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ACHIEVEMENTS AND GAPS:

THE STATUS OF THE ISRAELI EDUCATION SYSTEM

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Achievements and Gaps: The Status of the Israeli Education System

Nachum Blass

Abstract

This study focuses on the achievements of various population groups and the gaps between them in the formal education system (preschool to high school) as reflected in attendance rates, study tracks, the various stages of education and achievement on the Meitzav tests, the bagrut (matriculation) exams and international tests. The analysis relates to the trends in Israel between 2000 and 2018, as well as the achievements of the education system in Israel relative to those in the OECD countries. The main conclusion is that although the education system in Israel has improved according to all the metrics examined, the narrowing of gaps has not been uniform. Thus, in some areas, the gaps have narrowed considerably, while in others, they have hardly changed and in a few there has even been a widening of gaps. Despite the improvement in Israel, its ranking is low relative to other OECD countries and this is seen as an unsatisfactory situation. Furthermore, it is worth noting that the steep upward trend in academic achievement and the narrowing of gaps came to a halt in mid-decade, and since then, the scores on international tests have been stable in the Hebrew education sector and have worsened in the Arab sector.

1 Nachum Blass, Principal Researcher, Taub Center for Social Policy Studies in Israel. My thanks to Avi Weiss, Alex Weinreb, Noam Zussman, and Yoram Harpaz for their comments on this work, and to Laura Schreiber for her assistance in preparing the figures. Responsibility for the final product rests solely with me, of course.

Introduction

Educational achievements are not randomly distributed in the student population. In certain population groups, a large share of the children attain high levels of academic achievement while in others this is true of only a small share. In Israel as well, there are large gaps between population groups, both in inputs (budgets and manpower) and in outputs (academic and educational achievement). In this study, we have made two assumptions: The first is that individuals differ in their characteristics, aspirations, level of effort and achievements and, therefore, differences in academic and educational achievement are expected and even justified. However, inequality between defined social groups according to sector, gender, socioeconomic status or other collective characteristics, which are not under the control of the individual, are unjustified and also deleterious, to both the individual and society. This effect is of particular concern due to the loss of potential skill and talent among those belonging to socioeconomically weaker groups. In the case of Israel, a small and relatively young country, which was founded by and on behalf of Jewish immigrants from all over the world and which includes a large minority of Arabic speakers, inequality also threatens the fabric of society.

The second assumption is that such inequalities in educational inputs and achievements are usually the result of the socioeconomic reality, cultural and environmental conditions, and a unique set of historical circumstances. This inequality is usually exacerbated by the structure of the education system, its methods and the social-educational principles adhered to by society, its leaders and workers.

Inequality between which groups?

In a discussion of inequality in the education system, it is worth defining the groups being compared. In the past, much of the discussion centered on ethnic group, gender, immigration status (years since arrival in Israel), and the residence in Israel's geographic periphery.

Ethnic group (within the Jewish sector): One of the variables that has been the subject of extensive studies over the first thirty years of Israel's statehood, and continues to be perhaps the most studied, is ethnic group. Dozens of studies have looked at the differential achievements of the various ethnic groups (for the most part according to the categories of Oriental Jews (Sephardim)

versus Ashkenazim or Asian-African origin versus European-American origin).[1] Currently, however, and in view of the fact that the vast majority of students in the formal education system are native-born, as are their fathers, and in view of the fact that a large majority of their parents are from "mixed" families, it would appear that the discussion of this variable in the context of academic achievement in formal education does not contribute much (apart from perhaps in the case of the Ethiopian community). [2] In fact, the Central Bureau of Statistics (CBS) no longer reports the achievements of students according to country of origin and recent research in this field has had to study third-generation students (Friedlander & Eisenbach, 2000; Dahan, Mironichev & Dvir, 2002; Dar & Resh, 1996) and children of "mixed" parents" (Yogev & Jamshy, 1984; Cohen et al., 2007; Okun, 2007; Haberfeld & Kristal, 2007).

The education system also attributes far less importance to this variable and, since the 1990s, the country of origin variable is no longer included in the Ministry of Education Nurture Index calculation of the used by the Ministry of Education. The Nurture Index has been used to indicate constraints on academic achievement and as a tool for determining levels of affirmative action for groups determined to be weak.

Our conclusions relating to ethnic origin are with respect to academic achievement only and do not relate to its importance as a social issue, as reflected in public and political discourse.[3]

Gender: Significant gender gaps have existed for years at all levels of the education system and in specific sectors, usually favoring boys. Currently, there is either no difference between boys and girls or the differences favor girls according to almost every important variable in the education system (Ayalon, Blass, Feniger & Shavit, 2019). This is also the case in the Arab sector.

1 These are general concepts that over time have taken on broader meanings than simply geographic place of birth.

2 About 77 percent of the Jewish adult population are native-born and 48 percent are the sons of native-born fathers. For the 5–19-year-old age group, the figures are 96 percent and 82 percent, respectively. Moreover, the parents of a large majority of students with one parent who is not native-born are from "mixed" families (based on the CBS *Statistical Abstract of Israel*, 2019, Table 2.6)

3 Practical examples are the public reactions to television documentary series, recently released movies, and heated discussions in the printed press.

Observed differences are usually concentrated in the choice of study majors in high school and higher education, where boys choose more technological majors relative to girls (ibid). For this reason, we will not deal with gender here.

Years in Israel: Despite the waves of immigration from the former Soviet Union (FSU) and Ethiopia at the end of the 20th century, the variable of years in Israel, which had a major influence on academic and educational gaps during the early years of the State, has diminished in importance. In our estimation, this variable has only temporary importance in view of the rapid absorption of Jewish immigrants from the FSU and the relatively small number of immigrants from Ethiopia, for whom there is also evidence of rapid absorption into Israeli society (Cohen, Haberfeld, & Kristal, 2013; Brand & Fuchs, 2015; Cohen, Lewin-Epstein & Lazarus, 2019).[4]

Geographic region: There are those who claim that this is an important variable, primarily when the discussing student achievements of students in the northern and southern regions relative to other regions, particularly Tel Aviv and the Center. However, it appears that the short distances in Israel do not justify a discussion of the geographic periphery and that the discussion should be framed in socioeconomic terms or in the context of a "social periphery".[5] In 2017, of the 39 schools with a bagrut (matriculation) qualification rate of 100 percent, only 18 were located in the Tel Aviv and Center districts, according to data published by the Ministry of Education.[6]

4 This is not to deny the feelings of discrimination that these populations may express or experience, which have resulted in sometimes violent protests in recent years. These periodic protests indicate that their integration process is far from over. Nonetheless, there is a basis for the hypothesis that it is, in fact, their increasingly rapid integration that is generating a basic awareness of disparities and the motivation for effective protest.

5 A different perspective on place of residence is the type of city in which students live (affluent cities, development towns, kibbutzim, etc.). Here again the most important factor is the city's socioeconomic level rather than its distance from the Center. See for example, Adler, Lewin-Epstein, and Shavit (2003).

6 See *The Educational Picture* at the *Transparency in Education* website of the Ministry of Education.

Supervisory authority:[7] The results of achievement tests in Israel over the years point to differences between students in the State education system and those in the State-religious education system. In recent years, thesedifferences have diminished and therefore it would appear that there is no great benefit to be gained from an examination of this variable.[8]

Overall, the most relevant variables in an analysis of educational achievements are sector (Hebrew versus Arab education or Jews versus Arabs and their various subgroups) and the socioeconomic background of the students and/or the schools (Nurture Index, socioeconomic cluster, and other background variables that appear to be relevant) and it is those variables that will be analyzed below.

What is the analysis based on?

The discussion of gaps in attendance rates and participation in the various study tracks is based primarily on CBS data. The discussion of academic achievement is based on the reports of the Mashov and Meitzav tests (school growth indices), international research reports, and the results of the bagrut exams as published by the Ministry of Education and the CBS. We also make use of past research, and wherever possible, studies conducted prior to 2000).

7 According to the terminology of the Ministry of Education, "supervisory authority" differentiates between the various school systems: Hebrew State education, State-religious education, and Haredi (ultra-Orthodox) education. The Hebrew and Arab education systems are based on the supervisory authority and language of instruction. The majority of students in Hebrew education can be assumed to be Jewish, and the majority of students in the Arab sector can be assumed to be Arab Israelis. Nevertheless, the division by the Central Bureau of Statistics is based on the language of instruction and not the religion or sector of the students.

8 It would have been worthwhile to discuss the Haredi education system, which currently accounts for close to 20 percent of the school population. However only 66 Haredi schools participated in the Meitzav tests held in 2017 and 2018 in Hebrew and mathematics for Grade 5, which is only a partial and unrepresentative sample of this population, and therefore the data was not published (RAMA, 2018). A larger share of Haredi girls participate in bagrut (matriculation) exams and international tests with only a negligible share of Haredi boys participating. Therefore, we cannot compare educational achievement (and all the more so other types of educational achievement) of Haredi students to those of other Jewish and Arab students. Furthermore, we do not discuss the claims that what Haredi students learn in Haredi institutions does not give them the ability to achieve the levels of knowledge and skills required in a secular society.

The Mashov and Meitzav exams:[9] Students in the State primary education system, both Hebrew and Arab, have been tested on national exams almost since the establishment of the State. The first exams were survey exams given to Grade 8 classes. The results pointed to particularly large gaps between students of Asian-African origin and those of European-American origin, between students from different socioeconomic backgrounds, and between Jewish and Arab students. The results of the annual survey of Grade 8 classes were to a large extent in line with those of other large studies carried out at later in the lower grades, one in the Hebrew sector (Minkovitz, David & Bashi, 1982) and the other in the Arab sector (Bashi, Cahan & David, 1981).

At the beginning of the 1990s, it was decided to administer Mashov tests among a representative sample of the Hebrew and Arab official school systems. The tests included the subjects of Hebrew and Arabic (native language — language of instruction), mathematics, science, civics, and English (as a second language) and were given to Grade 4, 6 and 8. Between 1996 and 1998, it was found that by Grade 4 major gaps appear in the Hebrew education system according to socioeconomic background and that by Grade 8, these gaps had widened. Similar results were found in exams administered in 2001 (see, Adler & Blass, 2003, in the Appendix).

In 2001, the Mashov exams were replaced by the Meitzav exams. As shown in a survey of more than 50 different exams, the large majority of which were Meitzav exams (Kent-Cohen, Cohen & Oren, 2005), and by the data appearing in the Statistical Abstract of Israel, these exams also confirmed gaps among the various population groups. Beginning in 2007, the responsibility for administering the Meitzav exam was transferred to the National Authority for Measurement and Evaluation in Education (RAMA), which was created on the recommendation of the Dovrat Committee. One of the first steps taken by RAMA was to calibrate the exams, with the goal of examining students' achievements not only at a particular point in time but also in terms of long-term trends.

9 Mashov is the national achievement examination that preceded the Meitzav exams. Meitzav is the Hebrew acronym for Measurement of School Growth and Efficiency. These are annual national achievement exams administered to a large portion of students in formal education.

International tests: To date, Israel has participated in six different international tests. Three of them evaluate academic achievements (TIMSS, PISA, and PIRLS), and three focus on knowledge in specific subjects (civics, computers, and risky behavior).

The TIMSS test is the oldest of the exams and is administered to students in Grades 4, 8 and 12. They test knowledge in mathematics and science. Israel has participated in all the exams for Grade 8 (and in the first test also Grade 12). Although they have been administered since the late 1960s, there is good reason to focus only on those administered after 1999, since in the first three exams carried out in the late 1960s and those administered in 1981 and 1995, Arab and Haredi students were not included. In addition, the very first exam — in which Israel's achievements were particularly high and which included only the Jewish population — did not reliably reflect reality.[10]

The PISA tests have been administered every three years beginning in 2000 (Israel participated in the version administered in 2002) and include exams in mathematics, reading comprehension, and science among 15-year-olds. These tests, in contrast to TIMSS, emphasize the ability to apply knowledge rather than formal knowledge itself.

The PIRLS tests examine reading comprehension in Grade 4 in the years 2001, 2006, 2011 and 2016. Overall, and as described below, the following findings emerge from the international tests:

A. It appears that Israel's ranking on all three tests has declined, although its ranking was also low in the past and remained almost unchanged if the comparison includes only the countries participating in the TIMSS tests since 1999, the PIRLS tests since 2001, and the PISA tests since 2002 and until today.

B. This ranking was to be expected considering Israel's level of economic development (Yogev, Livneh & Feniger, 2009; OECD, 2012) and its high rate of population growth (Feniger & Shavit, 2011).

10 Grade 8 and 12 participated in the first exam in Israel, which was administered in the 1960s. However, the two samples were biased since they primarily included schools with a high socioeconomic level. For Grade 8, schools in immigrant towns and development towns were not included, nor were Arab Israeli students. For Grade 12, the only schools included were those whose students continued on to higher education. As a result, Israel was ranked first for Grade 12; this is also the basis for the claim that, since then, Israel's achievement level has declined (Husen, 1967).

C. The gap in Israel between weak and strong students is the largest among almost all of the developed countries and this situation has remained almost unchanged over the years.
D. Since Israel began participating in the tests, there has been a consistent improvement in scores (with fluctuations up and down) and a narrowing in gaps among the population groups.

Bagrut exams: Among all of the achievement tests administered in Israel, the bagrut exams are undoubtedly the most prominent from a social and public perspective. They are also the focus of numerous studies of social gaps. The most accessible source of data for researchers is currently the CBS publications, which appear in the *Statistical Abstract of Israel*.[11]

There may be different criteria for determining the existence of gaps in the education system. The two main criteria that are commonly used in the discussion of between group gaps are attendance rates (vertical stratification at every education level and horizontal stratification of the distribution of students in various educational tracks) and academic achievements and gaps. These will also be the basis for this work.

School attendance rates

Vertical stratification

One of the accepted criteria for evaluating the achievements of a national education system is the attendance rates of students in various age groups (vertical inequality). Early on, attendance rates — both at age 5 and in the 6–13-year-old age group — were close to 100 percent in both the Hebrew and Arab education systems. In 1970, 98 percent of Jewish children and 87 percent of Arab children attended primary school. In 1980, the attendance rate of students in this age group in the Arab sector was already 94 percent

11 Regarding tracking and analyzing bagrut exam data, it is worth mentioning that beginning in 2015, the Ministry of Education stopped publishing the analysis of the exam results, which had allowed a comparison at any point in time according to sector, gender, supervisory authority, and the Nature Index of the students' residential and/or school locality. These data exist at the Ministry of Education and in order to obtain them a request must be made to the Ministry as part of the Freedom of Information Law.

(CBS, 1991, Table 22.12, 22.13). Therefore, the discussion of vertical gaps will focus on the attendance rates among preschoolers and in high school.

Preschool education

The data in Figure 1 clearly indicate that the gaps between attendance rates of 3–4-year-olds in Hebrew and Arab education have drastically declined.[12] The most dramatic change in this age group occurred in the Arab education sector, where attendance rates for 3-year-olds increased from 15 percent in 1982 to 72 percent in 2018 and for 4-year-olds from 30 percent in 1982 to 89 percent in 2018. The improvement in the Arab sector occurred primarily between 1989 and 2010, the years in which the Compulsory Education Law for 3–4-year-olds was implemented differentially and provided an advantage to cities with a low socioeconomic cluster. Since the implementation of the Compulsory Education Law for 3–4-year-olds in 2013, the attendance rate in this age group — in both education sectors — has been close to 100 percent (apart from among 3-year-olds in the Arab sector).[13]

Academic and social gaps can be expressed in at least two ways, each of which is liable to generate different conclusions. One is to look at absolute gaps and the other is to look at relative gaps. If the gaps change in the same direction over time, then the conclusion will be unambiguous, but things get complicated if the directions of change differ, as might occur for example when the absolute gap increases but the relative gap decreases (see the discussion in Hellevik, 2002).

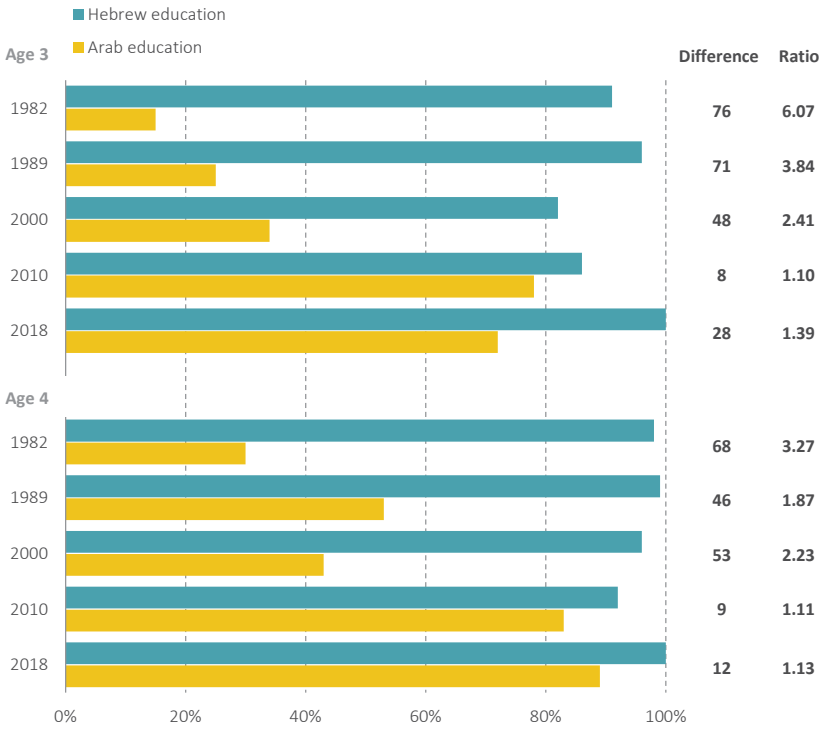
The discussion of the different definitions of an academic gap is not simply a technical one. On the assumption that the reduction in gaps is the target (for ethical, political, economic, and other reasons), then different outcomes, and sometimes conflicting ones, may have far-reaching implications.

12 It is worth mentioning that in 1980, the Statistical Abstract did not include data on attendance rates of Arab children in this age group in preschool frameworks; the data for them only became available in 1982. Furthermore, the Statistical Abstract does not have data for 1990 and, therefore, we will use the 1989 data.

13 The data presented in Figure 1, based on the *Statistical Abstract*, point to an unexplained decline in the attendance rate for preschoolers between 1989 and 2000 among Jews and between 2010 and 2018 for Arab Israelis. This brings into question the reliability of the data. We tend to attribute the change — at least among Jews — to inaccurate records (either overreporting in the early years or underreporting in the later years) for children attending private preschools.

For example, in Figure 1, the attendance rates among 3-year-olds changed "overall" by about 10 points between 1980 and 1990 in the Hebrew and Arab sectors while the absolute gap remained almost unchanged at about 70 points. However, the relative gap declined drastically, from 5.8 to 3.8.[14]

Figure 1. School attendance rates in Hebrew and Arab education, ages 3 and 4



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

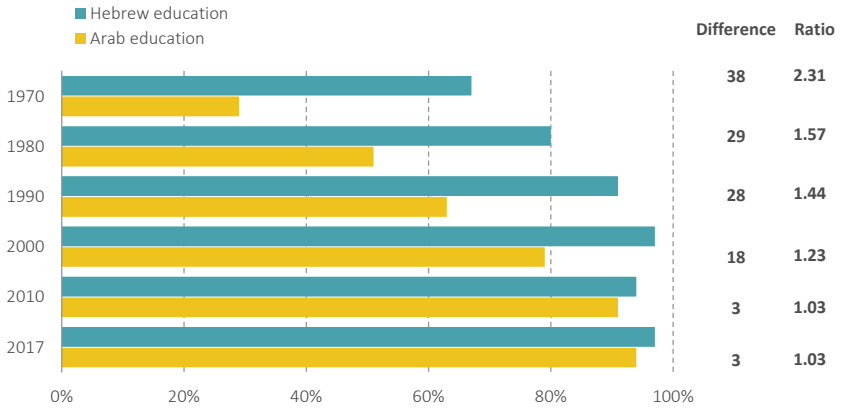
14 The question that naturally arises is whether the gap has narrowed or not. In this case, the decision is in our opinion a value judgment to a great extent. From a social and political perspective, the relative gaps are in general more important. Similarly, if the situation of the weaker population is worsening in terms of the absolute gap but improving in terms of the relative gap, we would view this positively.

High-school education system

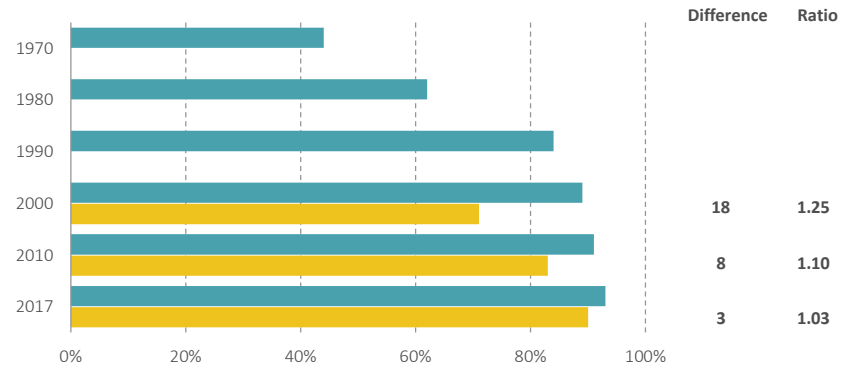
The attendance rate in the primary education system in both the Hebrew and Arab sectors is currently close to 100 percent. In the Hebrew education system, in 1990, the attendance rate in the 14–17 age group (Figure 2a) reached 90 percent, while in the Arab education sector, this occurred only in 2018, a decade later; in 2018, the rates reached 90 percent even among 17-year-olds (Figure 2b).

Figure 2. School attendance rates in Hebrew and Arab education

a. Ages 14-17



b. Age 17

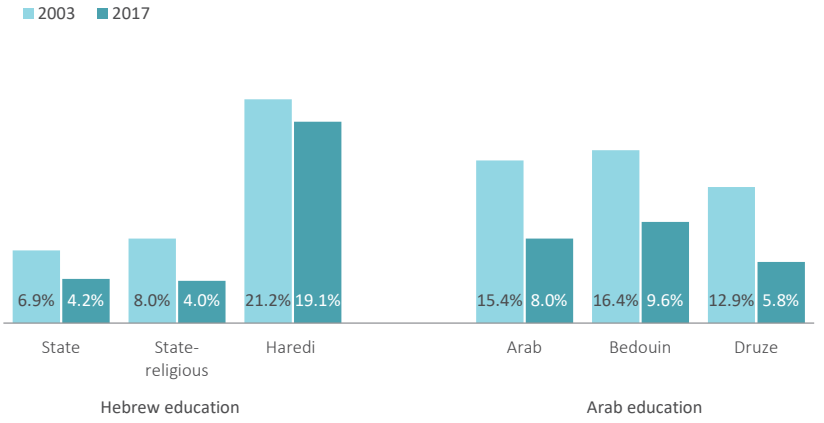


Note: There are no data for 17-year-olds between 1970 and 1990. In 2010 and 2018, reporting was in a different form than in previous years, where the average attendance rate for 14–17-year-olds was calculated as if the age groups were equal in size (since that is the data that appears in the tables).
Source: Nachum Blass, Taub Center | Data: CBS, *Statistical Abstract of Israel*, various years

Notwithstanding the positive overall picture, in certain population groups the dropout rates are higher than in the rest of the population, although there have also been improvements in this area.

A study carried out by the Taub Center (Yanay, Fuchs & Blass, 2019), tracked students from Grade 10 for three years and found that the dropout rates among the 2001 cohort were higher than those for the 2015 cohort (Figure 3).[15] It is important to emphasize that the average decline in dropout rates among Arabic-speakers conceals to some extent the fact that in this sector dropout rates are higher for boys than for girls. In these years, the dropout rate fell among boys from about 20 percent to 12 percent which remains much higher than in the Hebrew sector, while among girls, they dropped from about 10 percent to 5 percent, a rate similar to that for girls in the Hebrew sector.

Figure 3. Dropout rates by sector and supervisory authority



Source: Yanay, Fuchs, and Blass, 2019, Figure 4

15 The high dropout rates among Haredim should be treated cautiously since it is quite likely that they do not indicate dropping out of school but rather dropping out of the education system supervised by the Ministry of Education. Similarly, these data do not take into account students who transfer to technical schools under the auspices of the Ministry of Economy. In 2017, a total of 11,892 students were attending alternative frameworks under the supervision of the Ministry of Labor, Social Affairs and Social Services (CBS, *Statistical Abstract of Israel 2018*, Table 8.28).

Other groups with higher than average dropout rates include the children of immigrants who arrived after 1998 and those of Ethiopian origin. This calls for the system to increase its efforts to find better educational solutions for these groups, which will make it possible for them to continue in school until Grade 12 and complete their studies successfully.

Horizontal stratification

One of the ways for the dominant group in a society to maintain inequality in access to educational services — despite the official equality reflected in similar attendance rates among all population groups — is the segregation of their children into separate schools (see Ayalon, 2000; 2010; Adi-Rakach, Grinstein & Bahak, 2015; Tamir, 2016). This stratification can occur when in schools differ in the socioeconomic composition of their student body and/or when schools that are heterogeneous from a socioeconomic perspective maintain separate frameworks for students with different characteristics (tracking and grouping). The discussion of horizontal stratification (i.e. integration, segregation, etc.) takes place in a framework of three "realities," in which there are three main "players."

The first is the "physical reality," which refers to the spatial distribution of the population and its socioeconomic characteristics. This reality primarily characterizes geographic areas that are homogeneous with respect to sector or religion (Bank of Israel, 2017).

The second is the "social reality," which refers to the degree of social, economic, and sectoral homogeneity in a geographic region (such as a school district), the balance in size between various population groups, and their attitudes toward attending the same schools. A socially heterogeneous reality can occur in a homogeneous physical reality, but it is uncommon to have a homogeneous social reality in a heterogeneous physical reality.

The third is the "ideological reality," which refers to the ideologies of the residents in the geographic regions in which the schools are located and in society in general and to their attitudes toward issues of social and economic equality.

The three main factors ("players") that determine the level of stratification in the education system are the government (the Ministry of Education and local authorities), the education system (principals and teachers), and the "customers" (parents and students). In general, it can be said that the tools available to the State are the strongest and include legislation, budgets, and

regulation. Parents have the possibility of changing area of residence, sending their children to private schools or using political and public pressure to have their expectations met. Teachers and principals have a major say in determining the admissions rules, student suspensions, and rules of conduct (both stated and implied, official,or semi-official) in their schools. These "realities" and the "players" are the main factors that determine stratification processes, which are based on registration rules, fees, acceptance exams, codes of conduct imposed on students and their parents, and the like.

In the following discussion, bear in mind that for preschools, primary and middle schools, the Ministry of Education has a policy of closed school districts (although this policy has become less stringent in recent years); at the high school level, there are essentially no school districts (although the local authority is required to provide schools for students in its jurisdiction or to allow them to attend schools in neighboring local authorities if it has no appropriate schools, up to Grade 12) and every parent can send their child to any school within his city and/or in another city on the condition that the school is willing to accept him and he is willing to bear the costs of that choice (transportation, higher school fees, etc.). This fact requires a separate discussion of stratification for each level of the education system.

The most strictly adhered to format of segregation in the education system in Israel is that between the Hebrew and the Arab sector. This segregation is a result of both the demographic-geographic reality and the practice — which is not legislated — to allow the Arab population to educate their children in their own schools. The segregation in the Hebrew sector is first and foremost based on ideological-political-religious background, and practiced before the establishment of the State receiving legal affirmation through the State Education Law in 1953. There are other types of horizontal stratification within each sector and supervisory authority. For example, there is differentiation according to educational characteristics (such as in the case of the Waldorf schools), the material taught (schools for the sciences and the arts), and legal status (official schools and unofficial recognized schools).[16] These different types of stratification usually also involve socioeconomic elements since the

16 Unofficial recognized primary schools in the State education system are for the most part private, both in terms of ownership and educational, social, and operational characteristics. There are fewer of them in the Hebrew sector and more of them in the Arab sector. Most middle and high schools are unofficial and recognized, but essentially they are public in many aspects.

more affluent groups can find frameworks to provide their children with a separate education.

Private versus public preschools

As noted previously, most children in preschools, which currently includes 3 to 5-year-olds, attend preschools near their homes; registration is on the basis of school districts, as determined by the local authority. Children in the Hebrew sector have the possibility of choosing from among State, State-religious, and Haredi preschools, or, alternatively, private preschools which are not connected to any specific supervisory authority. Many parents have used this opportunity to choose a nearby preschool or one that they feel provides better service, while not assigning a great deal of importance to its religious affiliation.[17]

Although the Compulsory Education Law for 3–4-year-olds has been in effect since the 1980s, a substantial number of parents in the Hebrew sector — in particular prior to 2013, when the law went into full effect — used this opportunity to send their children to preschools outside of their school district including expensive private preschools.

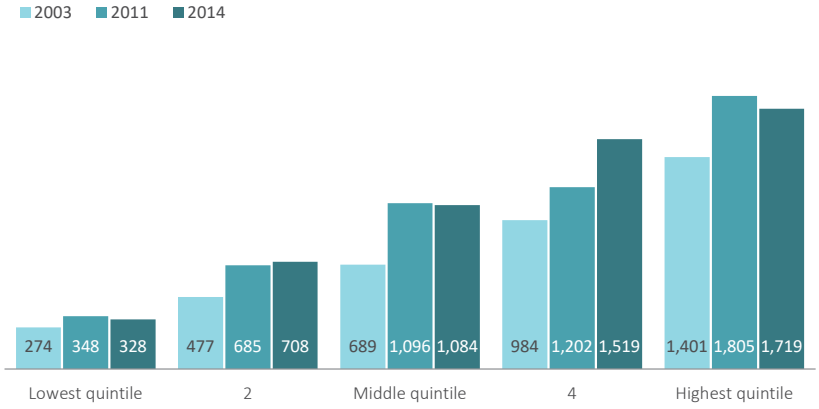
Until 1990, the CBS reported preschool attendance rates in the Jewish population according to country of origin. The data indicate that the share of children of Asian-African origin attending public preschools was in general higher than for children of European-American origin while in private preschools the situation was exactly the opposite.[18] Beginning in 2000, attendance data for private preschools according to country of origin are not available although there are data by sector which indicate that since then, attendance in private preschools in the Hebrew sector was more widespread than in the Arab sector. A different statistic — which although it does not relate to the number of children attending private preschool does relate to the population sending their children to these preschools — is private expenditure on education in the preschool age group (Figure 4). In the upper income quintiles, this

17 This statement is based to a large extent on the high rates of transfer from one supervisory authority to another in the transition between preschool and Grade 1 (Blass, 2012).

18 Although this study does not deal with gaps according to country of origin, it will be part of the discussion of preschools, in view of the lack of data according to socioeconomic background and the high correlation during that period between ethnic origin and socioeconomic background.

expenditure is much higher than in the lower ones (see Shraberman & Blass, 2016). All of the data indicate that stratification — for whatever reason — is already prevalent among parents of preschoolers; the situation did not change substantially after full implementation of the Compulsory Education Law for the 3–4-year-old age group in 2012, effective 2013.

Figure 4. Average monthly expenditure on preschool per child
By consumption quintile, 2014 prices, NIS



Note: Preschool settings include daycare centers, private and public preschools. Consumption quintiles per standard person in households with children ages 2–5 in preschool.
Source: Shraberman and Blass, *State of the Nation Report 2016*, Figure 2

Primary schools

Socioeconomic stratification

The presence or absence of stratification between primary schools (as well as middle schools) is determined to a great extent by the Ministry of Education, which sets policy for the registration of students, and by the local authorities, which delineate the school district boundaries. When a residential area is characterized by socioeconomic heterogeneity, a strict registration policy that requires registration for schools near the student's place of residence contributes to integration and prevents stratification; the reverse is also true when there is a lax registration policy. When the population of a residential

area is homogeneous and differentiated from neighboring areas, this leads to stratification. A more open or less strictly applied registration policy by the local authority will support segregation processes, since the more prosperous population will use the opportunities open to them more successfully, and, if they feel it is necessary, they can send their children to a school that they prefer (for whatever reason — socioeconomic, educational, ideological), even if it is not local.

The result is that if the goal is integration between students of different socioeconomic backgrounds and socioeconomically homogeneous neighborhoods, the policy usually includes large-scale busing, a strict adherence to registration rules to prevent any preference to students from more prosperous groups (such as for example by means of a lottery), information programs among the weaker populations explaining their options, and improvements in schools that serve weaker populations so that they will attract the more affluent populations. In sum, and even when all of these measures are adopted, a policy of open school districts or even the absence of school districts altogether allows stratification to happen (Ayalon, Blass, Feniger & Shavit).[19]

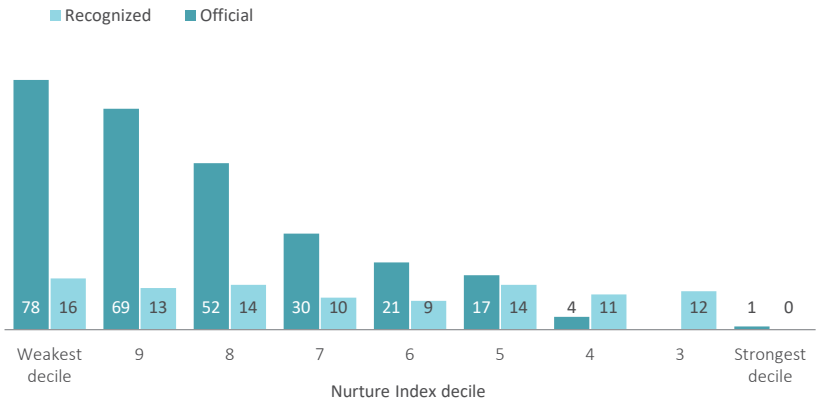
There are those who link stratification to privatization; however, in Israel the number of private Jewish primary schools is negligible.[20] In these schools, segregation is absolute, as can be seen from the fact that the vast majority of the students are from the upper two deciles according to the Nurture Index. Also in the Arab State schools, where the share of unofficial recognized schools is more than 25 percent, the students are usually children from more affluent families. Thus, in the highest deciles (Nurture Index deciles 1–3), most of the schools are recognized ("private") while most of those in the lowest deciles (8–10) are official, as can be seen from Figure 5.

19 Experience in Israel and abroad indicates that these conditions do not usually exist and that, even when an attempt is made to implement them, parents and principals find "creative" ways to get around them.

20 In 2018, there were only 21 schools in the Hebrew State education system and 4 in State-religious education defined as "Recognized" and they were essentially private from a legal point of view although some of them looked like State schools.

Figure 5. Primary schools in Arab education

By Nurture Index decile and legal status



Note: In the strongest Nurture Index decile there are no Arab education sector schools.
Source: Nachum Blass, Taub Center | Data: Ministry of Education, *A Wide Perspective*

The shift towards private education in the Arab sector (Michaeli, 2015; Blass, 2011–2012; Weissblau, 2016) is apparently the result of dissatisfaction among the middle class — whose share of that population is growing — with the official education system. It is too early to know what the effect of this trend will be, but experience in Israel and abroad indicates that it will increase inequality within the sector and will make it more difficult to provide satisfactory educational services to the majority of the official education system.

The existence of socioeconomic stratification in the recognized State schools (both Hebrew and Arab) is unambiguous but does this suggest that there is no stratification in the official schools? This question is more complicated and there is no unequivocal answer. The reasons for this are the existence of hundreds of schools that define themselves as "special" and the growing abandonment of school districts and/or the creation of schools districts that include a number of schools. Although the Ministry of Education expected that allowing more schools to be categorized as special would strengthen public education and allow parents and students to choose the school that suits their outlook and answers the student's needs, while preserving the Ministry's criteria and equality of opportunity, some of these special schools exist on the

basis of fees paid by the parents, which are often very high, and an acceptance process for students. A prime example can be seen in schools for the arts, nature, and the environment in Tel Aviv in the Hebrew State system and the various types of *Torani* schools in the State-religious system.

The growing phenomenon of special schools and the abandonment of school districts has exacerbated the inbuilt conflict between the desire to satisfy the needs and desires of parents and students on the one hand and the goal of maintaining equality, integration between various groups in the population, and the ability to monitor and manage the system on the other hand. The accumulated experience in other countries where school districts were eliminated and parents and students were given the freedom to choose a school and/or were given the option of establishing semi-private schools (charter schools) is an indication of the increasing trend toward stratification based on socioeconomic status. Furthermore, findings with regard to academic achievement under "competitive" conditions (such as in the case of charter schools) are mixed and are the subject of debate among researchers, a debate that is often influenced by the researcher's ideological position (Ayalon, Blass, Feniger & Shavit).

Sector Segregation

One type of segregation is according to sector. As noted, this type of segregation is primarily the result of Israel's political-geographic reality, which creates a division between Jewish and Arab Israeli cities and neighborhoods, although in recent years there has been a growing number of Jewish cities in which Arab Israelis also reside (Bank of Israel, 2017). This phenomenon was reported in a long article published in the newspaper *The Marker*:

> According to estimates, about 60,000 Arabs currently reside in 16 cities that are not officially defined as mixed or in Jewish neighborhoods in the large cities. […] Nazareth Illit and Maalot Tarshihah are two cities that became mixed during the past decade, […] 19.2 percent of the residents of Nazareth Illit are Arabs, although according to estimates, the proportion is much higher (about 30 percent). This is a result of the phenomenon that many of the Arab residents do not change their official address, for various reasons. […] In Maalot Tarshihah, the proportion of Arabs is 20 percent and here as well it is believed that the proportion is higher. Carmiel is another city in the Galilee in which there

> is a massive influx of Arabs. However, officially, only 2.5 percent of the residents are Arabs and even according to the estimates of researchers the proportion is actually between 10 and 15 percent (Sadeh, 2015).[21]

The increase in the number of Arab Israelis living in Jewish cities, alongside the growing trend among the Arab population in Arab cities to send their children to Hebrew schools, has created a number of problems and sources of tension which are expected to intensify in the future and to which the education system has not found a solution. This tension centers on two issues: a) Should Arab schools be established in Jewish cities? and b) Does the increasing share of Arab students in Hebrew schools have an effect on the curriculum, the social environment, and relations with the community and should it?

There is also a question of stratification within the school. Here again there are two types of segregation: the creation of separate classes according to social composition and ability groupings according to academic criteria. Despite the best intentions, the reality is that these measure lead to socioeconomic stratification.

With respect to the first form of stratification (separation between schools), research carried out a few years ago did not find any evidence that this is a common phenomenon in primary schools (Blass, Tsur & Zussman, 2014). Nonetheless, in some cases, and in particular in the State-religious system and the Haredi system, a policy of segregation has been adopted. In the State-religious system, the problem arose when students born in Ethiopia and students with parents born in Ethiopia were separated into their own classes. This occurred primarily in areas with a large Ethiopian community (such as Netanya and Petah Tikvah), and the parents of the other students — with the support of the principals — acted in violation of Ministry of Education guidelines. After public protests, the principals were forced to abandon this policy. In the Haredi system, the problem arose when schools refused to accept girls from the Sephardic community or these girls were separated into their own classes.

21 The CBS figures for 2016 show that about 40,000 residents, who are not "Jews and others" and therefore are likely to be Arab Israelis, lived in Jewish cities that are defined as mixed, namely cities in which more than 10 percent of the residents are Arab Israelis (see the CBS site, Local Authorities in Israel: Data file for processing, 2016).

With respect to the other type of stratification (ability grouping and tracking within a class), Ministry of Education guidelines state that there should be no separation into tracks in primary schools. Nonetheless, there is evidence that this is still being done (Adi-Rakach, Biran & Friedman-Goldberg).

Middle schools

The establishment of middle schools in 1968 was one of the seminal events of the education system. One of the most important principles behind this move was to create schools that would draw students from schools districts with a diversity of socioeconomic backgrounds. The creation of expanded school districts and schools with large student populations was meant to reduce the stratification that had existed up until that point, both in primary schools and in high schools. The move led to conflicts between the Ministry of Education on the one hand, and parents and local authorities on the other who were opposed to the creation of integrated middle schools. The most well-known of them involved the opposition of parents with children in the Hebrew University High School who refused to send their children to the Denmark school (a more socioeconomically diverse school) but in the end were forced to do so by a Supreme Court decision.[22]

Despite the efforts of the Ministry of Education, or perhaps because this policy is not enforced with sufficient effort, the trend toward stratification is also common in the middle schools and is essentially the same as in the primary schools: stratification based on "special" schools and the opening up of school districts and within-school stratification.[23] Within-school stratification based on classes that are completely separate for all their class hours is not very common (Blass, Tsur & Zussman, 2014); ability grouping, on the other hand, is much more common. Ability grouping is one of the main tools used by the education system to deal with the student population heterogeneity in middle schools, which is a desired outcome of the integration policy and one of the components of the reform. A study ordered by the Chief Scientist of the Ministry of Education opposes the ability grouping system in primary schools and leaves the decision in middle schools to the principal, subject to a number

22 Supreme Court 152/71. Kramer et al. versus the Jerusalem Municipality, June 3, 1971.

23 Since the middle schools draw their students from larger school districts than the primary schools, the cancelation of school districts in the middle schools has less of an effect on stratification processes.

of guidelines (Arcavi & Mandel-Levy, 2014). These guidelines state that starting from the second half of Grade 7 it is permitted to divide students into ability groups according to level in the subjects of mathematics and English, on the condition that the lower and intermediate groups are allocated appropriate teachers and more study hours. Furthermore, the school must develop tools that will allow students in the lower levels to move to a higher one at least twice a year.

The widespread use of ability grouping and its effect on students (particularly those in the lower groupings) has been studied many times. Researchers have found that ability grouping has become one of the main tools used by principals and teachers to deal with student heterogeneity in the middle schools (Amir, Sharan & Ben-Ari, 1984; Kfir & Alroy, 1998; Kashti, Fridman, Ben-Yehuda, Alroy, Skolnick & Shemesh, 2001; Oplatka & Tubin, 2008; Konstantinov, Baruj-Kovarsky, Levi, Hasin, Navot & Awadyeh, 2009).

Currently, teaching in homogenous ability groups is very common. A study by Glickman and Lipstadt (2013) of grouping in mathematics focused primarily on schools in the Hebrew education system and arrived at a number of insights. The following are a few examples of their findings:

A. Most of the Hebrew-speaking schools use grouping in mathematics (about 60 percent in Grade 7, 75 percent in Grade 8, and about 90 percent in Grade 9).[24]
B. The stronger a student's socioeconomic background, the greater the chance of the student learning at a higher academic ability level. Only 9 percent of students from weaker socioeconomic backgrounds were in the highest level, as compared to 23 percent of students from a strong socioeconomic background. In contrast, the corresponding shares for the lowest level were 15 percent and 2 percent, respectively.
C. Within each grouping, students of higher socioeconomic status had higher achievements. In the highest level, the average score of the students from high socioeconomic groups was almost 100 points higher than that of students from lower socioeconomic groups (654 versus 554). At the lowest level, the gap was narrower (486 versus 432).

24 The corresponding figures for the Arab sector are 38 percent, 38 percent and 45 percent, respectively (Glickman & Lipstadt, 2013).

D. The lower the ability level of the group, the higher will be the share of less experienced teachers. At the lowest level, the share of experienced teachers was 7 percent, as compared to 38 percent who were younger teachers. In contrast, in the highest level, the share of less experienced teachers was 14 percent and that of more experienced teachers was 24 percent.

The findings of a RAMA study (Glickman & Lipstadt, 2013) show that ability grouping creates a reality of stratification of teachers and students and of material taught and the methods used; in addition, there is little compliance with the aforementioned guidelines in order to prevent this stratification. Furthermore, many studies indicate that high levels of achievement are also possible in heterogeneous classes if the appropriate teaching methods are used (Ayalon, Blass, Feniger, & Shavit, 2019).

High schools

In the higher grades, parents and teaching staff have greater influence on stratification trends in schools. In preschool, primary, and middle school, the Ministry of Education operates according to a policy of school districts, acceptance of all students by a school, limiting of fees paid by the parents, and limitations on ability grouping. However, in high schools, these restrictions are less stringent and, in practice, are almost not enforced, thus giving schools and parents complete freedom to create stratification both between and within schools. Stringent conditions for acceptance, high fees paid by the parents and ability grouping within schools have become routine in the high schools. In large and mid-size cities, in which there are a number of high schools under the same supervisory authority, there is often a clear hierarchy of prestige rankings of schools, and the most prestigious ones are usually those with students from the highest socioeconomic background.[25]

Alongside between-school stratification there is also within-school stratification. This stratification is reflected in differences in socioeconomic and academic characteristics between tracks, which differ in social and educational prestige. There is a clear differentiation in the socioeconomic and academic backgrounds of the students — and sometimes among the teachers as well — between those specializing in mathematics and science subjects and those

25 In locations that have only one high school, segregation is accomplished by means of separate specializations and tracks with differing levels of prestige.

specializing in liberal arts and social science subjects. Also, in the technological education system there are similar gaps between students according to track.[26]

The issue of stratification and tracking students between academic and trade schools and then within these tracks is a complex one and continues to be a focus of public debate (Ayalon, Blass, Feniger & Shavit, 2019). Tracking and the subsequent stratification between academic schools and trade schools was not the result of decisions made following the reforms in 1968, the creation of comprehensive schools and/or the expansion of the trade school system. There have been trade schools in Israel since before the State was established (such as Max Fein and Shevah in Tel Aviv). As in other developed countries at the time, these schools (prior to the establishment of the State and to a large extent also after it) were designated for low performing students, and as a result, they were also characterized by a higher share of students from lower socioeconomic groups (in view of the high correlation between previous academic achievement and socioeconomic status). The current debate over the trade school system cannot deny this historic fact.

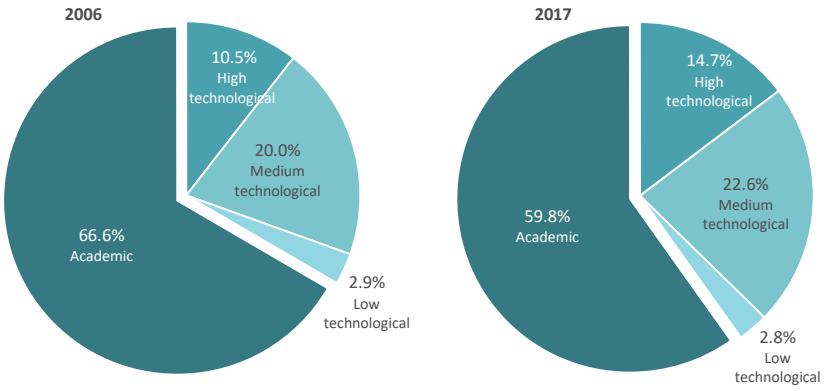
The political and social sensitivity that characterizes a discussion of stratification between academic schools and trade schools relates to quite a different question: Is the assignment of students to trade schools carried out on the basis of academic background or on the basis of stereotypes — in the best case racial-socioeconomic stereotypes and in the worst case stereotypes regarding academic abilities of students of Sephardic origin. The opinions are divided on this issue and the interpretation of the facts is to a large extent dependent on the views and background of the interpreter. To illustrate, between 1970 and 1980, the share of high school students of Asian-African origin rose from 30 to 39 percent and in 1980 it became equal to that of students of European-American origin (the rest were native Israelis). In 1982, 40 percent of 17-year-olds of Asian-African origin were studying in academic specializations. Therefore, it cannot be said that ethnic origin is determining a student's assignment to a study track and the data disprove this claim unambiguously.

26 The differences between students in the various classes within the same school are powerfully presented in the movie *Scaffolding*. The movie illustrates the contrast between the conceptual, social, and educational reality of Class 12-2 (which is composed of weak students, most of whom are from Sephardic origins and apparently from weak socioeconomic backgrounds) to that of students in Class 12-3, who are allowed to study in the library and prepare a ballet performance in memory of a well-liked teacher.

There is no doubt that there was a greater tendency to assign students of Asian-African origin to trade schools than students of European origin. However, in our estimation, this is related more to academic achievements — which are crucially influenced by parents' socioeconomic and educational background — than to their ethnic identity. And there were often patronizing assumptions about "what is good for the future of children from poor and/or large families," which were usually of Asian-African origin. What is the historical truth? The answer is likely to be dependent more on interpretation than research.

Beyond the historical discussion — which has current political implications — it is important to note that attitudes toward trade schools as a track designated for students from weaker socioeconomic backgrounds not enabling social mobility is outdated and not in sync with the current reality. Technology and vocational schools currently include three main tracks (as they did in the past): an engineering track (high technology), a technological track (middle technology), and a trade track (low technology) (Fuchs, Yanay & Blass, 2018). What has changed significantly is the distribution among the tracks and the socioeconomic characteristics of the students within them. Students in the high tech track are characterized by higher socioeconomic characteristics and higher academic achievements than those in the academic track. As can be seen from Figure 5, this track included about 10 percent of all students in the high school system in 2006 and about 15 percent in 2007. Most of the students in the middle technology track also pass the bagrut exams and their share of the student population has risen from 20 percent in 2006 to about 23 percent in 2017. The share of students in the low technology track remains at about 3 percent of all students in the high school system. The simple conclusion is that, for the vast majority of students, education in the technological track is currently not a barrier to continuing on to higher education.

Figure 6. Distribution of students by education tracks,2006 and 2017



Educational track	Sample courses
High Technological	Computer systems; Biotechnology systems; Mechatronics
Medium Technological	Systems control, Design; Human resource management; Telecommunications
Low Technological	Culinary arts/Hospitality; Car mechanics; Cosmetology/Hair design

Source: Fuchs, Yanay, and Blass, 2018, Figure 2

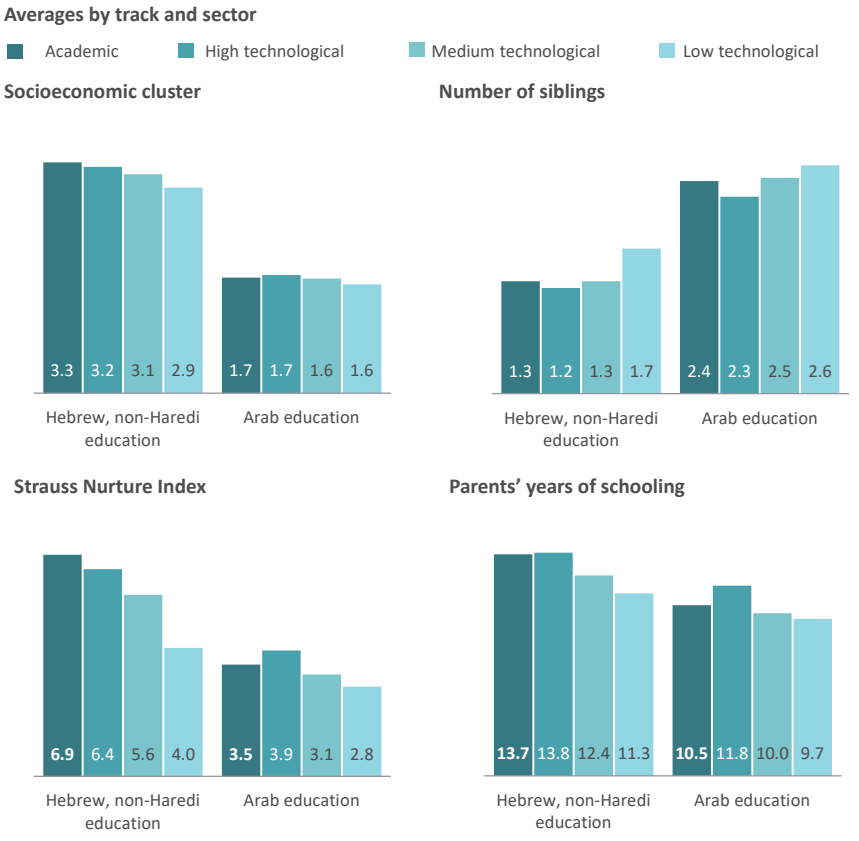
Moreover, and as will be seen below, the trend is particularly evident among Arabic-speaking students, and in particular Arabic-speaking girls. Furthermore, the dropout rate from the technological education system is no higher than that from the academic education system (Yanay, Fuchs & Blass).

A particularly interesting point is related to socioeconomic background in technological education.[27] As expected, the data shows a close fit between students' level of academic achievement and the technology track level. That is, students in the high technology track have the strongest socioeconomic

27 In the Ministry of Education's Virtual Research Room, the existing data on an individual level include parents' education, number of siblings and the student's place of residence. Figure 7 presents the data for students in each track (high, middle, and low technology, and the academic track) according to both the Ministry of Education's School Nurture Index and the socioeconomic cluster of the student's place of residence. A high Nurture Index characterizes a weak population while a high value for socioeconomic cluster characterizes a strong population. For the sake of clarity, we have reversed the values of the School Nurture Index in the figure.

background, followed by students in the middle technology track and finally by students in the low technology track (a similar result was shown by Blank, Shavit and Yaish, 2015). However, the most prominent finding is that parents' years of schooling in the case of students in the Hebrew education system who are in the high technology track and in the academic track is 13.7 years on average while that of the parents of Arab students in these tracks is about 11.7 for the high technology track and 10.5 for the academic track. Their achievements on the bagrut exams are similar.

Figure 7. Socioeconomic profiles of 12th grade students,2006–2017



Source: Fuchs, Yanay, and Blass, 2018, 2018, Figure 5

Academic achievement and gaps

The main empirical part of this study discusses the academic achievements and gaps in achievement between students in Hebrew education and those in Arab education and according to socioeconomic status. This is not to imply that other issues in the education system are of less importance. The discussion of education and its goals, the character of education system graduates, relations between teachers and students, and school climate are all important issues and perhaps even more important than the level of knowledge in mathematics and English acquired by a students. The decision to focus on academic achievement is based on two reasons, one fundamental and the other practical. The first is that the acquisition of academic knowledge continues to be perceived by the public as the main purpose of education, and its success or failure is measured to a great extent by achievement. The practical reason is that academic achievement and achievement gaps between various groups is the issue most studied and measured and therefore the most accessible for making assessments and drawing conclusions. This does not imply that "we measure what is measurable and ignore what is important." It can only be hoped that other issues also receive a similar amount of attention and that it will be possible to include them in future surveys. The discussion of students' academic achievements in Israel is, as mentioned, based on standardized national tests (Meitzav and bagrut) and on international tests.

Academic achievements and gaps in primary education

The discussion of achievement in primary education[28] will be based on the Meitzav test given to Grade 5 students[29] and on the PIRLS test, which measures reading comprehension among Grade 4 students.

28 The decision not to examine scholastic achievement and gaps in preschool, in spite of its importance and its effect on academic and other outcomes at later ages, is based on the simple fact that there are no formal achievement tests given to preschool children. It may be that a discussion of academic skills and preparedness of preschoolers for school is important; nonetheless, the subject will not be discussed here.

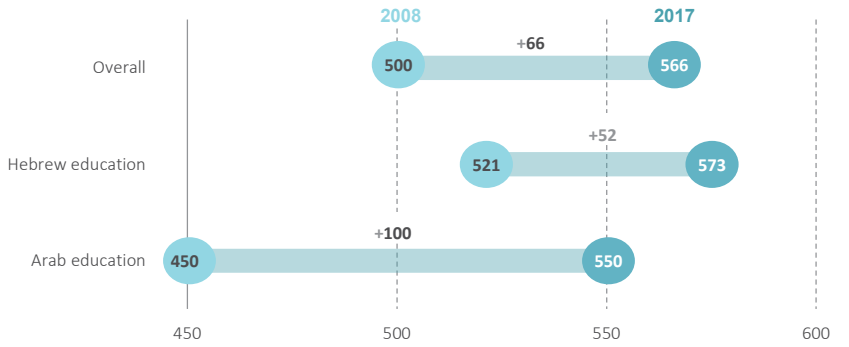
29 In 2008, the results of the Meitzav test were calibrated for the first time and therefore they can be used for comparison. The results of the 2008 test will be compared to those of the 2017 test because in 2018 only part of the data was published due to a disproportionate number of special needs examinees. The average score in 2008 was 500 with a standard deviation of 100.

In 2008, the Meitzav tests were calibrated.[30] It was decided that the average score would be 500 with a standard deviation of 100, in order to facilitate comparison over time. Figure 8 clearly shows that between 2008 and 2017, the average score of all students in Grade 5 rose by about 13 percent in mathematics and by about 8 percent in English (two-thirds of a standard deviation and 0.39 of a standard deviation, respectively). In the Hebrew education sector, the figures were 10 percent and 6 percent, respectively, and in the Arab sector the improvement was even larger: 22 percent and 13 percent, respectively. Moreover, the increase was continuous over time. Even assuming issues of cheating and of reliability in the administration of the exams, it is unreasonable to assume that the overall trend is incorrect. The increase in scores in both sectors was accompanied by a narrowing of gaps in achievement, which was reflected in a decline in the standard deviation and the coefficient of variation.

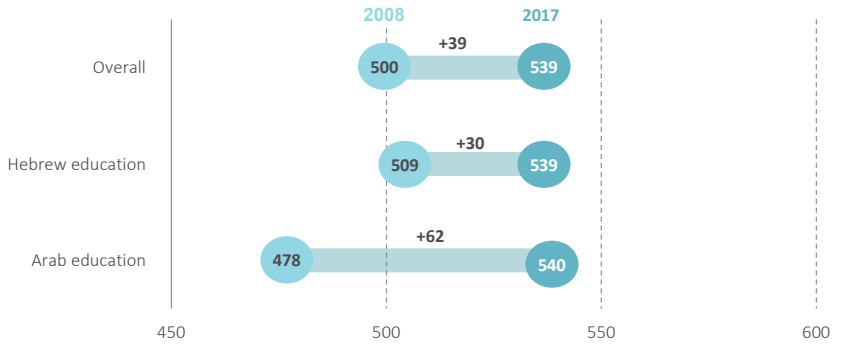
30 Calibration is explained as follows in the RAMA report: "In order to facilitate multi-year comparisons of the Meitzav scores, RAMA adopted a system of statistical calibration of the examinees' scores, which translates the raw score each year in each subject and for each grade into a multi-year Meitzav scale. The scale is meant to facilitate comparison of achievements on the Meitzav test over the years, in the same subject and for the same grade. The base year for multi-year comparison was determined to be 2008. The multi-year Meitzav scale was formulated such that in the base year (2008) the average score in each subject and in each grade is 500 and the standard deviation is 100. The scores in each year are calibrated and reported in terms of this multi-year scale." (RAMA, 2017c, p. 3)

Figure 8. Meitzav exam scores in mathematics and English, Grade 5, 2008 and 2017

Mathematics



English



Note: For coefficient of variation and standard deviation, see Appendix Table 1. Although at the time of writing the Meitzav results for 2018 and 2019 were available, we chose not to use them for several reasons. In 2019, there were issues of reliability, and in 2018, RAMA claimed that they are not comparable to previous years exams due to changes that were made that were made in the exams like a new scoring system and changes in testing of students with learning disabilities. It is nonetheless important to note that in the 2019 exams, the achievements of Arab students in mathematics were higher than Hebrew education students for students in the high and middle socioeconomic groupings, and somewhat in the lower socioeconomic groupings. The picture is even clearer when it comes to the exam in English. The score of Arab students in English is higher than Hebrew education students (RAMA, 2020).

Source: Nachum Blass, Taub Center | Data: RAMA, 2017a

By way of comparison, achievements of Grade 4 students in the United States in terms of average scores and gaps between blacks and whites, as measured by the NAEP tests, have remained almost unchanged from 2007 until 2017 (Blass, 2016b, p. 135).[31] In Australia, the average score of Grade 5 students rose from 484 in 2008 to 509 in 2018 (about one-third of a standard deviation) and similarly in mathematics, with almost no change in the standard deviation (ACARA, 2018). Also in Norway, there has been no change in the scores of students from 2014 until 2018.[32] These data, like those for the international tests to be discussed below, indicate that scores and gaps have changed very slowly in other developed countries, if at all.

Figures 9a and 9b present the achievements in mathematics and English and the gaps for the entire system, between sectors and within each sector, according to socioeconomic status of the schools attended by the students (the Nurture Index). Not surprisingly, at each socioeconomic level, for the system as a whole and within each sector, there are large differences between the achievements of students from schools with a high socioeconomic status and those from a low socioeconomic status school.

This observation holds for both the subjects that were examined, although in English the gaps are somewhat smaller. However, when the gaps are examined for Jews and Arabs with the same socioeconomic status, a different picture is obtained: between 2008 and 2017, the gaps in scores between the two sectors narrowed substantially. This is especially evident in English where at each socioeconomic level the achievement of Arabic-speaking students in 2017 exceeded those of their Hebrew-speaking counterparts. In mathematics, this was true for the middle socioeconomic school level while in the other two levels there was close to equality. The achievement of Arab students is even more impressive considering that their Nurture Index is higher than that of their Jewish counterparts (in other words, their socioeconomic level is lower) in all of the groups (high, middle, and low).

Another way of looking at the narrowing of gaps is to examine the gap in academic achievement between students in schools that serve the more affluent population (who are accordingly the students with the strongest socioeconomic background, both in general and on average) and students in schools with a Nurture Index in the lowest two deciles. Figure 9 clearly shows

31 https://www.nationsreportcard.gov/mathematics_2017/nation/scores/?grade=4

32 https://www.ssb.no/en/statbank/table/10793/

that these gaps have narrowed substantially, both in the education system as a whole and within each sector, and in both mathematics and English.

Figure 9a. Meitzav exam scores in mathematics, Grade 5, 2008 and 2017

Overall student population and by sector and school Nurture Index grouping

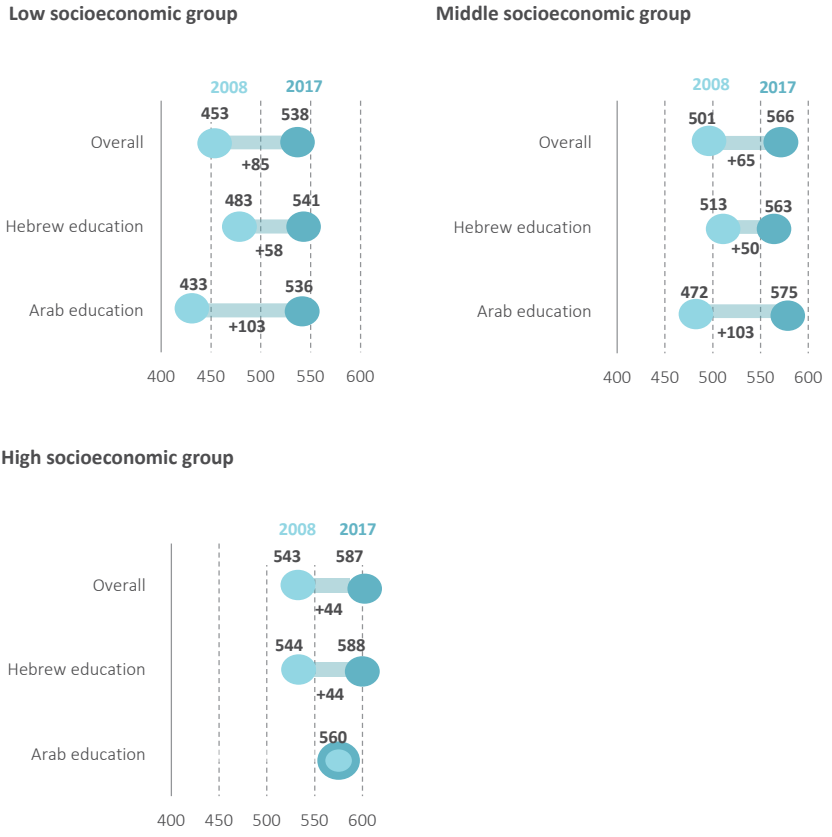
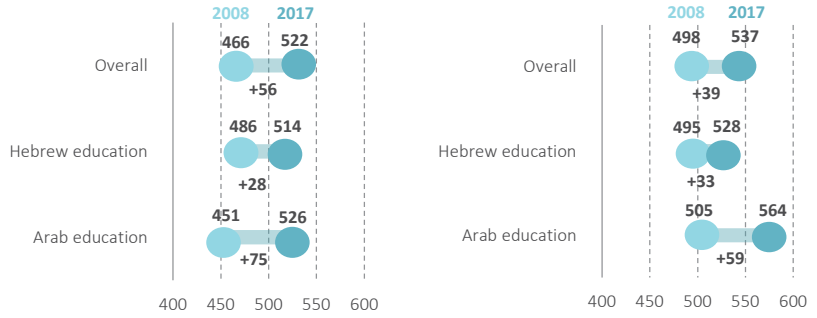


Figure 9b. Meitzav exam scores in English, Grade 8, 2008 and 2017

Overall student population and by sector and school Nurture Index grouping



Note: For coefficient of variation and standard deviation, see Appendix Table 1. Change in score is the high score minus the low score.

Source: Nachum Blass, Taub Center | Data: RAMA, 2017a

Within the Arab sector, the achievements of the Druze students are consistently better than those of the Arab students and in turn those of the Arab students are better than those of the Bedouin students (see the RAMA report that distinguishes between Arab students by religion). Maagan (2018) also shows that although students in the Hebrew education system have a considerable advantage over students in the Arab education system in the lower deciles, their advantage is much smaller in the higher deciles. In other words, the main gap between Jews and Arabs on the Meitzav test, which is reflected in

lower achievement of the Arab sector in general relative the Jewish sector, is related to differences in the socioeconomic background of the students and the higher share of families with a low socioeconomic status in the Arab sector.

In the section on education in recent issues of the CBS *Statistical Abstract of Israel*, there are two tables that present data on the distribution of achievement for Grade 5 and 8 students on the Meitzav test according to three additional background characteristics: mother's education, parents' income, and the socioeconomic index of the city in which the student attends school. Unlike in the RAMA reports, in which the socioeconomic background characteristics are those of the school, the CBS data is based on the individual's characteristics. These data (Appendix Table 2 and 3) clearly indicate several factors that support the Meitzav data:

A. There is a strong link between students' background characteristics and their scores on the Meitzav test. Thus, achievement improves as the student's socioeconomic level rises.
B. The achievements of students in Hebrew education are higher than those of students in Arab education.
C. When socioeconomic background is taken into account, the gap between students in Hebrew education and Arab education is smaller than in the comparison of all Jewish students to all Arab students. In certain cases, the results for Arab students are even higher than those of their Hebrew education counterparts.

What is the trend in achievements and gaps in primary education according to the scores in reading comprehension on the PIRLS test given to Grade 4 students? The first and most noticeable outcome is Israel's relatively low ranking on the 2016 PIRLS test (29th out of 50 countries) and its high ranking with respect to gaps in achievement between the highest-scoring students and the lowest-scoring (13th place). There is no doubt that the main reason for this is the large gap (of 96 points) between the achievements of students in Hebrew and Arab education. Nonetheless, Table 1 shows that this gap is also primarily the result of differences in the socioeconomic background of students in the two sectors and that when students have similar socioeconomic background characteristics the gaps are much smaller (53 in the middle group and 65 in the lowest group) although they are still substantial.

Table 1. Exam scores, coefficient of variation, and standard deviations on the PIRLS 2016 exam in reading literacy, Grade 4

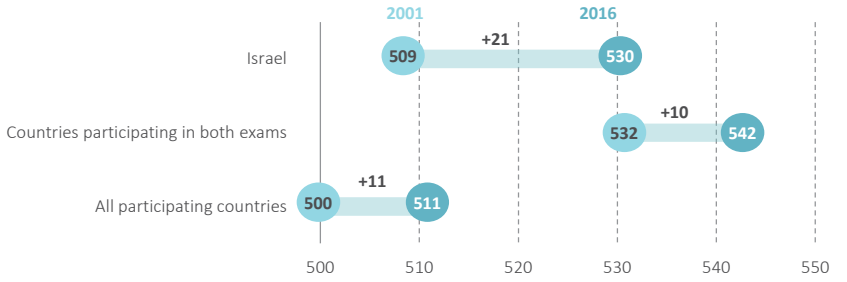
By sector and socioeconomic grouping

Variable	Category	Average score	Coefficient of variation (CV)	Standard deviation (SD)
Overall	Israel	530	0.17	89.5
Sector	Hebrew speakers	557	0.13	74.8
	Arabic speakers	461	0.19	86.8
Sector and socioeconomic grouping	Hebrew-low	508	0.16	82.1
	Hebrew-middle	545	0.13	69.7
	Hebrew-high	582	0.11	66.6
	Arab-low	443	0.20	87.4
	Arab-middle	492	0.15	76.1

Source: Nachum Blass, Taub Center | Data: RAMA, 2017b

A comparison between achievements in Israel and in other countries on the first test given in 2001 and those on the 2016 test provide a somewhat more positive picture.[33] Figure 10 shows that the average for all countries and for those countries participating in both tests rose by about 10 points while Israel's score rose by 21 points, although its ranking remained unchanged.

Figure 10. PIRLS exam scores, 2001 and 2016



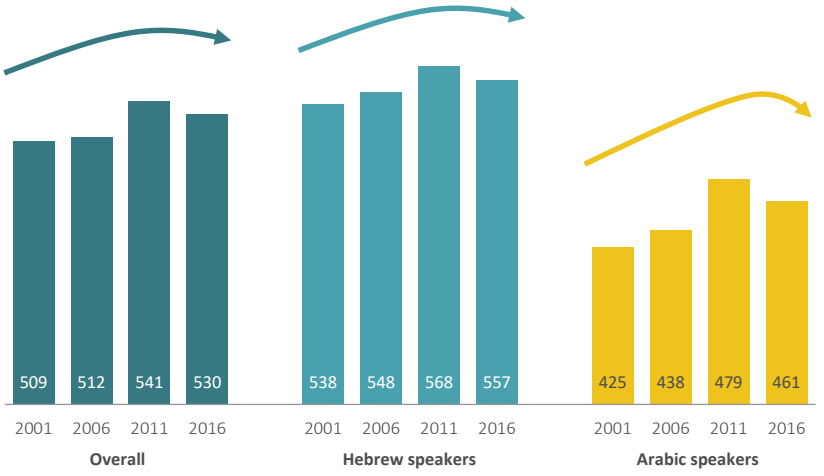
Note: For coefficient of variation and standard deviation, see Appendix Table 1.
Source: Nachum Blass, Taub Center | Data: RAMA, 2017b

33 Only 14 countries participated in both 2001 and 2016 and almost all of them were developed countries or OECD members.

As shown in Figure 11, the improvement in the Arab sector (36 points) was larger than that in the Hebrew education sector (19 points). Nonetheless, it is worth mentioning that the increase occurred primarily between 2006 and 2011 and that there was a moderate decline in both sectors in 2016.

Figure 11. Average achievements in reading in the PIRLS exams

Overall Israeli student population and by sector



Source: RAMA, 2017b

Overall, it can be said that the achievements of students in primary schools do not meet the expectations of the Israeli public (which could be said at any point in time and in any country in the world) and that there are substantial gaps in achievement between students in Hebrew education and those in Arab education and between students from strong socioeconomic backgrounds and those from weaker backgrounds. This is also true when looking at achievement on a national level and when comparing achievement in Israel to that in the developed countries participating in the PIRLS test. Nonetheless, it is important to note the significant progress in the last decade both in the level of achievement and in the narrowing of gaps on a national level and relative to the countries participating in the PIRLS test.

Achievement and gaps in middle schools (Grade 8)

As in the analysis of primary education, we examine the gaps in Grade 8 based on the scores on the Meitzav test and the TIMSS test.[34]

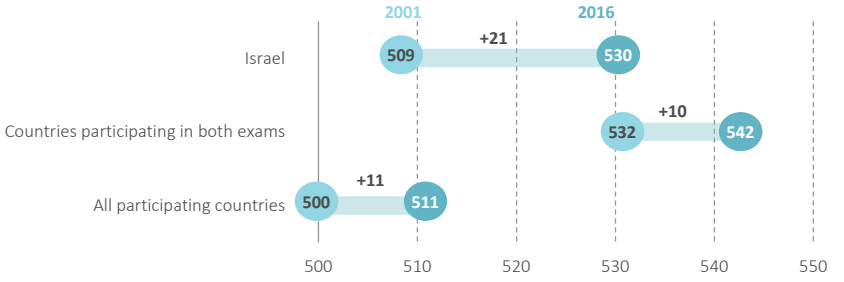
Figure 12 compares the Meitzav scores for Grade 8 students in 2008 to the corresponding scores in 2017.[35] It can be seen that the situation in the middle schools is similar overall to that in the primary schools. On the one hand, there are large gaps in achievement between the sectors in all of the subjects, while on the other hand there has been an improvement in achievement both in the system as a whole and in each sector separately. The gap between the sectors in mathematics remained basically unchanged while in English and science they have narrowed. It can also be seen that although the improvement in mathematics and English was relatively moderate, in science it was dramatic, particularly in the Arab sector. This raises the question of whether there is a link between this improvement, on the one hand, and the growing choice by students in the Arab sector to study in the engineering specializations in technological education in order to facilitate their future integration into engineering and medical professions.

34 To the best of our knowledge, no reliable studies have been done in Israel that allow a test of the differences in achievement between Grade 8 students in eight-year schools and those in middle schools (see also, Adi-Rakach, Biran & Friedman-Goldberg, 2011).

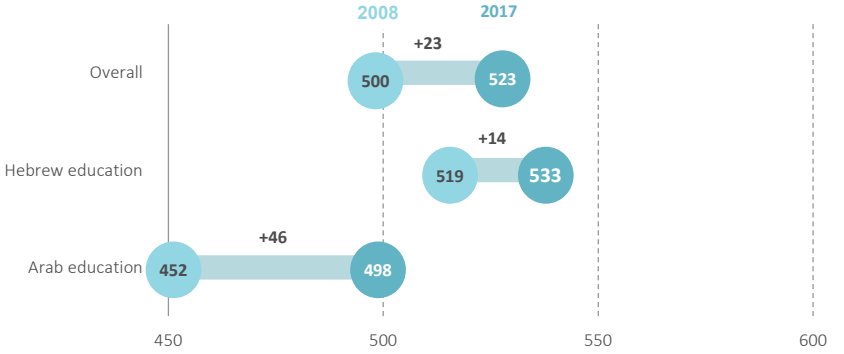
35 Here again and for the reasons given in footnote 31, we will not be using data published in 2018 and 2019, apart from the fact that in mathematics, Jewish students at a high or low socioeconomic level excel, while Arab students in the middle socioeconomic level excel. In English, Jewish students do better at all the socioeconomic levels. In science and technology, Arabs in the middle socioeconomic level do better. In all the subjects, when the comparison is made for each socioeconomic level separately, students in Hebrew education do much better overall than students in Arab education (RAMA, 2020).

Figure 12. Meitzav exam scores, Grade 8, 2008 and 2017

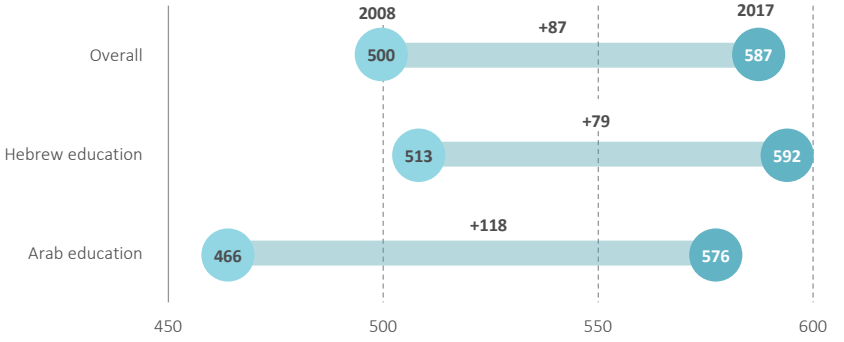
a. Mathematics



b. English (as a second language)



Sciences



Note: For coefficient of variation and standard deviation, see Appendix Table 1.
Source: Nachum Blass, Taub Center | Data: RAMA, 2017a

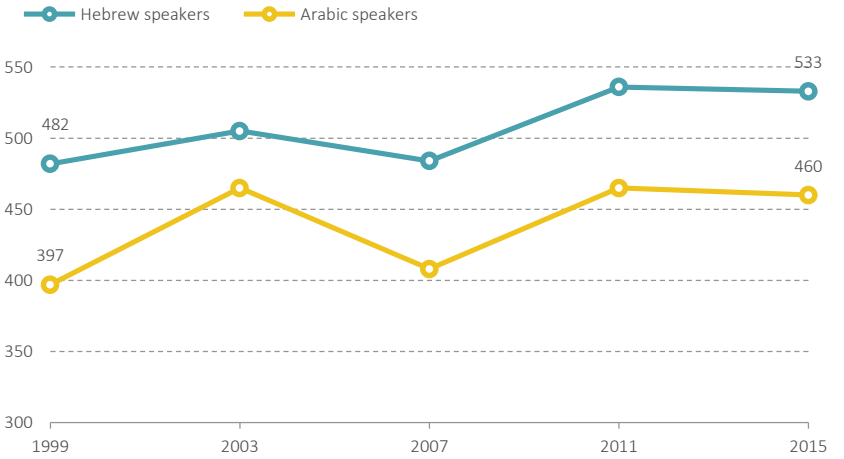
Gaps between the sectors according to socioeconomic differences

An examination of the gaps between Jews and Arabs while considering socioeconomic differences paints an unambiguous picture: when socioeconomic sectors are similar, the gaps are smaller and narrowing over time (see RAMA, 2017a, pp. 56–59). In 2008, the achievements in mathematics for Hebrew education students from the middle socioeconomic status background were 16 points higher than those of Arab system students (at that time there were no Arab students with a strong socioeconomic background), while in 2017, the gap was already 9 points in favor of the students in the Arab system. For students with a low socioeconomic status, the gap narrowed from 19 points in favor of the Jewish students to only one point in 2017. The situation was similar in English, although the gaps at each socioeconomic level are larger.

In the sciences, the switch occurred in 2017 when the achievements of students in the Arab education system were higher at all of the socioeconomic levels. The CBS analysis of the Meitzav scores for 2015 also indicates that the scores of the Druze students, for example, were even higher than those of the Jewish students in science and technology and the achievements of Christian students were higher than those of the Jewish students in English (Appendix Table 3; CBS *Statistical Abstract of Israel* 2017, Table 8.17). A similar situation is described by Maagan (2018).

TIMSS test scores allow an examination of the academic gaps among students in the middle schools in Israel relative to other developed countries as well as those between the Jewish and Arab sectors. Figure 13 presents the achievements of Hebrew and Arab system students in mathematics on the TIMSS test over the years. It clearly shows the upward trend in scores of both Jewish and Arab students and shows the increase in the Arab sector (63 percent versus 51 percent).

Figure 13. Student achievements in mathematics on the TIMSS exam over the last five exam cycles

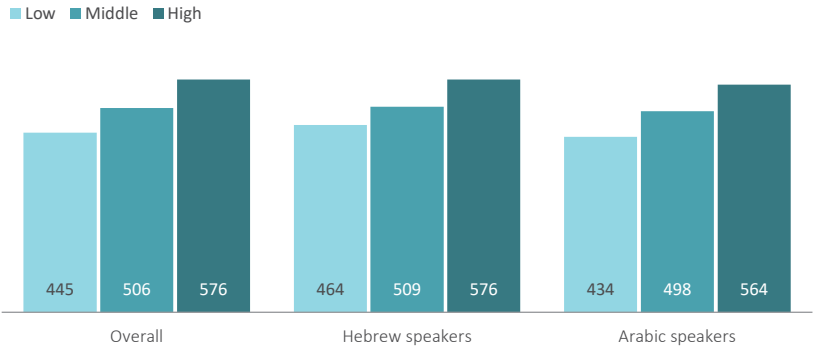


Source: RAMA, 2016

Appendix Figure 1 presents Israel's average score in mathematics and science relative to those of other countries participating in the international exams in those same years. The data clearly show that Israel's score in these two subjects improved at a faster rate than the average for the other countries. Figure 14 presents the large gaps in achievement according to socioeconomic background, both in the education system as a whole and within each sector (in mathematics the gaps are 112 points in the Jewish sector and 130 in the Arab sector). Nonetheless, when comparing the achievement of Arabic-speaking students to Hebrew-speaking students from the same socioeconomic background, the differences are much smaller. While the gap in achievement in mathematics between all Jewish students and all Arab students is about 70 points, that between students with the same socioeconomic background was only 30 points. The conclusion is that a significant share of the relatively large gap in achievement in mathematics between Jewish and Arab students is due to differences in socioeconomic background (Blass, 2017).

Figure 14. Exam scores in mathematics on the TIMSS 2015 exam

By sector and socioeconomic grouping



Source: RAMA, 2016

Achievements and gaps in high school education

The achievements in high school education and the gap between sectors and supervisory authorities will be described based on the bagrut exams, most of which are taken in Grade 12, and based on the PISA tests, which are administered in Grade 10 (15-year-olds).[36]

Bagrut exams

Attaining a bagrut certificate is a criterion for continuing on to higher education and the lack of one is often considered an obstacle to socioeconomic mobility. Therefore, the rates of bagrut qualification and the gaps between the various populations are often used as a criterion for defining success in the formal education system (preschool to Grade 12). Four major studies in recent years have looked at the issue of gaps in bagrut scores between various populations. Each of them shows that although the bagrut qualification rate has increased over the years, socioeconomic background plays a major role in determining the success rates on the exams and in turn the chance of being accepted to higher education in the future.

36 Although some of the bagrut exams are taken in Grade 10 and 11, in theory, they are taken in Grade 12.

Dahan, Mironichev and Dvir (2002) found that when parents' education is controlled for, the gaps in achievement narrow greatly and in many cases even disappear. In their opinion, this supports their basic assumption that "on average, populations are similar in personal skills. Jews have no advantage or disadvantage over Arabs and the same goes for Sephardic Jews relative to Ashkenazi Jews. Given this assumption and under conditions of equal opportunity, there are not expected to be any major differences in academic achievement between various populations." (ibid., page 7).

Zussman and Tsur (2008) show that for the school years 1992/93 through 2004/05: "…the gaps between the achievement of students from weak socioeconomic backgrounds and those from strong backgrounds narrowed during the period, while some of the gaps in indicators of excellence widened… All in all, there was a non-negligible improvement in the Israeli students' achievement in matriculation examinations…." (ibid., 1)

Friedlander and Eisenbach (2000) found that a student's achievement is strongly and positively related to his parents' level of education, among both Jews and Arabs. They predicted that differences in education by ethnic group among Jews would shrink in the future, although a similar conclusion with respect to the gap in education between Jews and Arabs is less convincing.

Shavit and Bronstein (2010) compared the achievements of students born in the late 1950s to those of students born in the 1970s and found "something of a decrease in the gap between these groups in the number of those eligible for matriculation certification, primarily as a result of the increase in the rate of eligibility among those from weaker sectors…(ibid., p 290) They based their conclusion on a decrease of 16 percent in the gap between students whose parents have an academic education and those whose parents have a primary education and a decrease of 9 percent in the gap between students whose parents have an academic education and those whose parents have a high school education (ibid., p. 290). The question of whether there has been *"somewhat of a decrease"* or a *"significant decrease"* is subject to interpretation.

Stages in the bagrut process and how the quality of the exams and their level are defined

Any discussion of the bagrut exams usually relates to four stages in the process, four definitions of bagrut certificate quality and five definitions of rates of success on the bagrut exams.

The four stages necessary to complete a bagrut certificate are making it to Grade 12, completion of Grade 12, taking the exams, and passing them. Since in recent years, almost 95 percent of every cohort completes Grade 12, the discussion of the first two stages is unnecessary.[37]

Regarding bagrut certificates and their quality, there are three levels: The first relates to a bagrut certificate on the lowest level, namely with a score of "pass" on all the compulsory subjects included in the certification. The second is a bagrut certificate that fulfills the requirement to study at an institution of higher education, which includes at least three units in mathematics, four in English, and extended study in a study major. The third is a bagrut certificate with honors, which includes at least five units in mathematics and English.

The five definitions of rates of success require a more detailed explanation:

1. The bagrut qualification rate **within the entire age cohort**: This definition measures Israeli society's success in having children reach the final stage of studies in the formal education system. This also includes Haredi and Arab students living in East Jerusalem, many of whom do not take the bagrut exams for nationalistic or religious reasons. This definition can also be divided into two: one definition that includes all those eligible for bagrut at the completion of their studies[38] and the other that includes those eligible for a certificate at the end of a defined period after the completion of Grade 12 (see below).
2. The bagrut qualification rate **within the relevant age group**: This definition does not include students who choose not to take the bagrut exams (Arabs from East Jerusalem and Haredi students, based on religious or nationalistic commitment). This definition measures the success of the education system (rather than that of society as a whole) in getting students to the final stages in the formal education system. Up until 2014, this data was included in Ministry of Education reports. There is a major difference between this definition and the first one since it essentially absolves the Ministry of Education of responsibility for populations that refuse to take the exams for reasons not under Ministry control.

37 This does not apply to residents of East Jerusalem and the Haredi who do not take the bagrut exams for ideological reasons nor to the Bedouin whose dropout rates prior to Grade 12 are relatively high.

38 As noted in footnote 10, prior to 2014, the Ministry of Education published this statistic every year together with the results of the exams. For some reason, from that year onward, it no longer did so and from 2015 this data is not available to the public.

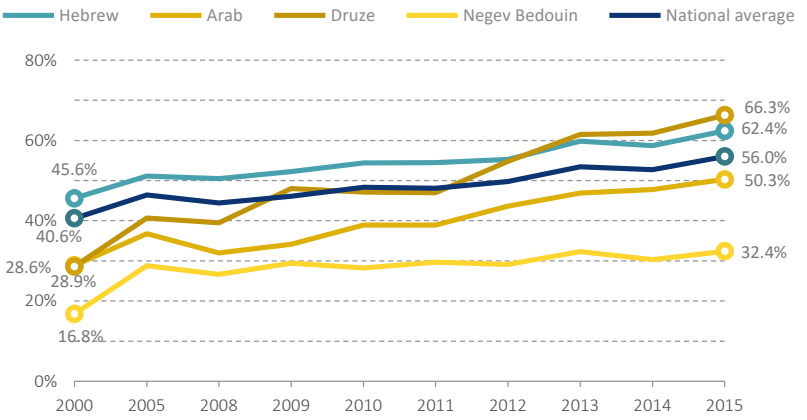
3. The bagrut qualification rate among all Grade 12 students: This definition ignores students who dropped out of school before reaching Grade 12. This is the most common definition in the tables based on the Statistical Abstract of Israel.
4. The bagrut qualification rate among Grade 12 students taking the exams. This definition ignores students in Grade 12 who do not take the bagrut exams.
5. The bagrut qualification rate among students taking the exams within eight years of completing Grade 12 and had taken the exams during high school but failed at that time to qualify or complete all of them.[39]

Over the years, the differences between the definitions have diminished since the attendance rates for Grade 12 and the share of students taking the bagrut exams within each cohort have been on the rise in all sectors. In what follows, it is worth noting the definition that is being used, which is determined according to both the goal of the discussion and the accessibility of the data.

We begin with a discussion of the trend in bagrut qualification rates within the age group considering the importance in having as many students as possible complete and qualify for a full bagrut. This is particularly important in the case of students from weaker socioeconomic backgrounds, for whom the bagrut certificate is key in enabling continuation on to post-high-school and/or academic studies. Figure 15 clearly shows that the bagrut qualification rates, according to the most stringent definition, grew substantially from 1990 to 2015. In view of the data, which indicate an improvement in the bagrut rates also according to the other definitions, it appears that the trend has continued in recent years.

39 It is the practice of the CBS in its *Statistical Abstract* to publish the bagrut qualification rate among all those who took the exams within eight years of completing their high school studies. Based on the assumption that the bagrut certificate is a condition for continuing on to academic studies an approximation of this statistic can be obtained from a different table in the Statistical Abstract which presents the rate among those with 13 (or alternatively 16+) years of education.

Figure 15. Share of those qualifying for bagrut certification out of the age group
By sector



Source: Blass, 2017, Figure 9

We now focus on a description of the achievements and gaps among students reaching the highest level of the bagrut exams, namely students who attain a bagrut with honors. This focuses on the final stage of formal education, in which achievements and gaps are the most evident. During this period, have gaps between the strongest and weakest students widened or narrowed? An interesting discussion of this question is taking place in the US. On one side of the spectrum are Hanushek, Peterson, Talpey, and Woessmann (2019) who claim that, despite decades of investment, the gaps have not narrowed. On the other side is Reardon (2011) who claims that the gaps have widened. Note that no one is claiming that the gaps have narrowed.

Figures 16a and 16b compare students with a strong socioeconomic background to those with a weak socioeconomic background. The criteria used to determine socioeconomic background are mother's years of schooling and the residential socioeconomic cluster while the criterion for achievement is a bagrut certificate that meets university requirements. An examination of the data according to mother's years of schooling indicates that there has been little change in the Hebrew education sector (the gap between students whose mothers have up to eight years of education and students whose mothers have

16 years of education was 49 percentage points in both 2007 and 2015) while in the Arab sector the gap grew somewhat (from 49 percentage points in 2007 to 56 percentage points in 2015). When the criterion is student's residential socioeconomic cluster, the gap between students living in cities with the highest socioeconomic cluster and those living in cities with the lowest cluster grew in the Hebrew education sector from 64 percent points in 2007 to 71 percentage points in 2015 while in the Arab sector the gap narrowed from 19 percentage points in 2007 to 3 percentage points in 2015. Overall, it can be said that gaps in achievement between the groups according to socioeconomic status grew somewhat in the Hebrew education sector while they remained unchanged or narrowed somewhat in the Arab sector.

Figure 16a. Grade 12 students who fulfill the admissions requirements for higher education by mother's years of schooling, 2007 and 2015

Hebrew and Arab education sectors

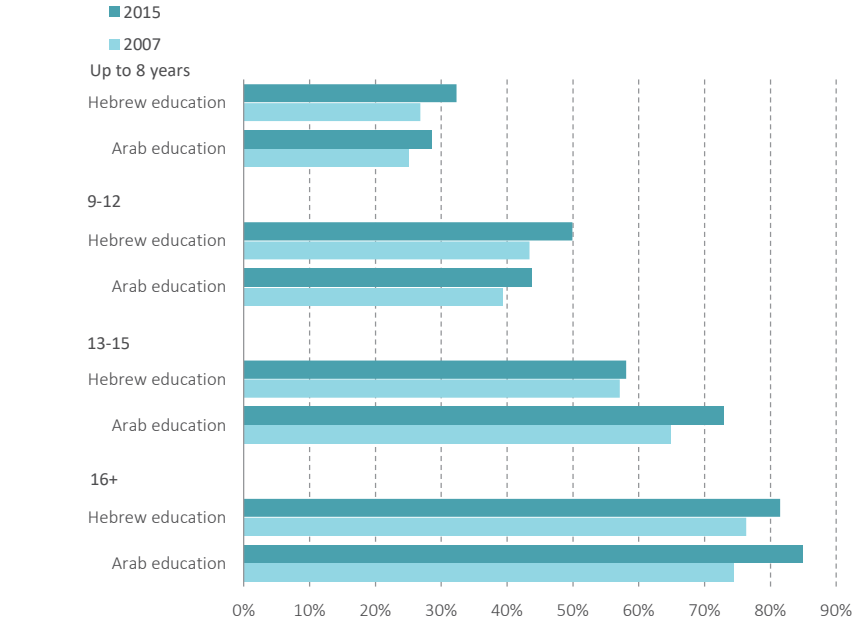
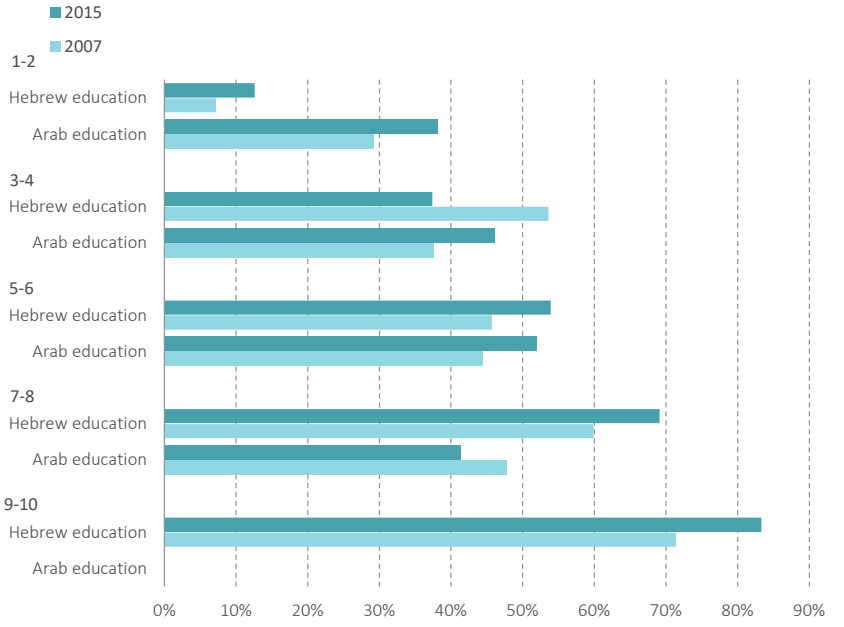


Figure 16b. Grade 12 students who fulfill the admissions requirements for higher education by residential socioeconomic cluster, 2007 and 2015

Hebrew and Arab education sectors



Source: Nachum Blass, Taub Center | Data: CBS, ***Statistical Abstract of Israel*** 2009; 2017

A different perspective on Figure 16 points to some additional insights:

The bagrut qualification rates at a level that meets the university admission requirements rise with an increase in mother's years of schooling or when the student resides in a residential area of higher socioeconomic status (and obviously this is true for the share of those taking the bagrut exams and those who receive a bagrut qualification at any level). This remains true throughout the sample period and among students in both Hebrew and Arab education.

The absolute gap between students in Hebrew and Arab education in qualifying for a bagrut certificate that meets university admission requirements fell from 14.3 to 11.4 percent during the sample period while the relative gap (the rate in the Arab sector relative to that in the Hebrew sector) rose from 0.7 to 0.8.

The most relevant comparison between students in Hebrew and Arab education is between students whose mothers' have 9 to 12 years of schooling or between those who live in a city with a socioeconomic cluster of 3 or 4.[40] Among students whose mothers' have between 9 and 12 years of schooling, the bagrut qualification rates among Arabs was lower by 4 percentage points in 2007 and by 6 percentage points in 2015.

In 2007, among students living in cities with a socioeconomic cluster of 3 and 4, the bagrut qualification rate was higher among those in Hebrew education by about 16 percentage points; in 2015, the situation had reversed and the share of students with b bagrut qualification among Arab students was about 9.2 percentage points higher than their peers in Hebrew education. This surprising finding indicates that in localities of similar socioeconomic status, students in Arab education are higher achievers today.

Figure 17 presents school attendance rates bagrut qualification rates at a level of five units in mathematics and English, the study majors that receive the most attention from the Ministry of Education. The data reveal a number of trends:

A. In these two subjects, the number of students studying at the five-unit level in all sectors and in all supervisory authorities grew faster than the total number of students. However, the number of Haredim taking the bagrut exam in mathematics at a level of five units is negligible; they are, also, most likely girls. In English, the change is more significant.
B. The fastest growth was in the Bedouin sector. It should be remembered that the rates in this sector were low to start with. The lowest rate of growth was in the Hebrew State education system.
C. The average score among Hebrew education students in the two subjects was in general higher than the average among Arab students although only by a few points (not more than 10) bearing in mind the much lower socioeconomic status of Arabic-speaking students.

40 A comparison of students whose mother' have between 0 and 8 years of schooling is not relevant due to the small number of Jews in this category, while a comparison of students whose mothers have 13+ years of schooling is not relevant due to the small number of Arabs in this category. The comparison between cities in cluster 1 and 2 is not relevant since the Jewish cities in this cluster are almost all Haredi and few Haredi students take the bagrut exams. A comparison between students in Hebrew and Arab education in socioeconomic cluster 5 to 10 is not relevant due the few Arab students living in such cities and the low socioeconomic level of those who attend schools in mixed cities in these clusters (Yaffo and Tel Aviv).

Figure 17. Number of students, average exam score, and the number qualifying for a bagrut certificate at the 5-unit level in mathematics and English, 2001 and 2016

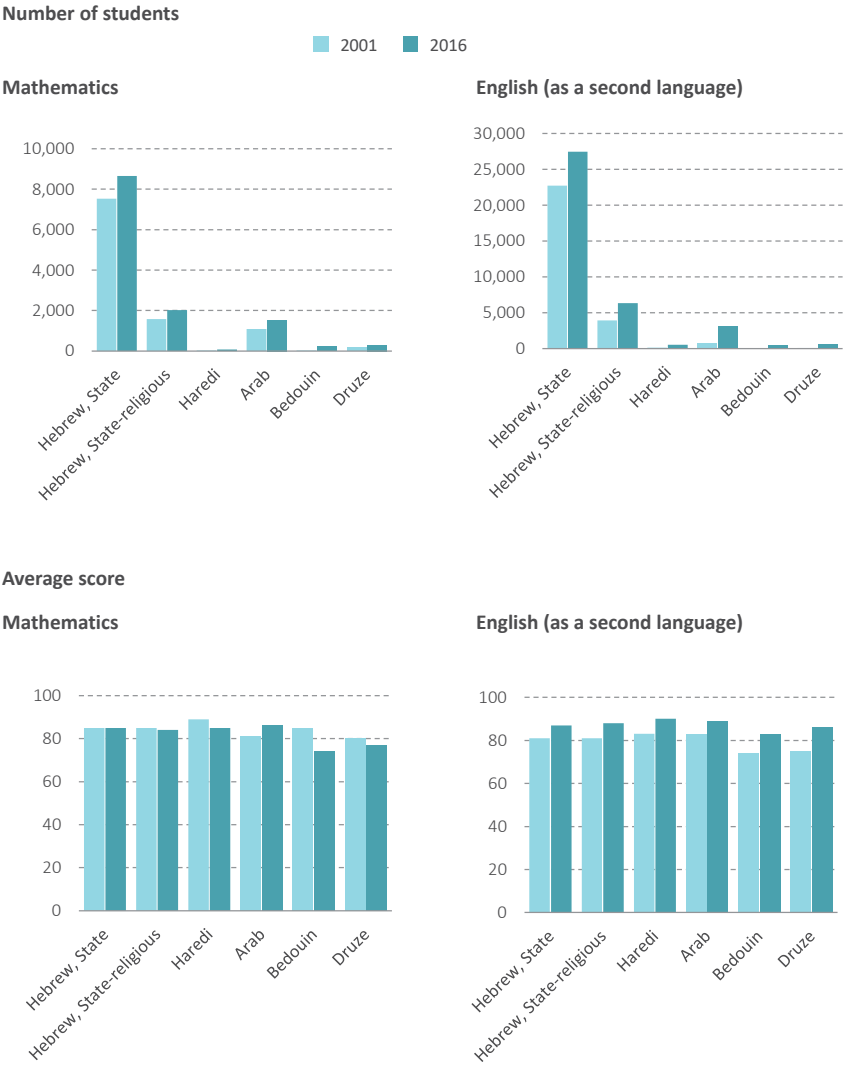
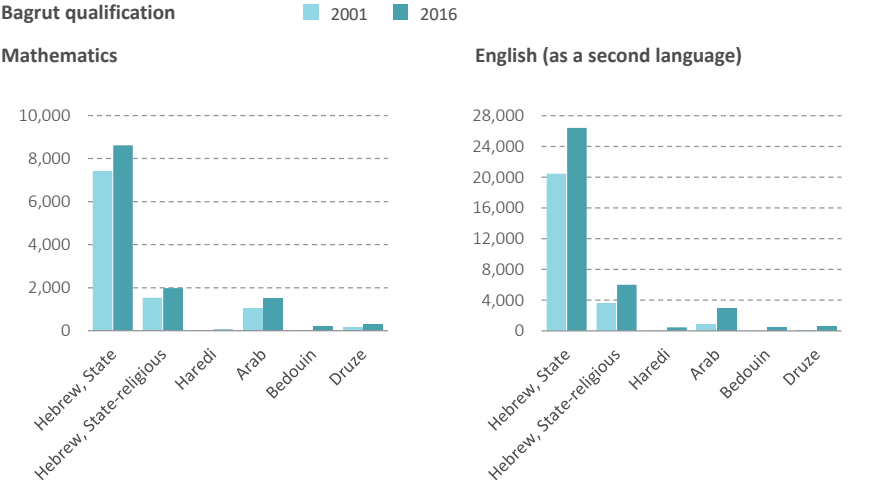


Figure 17 (continued). Number of students, average exam score, and the number qualifying for a bagrut certificate at the 5-unit level in mathematics and English, 2001 and 2016



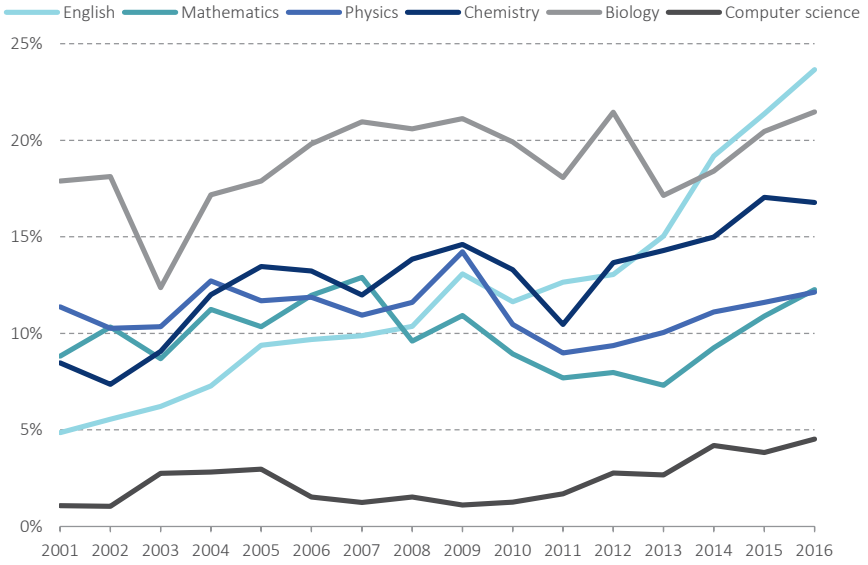
Note: For coefficient of variation and standard deviation, see Appendix Table 4.

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

The standard deviations also provide a number of insights. While in English the standard deviations declined substantially from 2001 to 2016 in all the sectors, in mathematics, they increased during this period, apart from in the State-religious system and the Haredi system. Another point worth noting is that despite the similar average scores in all the sectors, there is no uniformity in the standard deviations.

With respect to the rate of students graduating with a bagrut of five units in other subjects, Figure 18 clearly shows that, between 2001 and 2016, there was an increase in bagrut qualification rates with five units in science subjects. The data also show that in some of the subjects the trend was not continuous and fluctuated. Nonetheless, since 2013, there was a continuous increase in all the subjects in the figure. It is unclear if this implies higher aspirations on the part of students, pressure from parents, and encouragement by principals, or a decline in the exam difficulty at the higher levels.

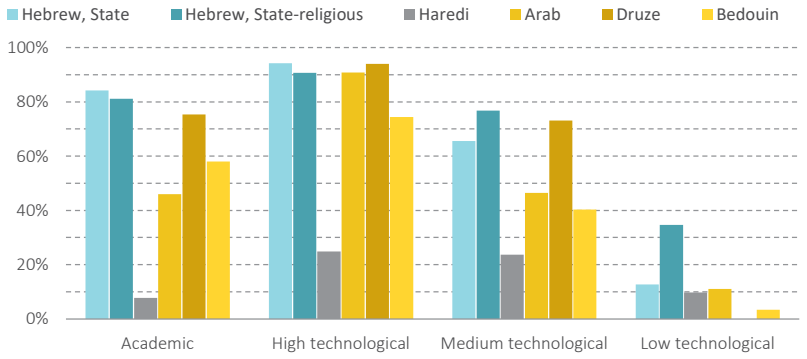
Figure 18. Share of students qualifying for a bagrut certificate with 5 units of study in various majors out of all those taking the bagrut exams



Source: Nachum Blass, Taub Center | Data: Virtual Research Room, Ministry of Education

A recent study carried out by the Taub Center (Fuchs, Yanay & Blass, 2018) which looks at bagrut exam achievement and technological education indicates that the bagrut qualification rates on the highest level in each sector and supervisory authority are achieved by students in the high technology track. Bedouin students in this track had a success rate of almost 75 percent on the bagrut exams, despite their socioeconomic background and their learning conditions, and thus their bagrut rates approach those in academic schools in the State school system and the State-religious school system in the Hebrew education sector (Figure 19). The other Arabic-speaking students attain outcomes similar to those of their Hebrew education counterparts, although in the academic schools the situation is different.

Figure 19. Bagrut qualification by educational sector and track, 2017



Source: Fuchs, Yanay, and Blass, 2018, Figure 7

There are those who doubt the reliability of achievements in the Arab and Druze sector, just as there are those who doubt the reliability of the Meitzav tests. It is claimed that in these sectors there is a high rate of cheating. Even if cheating rates are higher in the Arab sector than in the Hebrew sector, it is much harder to cheat on attendance rates and participation rates than on bagrut exams. Therefore, if there is any connection between attendance rates and motivation to study (variables that are reflected in the expanded study of a study major and in taking the bagrut exams) and success on the bagrut exams (in terms of both their level and the scores), then this connection should exist in the Arab sector as it does in the Hebrew sector.[41]

41 In a study that looks at the achievements in the Arab education sector (Blass, 2017), Ministry of Education data are presented on cheating on exams, which were provided to the author at his request (the data were not available to the public). According to the data, which are correct as of 2017, the share of exams disqualified in the entire education system between 2012 and 2016 was less than 1 percent. The rates of copying or assistance from a teacher during an exam, according to 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 disqualified exams ranged from 1.76 percent to 1.36 percent and in the Druze sector from 1.16 percent to 0.85 percent. Also, since there are no large differences in the standard deviations of scores in English and mathematics, and when there are, they show a different trend, suggests that with regard to cheating, the differences between the two sectors are not substantial. Nonetheless, the implication of the standard deviations in this context call for a more in-depth examination. According to a document published by the Ministry of Education, 0.8 percent of the exam booklets were disqualified in 2016 and 1 percent disqualified in 2017 (see Ministry of Education, 2018).

The PISA test

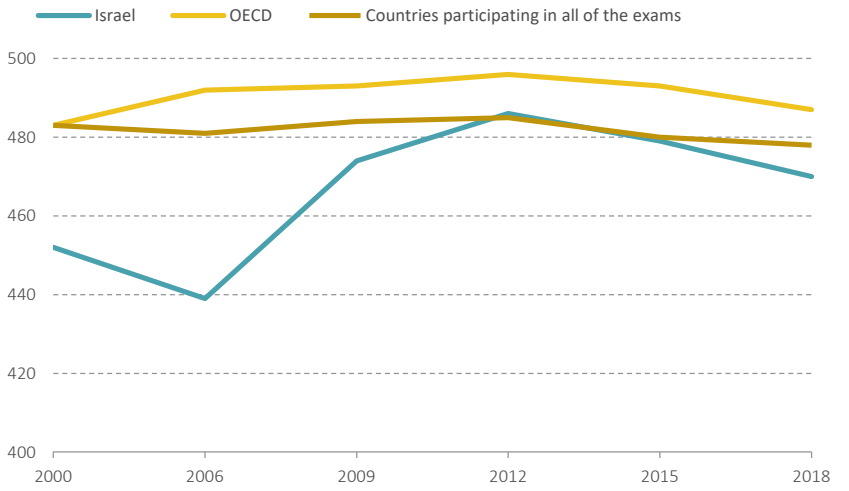
Israel has participated in the PISA test since its inception.[42] The results of the test clearly show that Israel's students' scores are lower than the average for the participating countries while the gaps between the best and worst performing students are the largest. Nonetheless, Israel's average scores were in line with expectations given the conditions under which the education system operates in Israel, GDP levels, and education expenditure per student (RAMA, 2016; Blass, 2016), class size (Feniger & Shavit, 2011) and incidence of poverty among students in Israel (Cahan, Casali, Herskovitz & Segev, 2017).

Notwithstanding this discouraging picture, and the public discourse about it, Figure 20 shows that, since 2000, there has been an improvement in the scores for reading. Furthermore, while Israel improved its score in the last test relative to 2006, the average score of the countries participating in all of the exams who are members of the OECD declined. However, the improvement in Israel (as well as in the rest of the countries participating in all of the tests) came to a halt in 2012, and since then, there has been no improvement and even somewhat of a reversal. The picture in Israel is similar to those countries also with respect to the size of the gap between strong and weak students. Thus, the standard deviation decreased between 2006 and 2012 and increased after that; in 2018, it was even larger than in 2000. As a result, the coefficient of variation, which showed a downward trend from 2006 until 2012, has increased since then, and, in 2018, it was similar to what it was in 2006. It is worth mentioning that, as in the case of Israel, there has been a widening of gaps among countries participating in all the tests, though at a slower rate.[43]

42 The first PISA test was given in 2000 and Israel participated in its own special round in 2002. The results were added to those of the 2000 test, and, as a result, Israel did not participate in 2003.

43 In the RAMA report, emphasis was placed on the fact that while in the longer term the change in the scores for reading in Israel between 2000 and 2018 were positive and statistically significant, there was no improvement in the 30 countries participating in all the tests since 2000 (RAMA 2019, p. 77). A similar trend was reported for mathematics, though not science.

Figure 20. PISA reading literacy exam scores

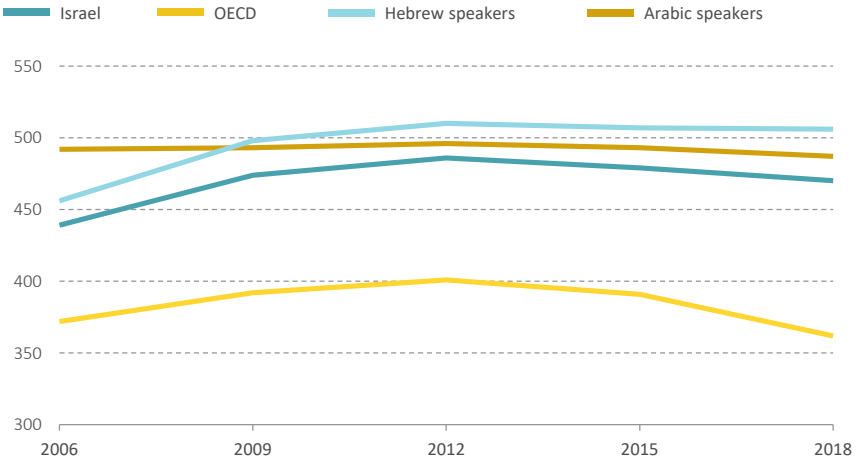


Note: For coefficient of variation and standard deviation, see Appendix Table 4.
Source: Nachum Blass, Taub Center | Data: RAMA, 2019

Figure 21 looks at the various populations in Israel. The achievements of Hebrew-speaking students are higher than the OECD average (506 versus 487) but those of Arabic-speaking students (a score of 362) were lower than those of both the Hebrew-speakers and the OECD average. Over time, while the scores of the Hebrew-speaking students have risen by 50 points since 2006, with no change between 2012 and 2018, those of Arabic-speaking students fell overall by 10 points since 2006, following an increase up to 2012 and a fairly sharp decline of 40 points up to 2018.[44]

44 Although the decline in the scores of the Arabic-speaking students since 2006 was not statistically significant, it was between 2015 and 2018.

Figure 21. Reading literacy — averages over time



Source: RAMA, 2019, p. 81

The data for the 2018 PISA test, particularly in the case of Arabic-speaking students, contradict the data that indicate a significant improvement in the Arab sector during that period and a reduction in gaps between it and the Hebrew sector, as described here and in other places (Blass, 2017). Other "external" data, such as the psychometric exam, in which Arabs of both genders improved their scores from 2005 until 2017 by more than Jews,[45] and the more rapid increase in the share of Arabs with an academic education relative to Jews, also contradict the 2018 PISA data.[46]

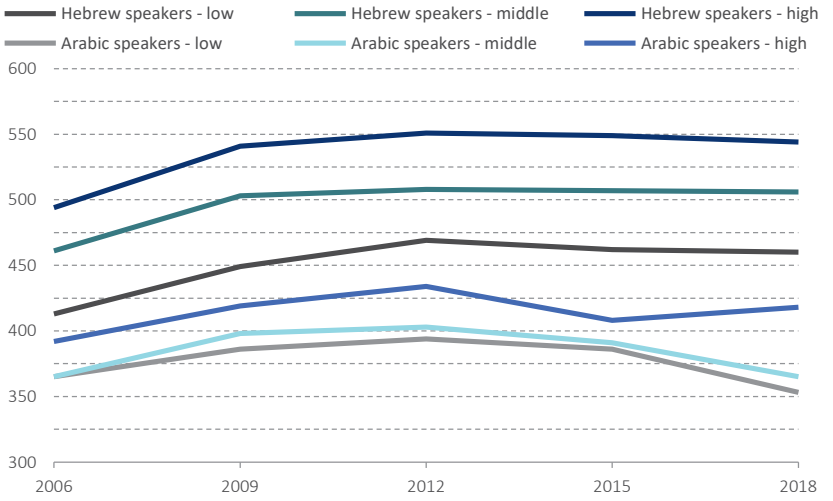
45 An average improvement of 38 points among Arab Israeli men versus 15 points among Jewish men, and 24 points among Arab Israeli women with only 11 points among Jewish women (Krill & Amaria, 2019).

46 According to the CBS Statistical Abstract of Israel 2018, Table 4.80, the share of Jews with 13+ years of schooling rose from 45.4 percent in 2005 to 56 percent in 2018 while among Arabs it rose from 19.1 percent to 26.4 percent. Although the gap has widened, the increase among the Jews was 23 percent while that among the Arabs was 38 percent. Another way of putting this is that the ratio of Jews with 13+ years of schooling to Arabs with 13+ years of schooling fell from 2.37 in 2005 to 2.15 in 2018.

The picture with respect to differences between students according to socioeconomic background, as presented in Figure 22, is similar to the overall picture. Thus, until 2012, there was a rapid and continuous increase for all the groups. There was little change among Hebrew education students between 2012 and 2018 and a mild decline among the Arab students between 2012 and 2015, which accelerated among most of them between 2015 and 2018 (apart from students with the highest socioeconomic level, although this involved only a small number of students and their scores are still low relative to 2012).

Figure 22. PISA exam scores in reading

By sector and socioeconomic grouping



Source: Nachum Blass, Taub Center | RAMA, 2019

How can the difference between the two sets of data be explained? We are unable to offer a convincing and well-substantiated explanation. There are those who explain the phenomenon based on the fact that cheating has higher stakes in the Arab sector; however, this does not appear to be all that plausible, as we explained previously in the discussion of the bagrut exams. Others suggest that the bagrut results are for Grade 12 while the PISA results are for Grade 10 and some are even for Grade 9. This explanation is not

convincing either since, in general, gaps increase with age. A third explanation is the possibility that Arab students take international exams less seriously than their Jewish counterparts (and perhaps are even hostile towards them due to increasing nationalistic tension between the sectors in Israeli society; see Ofek-Shani, 2019). In any case, these explanations are only conjectures. The fact that there is a major gap between the 2018 PISA data and the other data presented, and in particular with respect to the narrowing of gaps between Jews and Arabs, remains valid, which calls for an in-depth examination and monitoring of the situation.

Conclusion

During the past twenty years, the formal education system in Israel (preschool to Grade 12) has prided itself on achievements in narrowing academic gaps, both between sectors and between students from different socioeconomic backgrounds.

However, there is a still a long way to go in order to achieve equality. Alongside the attendance rates that are close to one hundred percent up to Grade 12 ("horizontal stratification"), there are still major differences in the prestige of schools and between the various learning tracks, particularly in primary education ("vertical stratification"). These gaps are even more pronounced in the high school system and higher. This is seen in many other countries as well: when gaps in the level of basic education are reduced, families of a higher socioeconomic status use a variety of means to maintain their "advantage." These include strategies to maintain both a vertical advantage, such as the share of those studying towards an MA or PhD, and a horizontal advantage, such as the share of their children entering prestigious fields of study like medicine (Feniger, Mcdossi & Ayalon, 2015; Lewin-Epstein & Cohen, 2018).

Academic achievement is low in Israel relative to both the expectations of the Israeli public and the achievements of students in most of the developed countries. The gaps in achievement are higher than in the countries to which Israel compares itself.[47]

47 Nonetheless, Israel's rapid progress relative to other countries has been recognized also in the OECD's last report, which singled out only three countries (Israel, Chile, and Germany) that had both improved their levels of achievement and had reduced gaps in reading comprehension (OECD, 2018).

In this survey, we have described the progress made by the education system in preventing dropouts, reducing differences between the various learning tracks, and narrowing gaps in achievement, without trying to deemphasize the significant gaps of each type between the various populations. This is particularly the case with the international tests, of which the 2018 PISA test is the best example. The fact that the gaps are closely related to socioeconomic levels and are identified with two main populations, i.e., Arab Israelis and Haredim, is of particular concern. In our estimation, the achievements of the education system, as presented here, argue against claims of a lack of benefit from the investment of resources and effort in the system. We believe that we have proven the opposite to be true. Nonetheless, the continued existence of gaps — notwithstanding what has already been achieved — calls for the Ministry of Education to persevere in narrowing them. It is of particular concern that in recent years there has been little change and even somewhat of a reversal, both in the rate of improvement in achievement and in the narrowing of gaps.

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Appendix

Appendix Table 1. Coefficient of variation (CV) and standard deviation (SD) for Figures 8, 9, 10, 12, and 20

		Overall population participating in the exams		Hebrew education		Arab education	
		CV	SD	CV	SD	CV	SD
Meitzav Grade 5 (Figure 8)	Mathematics						
	2008	0.20	100.0	0.18	93.8	0.22	99.0
	2017	0.13	75.6	0.12	68.8	0.14	77.0
	English (as a second language)						
	2008	0.20	100.0	0.19	96.7	0.22	105.2
	2017	0.17	91.6	0.17	91.6	0.16	86.4
Meitzav Grade 5 School Nurture Index (Figure 9a and 9b)	Mathematics						
	Low socioeconomic grouping						
	2008	0.22	99.7	0.20	96.6	0.22	95.3
	2017	0.14	75.3	0.14	75.7	0.14	75.0
	Middle socioeconomic grouping						
	2008	0.19	95.2	0.18	92.3	0.20	94.4
	2017	0.13	73.6	0.13	73.2	0.12	69.0
	High socioeconomic grouping						
	2008	0.16	86.9	0.16	87.0		
	2017	0.11	64.4	0.11	64.7	0.12	67.2
	English (as a second language)						
	Low socioeconomic grouping						
	2008	0.23	107.2	0.21	102.1	0.25	112.8
	2017	0.17	88.7	0.18	92.5	0.16	84.2
	Middle socioeconomic grouping						
	2008	0.19	94.6	0.20	99.0	0.18	90.9
	2017	0.17	91.3	0.18	95.0	0.14	79.0
	High socioeconomic grouping						
	2008	0.16	85.0	0.16	84.8		
	2017	0.15	83.1	0.16	88.5	0.12	69.1

Appendix Table 1 (continued). Coefficient of variation (CV) and standard deviation (SD) for Figures 8, 9, 10, 12, and 20

		Israel		Countries participating in both exams		All countries participating in the exams	
		CV	SD	CV	SD	CV	SD
PIRLS (Figure 10)	2001	0.19	96.7	0.14	74.5	0.20	100.0
	2016	0.17	90.1	0.14	75.9	0.16	81.8
Meitzav Grade 8 (Figure 12)	Mathematics						
	2008	0.20	100.0	0.20	102.4	0.19	89.5
	2017	0.18	96.1	0.17	92.7	0.19	96.5
	English (as a second language)						
	2008	0.20	100.0	0.19	98.6	0.19	85.9
	2017	0.16	83.7	0.17	90.6	0.15	74.7
	Science						
	2008	0.20	100.0	0.18	92.3	0.23	107.2
	2017	0.19	111.5	0.19	112.5	0.19	109.4
		Israel		OECD		Average of all countries taking the exams	
PISA Reading literacy (Figure 20)	2000	0.24	109	0.20	95	0.20	95
	2006	0.26	119	0.20	99	0.20	97
	2009	0.23	111	0.19	93	0.19	91
	2012	0.23	110	0.19	94	0.19	93
	2015	0.24	114	0.19	96	0.20	94
	2018	0.26	124	0.20	99	0.20	97

Note: Coefficient of variation (CV) adjusts for the size of the average. A decline in the CV indicates a decrease in inequality, and vice versa.
Source: Nachum Blass, Taub Center | Data for Figures 8, 9, 12: RAMA, 2017a; Data for Figure 10: RAMA, 2017b; Data for Figure 20: RAMA, 2019

Appendix Figure 2. Average Meitzav exam score, Grade 5, 2015

By socioeconomic background

	Mathematics		English (as a second language)	
	Hebrew education	Arab education	Hebrew education	Arab education
Overall population	63.8	51.2	64.6	59.0
School Nurture Index				
1–2		47.8		56.0
3–4	61.6	56.6	59.1	62.8
5–6	59.5		59.8	
7–8	66.5		68.5	
9–10	69.9		70.2	
Mother's years of schooling				
Up to 8 years	52.1	48.5	54.4	53.8
9–12	58.6	52.9	59.5	59.5
13–15	65.9	61.4	66.4	70.8
16+	69.9	62.9	70.2	73.8
Parent's income decile				
1–2	56.2	46.8	60.3	54.5
3–4	58.6	51.3	59.6	57.2
5–6	60.8	55.0	60.8	63.5
7–8	64.9	60.0	64.6	71.0
9-10	71.1	63.4	72.3	75.8
Religion				
Jews	64.2		64.4	
Muslims		50.2		58.0
Christian Arabs		55.6		69.1
Druze		60.7		63.6

Note: Empty cells mean that there were no data or very few cases.
Source: Nachum Blass, Taub Center | Data: CBS, *Statistical Abstract of Israel 2017,* Table 8.10

Appendix Table 3. Achievement gaps between students in Hebrew and Arab education on the Meitzav exams, Grade 8, 2015

By background characteristics

	Mathematics		English (as a second language)		Science	
	Hebrew education	Arab education	Hebrew education	Arab education	Hebrew education	Arab education
School Nurture Index						
1–2	46.6	38.9	56.5	48.1	41.2	38.9
3–4	48.6	47.8	60.2	60.8	45.0	45.5
5–6	51.1		67.3		48.8	
7–8	62.8		79.8		56.3	
9–10	66.0		84.7		58.3	
Mother's years of schooling						
Up to 8 years	34.1	37.2	50.5	47.9	36.2	38.5
9–12	48.2	43.2	64.1	56.8	45.9	41.8
13–15	61.0	59.3	77.2	76.5	55.1	55.0
16+	67.1	63.0	82.1	81.9	59.5	59.6
Parent's income decile						
1–2	45.5	37.7	62.6	46.2	43.7	36.6
3–4	47.4	42.2	64.5	53.6	45.8	41.1
5–6	50.9	46.9	67.3	60.2	48.2	45.8
7–8	58.5	55.7	73.6	72.4	53.2	53.1
9–10	68.5	64.6	83.5	81.4	60.0	
Religion						
Jews	56.9		72.2		52.0	
Muslims		41.5		51.9		40.2
Christina Arabs		55.4		77.8		50.7
Druze		54.6		62.3		55.1

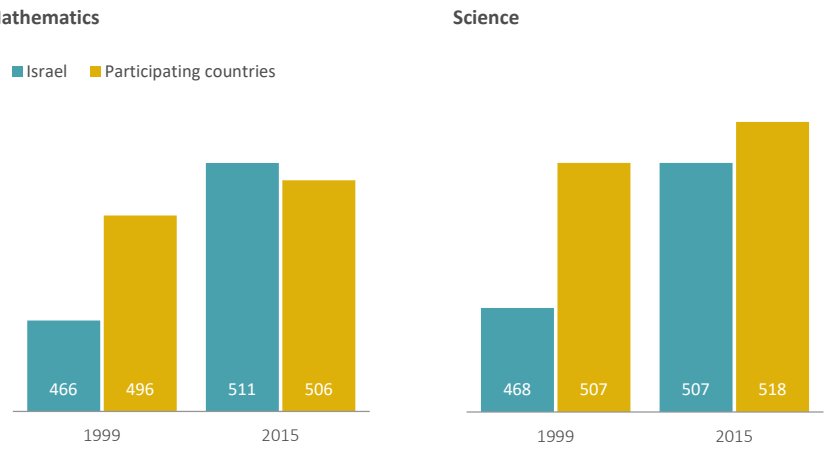
Source: Nachum Blass, Taub Center | Data: CBS, *Statistical Abstract of Israel 2017*

Appendix Table 4. Standard deviations for Figure 17

		Standard deviation					
		State	State-religious	Haredi	Arab	Bedouin	Druze
Bagrut qualification at the 5-unit level	Mathematics						
	2001	11.8	12.1	11.6	11.0	8.2	12.9
	2016	12.1	11.8	9.5	12.3	13.4	15.3
	English (as a second language)						
	2001	10.4	10.1	9.2	8.9	13.5	10.0
	2016	7.5	7.5	6.5	6.7	8.3	8.1

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

Appendix Figure 1. TIMSS exam scores in mathematics and science, Israel and countries participating in the exams, 1999 and 2015



Source: Nachum Blass, Taub Center | Data: TIMSS reports