

THE IMPACT OF SOCIO-ECONOMIC STATUS ON ACADEMIC ACHIEVEMENTS IN ISRAEL

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Abstract: Research investigated gaps in achievements between Jewish and Arab pupils in Israel. Research questions were: Were there significant differences in grades attained by Jewish and Arab pupils in Israel in PISA 2009 tests? Was there a correlation between the socio-economic index measured by the PISA program, and grades attained in PISA 2009 tests? Was there a correlation between the mean grades in the PISA 2009 tests and the overall organizational status of Jewish in comparison to Arab schools? Quantitative data were collected with questionnaires for pupils and principals developed by the PISA program. Data-analysis indicated significant positive correlations of the pupils' grades with the combined socio-economic index of the school pupils, and with the school climate. Positive correlations were found with the quality of educational resources and extent of school independence in allocation of resources. Pupils' achievements in the Jewish sector in reading were significantly higher than pupils' achievements in the Arab sector. Achievements of pupils from socio-economic strata above the median were higher than those of pupils from socio-economic strata below the median. The research contributes knowledge regarding factors leading to gaps in learning achievements, between different sectors. Intensive activity is needed to reduce these gaps.

Key words: Israel, socio-economic status, PISA, OECD, Arabs, Pupil achievements.

JEL Classification: A14, A21, C12, I21, I28.

1. Introduction

Socio-economic status is a family characteristic that most strongly predicts pupils' academic performances, so that when it is higher, pupils' academic achievements increase (Van Laar and Sidanius, 2001). Socio-economic status is measured by different factors such as: parents' level of education, parents' occupations, family income and location of residence (Ben-David, 2010; Gough, 1964; Sbirsky and Degan-Bouzaglo, 2009; Van Laar and Sidanius, 2001; Yona, 2005).

There is also an additional systemic influence of socio-economic status on academic achievements, meaning that the general socio-economic status of most of the school's pupil population influences academic performances; when there is less money given to the school, it invests less money in the pupils. Sirin (2005) showed that schools in which most of the pupils came from low income families were considered "inferior" in relation to schools where most of the pupils came from high income families. Moreover, socio-economic composition of the pupil population influences achievements in physical exams, so that achievements in private schools are far higher than in state schools. Consequently there is competition between educational institutions to attract pupils from high socio-economic strata (Zimmer, Ikeda and Ludemann, 2011).

Equality in education is a basic principle of a democratic society, since education and training are important tools for the reduction of socio-economic gaps at the individual and community levels (Yona, 2005). The aspiration for equality is expressed at the level of outputs, and not necessarily at the level of input of resources (Golan-Agnon, 2006; Sbirsky and Degan-Bouzaglo, 2009) but in order to achieve such equality, corrective discrimination may be needed to allot resources to groups of pupils with a lower starting point (Abu-Asbeh, 2008; Ben-David, 2010; Sbirsky and Degan-Bouzaglo, 2009).

Education is an important factor for individual and social development of the Arab minority in Israel, and especially for Arab children, and also serves as a tool for the community's socio-political struggle for social mobility (Arar and Abu-Asbah, 2010; Mustafa and Arar, 2009) since they live as a minority in a Jewish state and are mostly within the lowest socio-economic strata (Mazawi, 2003). In recent years, a continuous increase in the level of Arab education including higher education has led to an increase in living standards and consumer habits (Abu-Asbeh, 2008).

The four main sources of inputs for the education systems in Israel are the central government, local government, parents and civil society. The Arab education system receives fewer resources from all four sources. The responsibility of the government for the inferior state of the Arab education system is disputed; some scholars claim that the government has at least partial responsibility for example with regard to teacher quality (Arar and Abu-Asbah, 2010).

The proportion of excellent pupils (with an average grade of 95 or more) is higher by a third in Jewish schools than in Arab schools (Sbirsky and Degan-Bouzaglo, 2009). A deeper examination shows that the gaps in mathematics achievements between the Jewish and Arab school are not large; in English, a discipline essential for university admittance there is a gap of one unit and close to 10 points between the two school systems. According to Degan-Bouzaglo and Sbirsky (2009) the achievements of Arab pupils in mathematics are the result of their high motivation to succeed in sciences, for long term goal attainment. Contrastingly, Arab pupils appear to have difficulties in studying English since it is a third language, in addition to Arabic and Hebrew. In addition, in Arab schools, emphasis is given to a broad-based matriculation certificate rather than aspiring for quality grades, to comply with threshold requirements for university admittance (Agbaria and Mustafa, 2012).

Examinations of the differences between the two populations, Jewish and Arab, indicates that there are significant gaps in all the basic social characteristics: gaps in elementary and higher education, gaps in the average number of children per family, gaps in proportion of the population living in poverty, and gaps in participation in the work force. Beyond these specific gaps, there is little doubt that the weak socio-economic status of Arab local governments also influences the level of services that they supply including education (Arar and Abu-Asbah, 2010).

Achievements for standard international exams (PISA and PIRLS) are significantly lower in Arab schools, and Arab pupils were graded in the lowest groups of tested pupils in Israel. Their average grade was lower than the general average for all tested countries and regions and significantly lower than the average for Jewish students in Israel. Nevertheless, a trend to reduction in the inequality in education in Israel is evident in two dimensions: the proportion of participation in studies and the proportion of those eligible for a matriculation certificate. But this is a slow, gradual, insufficient process, and elimination of the gap between the different school systems is not yet envisaged (Volansky, 2006). Zussman and Tsur (2008) showed that the gaps in basic achievements in matriculation exams between pupils from weak socio-economic strata and pupils from strong socio-economic strata have diminished, simultaneously with the broadening of some gaps in achievements that testify to excellence.

The Organization for Economic Cooperation and Development (OECD) conducts research once every three years known as: Program for International Students Assessment (PISA). Israel joined this research from 2000. The research examines the readiness of 15 year olds for adult life in terms of their acquisition of tools for economic thinking and analytical and comprehension abilities to cope effectively with the environment. The exam examines the level

of literacy in reading, mathematics and sciences. Literacy according to the PISA research is “the pupil’s ability to apply knowledge and skills that they have acquired. Pupils and schools are sampled to represent the various sectors of society in Israel and the various types of school (including three-year and six-year schools, schools from different networks, etc.

The present study aims to investigate gaps in academic achievements between the Jewish and Arab pupils in PISA 2009 tests, and the correlation between these academic achievements and general socio-economic variables and the level of the school as an organizational unit.

2. Methodology

Research population

The sample was drawn from all pupils aged 15 studying in formal settings in many states, who participated in the PISA exams in 2000. From this population, 176 schools were selected in Israel – 137 Jewish school (4,480 pupils) and 39 Arab schools (1,281 pupils).

Research tools

A quantitative research was employed to investigate differences between different segments of the population (model of difference analysis) and correlations between variables (correlation model). Data was collected with four questionnaires administered to pupils and one questionnaire for principals, which were developed by a staff of pedagogic, scientific, testing and psychometric experts from the PISA program.

The pupils’ questionnaires included a booklet testing literacy in reading, mathematics and sciences, background details, Self-Regulated Learning (SRL) and a questionnaire testing familiarity with the computer for purposes of entertainment and learning (Information Computer Technology – ICT). Questionnaires were translated in Israel into Hebrew and Arabic, and the cognitive tests underwent a pilot study and thorough analysis of the items to ensure their reliability.

The personal background details and SRL questionnaires included informative questions relating to personal and socio-demographic characteristics such as “country of birth”, “mother tongue”, “what is your father’s occupation?”; reports on the means and facilities for learning at home (computer, books, personal writing desk), reports on extra-school learning activities (such as enrichment lessons) and reports on reading habits and homework. They also included questions measuring attitudes and behaviors: for example items relating to reading habits (for example: “I only read when I have to”) and behaviors connected to learning strategies (for example: “when I prepare lessons I try to remember all the details in the text that I read”) etc. Alongside each sub-question in the indexed questions that measured attitudes there was a 4-level scale of answers from “completely agree” to “completely disagree”.

The ICT questionnaire was composed of ten different questions. Each question included sub-questions relating to computer equipment in the home, computer use in general or uses of the computer for learning or entertainment.

The principal’s questionnaire was composed of 27 informative questions and questions (attitudes, assessments) on the following subjects: school structure and organization, pupil characteristics, the community and the teachers, resources, regulations, curriculum and assessment processes, school climate and school policy, characteristics of the principal and school leadership.

Data analysis included examination of the differences between different population segments, some of the analyses were performed at the individual level and some at the school level.

Research questions

Were there significant differences in grades attained by Jewish and Arab pupils in Israel in PISA 2009 tests? Was there a correlation between the general socio-economic index measured by the PISA program, and grades attained in the PISA 2009 tests?

Is there a correlation between parents' occupational status and pupils' grades attained in PISA 2009 in Israel? Is there a correlation between the mean grades in the PISA 2009 tests and the overall organizational status in Jewish schools in comparison to Arab schools in Israel? At the organizational unit level, is there a correlation between school characteristics, teachers, pupil population and management and pupils' achievements in PISA 2009 tests?

Research hypotheses

In consideration of the literature review and the research questions the follow research hypotheses were composed:

1. There will be significant differences in the grades attained for reading literacy, mathematics and sciences in PISA 2009 tests between Arab and Jewish pupils in Israel.
2. There will be a significant difference in the achievements for reading literacy, mathematics and sciences in PISA 2009 tests between Israeli pupils in strata above and below the general socio-economic index median
3. There will be an interaction between "school sector" x "socio-economic status" with regard to grades attained for reading literacy, mathematics and sciences in PISA 2009 tests.
4. At the level of the school as an organizational unit, there will be a positive correlation between pupils' mean "socio-economic status", mean "index of learning facilities", mean "attitudes towards the school", mean "attitudes towards computers" and the mean school grade attained for reading literacy, mathematics and sciences in PISA 2009 tests.
5. At the level of the school as an organizational unit a correlation will be found between different indices that characterize the teachers, pupils, management, school climate and learning environment and the pupils' achievements.

Findings

To examine the first three research hypotheses MANOVA analyses were run to investigate the effect of "sector", the effect of "socio-economic status" and the interaction of these two variables for three grades in the PISA 2009 tests: reading literacy, mathematics and sciences. For the purposes of this examination the sequential distribution of the socio-economic cultural index was calculated and encoded according to the median for socio-economic statuses above and below the median. Table no. 1 displays the means and standard deviations for pupils' grades in reading literacy, mathematics and sciences, by sector and socio-economic status. It can be seen that in all three disciplines the achievements in the Jewish sector are higher than the achievements in the Arab sector. Moreover, with regard to socio-economic status, there is a higher level of achievements for pupils above the median than for pupils below the median.

Table no. 1. Means and Standard Deviations for Grades attained in Reading Literacy, Mathematics and Sciences, by Sector and Socio-economic Status (N=5525)

Sector	Jewish pupils			Arab pupils			Total no. of pupils		
	Reading literacy								
Socio-	Mean	SD	N	Mean	SD	N	Mean	SD	

economic status									
Below the median	1955	467.5	94.4	812	392.3	86.9	2767	445.4	98.4
Above the median	2329	533.1	88.6	429	417.3	93.3	2758	515.1	98.7
Total	4284	503.2	96.9	1241	400.9	89.9	5525	480.2	104.5
Mathematics									
Socio-economic status	N	Mean	SD	N	Mean	SD	N	Mean	SD
Below the median	1955	437.5	84.5	812	361.0	74.5	2767	415.1	88.8
Above the median	2329	505.3	82.9	429	392.9	81.7	2758	487.8	92.2
Total	4284	474.4	90.2	1241	372.0	78.5	5525	451.4	97.5
Sciences									
Socio-economic status	N	Mean	SD	N	Mean	SD	N	Mean	SD
Below the median	1955	443.4	90.2	812	378.9	78.0	2767	424.4	91.6
Above the median	2329	511.9	85.9	429	410.8	82.38	2758	496.2	92.9
Total	4284	480.7	94.3	1241	389.9	80.9	5525	460.3	99.0

The two-way 2X2 MANOVA analysis examining significance of the difference between the mean grade for “reading literacy” by “sector” and “socio-economic status” (N=5525), found an effect for “sector”: the achievements of pupils in the Jewish sector for reading literacy tests were higher than the achievements of the pupils in the Arab sector ($f=982.3$; $p<0.001$). Thus too an effect was found for socio-economic status: the achievements of pupils from socio-economic strata above the median were higher than those of pupils from strata below the median ($f=220.9$; $p<0.001$), and an interaction was also found ($f=44.5$; $p<0.001$).

Table no. 2 displays the correlations between the socio-economic status variables – combined socioeconomic cultural index, parents’ education, parents’ occupational status, learning facilities at home and attitudes towards the computer – and grades achieved in reading literacy, mathematics and sciences. It is clear that significant positive correlations were found.

Table no. 2. Pearson correlations between the socio-economic index (parents’ education, parents’ occupational status, learning facilities at home and attitudes towards the computer) and grades achieved in reading literacy, mathematics and sciences

	Sector ¹ (1) Jewish (2) Arab	Combined socio-economic and cultural index	Highest parents’ education 5474	Highest parents’ status 5155	Learning facilities at home 5647	Attitudes towards the computer 5051
Reading literacy	-.352(**)	.372(**)	.344(**)	.366(**)	.130(**)	.179(**)
Mathematics	-.328(**)	.425(**)	.403(**)	.389(**)	.140(**)	.159(**)
Sciences	-.313(**)	.410(**)	.380(**)	.372(**)	.147(**)	.138(**)

** $p<0.001$

In the analysis at the school level (Table no. 3) significant positive correlations were found between grades and the combined socio-economic index of the school pupils, and with the school climate. Thus too, positive correlations were found with the reported quality of educational facilities, and the extent of the school's independence in allotting resources. In contrast, negative correlations were found with emphasis on achievements, problem in the classroom, reports on teachers' work, self-reports of the school principal and the correlation between number of computers and the number of pupils. No correlations were found between the grades and reports on lack of teachers and problems with teachers.

Table no. 3. Correlations between school parameters and grades attained in reading literacy, mathematics and sciences

Quality of educational resource	School's degree of freedom in allotting resources	Proportion of computers to pupils	Combined socio-economic cultural index	Learning facilities at home	Attitudes towards computers	Emphasis on achievements	Problems in class	Problems with teachers	Lack of teachers	
.28 (**)	.09	-.01	.72 (**)	.3 (**)	.40 (**)	-.17 (*)	-.24 (**)	-.09	-.08	Reading literacy
.31 (**)	.18 (*)	.07	.78 (**)	.36 (**)	.39 (**)	-.14	-.21 (**)	.05	.07	Mathematics
.26 (**)	.19 (*)	.01	.71 (**)	.33 (**)	.40 (**)	-.17 (*)	-.19 (*)	.11	.02	Sciences

* p<.05 **p<.001 *** p<.001

3. Discussion and conclusions

The comparison between the Jewish and Arab sectors revealed that there are significant differences between the grades achieved in the two sectors for PISA 2009 tests. Similar results were also found for the PISA 2006 tests (Sbirsky and Degan-Bouzaglo, 2009). There is no clear scholarly consensus regarding the strength of prediction of grades according to socio-economic status. The first hypotheses was accepted.

Some studies found a strong positive correlation, while others argued there was little influence for socio-economic status (Gough, 1964; White, 1982; White, et al., 1993). Nevertheless, parents who have financial capabilities send their children to private schools, so that the principle of equality of opportunity in education is undermined (Zimmer, Ikeda and Ludemann, 2011).

There are several ways in which socio-economic status can influence pupils' academic achievements. According to Sirin (2005) pupils' socio-economic status influences the school's characteristics, so that insofar as there is a school with less money, it invests less in its pupils. This situation creates significant gaps between the different schools and thus inequality is established between different strata of the society (Golan-Agnon, 2006; Yogev, 2003).

Rouse and Barrow (2006) claimed that schools with a low socio-economic status do not use their material resources as effectively as schools with high socio-economic status. Following this argument, the studies of Rivkin, Hanushek and Kain (2005) found that the size of class has a

slight but significant influence on pupils' achievements in reading and mathematics tests. According to Van, Laar and Sidanius (2001) class size influences amount of personal time that pupils receive from the teacher and this directly influences pupils' achievements. Moreover, in schools with low socio-economic status, the level of teachers will be lower than in schools with higher socio-economic situation and indeed Croninger et al. (2007) showed that when teacher level is higher, pupils' achievements are higher. According to Rouse and Barrow (Arar and Abu-Asbah, 2010) teachers' expectations from their pupils are determined according to the pupil's socio-economic status, these findings were affirmed by Ben-David (2006).

In Israel gaps between the Jewish and Arab sector are the result of continuous ideological, religious, and national-ethnic discrimination expressed even in education. This means that resources provided for the Arab sector are lower and pupils in the Arab sector have weaker achievements than pupils in the Jewish sector (Sbirsky and Degan-Bouzaglo, 2009). Difference in the three sources of investment in education: the state, local government and local society between the two sectors leaves the Arab pupil behind, so that academic grades reflect a "concentration of disadvantage of resources" (Arar and Abu-Asbah, 2010).

Pupils' achievements in the PISA tests sharpens the recognition of gaps in Israeli education that have often been noted by Israeli education researchers. The second hypotheses was accepted. To reduce these gaps, several structural and technical reforms have been attempted (6; Sbirsky and Degan-Bouzaglo, 2009; White, 1982; Yogeve, 2003). The diverse characteristics of different pupils in Israel necessitate differential investment, and comprehensive reform of the education system in Israel or "a systemic program to reduce gaps" (Ben-David, 2010). Reform programs should be based on three pillars: teachers – substantial increase of wages, alongside significant improvement in teaching quality, since this is one of the weak points of the Arab education system, which essentially still needs to placate demands of strong hamullas (extended families) (Arar and Abu-Asbah, 2010). Analysis of the principal's questionnaire revealed that the principal's self-reporting was not reliable or that in the schools more "problematic" in terms of achievements, a higher level of leadership was required.

In conclusion, this research investigated the correlation between socio-economic status and academic achievements in reading, mathematics and sciences at the level of the school as an organizational unit, in a comparison between the Jewish and Arab sectors, and found a significant correlation between socio-economic status and pupils' achievements in both Jewish and Arab schools and also influence of the level of the school as an organizational unit.

In order to improve this situation, well-trained teachers are needed, who should be carefully selected and properly rewarded, to teach a focused significantly improved learning program in the core subjects (reading, writing, sciences, mathematics and English). Additionally the combination of personal responsibility with authority in the school should be encouraged with positive and negative incentives for the school and teachers. These conditions may be able to guarantee the bridging of existing gaps in education and bring economic outputs (Balas, 2010).

Research results reported here necessitate rethinking and intensive activity to reduce the gaps between the Jewish and Arab sectors. Future studies should relate to additional factors that cause gaps between these two sectors, such as systemic factors including educational policies, the school organization and its functioning, separation between Jewish and Arab schools etc.

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