic code. Items 7 and 9-11 require students'

Table 5: Percentage of Correct Answers in River trail Items and Student's Grouping

| items | IEA's categories | teacher's classification | | Student's grouping | | | | | | | |
|-------|------------------|--------------------------|-------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | | CCI | | CC2 | | CC4 | | CC5 | |
| | | | | Count | Col % | Count | Col % | Count | Col % | Count | Col % |
| 1 | EC | R | correct | 58 | 94.1 | 111 | 88.4 | 81 | 72.1* | 70 | 75.6* |
| 2 | EC | R | correct | 49 | 79.2 | 75 | 59.9 | 43 | 38.5* | 30 | 32.7* |
| 3 | RI | R | correct | 60 | 97.0 | 121 | 96.1 | 105 | 93.9 | 83 | 89.4 |
| 4 | SI | | correct | 55 | 89.1 | 88 | 70.1 | 53 | 47.7* | 59 | 64.1* |
| 5 | SI | R | correct | 59 | 95.5 | 104 | 82.4 | 71 | 63.6* | 60 | 64.4* |
| 6 | RI | - | 1/2 correct | 9 | 15.2 | 21 | 16.5 | 21 | 19.0 | 7 | 7.8 |
| | | | correct | 32 | 51.4 | 55 | 43.8 | 35 | 30.8* | 31 | 33.7* |
| 7 | SI | E | correct | 40 | 64.2 | 52 | 41.3 | 38 | 33.8* | 26 | 27.8* |
| 8 | II | R | 1/2 correct | 23 | 37.3 | 50 | 40.0 | 29 | 26.1 | 14 | 15.0 |
| | | | correct | 17 | 27.3 | 19 | 15.2 | 13 | 11.3* | 16 | 17.7* |
| 9 | II | E | 1/2 correct | 13 | 21.1 | 32 | 25.6 | 32 | 28.5 | 20 | 21.1 |
| | | | correct | 34 | 55.7 | 67 | 53.5 | 42 | 37.9 | 29 | 31.2* |
| 10 | II | E | 1/3 correct | 5 | 7.6 | 18 | 14.1 | 32 | 28.2 | 10 | 11.1 |
| | | | 2/3 correct | 12 | 19.4 | 30 | 24.1 | 17 | 15.5 | 26 | 27.6 |
| | | | correct | 43 | 68.9 | 62 | 49.2 | 45 | 40.3* | 37 | 40.0* |
| 11 | EC | E | 1/3 correct | 9 | 13.8 | 38 | 30.5 | 36 | 32.4 | 37 | 39.8 |
| | | | 2/3 correct | 20 | 32.5 | 33 | 26.5 | 28 | 25.3 | 22 | 23.8 |
| | | | correct | 32 | 51.2 | 37 | 29.5 | 18 | 15.9* | 9 | 9.2* |

* statistically significant differences at .05 when compared to CCI

possession of the elaborated code. In items 5 and 8, students should answer by drawing information from tables. Teachers considered this process as quite simple and easy for all students. However, students of low socio-cultural origin faced difficulties, especially in question 8. In items 10 and 11 students had to pair comments with specific information cited in maps and tables. Teachers considered this a very difficult task. Teachers also pointed out that the ordering of the items does not correspond strictly to the ordering of the two parts in the passage, making items more difficult.

It seems that the majority of Greek students are not very familiar with this type of recreational leaflet and that students of low socio-cultural origin face many difficulties in drawing information from this kind of document. The mean percentage of students in group 5 who answer correctly is the lowest compared to all the other passages. This is very important as reading literacy refers not only to understanding texts, but also to the ability to draw information from different symbol systems (Wolf, 1990). This was also obvious in the Reading Literacy study (1991), when Greek students scored significant lower in documents (Elley, Schleicher, 1994).

Introducing Antarctica

The Antarctica passage, which tests reading for acquiring information, includes four non-chronological parts referring to general information, the weather, penguins and food.

It is important to note that, according to IEA categories presented in table 6, for the first time in four out of the five items requiring the retrieval of explicitly stated information, the achievement of students in groups 1 and 5 differs. Furthermore, student achievement in groups 1 and 5 also differs in all questions requiring the interpretation of ideas.

According to teacher classification of PIRLS' items, questions 4 and 9 require students' possession of the elaborated linguistic code. In question 1, which teachers assessed as very easy, the percentage of students in group 5 that answer correctly is relatively low. Although the answer is explicitly stated in the passage and next to it there is a small map that contains the answer students from the lower social strata can hardly draw information from this kind of text, although the map is much easier than those of the passage "the river trail". Teachers found all other items requiring retrieval of information easy. Only one teacher pointed out that because the passage consists of four parts this might pose problems for some students. Indeed, a possible interpretation for the failure of many students from the lower social strata to

Table 6: Percentage of Correct Answers in Antarctica Items and Student's Grouping

| items | IEA's categories | teacher's classification | | Student's grouping | | | | | | | |
|-------|------------------|--------------------------|-------------|--------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | | CCI | | CC2 | | CC4 | | CC5 | |
| | | | | Count | Col % | Count | Col % | Count | Col % | Count | Col % |
| 1 | RI | R | correct | 55 | 92.6 | 91 | 84.5 | 73 | 83.5 | 63 | 59.9* |
| 2 | RI | - | correct | 41 | 68.8 | 73 | 67.8 | 55 | 63.4 | 59 | 56.2 |
| 3 | RI | R | correct | 50 | 83.6 | 94 | 86.9 | 66 | 75.6 | 64 | 60.7* |
| 4 | II | E | 1/2 correct | 34 | 57.7 | 58 | 54.1 | 58 | 66.5 | 55 | 52.8 |
| | | | correct | 22 | 37.5 | 41 | 37.9 | 17 | 19.7* | 18 | 17.3* |
| 5 | SI | R | correct | 58 | 97.5 | 100 | 92.8 | 75 | 86.7* | 96 | 91.4 |
| 6 | RI | R | correct | 54 | 90.6 | 95 | 87.6 | 64 | 73.2* | 72 | 69.0* |
| 7 | SI | - | 1/3 correct | 10 | 17.3 | 11 | 9.7 | 19 | 21.7 | 31 | 29.9 |
| | | | 2/3 correct | 12 | 20.9 | 38 | 35.3 | 30 | 34.4 | 41 | 39.3 |
| | | | correct | 32 | 53.7 | 50 | 46.6 | 25 | 29.1* | 17 | 15.9* |
| 8 | SI | R | 1/2 correct | 8 | 14.0 | 7 | 6.6 | 4 | 4.2 | 6 | 5.6 |
| | | | correct | 48 | 81.7 | 92 | 85.3 | 71 | 81.7 | 77 | 73.5* |
| 9 | II | E | 1/2 correct | 26 | 44.5 | 35 | 32.3 | 25 | 29.3 | 31 | 29.3 |
| | | | correct | 27 | 45.0 | 59 | 54.2 | 44 | 50.3 | 42 | 40.5* |
| 10 | EC | R | correct | 41 | 69.0 | 65 | 59.8 | 31 | 36.1* | 49 | 46.5* |
| 11 | EC | R | correct | 25 | 42.8 | 66 | 61.1 | 24 | 27.7 | 43 | 40.7 |

* statistically significant differences at .05 when compared to CCI

retrieve explicitly stated information could be that these students could not find, or they did not try to find the part of the passage that corresponded to each item.

Overall, it could be argued that this passage proved to be quite difficult for the students of low socio-cultural origin.

DISCUSSION

The important finding in this paper is that the achievement of students in groups 1 and 5 differs in the majority of PIRLS items. There are a total of 21 passages requiring the retrieval of explicitly stated information, and student achievement in groups 1 and 5 differs in only six items of this type, four in the passage "Leonardo Da Vinci". Therefore, it could be argued that in questions requiring this processes of comprehension, social origin is quite often not related to student achievement. In the items requiring "higher" processes of comprehension, the social origin of students seems to be a relevant factor in relation to achievement. Student achievement in groups 1 and 5 differs in 14 out of the 23 items across passages requiring interpretation of ideas. The achievement gap in this case would be much greater if the passage "nights of the puffins" were excluded: in this passage student achievement in groups 1 and 5 differs only in one question. Furthermore, student achievement in groups 1 and 5 differs in nine out of the twelve questions requiring evaluation of content.

On the whole, it could be argued that, regardless of the passage, questions requiring a "higher" process of comprehension are difficult for students of low social origin. It is important to note that Greek teachers assessed the majority of the items requiring interpretation of ideas as needing an "elaborated" code. They did not, however, assess items requiring evaluation of content in the same way. Regarding achievement on the passage as a whole, it is worth noting the low mean percentage of students who answered correctly in the passage "nights of the puffins". This is true for Greek students across social groups. The fact that student achievement in groups 1 and 5 does not differ is related to low performance of students of high social origin in that passage, the lowest for that group in all the examined passages. Thus, it could be argued that when students are tested on a passage with unfamiliar content (teacher comments on the "nights of the puffins"), or, in other words, on passages in which students of high social origin do not seem to maintain an advantage, the achievement of students does not differ by social origin.

Greek students of low social origin seem unable to interpret a passage requiring an "unusual" kind of knowledge, such as "the river trail" in which they are asked to draw information from tables and maps. Teachers assessed the passage "Leonardo Da Vinci" as heavily culture-loaded, favouring students from the higher social strata. Indeed, the mean percentage of students in group 5 who answered correctly was higher only when compared to the "river trail".

In conclusion, it could be argued achievement differences are related both to the process of comprehension that each item requires and to the kind of passage. The type of passage is related to the achievement of students across social groups, either downwards as it is the case in "nights of the pufflings" or upwards as it is the case

in "hare heralds the earthquake". Furthermore the process of comprehension each item requires differentiates students' achievement by social origin.

Note

1. G. Fragoulis conducted the interviews during work undertaken in the context of his MA thesis. The interviews are related to the way teachers classify PIRLS items vis-à-vis Bernstein's codes. Interviews are derived from: G. Fragoulis (2003) Reading Literacy Achievement and socio-cultural background of students in the fourth grade. Unpublished Thesis (in Greek).

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