

Policy Paper

The Academic Achievements of Arab Israeli Pupils

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 Internet edition

The Academic Achievements of Arab Israeli Pupils¹

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Abstract

For many years, the Arab Israeli (Arab) education system suffered neglect and discrimination reflected in large disparities relative to the Jewish (Hebrew) sector system — both in terms of resources and in terms of academic achievements. Although these disparities continue to exist, evidence has emerged in recent years that the gaps are narrowing. The level of formal education attained by teachers in the Arab system is equal, and sometimes even superior, to that of teachers in the Hebrew sector; the number of pupils in Arab classrooms is approaching that of pupils in Hebrew sector classrooms; enrollment rates in pre-primary and post-primary education, which lagged behind the Hebrew sector rates, are now almost identical to them. The last few years have also witnessed gains in the percentage of Arab Israelis who are pursuing higher education and earning academic degrees. The gains are particularly striking when one compares pupils of similar socioeconomic backgrounds. The road to true equality is still long, but the system is headed in the right direction.

Introduction

The research on Israeli education abounds with studies demonstrating large disparities between the academic achievements of Jewish sector pupils and those of pupils in the Arab Israeli sector.² These gaps have been a known phenomenon since the early years of the state, as reflected in data from the survey exams administered to eighth graders starting in the late 1950s. Later, a joint study was published by Bashi, Khan and Davis (1981) that indicated disparities between the academic achievements of primary school

1 Nachum Blass, principal researcher, Taub Center for Social Policy Studies in Israel. Thanks to Laura Schreiber for designing the figures in this paper.

2 According to the CBS, the education system is divided into Hebrew education and Arab education based on the language of instruction. In general, one can assume that almost all if not all of the pupils served in Hebrew education are Jewish. The Arab education system includes Christians, Druze and Bedouin education unless otherwise indicated.

pupils in the Arab system and those of their Hebrew education system peers. In subsequent years, many studies were also published on educational disparities between the sectors in post-primary and higher education.^{3,4}

The explanations given for these gaps are also well known. The most notable of them relate to discrimination and to disparities in budget, buildings and equipment, teacher education level, and class size. In addition, there are cultural/social gaps and problems unique to the Arab Israeli population who, in addition to regular subjects, also have to study Hebrew and literary Arabic. All of the research addressing these issues has been based on reliable data; most demonstrate professionalism and skill and effectively convey the actual situation of large disparities between the Arab Israeli pupil population as a whole, and the Jewish pupil population.

In recent years, however, developments have been taking place under the radar that require us to take another look at the academic disparities between Jewish and Arab Israeli pupils. These processes relate to both inputs and outputs — i.e., to both investment and achievements — and, for the most part, indicate a complex reality. Despite continuous and often severe educational discrimination, we can discern positive trends in quite a few areas including a qualitative improvement and a narrowing of gaps. Data will be presented on input and output disparities pertaining both to the sectors in their entirety, and to sub-groups within the sectors, distinguished from each other by socioeconomic status.

1. Changes in resource allocation to Arab education

Budgets

Despite recent changes to the primary and middle school budgeting method, budget disparities between the the Hebrew and Arab education sectors — both per pupil and per class — are still very large. Disparities exist in schools at all socioeconomic levels, and they are especially large in schools with high Nurture Index levels (those that serve disadvantaged

3 See Abu-Asba (2007); Adler and Blass (1997, 2003, 2009); Blass, Tsur and Zussman (2010); Lavy (1997).

4 These studies were based on, among other things, the feedback exams that were administered in 1996, 1998, and 2001; on the Meitzav exams, starting in 2001; on the bagrut exams that have been administered since before Israel's founding; on the psychometric exams, and on international exams (PISA, TIMSS, PIRLS).

populations).⁵ The budget gaps are reflected in figures appearing in two recent Ministry of Education publications (Ministry of Education, 2016a, 2016b). Two of those will be presented below.

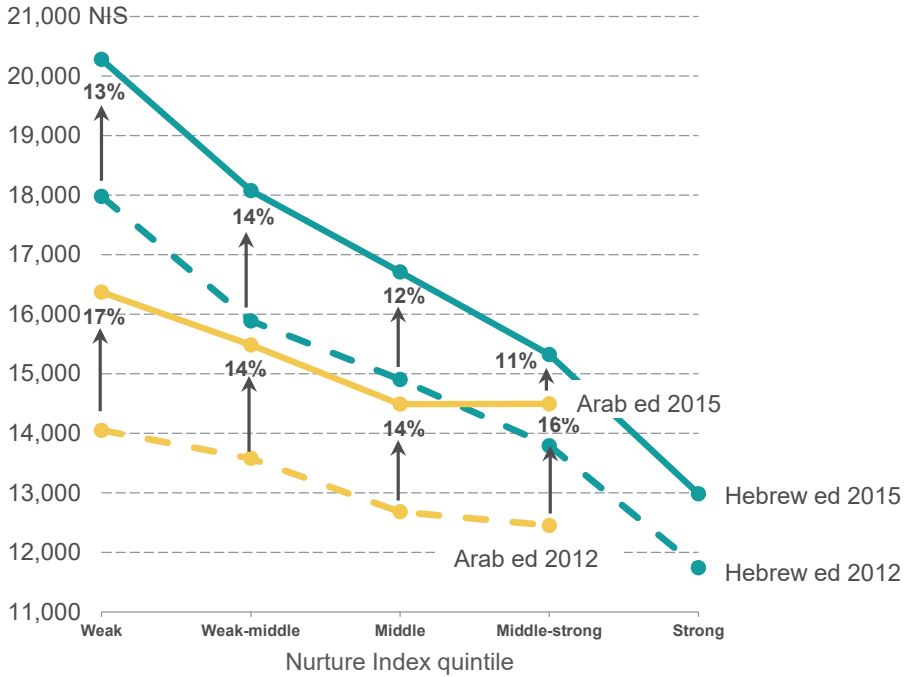
Figure 1 shows the budget per pupil in primary education by sector and using the Nurture Index for the years 2012 to 2015. The data encompass all expenditures and refer to official education only, i.e., they do not refer to recognized but unofficial schools which includes the entire Haredi (ultra-Orthodox) education system, and a portion of the Arab education system that serves pupils of higher socioeconomic status. It should be noted that a figure appearing in the explanations to the 2017-2018 budget and relating to 2016 indicates for the first time since the founding of the state, an advantage to the Arab sector over the Hebrew sector in the number of instruction hours per pupil at the primary level in regular education.⁶ It is important to note the difference between the data in the figure – which refer to the entire expenditure per pupil – and the data that appear in the budget proposal, which refer solely to instruction hours. We should also emphasize that the figure appearing in the budget refers to the entire pupil population, and does not take socioeconomic background into account. Since the Arab Israeli pupil population is much weaker socioeconomically, the sector's slight advantage (1.70 hours per week per pupil in Arab education versus 1.67 hours per week per pupil in Hebrew education) does not constitute a substantial level of affirmative action.

5 The Nurture Index is a Ministry of Education index of the socioeconomic levels of pupils and school districts. A high index level indicates a severely disadvantaged population.

6 Budget Proposal for Fiscal Year 2017-2018 and Explanations Submitted to the Twentieth Knesset: The Ministry of Education and the Items Linked to It 11, p. 20 – <http://meyda.education.gov.il/files/MinhalCalcala/hazaattakziv2017-2018.pdf>

Figure 1. Average cost per primary school pupil in regular education

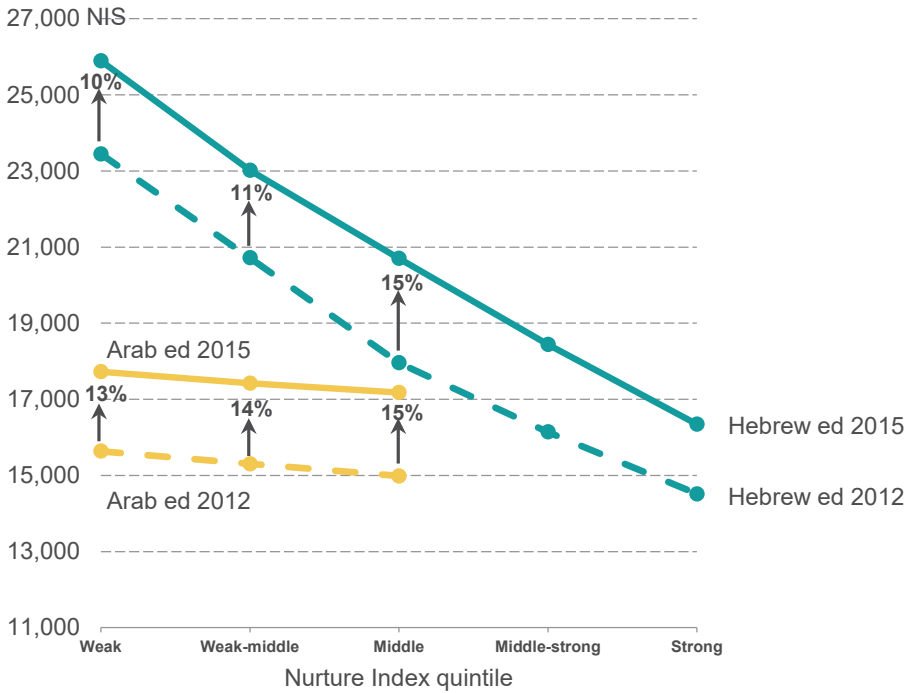
By sector and Nurture Index quintile



Source: Nachum Blass, Taub Center | Data: Ministry of Education (2016)

Figure 2 refers to the average cost per pupil in middle school for those years, and indicates a similar, though slightly weaker, trend. We should note that the improvement in per pupil budget was largely due to a more rapid decline in the number of pupils per class in the Arab education sector — itself an important and welcome development.

Figure 2. Average cost per middle school pupil
By sector and Nurture Index quintile



Source: Nachum Blass, Taub Center | Data: Ministry of Education (2016)

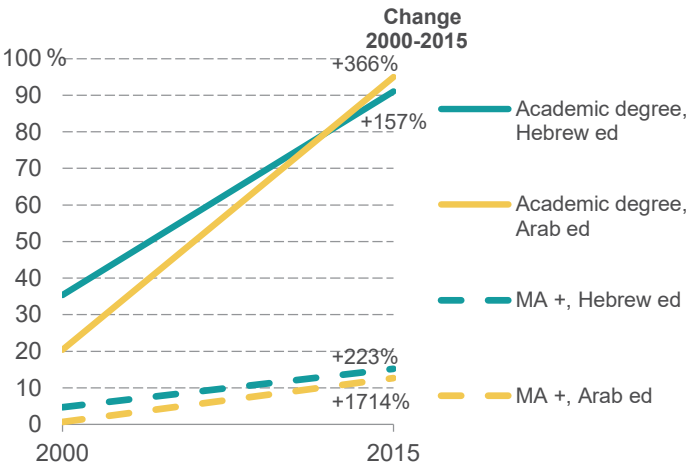
Teaching manpower

As is known, there is no accepted criterion for assessing teacher quality; a number of variables are commonly used for this purpose. One of the most widely-employed variables is that of teacher education level or, more precisely, teacher academic degree (Figure 3). In recent years a growing body of data indicate that the percent of academically-trained teachers in the Arab education sector is higher than in the Hebrew sector. The percentage of teachers with Master’s degrees in the Arab education sector is also approaching that of the Hebrew sector and is growing more rapidly, though gaps in this area are still considerable.

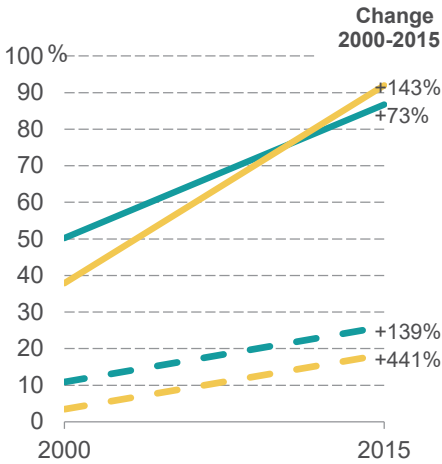
Figure 3. The share of teachers with an academic degree and the rate of change in this share between 2000 and 2015

By sector and academic degree

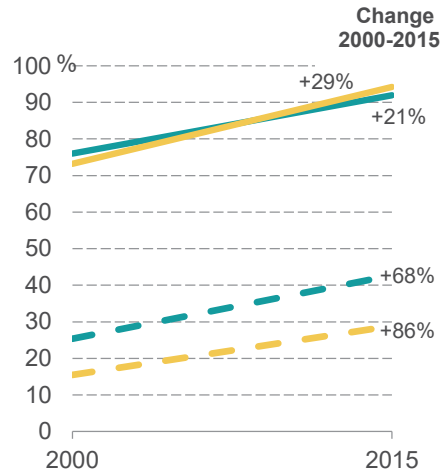
Pre-primary education



Primary education



Post-primary education



Source: Nachum Blass, Taub Center | Data: Central Bureau of Statistics, *Statistical Abstract of Israel*

Although education level and seniority are not accurate criteria for assessing instruction quality, the vast majority of Arab Israeli teachers receive their academic training — in both the subject-area and pedagogical spheres — at the same institutions attended by their Jewish colleagues, and under the same conditions.⁷ There are also indications that, due to the large number of Arab Israelis (mainly women) entering the teaching profession, schools in this sector are better able than Hebrew sector schools to choose the most highly-qualified graduates. Based on these data, we found the following:

- the quality of teaching personnel in the Arab education sector is now very close to that of the Hebrew sector;
- the Arab sector's rate of improvement in teacher education level is outpacing that of the Hebrew sector;
- the Arab sector's rate of increase in seniority in primary and post-primary education is similar to that of the Hebrew sector and, in pre-primary education, is even outpacing that of the Hebrew sector (see Appendix Table 1).

Number of pupils per class

In recent years, the Ministry of Education has taken steps to reduce the number of pupils per class. In the Hebrew education sector these measures have had no real results, but in the Arab education sector the outcomes have been more impressive (Table 1). The explanations to the 2017-2018 budget indicate that in 2015 the number of pupils per class in Arab primary and middle schools was lower than in the Hebrew sector. Only at the high school level did the Arab education sector have a higher number of pupils per class. The turnaround can, apparently, be attributed to the implementation of the five-year plan for classroom construction, as well as to both a rapid decline in the rate of natural increase and nearly maximum enrollment rates in the Arab Israeli sector. It should be remembered that the weak socioeconomic background of pupils in the Arab education system requires broad affirmative action (class size is only one action), and even reaching parity in this area still indicates a degree of discrimination.

⁷ There are only three Arab Israeli teacher training colleges (out of 26 such colleges recognized by the Council for Higher Education in Israel).

Table 1. Average number of pupils per budgeted class in regular education

	2005	2010	2015	2016 (preliminary data)
Hebrew education				
Primary school	29.4	28.8	28.3	28.2
Middle school	34.5	33.0	31.4	31.5
High school	30.7	31.0	29.8	29.6
Total	30.5	30.0	29.2	29.0
Arab education				
Primary school	32.1	30.8	27.8	27.3
Middle school	35.3	32.6	29.1	29.1
High school	33.3	32.4	32.3	32.0
Total	32.9	31.4	29.0	28.7

Source: Ministry of Education, *Budget Book 2017*

Long school day

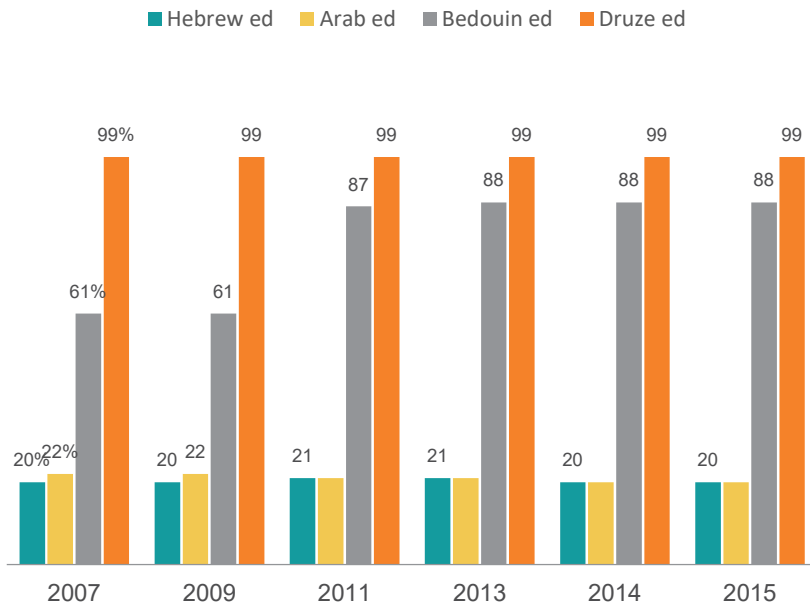
An interesting issue that is likely significant with regard to academic achievement is that of the percentage of pupils who have a long school day, defined as lasting until 3:30 pm or 2:30 pm (depending on how the school is organized). A long school day enables pupils to take part in a variety of educational, enrichment, and supplementary activities (Figure 4). It appears that the Druze sector⁸ is the only one where nearly all primary education frameworks feature a long school day program.⁹ There are only a limited number of studies that have examined the impact of a long school day on academic achievements in Israel. Of particular note is the work of Romanov and Rimon (2009), who found that a long school day has no real effect on

⁸ Due to the small number of Circassians, there is no advantage to including them here.

⁹ During the 2002 and 2003 school years, a long school day was instituted in 490 Hebrew schools, amounting to 23 percent of all Hebrew state schools (and the numbers have not changed much since then). In the state-religious stream, nearly a third of the schools offer a long school day, while in other streams (Haredi) only a seventh of the schools are included in the program. In the Druze sector, nearly all schools offer a long school day, compared with a quarter to a third of schools in the Arab and Bedouin sector.

academic achievement. However, these authors treated the Druze no differently than other sectors in Arab education and gave insufficient weight to the fact that all Druze pupils are included in the program, and that their achievements surpass their peers despite the fact that Druze schools have considerably higher Nurture Index scores. Thus, despite the findings of Romanov and Rimon, it is hard to ignore the possibility that full-scale Druze participation in a long school day program plays a role in their high degree of success on the bagrut exams of recent years.

Figure 4. Primary school pupils in a long school day framework



Source: Nachum Blass, Taub Center | Data: Ministry of Education, *Facts and Figures 2015*

We can thus determine that, although in general there are still large disparities in budgeting per child and per class between the Hebrew and the Arab education systems, the gaps are narrowing with regard to other types of input, such as teaching manpower and class size.

2. Outcomes and achievements for pupils in the Arab education system

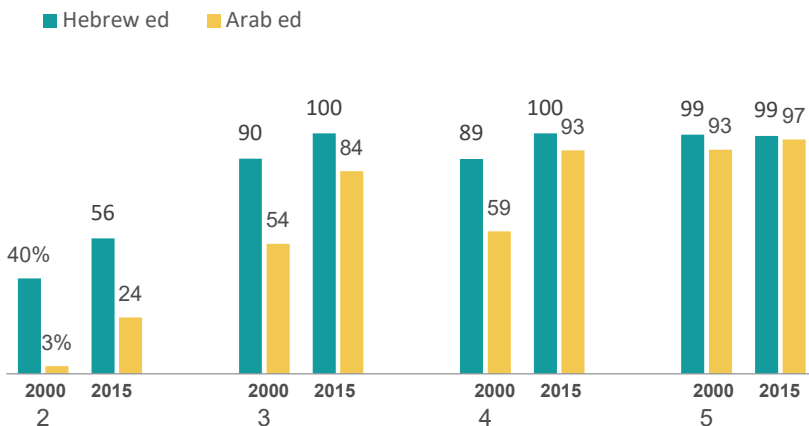
Enrollment rates

Pre-primary education

The progress in enrollment rates in recent years is actually evident in pre-primary education (Figure 5). Within just 15 years, the Arab sector almost completely closed the gap for ages 4 to 5, although for age 3 the disparity is still considerable. Regarding the 3- to 4-year-old age group, the increase in enrollment rates between 2000 and 2010 was more pronounced in the Arab education sector because the Compulsory Education Law for those ages was applied to localities in the lower socioeconomic clusters, which includes most Arab schools. By contrast, since 2012, progress has actually been greater in the Hebrew sector, in those places where, before that time, the law did not apply. In these years the greatest progress made in the Arab education sector was for 2-year-olds, where there was a major increase in enrollment rates (sevenfold and more), while the Hebrew sector increase was “only” 42 percent (Appendix Table 2).

Figure 5. Enrollment rates in pre-primary education

By sector

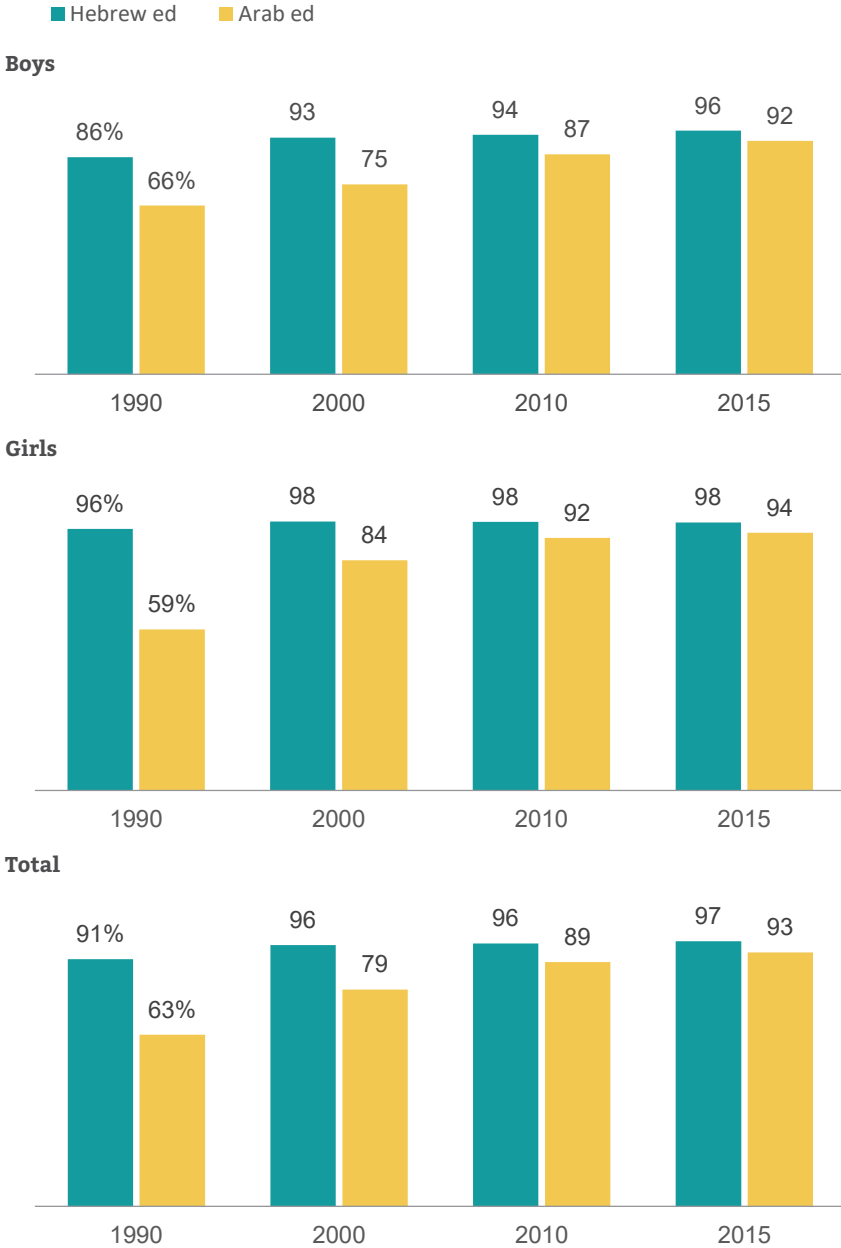


Source: Nachum Blass, Taub Center | Data: CBS, *Statistical Abstract of Israel* (various years)

Primary and middle school enrollment rates have been nearly 100 percent for quite some time. Great progress has also been made at the high school level (Figure 6). Hebrew school enrollment rates have risen since 1990 from 90 percent to 97 percent. Arab school enrollment rates, by contrast, have risen at a much faster rate — from 63 percent to 93 percent — and today there is almost no difference between the two sectors. The Arab sector shows a particularly striking change in enrollment rates for girls, where there was an increase from 59 percent in 1990 to 94.3 percent in 2015. Of the ten localities notable for their low school dropout rates, according to the Ministry of Education’s recent publication *The Education Picture* (2016c), six are in the minority sector. Given that Arab Israeli local authorities account for 40 percent of all local authorities, and that all of the Arab Israeli local authorities fall within the lowest third of the country’s socioeconomic ranking, this is a tremendous achievement.

Figure 6. Enrollment rates of 14-17-year-olds

By sector



Post-secondary and higher education

Completing bagrut¹⁰ and continuing to higher education. As is known, not all those who take the bagrut exams at the end of high school earn a bagrut certificate. However, not passing the exams does not necessarily prevent one from continuing to higher education; some of those who fail (see below) manage to pass the exams later on, while others continue their studies without the bagrut certificate. Data on the academic education of post-primary school graduates (including those without the bagrut certificate) eight years after they completed their high school studies indicate a decline among those in the Jewish sector, in the percentage of those going on to study in institutions of higher education — from 48 percent to 43 percent. At the same time, the Arab Israeli sector showed stability with a slight increase, from 28 percent to 29 percent (CBS, 2016, Table A3).

Students in institutions of higher education. Beyond the changes in the percentage of those found to have continued their studies eight years after completing secondary education, several other processes are underway in the Arab Israeli sector (Table 2):

- the Arab Israeli sector has shown a relatively rapid increase in the percentage of those both applying and being admitted to institutions of higher education, in contrast to a very slow upturn in the Jewish sector;
- a drop in the percentage of those accepted to study who do not attend (except for a slight rise with regard to Master's degree study in the universities);
- a large decline in the percentage of those rejected by undergraduate and Master's degree programs in the universities;
- a rise in the share of Arab degree recipients among all recipients.¹¹

To sum up, the Arab Israeli sector has made major strides, not only in the area of higher education in general but also in the academic level achieved. To these data we may add the thousands of Arab Israeli students who study at academic institutions in Jordan, the Palestinian Authority and the United States. Yet despite this, we cannot ignore the fact that, in 2015, only 16 percent of Arab Israelis aged 25 to 34 had more than 13 years of schooling, compared with 72 percent of their Jewish peers.

¹⁰ Bagrut are Israeli high school bagrut exams.

¹¹ On the assumption — which needs to be substantiated but is entirely reasonable, at least at the Master's degree level — that the institutions of higher education have not lowered their standards.

Table 2. Higher education candidacy and degree receipt rates

By sector

		2010		2015	
		Hebrew ed	Arab ed	Hebrew ed	Arab ed
Candidates for 1st year in academic colleges	Accepted/ studying	71%	54%	67%	59%
	Accepted/ not studying	13%	20%	13%	18%
	Not accepted	16%	26%	20%	23%
Candidates for 1st year of BA in university	Accepted/ studying	66%	50%	70%	58%
	Accepted/ not studying	14%	15%	10%	10%
	Not accepted	21%	35%	20%	32%
Candidates for 1st year of 2nd degree university	Accepted/ studying	66%	42%	68%	47%
	Accepted/ not studying	12%	13%	14%	15%
	Not accepted	22%	45%	18%	38%
Degree holders from academic colleges	BA	96%	4%	89%	11%
	MA	94%	6%	92%	8%
Degree holders from colleges of education	BA	70%	30%	80%	20%
	MA	81%	19%	78%	22%
Degree holders from university	BA	91%	9%	90%	10%
	MA	94%	5%	91%	9%
	PhD	97%	2%	96%	4%

Source: CBS, Statistical Abstract of Israel (various years) | Calculations: Nachum Blass, Taub Center

Academic achievements

Meitzav exams. The Meitzav exams are administered annually to pupils in grades 5 and 8, to half (and recently to a third) of the pupil population in Israel's state and state-religious education streams.¹² The exams are given in several subjects – Hebrew and Arabic (depending on the sector), English, mathematics and science. Since 2007, the exams have been calibrated in such a way that we can compare scores between the years.

The data point to a real improvement in achievements for the Israeli pupil population as a whole (Blass, 2016). This is also true of each individual sector. For fifth graders in the Arabic-speaking sector, the changes in achievement documented between the years 2007 and 2015 pointed to a major overall improvement in mathematics, modest gains in English, and a narrowing of gaps between the two sectors in both of those subjects. Eighth graders showed a reduction of disparities in science and technology, a widening of the gap in math, and no change in the English (as a second language) gap (RAMA, 2016).

Table 3 compares the average achievements of the pupils in Hebrew and Arab schools on the Meitzav exams between 2007 and 2016. When we look at the entire pupil population, the differences are very great, for both Grade 5 and Grade 8. But when the pupils in each sector are divided into three groups by the socioeconomic background of the schools they attend, the differences in their scores prove much smaller. In grade 5 they shrink by up to half, while in grade 8 they decline even further. This is particularly noticeable among the group in the middle socioeconomic position: in some cases, the Arab Israeli population's scores surpass those of the Jewish population. Of course it must be emphasized that when we look at each sector separately, the relative weight of the schools in the lowest third is much greater in the Arab Israeli sector than in the Jewish sector, while for the highest third the situation is reversed (there are few Arab Israeli schools in the middle third, and even fewer in the highest third).

12 In the 2013-2014 school year no Meitzav exams were administered.

Table 3. Differences in Meitzav scores between Hebrew and Arabic speakers
By Nurture Index level, 2007-2016*

	English	Mathematics	Science/ Technology
Fifth grade			
Overall average difference	25.9	51.3	—
Low socioeconomic background	14.2	26.6	—
Middle socioeconomic background	-12.9	20.4	—
High socioeconomic background	-13.5	33.0	—
Eighth grade			
Overall average difference	62.8	43.3	41.9
Low socioeconomic background	33.5	-1.8	8.3
Middle socioeconomic background	19.0	-0.6	-2.6
High socioeconomic background	13.5	22.5	16.0

* A negative score denotes an advantage to the Arab education system

Source: Nachum Blass, Taub Center | Data: RAMA

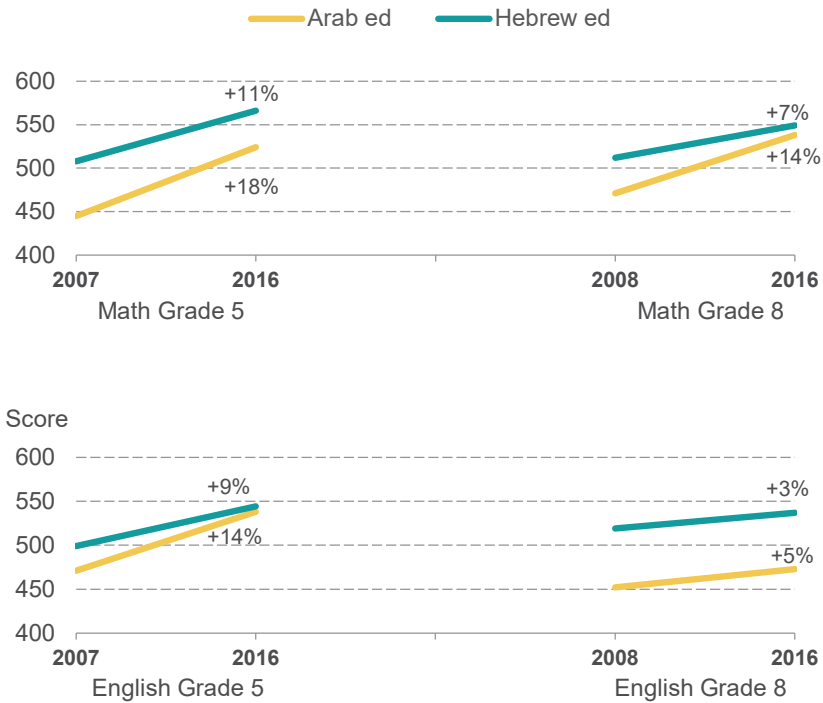
It is important to note that a rough division into three groups based on socioeconomic rankings biases against the Arab Israeli sector pupils' achievements, as their representation in the weaker segments of each group is greater. This means that in the lowest group which is composed of the three lowest socioeconomic deciles, the share of Arab Israelis is much higher than the Jewish share. By contrast, in the highest third, the share of Jews in the highest decile is greater than the share of Arab Israelis. The obvious conclusion is that a more subtle division into Nurture Index level deciles would likely present the Arab Israeli sector's academic achievement data in a more positive light.

A look at the change in pupil scores in both sectors (Figure 7 and Appendix Table 4) reveals two interesting findings here as well:

1. the achievements of pupils in both sectors have improved;
2. the improvement shown by Arab Israeli pupils is more substantial, both in terms of absolute disparities between the scores and in terms of the change percentages (except for grade 8 math, where the absolute disparity is greater in the Arab Israeli sector than in the Hebrew sector).

In both education sectors the standard deviations in most subjects were reduced (Appendix Table 4), though not by much. In Arab education there was a substantial reduction in two subjects (grade 5 math and English), no change in two subjects (grade 5 English, grade 8 science and technology), and an increase in one subject (grade 8 math). For pupils in Hebrew education, there was a reduction in three subjects (grade 5 math and English and grade 8 English), no change in one subject (grade 8 math), and an increase in one subject (science and technology).

Figure 7. Percent increase in Meitzav scores, grades 5 and 8



Source: Nachum Blass, Taub Center | Data: RAMA

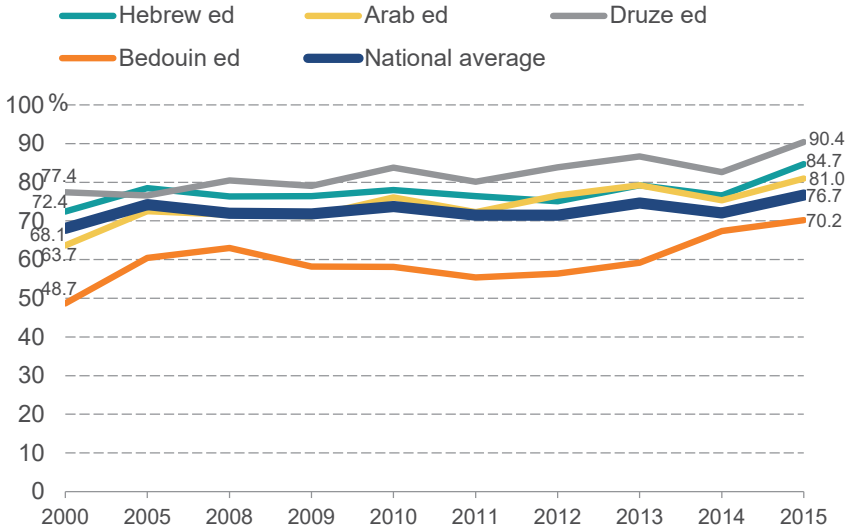
Bagrut exams

There is also evidence of major progress in educational achievements in post-primary school in the Arab education system. Here we examine the data from several perspectives:

Percentage of pupils taking the tests: Since Arab sector enrollment rates are very similar to those of the Hebrew sector, and most twelfth graders also take the bagrut exams, we can view the percentage of pupils who take the exams, out of the entire pupil population, as highly representative of the system's ability to guide its pupils to this academic benchmark. Ministry of Education data reveal two main facts:¹³

- the percentage of those taking the bagrut exams in the Arab sector is similar to that of the Hebrew sector;
- the Druze sector percentage surpasses that the Hebrew sector; since 2000, the rate of improvement in the Druze and Bedouin sectors is similar to, or surpasses, that of the Hebrew sector.¹⁴

Figure 8. Percentage of those taking the bagrut exams within the age cohort



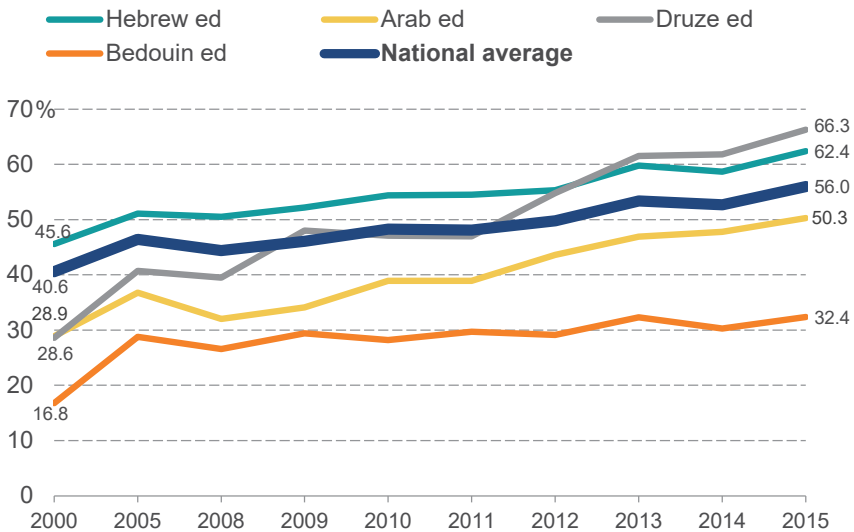
Source: Nachum Blass, Taub Center | Data: Ministry of Education, *Facts and Figures 2015*

¹³ It should be emphasized that these are reliable data. The Ministry of Education strives to accurately report its pupil numbers and the number of pupils who take the bagrut exams, as these figures are closely connected with school tuition budgeting.

¹⁴ Clearly, we cannot ignore the fact that, by 2000, the Hebrew education sector had already reached a very high level with little room for real improvement.

Bagrut certification rate. The percentage of those with a bagrut certificate out of those who take the exams is an important criterion, but an even more important one is the percentage of those with a bagrut certificate within the relevant age cohort (Figure 9). The data show that here as well, the gaps have narrowed considerably. The percentage of bagrut-qualified Druze pupils is higher than that of pupils from Hebrew education, while the disparity between pupils from Hebrew and Arab education declined from 17 percent in 2000 to 12 percent in 2015.¹⁵

Figure 9. Percentage of those earning a bagrut certificate within the age cohort



Source: Nachum Blass, Taub Center | Data: Ministry of Education, *Facts and Figures 2015*

Quality of the bagrut certificate.¹⁶ For reasons not made public, in 2011, the Ministry of Education stopped publishing bagrut exam data in a way that would allow certificate quality comparison by sector. However, ministry research data allow us to ascertain the percentage of pupils who take the exams and who are qualify for the bagrut certificate by sector and gender, as

¹⁵ Not including East Jerusalem Arabs.

¹⁶ The figures noted in this part of the study are based on Ministry of Education research data, and on calculations carried out by Taub Center researcher Hadas Fuchs.

well as by average scores in the various subjects.¹⁷ The following comparison refers to the percentage of those who pass the bagrut exams (and thereby qualify for a certificate) out of all those who take them, and their scores. These comparison parameters offset the problem raised by the size of the populations.¹⁸

The data presented in Table 4 indicate that between 2005 and 2014 there was a major decline in the total number of Hebrew system pupils who took the math exam (and the exams in other subjects). The reason for this is primarily demographic — smaller graduation year cohorts and relative growth in the Haredi share of the Jewish pupil population. Within the Arab education sector, by contrast, the number of those taking the bagrut exams rose by 43 percent.

Table 4. Change in the number of those taking the mathematics bagrut exam

	< 3 units	3 units	4 units	5 units	Total
Hebrew ed					
2005	4,989	20,847	15,099	9,501	50,436
2015	2,594	23,637	12,588	7,454	46,273
Difference	-2,395	+2,790	-2,511	-2,047	-4,163
Arab ed					
2005	1,655	3,863	2,653	1,816	9,987
2015	1,846	7,926	3,179	1,312	14,263
Difference	+191	+4,063	+526	-504	+4,276

Source: Ministry of Education (2016)

17 The comparison focuses on the Hebrew (secular) state education stream, and on Arab and Druze education. Data on state-religious education are very similar to those of the Hebrew state education stream — an interesting phenomenon in and of itself, given the weaker socioeconomic background of pupils in state-religious education. Data on the Haredi education stream and on East Jerusalem Arab education were not included in the sample and are all but irrelevant due to these groups' low rates of participation in the bagrut exams, an ideologically-driven situation. Within the Arab education system, the Bedouin are a separate and unique group; only recently have efforts been moving their scores towards those of the general population. The Circassian population is not relevant due to its small number of pupils.

18 For example, the fact that the number of Druze pupils is much smaller than the number of pupils in Hebrew state education, and that any relatively small change in the number of those with a bagrut certificate appears as a large change in the percentage of the total population, is not relevant, in the present context, to the issue of percentage of the total population.

A review of the distribution of math bagrut exam takers by number of study units indicates that, in the Hebrew education stream, there was a large decrease (partly explained by an overall drop in the number of pupils) in the number of those taking the four- and five-unit bagrut exams, and an increase in the number of those taking the three-unit exam. In their present form, the data do not allow us to say whether the rise in the percentage of those taking the three-unit exam is due to pupils who previously studied math at a higher level, or to pupils who previously studied at a lower level. By contrast, the total number of those taking the exam in the Arab sector rose greatly. The main area of growth — more than 100 percent — was among those taking three units of math. There was also a 2 percent rise in the number of those taking the four-unit math exam, and a 3 percent drop in the number of those taking five units of math.

A comparison of the Hebrew state education and Arab and Druze education streams indicates a slight decline in the percentage of those who pass the five-unit math bagrut exam in the Hebrew state stream (Table 5).¹⁹ In Arab state education, there was a steep decline — from 15 percent to just 7 percent. Only the Druze stream displayed a small increase — from 11 to 12 percent. During this period a similar trend was observed with regard to the four-unit math bagrut exam, and a steep rise in the number of those taking the three-unit exam.

The drop in the percentage of those taking the math exam at the higher levels is indeed a negative and worrisome phenomenon, but the rise in the number of those taking the test at the three-unit level in the Arab education sector may actually point to a positive development: the addition of weaker populations to the ranks of those with bagrut certification. Also of note is the fact that the average scores of the Hebrew, Arab and Druze test-takers are very similar.²⁰

19 In the state-religious stream, it dropped from 17 percent to 13 percent. This data point was omitted from the table on the assumption that a comparison with state education only is more relevant.

20 The population groups' average achievement standard deviations are very similar as well (in the vicinity of 12 points). This weakens the argument that Arab pupils' achievements are attributable, to some degree, to cheating or to strategic decisions by the schools regarding who takes the exams and at what level.

Table 5. Share of bagrut qualifiers and average score in math
By sector, out of all grade 12 pupils

	Hebrew education		Arab education		Druze education	
	% qualified	Average score	% qualified	Average score	% qualified	Average score
5 units						
2005	17%	88.20	15%	89.07	11%	85.16
2010	17%	84.42	9%	85.61	11%	81.62
2014	16%	84.20	7%	88.54	12%	80.62
4 units						
2005	27%	84.40	2%	81.29	24%	78.44
2010	25%	82.73	16%	84.11	22%	80.24
2014	26%	81.44	18%	80.48	21%	77.65
3 units						
2005	38%	81.62	26%	79.98	32%	76.00
2010	39%	80.5	25%	76.30	33%	70.84
2014	48%	82.92	36%	79.18	49%	75.61

Source: Ministry of Education (2016)

The largest gap between the Hebrew and Arab sectors is in English as a second language (Table 6). Although achievements in this subject have improved slightly among Arab system pupils and substantially among the Druze, these groups' English pass rates are still much lower than the rate in Hebrew schools. However, the average scores of those who pass the exam are similar.²¹

²¹ It should be noted that there is also a 10 percent difference in the percentage of those who pass the five-unit English bagrut exam between the Hebrew state and state religious sectors.

Table 6. Share of bagrut qualifiers and average score in English at the five-unit level

	Hebrew education		Arab education		Druze education	
	% qualified	Average score	% qualified	Average score	% qualified	Average score
2005	50%	85.58	10%	86.72	10%	82.01
2010	52%	85.93	9%	89.20	14%	83.11
2014	58%	87.98	14%	91.28	25%	87.66

Source: Ministry of Education (2016)

When we look at scores in the science and technology subjects (Figure 10), we find data that contradict some common “truths” regarding bagrut certificate quality in general, and gaps between Hebrew and Arab education pupils in particular.

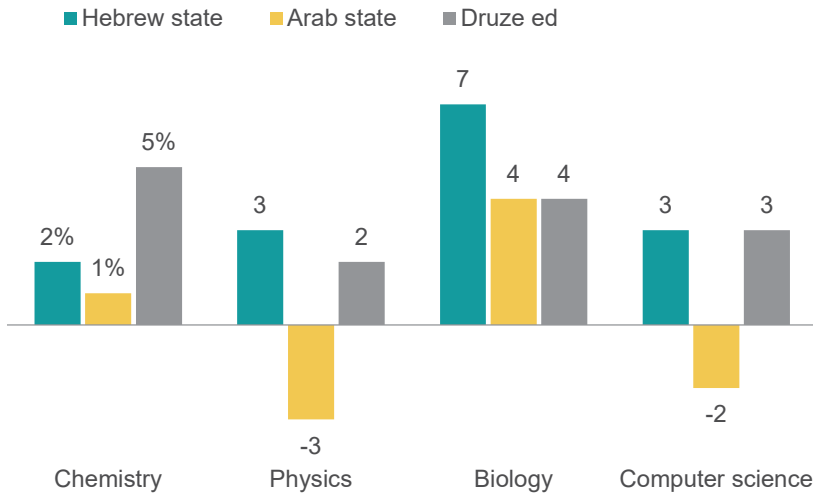
The first noteworthy fact is that, in the Hebrew state sector, the percentages of those with a bagrut certificate that includes science at the five-unit level have risen in all subjects, to a striking degree (see Appendix Table 5).²²

In the Arab education sector, the picture is more complex. In chemistry and biology, the exam pass rates have risen, and have even surpassed those in the Hebrew sector. By contrast, in physics and computer science, the pass rates have dropped and the scores have been lower than those in the Hebrew sector.

Of particular interest is how the situation in the Druze sector has developed. The percentage of Druze pupils who pass the bagrut science exams at the five-unit level rose throughout the period in all science studies, and constituted the highest pass rate of the three sectors during nearly the entire period – with, however, lower average scores than the other two sectors.

22 The state religious sector has also displayed an increase, though a more moderate one.

Figure 10. Change (in percentage points) in the share of pupils who passed the bagrut exams, 2015 versus 2005



Source: Nachum Blass, Taub Center | Data: CBS, Statistical Abstract of Israel 2016, Table 8.29

A possible explanation for the Arab and Druze sector's higher-than-expected results in the sciences has to do with the great difference between the schools in the variety of subjects they offer and their level of teaching. On the whole, Arab schools offer a more limited array of science subjects (Ayalon 2000, 2010; Ayalon, 2006). In schools where the selection is limited, pupils are "forced" to choose from among a small number of subjects, but are then able to devote more attention to these subjects and achieve higher scores in them. Another, more plausible, explanation, is that parents and pupils in the Arab education system are aware of the need to study subjects that enable them to enter career paths that are open to them – the most notable of these being pharmacy studies and medicine.

Central Bureau of Statistics data also indicate that pass rates among those who take the bagrut in various subjects at the higher study levels (four units and above) are very similar between Hebrew and Arab system pupils, and are very high in all subjects (Table 7).²³

²³ Within the Arab Israeli sector, however, the pass rates of Druze and Christians are higher than those of Muslims.

Table 7. Percentage of bagrut qualifiers at the four-unit or higher level in selected subjects

By religious affiliation, 2015

	Jews	Muslims	Christians	Druze
English	93%	90%	89%	93%
Social sciences	95%	64%	74%	82%
Mathematics	98%	97%	99%	98%
Physics	99%	99%	100%	98%
Chemistry	99%	96%	98%	98%
Biology	97%	82%	83%	93%
Computers	97%	98%	99%	99%
Electronics	94%	95%	99%	91%

Source: CBS, Statistical Abstract of Israel 2016 | Calculations: Nachum Blass, Taub Center

Additional support for these data is obtained through an analysis of the data in the *The Education Picture for Post-Primary Schools*. Out of the twenty localities with the highest percentage of high achievers, eight are Arab Israeli or Druze; of the top ten localities in terms of percentages of those taking math at the four- or five-unit levels — four are Arab Israeli or Druze (Appendix Table 6).²⁴

Up to now (with a few exceptions), comparisons have been drawn between the total Hebrew pupil population and the total Arab pupil population. Now we will look at the data with attention to pupil background information. Figures 11a and 11b show the bagrut certification rates, eight years later, of those who graduated in the 2002 and 2007 school years.

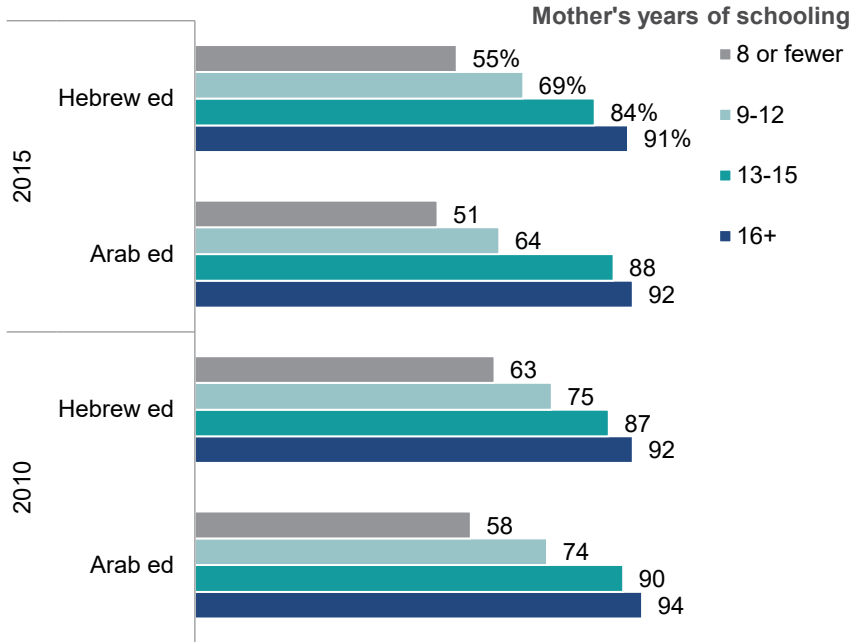
The data in Figure 11a, which refer to the final percentage of those with a bagrut certificate within eight years of completing high school, indicate some regression during between 2010 and 2015, both in the Hebrew sector (except for those whose mothers had between 9 and 12 years of schooling) and in the Arab sector. It is important to note that, while among pupils whose mothers have over 13 years of schooling, Arab pupils surpass Hebrew system pupils, among pupils whose mothers have lower educational levels pupils in the Hebrew system have superior outcomes (Appendix Table 7).²⁵

²⁴ A high achiever is defined as someone who takes 30 bagrut exam units and earns an average score of 90, or one who takes 25 bagrut exam units with an average score of 95.

²⁵ The CBS Statistical Abstract does not provide data on father's education level.

Figure 11a. Percentage of those qualifying for bagrut certification eight years after completing high school

By sector and mother's education level

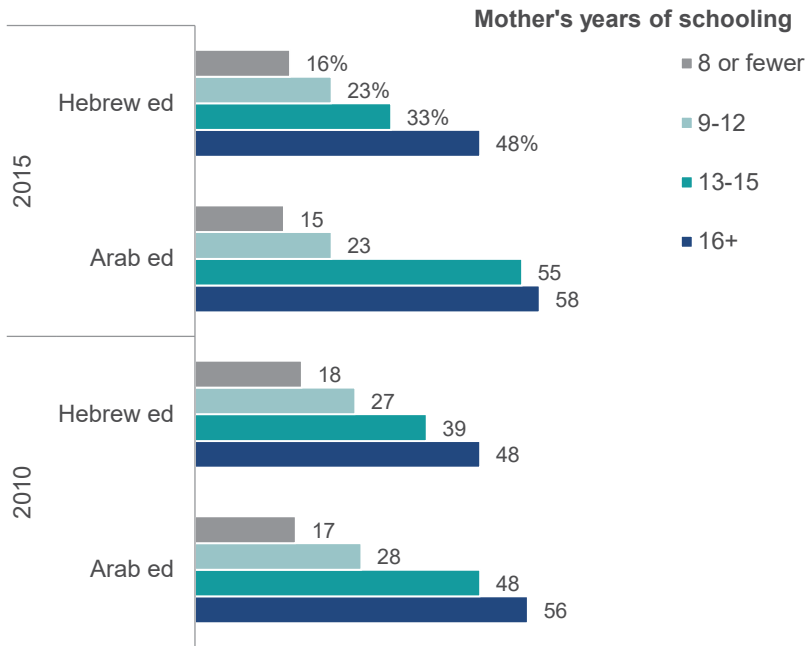


Source: Nachum Blass, Taub Center | Data: CBS, *Statistical Abstract of Israel*, 2011, 2016

Figure 11b refers to the percentage of those who failed the bagrut exams between 2002 and 2007 but who, eight years later, had completed their studies with a bagrut certificate. Within this group, the Hebrew and Arab Israeli sectors show very similar eligibility rates for those whose mothers had up to 12 years of schooling; Arab Israelis whose mothers had over 13 years of schooling had higher rates.

Figure 11b. Percentage of those who failed the bagrut exams and completed their studies within eight years

By sector and maternal education level



Source: Nachum Blass, Taub Center | Data: CBS, *Statistical Abstract of Israel*, 2011, 2016

Two recent studies make it possible to take another look at the bagrut exam performance of pupils in the Arab education sector, with attention to background data of various kinds. One of these studies (Maagan, 2016) examined the achievements and educational careers for ten years of pupils who took the Meitzav exams in grade 8 in 2002–2003. The other study (Maagan, 2017) followed up on the educational trajectories of first graders who started school in 1996.

We will look first at the 2016 study. Students in grade 8 took the Meitzav exams in the 2003 school year in four subjects: mathematics, science, English, and reading. For purposes of the study, the data for each pupil who took the Meitzav exams were cross-referenced with data on his/her further studies in higher educational frameworks that award academic degrees.

Table 8 clearly shows the advantage enjoyed by Hebrew sector pupils over pupils in the Arab sector in terms of parent education background; one also sees the expected score disparity between the two sectors. This disparity ranges from 13.7 points in English to 5.6 points in science. The study also shows that, when pupils from Hebrew education (we refer only to pupils in the state education stream) and Arab education system pupils are divided into achievement quartiles, the Hebrew pupils' average score in each quartile surpasses that of the Arab pupils (Maagan, 2016, p. 7). The obvious conclusion is that the Arab pupils' starting point (the grade 8 Meitzav scores) is lower than that of the Hebrew pupils.

Table 8. Parent education level of pupils in grade 8 who took the Meitzav exams

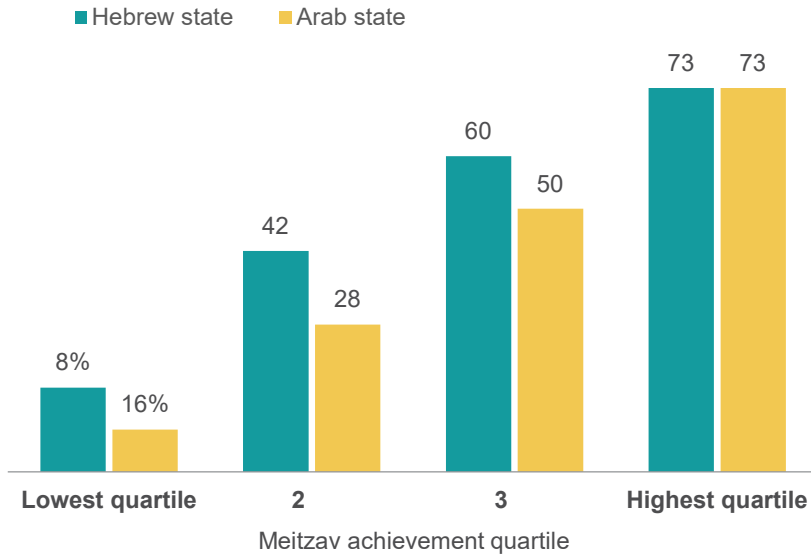
By sector and score

	Jewish pupils		Arab pupils	
	Average	Standard deviation	Average	Standard deviation
Mothers' years of schooling	13.31	2.89	9.65	2.98
Fathers' years of schooling	13.23	3.17	10.28	3.28
Math score	54.27	24.00	43.69	23.12
Science score	65.54	8.79	59.96	20.95
English score	79.77	20.63	66.05	22.77
Reading score	64.95	19.50	55.32	23.30

Source: David Maagan (2016)

Despite the fact that Arab pupils start from a much lower point than do Jewish pupils (as reflected in their parents' education level and in their grade 8 Meitzav scores), when we look at average bagrut certificate scores and at the percentages of those with a quality bagrut certificate (one that allows its holder to pursue higher education), Arab Israeli pupils' achievements are nearly identical to those of their Jewish peers. However, the most meaningful finding is that rates of entry into academic institutions are equal for Jews and Arab Israelis who were in the highest Meitzav achievement quartile — though serious disparities exist within all of the other achievement quartiles (Figure 12).

Figure 12. Higher education entry rates, by Meitzav average achievement quartile (grade 8)

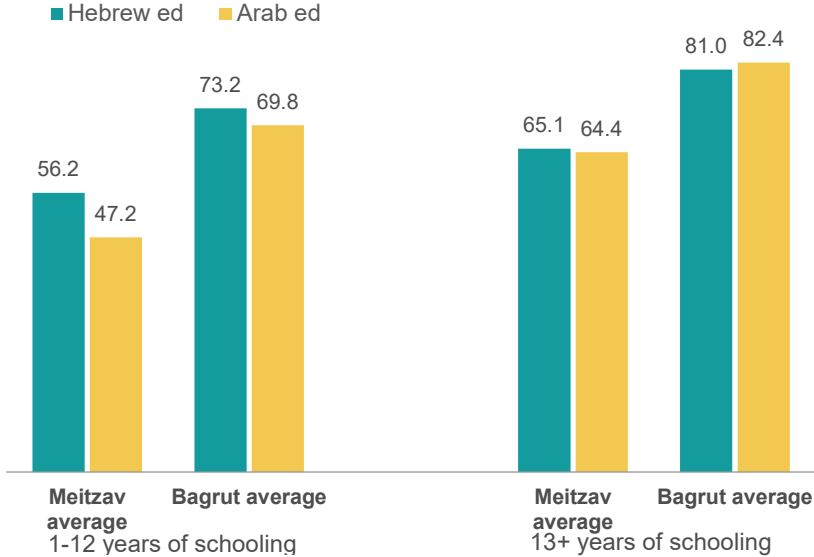


Source: David Maagan (2016)

In the other study (Maagan, 2017), which looks at the educational trajectory of those who entered first grade in 1996, the background data are reflected in the parental education level variable (mothers’ education level was used). A review of the pupils’ Meitzav performance in grade 8 and of their bagrut exam score averages, with mothers’ education taken into account, indicates that the average Meitzav score of Arab Israeli pupils whose mothers’ education level is low, is itself significantly lower (by 9 points) than that of their Jewish peers (Figure 13). Their average bagrut exam score is also lower (3.4 points).²⁶ By contrast, Arab Israeli pupils whose mothers had more than 13 years of schooling showed almost no disparity relative to Jewish pupils in their Meitzav and bagrut exam scores: the disparity amounts to one point, give or take — favoring Jewish pupils on the Meitzav exams and Arab Israelis on the bagrut exams.

²⁶ The highest Meitzav achievement quartile also displays major attainment gaps between Jews and Arab Israelis on the psychometric exam.

Figure 13. Meitzav and bagrut exam scores of pupils who entered grade 1 in 1996

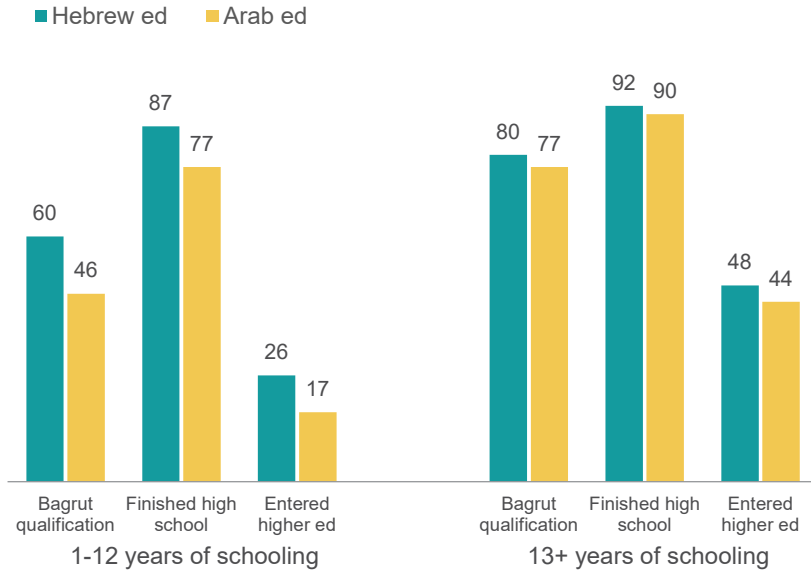


Note: It is important to note that the Meitzav and bagrut exam score scales are not identical and the inter-sector differences for each test should, therefore, be examined separately.

Source: David Maagan (2016)

When we look at the entire academic career trajectory, we find that the achievements of Arab Israeli high school graduates whose mothers had up to 12 years of schooling are inferior to those of Jews in terms of rates of high school completion, taking the bagrut exams, earning the bagrut certificate, taking the psychometric exam, and undertaking higher education (Figure 14). However, the picture changes substantially when we look at pupils whose mothers had 13 years of schooling or more. Here, Arab Israeli and Jewish pupils are more or less equal in terms of the percentage taking the bagrut and psychometric exams.

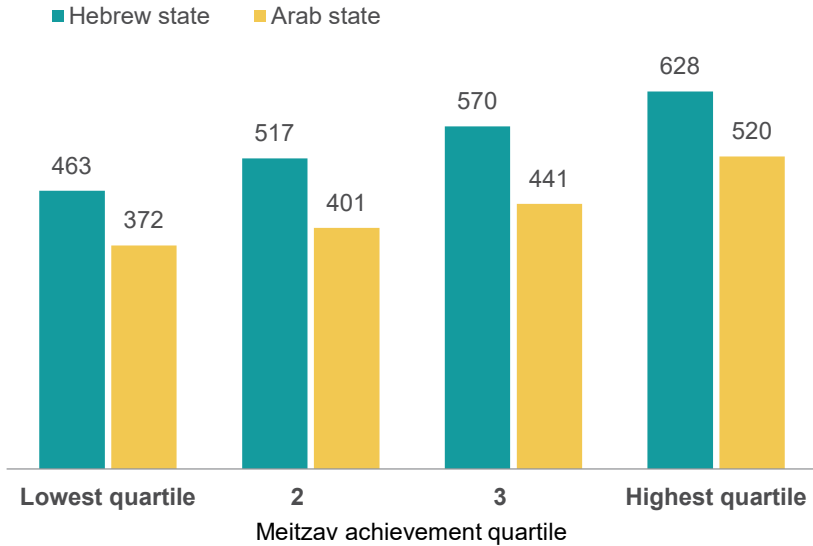
Figure 14. Academic trajectory of pupils who entered grade 1 in 1996, by mothers' education level



Source: David Maagan (2016)

The picture is also drastically different when we examine psychometric exam scores (Figure 15). Here, even those Arab Israeli pupils whose Meitzav exam achievements placed them in the highest quartile earned a psychometric score 120 points lower than that of their Jewish peers.

Figure 15. Average psychometric score, by average Meitzav achievement quartile (Grade 8)²⁷



Source: David Maagan (2016)

Jewish and Arab Israeli pupil achievements on international exams

This section will discuss pupil achievements on the international exams, looking separately at sector and socioeconomic level.²⁸ Israel participates in three international exams, each administered to a different age group: PIRLS (Progress in International Reading Literacy Study) – primary school; TIMSS (Trends in International Mathematics and Science Study) – middle school; and, PISA (Programme for International student Assessment) – high school. On each of these tests, Arab Israeli pupils perform less well than their Jewish counterparts, even when taking into account the Nurture Index level of the schools they attend.

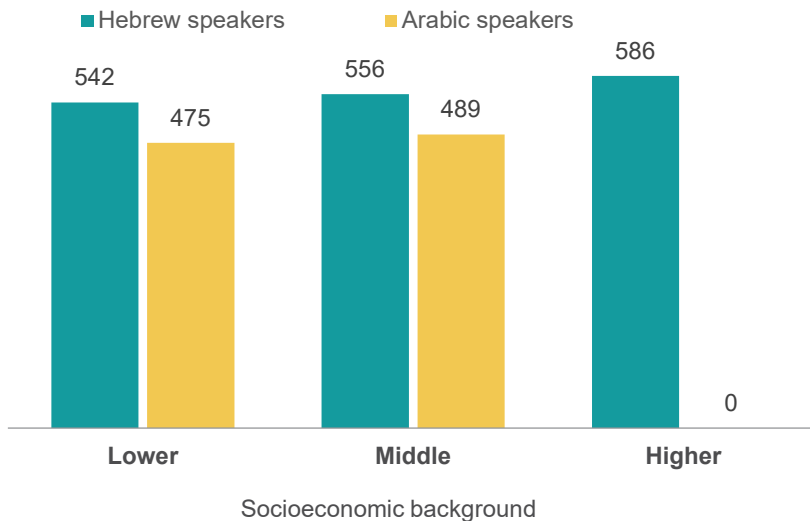
²⁷ The National Institute for Testing and Evaluation does not publish data on the Arab Israeli sector broken down into the Bedouin, Druze and Arab sub-sectors, making it hard to study academic achievement differences between them.

²⁸ It is important to remember that the socioeconomic variables differ from exam to exam and are also different from the Nurture Index.

PIRLS 2011

Figure 16 presents the PIRLS reading achievements broken down by socioeconomic group within the two language sectors (there are no Arabic speakers in the high socioeconomic group). In both sectors, the higher the socioeconomic level, the higher the score; the relationship between socioeconomic background and achievement is maintained in each language sector. As noted previously, some of the achievement differences by Nurture Index group are explained by the rough division into only three groupings, and by the relatively higher weight of socioeconomically weaker Arab Israelis in each of the three socioeconomic groups.

Figure 16. Pupil achievements on the PIRLS 2011 exams
By exam language and socioeconomic background



Source: Nachum Blass, Taub Center | Data: RAMA

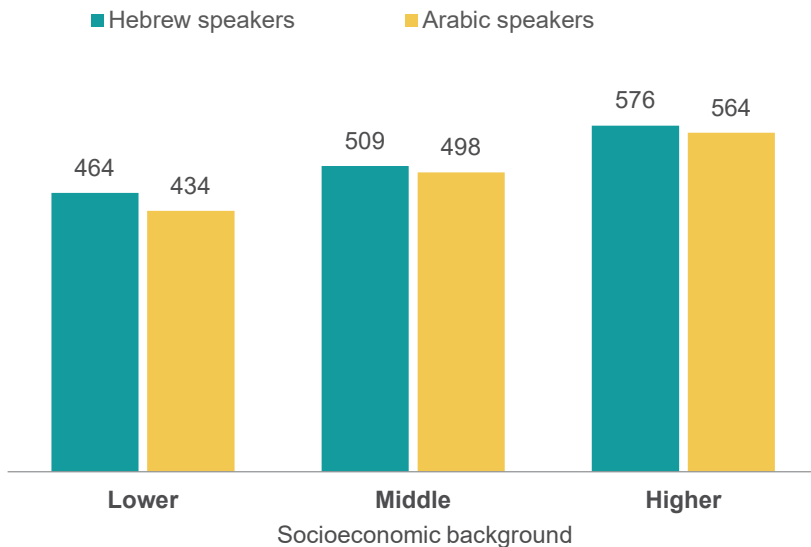
TIMSS 2015

On this exam as well, the higher the socioeconomic level of the school and the pupil, the higher the score, and the relationship between socioeconomic level and achievement is preserved in each language sector separately.²⁹ However, a comparison between pupils of the same socioeconomic standing

²⁹ The effect of the rough division into socioeconomic groupings applies, of course, both here and in our discussion of the PISA exams.

reveals that the gap between the average math score of Hebrew speakers and that of their Arabic-speaking peers is relatively small. The disparity in math achievements between all Jewish and all Arab Israeli pupils is 70 points, the gap between pupils of high socioeconomic standing in the two sectors is only 12 points, between pupils of middle socioeconomic standing — 11 points, and between pupils of low socioeconomic standing — 30 points (Figure 17). Thus, at least part of the relatively large math achievement disparity between the two sectors is explained by the pupils' socioeconomic status.³⁰

Figure 17. Pupil achievement on the TIMSS 2015 exams
By exam language and socioeconomic background



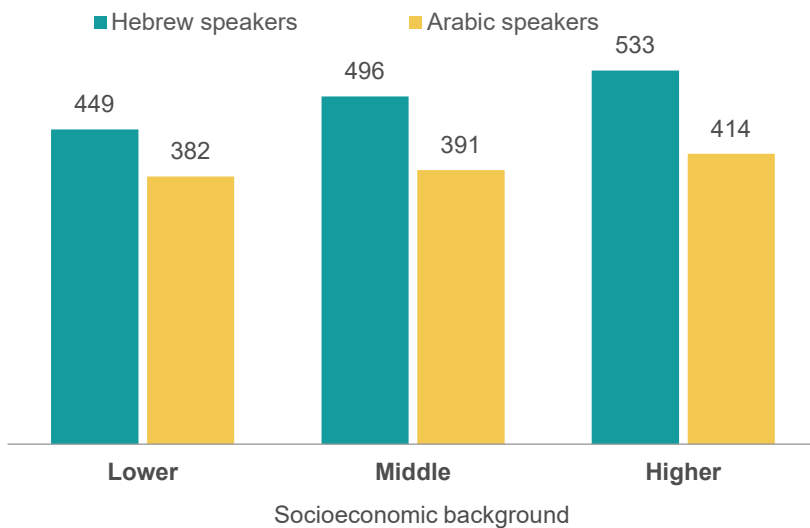
Source: Nachum Blass, Taub Center | Data: RAMA

30 The relative percentages of pupils in the three socioeconomic groupings differ greatly in the two language sectors. In the Hebrew speaking sector, a sixth (16 percent) of pupils belong to the low socioeconomic grouping, while nearly half (46 percent) belong to the high socioeconomic grouping). In the Arabic speaking sector, by contrast, two-thirds (65 percent) of pupils belong to the low socioeconomic grouping, while only 6 percent belong to the high grouping. These data are estimates calculated on the basis of the TIMSS sample.

PISA 2015

Here the picture more closely resembles that of PIRLS than of TIMSS (Figure 18). The large disparity between the sectors, amounting to 104 points (more than a full standard deviation), also persists when we look at each socioeconomic grouping separately. Although within the low socioeconomic grouping the gap between the two language sectors narrows from 104 to 67 points, the gaps within the middle groups are similar to the general language-sector gap, while the disparities within the high socioeconomic group are even larger than those between the language sectors in the population as a whole. The gap to the advantage of Hebrew speakers is 105 points for pupils of middle socioeconomic standing, and 119 points for pupils of high standing.

Figure 18. Pupil achievement on the PISA 2015 exams
By exam language and socioeconomic background



Source: Nachum Blass, Taub Center | Data: RAMA

Table 9 also points specifically to a trend toward wider, rather than narrower, gaps between Jews and Arab Israelis. Although both groups' achievements improved, the Hebrew-speaking sector's improvement was greater.

Table 9. Average score on PISA math tests since 2006
By socioeconomic level

	2006			2009			2012			2015		
	Low	Middle	High	Low	Middle	High	Low	Middle	High	Low	Middle	High
Hebrew speaker	416	462	500	421	473	515	440	486	536	449	496	533
Arabic speaker	361	373	406	356	374	400	373	391	430	382	391	414
Difference	55	89	94	65	99	115	67	95	106	67	105	119

Source: David Maagan (2016) | Calculations: Nachum Blass, Taub Center

Conclusion and discussion

This work reviewed data from recent years that provide an overall picture of the Arab education system relative to the Hebrew education system; it also compared different socioeconomic groupings within the two sectors. The data paint a mostly positive picture of improvement in the relative status of pupils in the Arab Israeli sector (especially the Druze sub-sector), with regard to both the inputs channeled to them, and the anticipated outputs. The data are particularly encouraging when socioeconomic background is accounted for in the comparisons. Socioeconomic background is assessed here in terms of mothers' education level, the socioeconomic cluster of the pupils' locality of residence, and/or the Nurture Index level of the schools the pupils attend.

The variables examined in this chapter can be divided into two main groups: those related to diligence and motivation, and those related to achievements and skills. In the first group we can place dropout rates, choice of subjects for high-level study in high school, bagrut exam participation, psychometric exam participation, and the pursuit of higher education. The second group includes Meitzav scores, bagrut scores and pass rates, scores on the international and psychometric exams, higher education admissions rates, and completion of academic studies.

An examination of the variables in the first group (diligence and motivation) shows that the Arab Israeli pupils' achievements — especially when their socioeconomic status is taken into account — are generally similar to, and sometimes surpass, those of their Jewish peers.

By contrast, the variables of the second group (achievements and skills), reveal a more complex picture. Overall, on internal school exams, where the results are highly important to pupils, teachers or both, pupils in Arab schools perform similarly to those in Hebrew schools (again, only after controlling for the effect of the socioeconomic variable). However, on external exams where there are no real and immediate implications for the future of pupils or teachers, Arab system pupils' achievements are generally, and greatly, inferior to those of their Hebrew system peers (TIMSS is an outlier).

The obvious question is: Why, for some of the variables reflecting academic and educational achievement, are Arab Israeli pupils' outcomes similar, or sometimes superior, to those of their Jewish counterparts, while for other variables the achievements of Arab Israeli pupils — even those of high socioeconomic standing — are much lower? A few possible answers are presented here:

The intuitive explanation that is routinely given by some is that, on the exams administered by the Ministry of Education, whose results have ramifications for both teachers and pupils, there is more widespread cheating in Arab schools than in Hebrew schools and so the scores do not reflect the pupils' actual abilities. This explanation has several flaws. According to Ministry of Education data from 2017, the rate of invalidated exams in the education system as a whole between 2012 and 2016 was less than 1 percent. The rates of copying or teacher-pupil assistance during exams, by sector, range from a maximum of 2.12 percent in the Bedouin sector in 2012, to a minimum of 0.21 percent in the Hebrew sector in 2014. In the Arab sector, the rate of invalidated exams ranges from 1.76 to 1.36 percent, and in the Druze sector from 1.16 to 0.85 percent. Even if cheating is greatly underreported, since not all pupils who copy or teachers who help their pupils answer questions correctly are caught, it is still not reasonable to attribute so great an impact to the phenomenon.

Even if copying on tests does occur on a large scale, school enrollment and test-taking rates are much harder to falsify. Thus, if any kind of relationship exists between enrollment rates/motivation to study (variables reflected in high-level subject study and participation in the bagrut exams) and success on exams (both in terms of the pass rate and in terms of scores), then this would have to manifest in both sectors to the same degree. The fact that the two sectors' scores and standard deviations are so similar also indicates that cheating on exams cannot have that great an impact; the standard deviations would have to be lower, and the scores higher, if cheating were really widespread.

A second possible explanation relates, as noted previously, to the way in which the data are presented. Reports by RAMA (National Authority for Measurement and Evaluation in Education) divide test-takers by sector and Nurture Index level into three “rough” groupings (low, middle and high socioeconomic standing). It is reasonable to assume that, in the Arab Israeli low socioeconomic group, the percentage of pupils from the weakest deciles is much higher than among Jews, meaning that the average score of the “weaker” Arab Israeli pupils is lower than that of the “weaker” Jewish pupils.

A third possible explanation has to do with differences between the various tests. On the one hand, there are the bagrut, Meitzav, and TIMSS exams which, ostensibly, test knowledge learned in school; on the other hand are the psychometric exams, and the PIRLS and PISA exams, which are oriented toward testing intelligence and general skills, and which are more prone to cultural influence.

A fourth possible explanation is that, because Arab Israeli parents are generally first-generation academic degree holders, the socioeconomic data as examined in the current context (mainly that pertaining to mothers’ education level) do not fully reflect the cultural capital enjoyed by Jewish pupils, which is a very important factor in academic achievement.

Whatever the actual explanation may be, the data show that the large achievement disparity between the Jewish pupil population as a whole and the Arab Israeli pupil population as a whole can be explained, to a large degree, by the two groups’ socioeconomic data. If we wish to narrow the gap, we should concentrate, first and foremost, on the general socioeconomic level keeping in mind the responsibility of the education system to continue to take action to narrow educational gaps.

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Appendix

Appendix Table 1. Seniority and education of teachers

By sector and teaching level

	2000		2010		2015		Change ratio: 2000 to 2015		
	Jews	Arabs	Jews	Arabs	Jews	Arabs	Jews	Arabs	
Pre-primary									
Academic paygrade	35.4	20.4	71.7	75.8	91.0	95.0	2.6	4.7	
Holds MA or higher	4.7	0.7	10.8	3.3	15.2	12.7	3.2	18.1	
Average seniority	15.9	10.5	17.6	12.8	14.6	15.8	0.9	1.5	
Primary									
Academic paygrade	50.2	37.9	75.6	81.7	86.7	92.0	1.7	2.4	
Holds MA or higher	10.9	3.4	19.0	10.4	26.0	18.4	2.4	5.4	
Average seniority	14.3	12.5	15.5	13.0	15.6	14.2	1.1	1.1	
Post-primary									
Academic paygrade	76.0	73.2	83.7	86.3	91.9	94.2	1.2	1.3	
Holds MA or higher	25.4	15.5	38.7	26.9	42.7	28.9	1.7	1.9	
Average seniority	18.0	12.8	19.2	13.9	18.2	13.7	1.0	1.1	

Source: CBS, *Statistical Abstract of Israel* | Calculations: Nachum Blass, Taub Center

Appendix Table 2. Enrollment rates (per 1,000), ages 2-5

Age	2000		2015		Absolute difference		Relative difference		Change ratio: 2000-2015	
	Jews	Arabs	Jews	Arabs	2000	2015	2000	2015	Jews	Arabs
2	397	32	563	235	365	328	0.08	0.42	1.42	7.34
3	895	541	1,061	843	354	218	0.60	0.79	1.19	1.56
4	893	592	1,024	929	301	95	0.66	0.91	1.15	1.57
5	994	932	989	974	62	15	0.94	0.98	0.99	1.05

Source: CBS, *Statistical Abstract of Israel* 2001, 2016 | Calculations: Nachum Blass, Taub Center

Appendix Table 3. Share of high school pupils continuing on to higher education within 8 years of completing high school

By socioeconomic cluster of residential area

	2010		2015	
	Jews	Arab Israelis	Jews	Arab Israelis
Total population	48%	28%	43%	29%
Clusters 1-4*	31%	28%	33%	31%

* Almost all of the Arab Israelis are in clusters 1-4; comparing clusters 5-10 is of little significance

Source: CBS, *Statistical Abstract of Israel 2016*, Table 8.48

Appendix Table 4. Changes in Meitzav exam scores, 2007-2016
Grades 5 and 8

	Hebrew speakers		Arabic speakers	
	Average score	Standard deviation	Average score	Standard deviation
Mathematics, Grade 5				
2007	508	93	445	96
2016	566	74	524	77
Difference	58	-19	79	-19
Mathematics, Grade 8				
2007	512	102	471	89
2016	549	1010	496	103
Difference	37	-1	25	14
English, Grade 5				
2007	499	100	471	106
2016	544	92	538	88
Difference	45	-8	67	-18
English, Grade 8				
2007	519	99	452	86
2016	537	86	473	86
Difference	18	-13	21	0
Science/Technology, Grade 8				
2007	513	94	466	107
2016	573	105	543	106
Difference	60	11	77	-1

Source: RAMA 2016 | Calculations: Nachum Blass, Taub Center

Appendix Table 5. Share of bagrut qualifiers and average score in science at the 5-unit level

By sector

	Hebrew education		Arab education		Druze education	
	Qualified	Average	Qualified	Average	Qualified	Average
Chemistry						
2005	8%	86.95	14%	84.73	14%	79.81
2010	9%	85.11	17%	83.06	16%	82.47
2014	10%	84.24	15%	81.42	19%	76.87
Physics						
2005	10%	84.49	12%	89.83	12%	81.00
2010	11%	84.09	9%	84.15	12%	79.47
2014	13%	83.28	9%	87.07	14%	78.97
Biology						
2005	12%	84.54	17%	79.6	19%	73.93
2010	15%	83.95	20%	78.23	23%	76.58
2014	19%	83.61	21%	78.96	23%	76.89
Computer science						
2005	8%	88.55	5%	90.16	3%	86.27
2010	10%	90.13	4%	90.88	1%	89.79
2014	11%	90.35	3%	90.36	6%	87.37

Source: Ministry of Education, The Education Picture, 2016 | Calculations: Nachum Blass, Taub Center

Appendix Table 6. Locales that meet the criteria for excellence on Bagrut exams

Locale	Excellence criteria				
	Share of excellent pupils	Share of pupils taking 4-5 math units	Share of pupils taking 4-5 English units	Bagrut qualifiers	Drop-out rate
Arab locales					
l'billin	+				
Beit Jann				+	+
Julis		+			
Jish	+				
Daburiyya	+				
Deir al-Asad			+	+	+
Hurfeish				+	+
Yarka	+	+			
Kaukab Abu al-Hija	+			+	+
Kafr Yasif	+	+			
Mi'ilya	+	+			
Sakhnin	+				
Ghajar				+	+
Jewish locales					
Efrata	+	+			
Binyamina		+			
Givat Brener			+		
Givat Shmuel	+	+	+	+	+
Gedera	+				
Givatayim		+	+	+	+
Gush Etzion	+		+		
Drom HaSharon	+	+	+		
Ha'Arava			+	+	+

Locale	Excellence criteria				
	Share of excellent pupils	Share of pupils taking 4-5 math units	Share of pupils taking 4-5 English units	Bagrut qualifiers	Drop-out rate
Jewish locales					
Herzliya		+			
Yavneh				+	+
Lev HaSharon				+	+
Modi'in-Maccabim-Re'ut	+	+	+	+	+
Mazkeret Batya		+	+	+	+
Omer			+		
Kedumim	+			+	+
Kiryat Ono	+	+	+		
Kiryat Ekron	+	+	+	+	+
Rekhasim			+		
Ramat Gan	+	+	+	+	+
Ramat HaSharon	+	+		+	+
Ramat HaNegev		+	+	+	+
Ra'anana	+	+			
Shoham		+	+	+	+
Shafir				+	+
Tel Mond			+	+	+

Note: About 100 out of 250 authorities are Arab Israeli

Source: Ministry of Educaiton, *The Education Picture*, 2016 | Data: Calculations: Nachum Blass, Taub Center

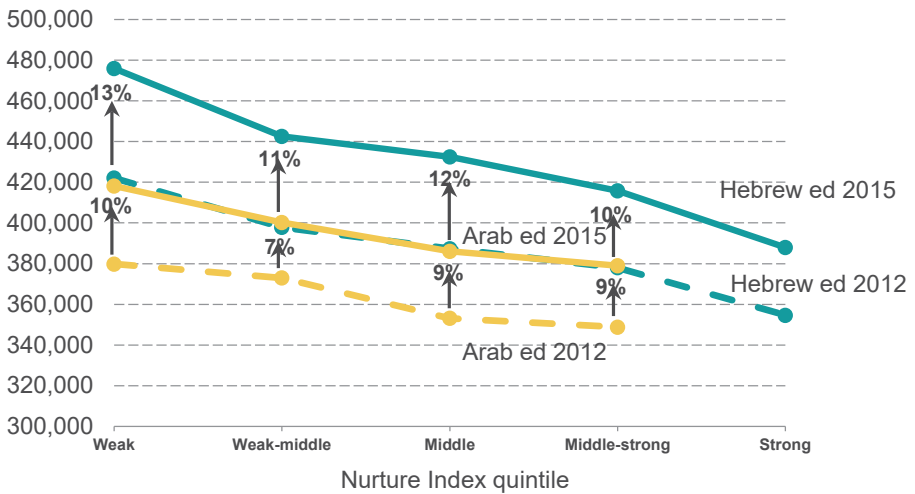
Appendix Table 7. Share of bagrut examinees who completed the bagrut within 8 years of finishing high school and total bagrut qualifiers out of those taking the bagrut exams

	2010		2015	
	Hebrew ed	Arab ed	Hebrew ed	Arab ed
Share of those who complete the bagrut within 8 years (%)				
By mothers' years of schooling				
8 years or fewer years	18	17	16	15
9-12 years	27	28	23	23
13-15 years	39	48	33	55
16+ years	48	56	48	58
Total	29	21	26	21
Total qualifiers after 8 years (%)				
By mothers' years of schooling				
8 years or fewer years	63	58	55	51
9-12 years	75	74	79	64
13-15 years	87	90	84	88
16+ years	92	94	91	92
Total	79	66	75	59

Source: CBS, *Statistical Abstract of Israel* | Calculations: Nachum Blass, Taub Center

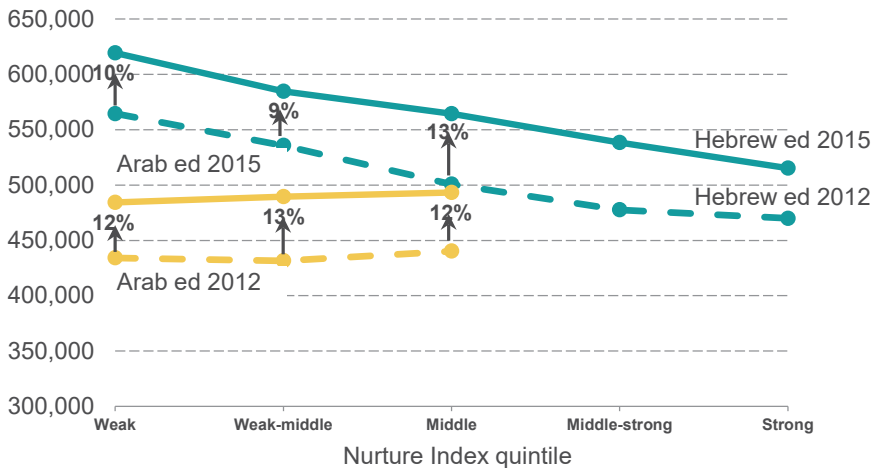
Appendix Figure 1. Average budget per class in primary schools in regular education

By Nurture Index quintile, NIS



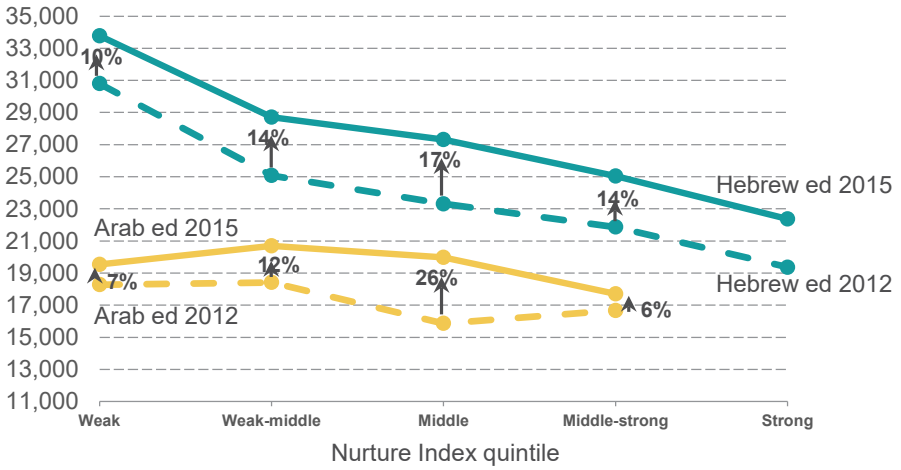
Source: Nachum Blass, Taub Center | Data: Ministry of Education, *Transparency System*

Appendix Figure 2. Costs per class for middle school



Source: Nachum Blass, Taub Center | Data: Ministry of Education, *Transparency System*

Appendix Figure 3. Per pupil costs for high school
By Nurture Index quintile, NIS



Source: Nachum Blass, Taub Center | Data: Ministry of Education, *Transparency System*