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This article examines the deteriorating status of the humanities and social sciences versus mathematics and the sciences in the curriculum of Israeli high schools. We examine this tendency by conducting a multi-level analysis of the effect of school and individual characteristics on inequality in curriculum specialization on a sample of academic-track 12th-graders in 1989. The main findings are (a) more able students, males, and members of the privileged Jewish ethnic group in Israel tend to specialize in mathematics and the sciences, and (b) students' characteristics are the major determinant of course-taking in mathematics and the sciences, whereas school policy is central regarding the humanities and social sciences. The article discusses social implications of the findings.

The centrality of mathematics and the sciences constitutes a major feature of the curriculum of secondary education in many western industrial societies (Apple, 1990; Kamens & Benavot, 1992). The research treats this centrality mainly by studying the time allocated in the curriculum to these school subjects compared to the humanities and social sciences. The relative share of mathematics and the sciences in the curriculum increases with time, while that of the humanities decreases; this is interpreted as an indication of changes in the status of these areas of study in the hierarchy of school subjects: The prestige and social esteem of mathematics and the sciences are improving while those of the humanities are deteriorating (see Kamens & Benavot, 1992, for a global comparison; Goodson, 1983, for Britain; Kliebard, 1992, for the U.S.; Mitter, 1995, for Germany; Morris, 1995, for Hong Kong).

Although we find expressions of intellectual concern with the deteriorating prestige of the humanities (Bloom, 1987; Hirsch, 1988; Iram, 1995; Kliebard, 1992), the empirical research on their status in the school curriculum is still limited. Indicators of the status of the different subject areas, beyond differential allocation of time, have hardly been studied in primary and secondary education. One exception is the study of Morris (1995), who reported that in Hong Kong mathematics, the sciences, and languages are given special weight in calculating the grades of students in secondary education. More evidence exists on the differential status of these areas of study in higher education. A recent OECD comparative project indicates that in Japan only a minority of the students of the humanities and social sciences attend prestigious state universities and that in France, Germany, and the Netherlands, the humanities belong to the open, non-selective sector of the universities, which is associated with low employment prospects (Raivola, 1995).

In this article, we wish to contribute to the research of the status of the two subject areas by referring to the social profile of the students who study them in Israeli secondary education. We focus on this aspect because the social profile of the students who study the various school subjects is considered an inherent part of the stratification of these subjects. Higher-status knowledge is offered to and preferred by higher-status students, who usually do better in school. The ability and social identity of the students, in turn, reflect on the subjects' status (Goodson, 1983).

Israel is a particularly appropriate arena for studying the matching between students and the two subject areas because of a special characteristic of the curriculum of secondary education: Students get the option of choosing between specializing in either mathematics and the sciences or in the humanities and social sciences. Consequently, the identification of the social profile of the students who study each area is straightforward, and the analysis is more reliable.

The distinction between specialization in the different areas of study is unique to Israel, compared with other western societies. In some countries, like the United States, college entry examinations balance the requirements in both areas of study (Eckstein & Noah, 1993). Such a balance is also achieved by various examination techniques in several European countries (Moreno Olmedilla, 1992). Consequently, an analysis of a possible matching between students and the two subject areas must rely on a more complicated and less direct analysis of attitudes and perceptions of students and teachers.

Our study examines the characteristics of the students who specialize in each area of study in Israeli schools that differ in policy regarding course-taking and in social composition. The question guiding our analysis is, do the students of mathematics and the sciences differ from those in the humanities and the social sciences in profile, and to what extent is this difference a function of school policy and social composition?

Previous Research

Changes in the Status of the Two Areas of Study

The current high appreciation for mathematics and the sciences is relatively new. During the 19th century, mathematics and the sciences were integrated into the curricula of European and North American schools, but they were secondary to reading, writing, and recitation in the national and classical languages. Mathematics and the sciences were taught in non-European countries, but here again they were secondary to languages and religious studies (Kamens & Benavot, 1992). In fact, there was strong resistance to the inclusion of the sciences in the school curriculum. When they finally were introduced in the curriculum of European and North American schools, the sciences were considered practical subjects, appropriate for the lower classes only (Goodson, 1983; Kamens & Benavot, 1992).

The current emphasis on mathematics and the sciences is usually explained in functionalist terms. The school's emphasis has shifted from cultural transmission to the preparation of youngsters for future occupational roles (Bloom, 1987; Kliebard, 1995; Raivola, 1995). Mathematics and the sciences represent the type of knowledge expected of rational people who wish to adjust to the demands of the highly sophisticated modern economy (Kamens & Benavot, 1992). Apple (1990), who represents another approach, attributes the high status of mathematics and the sciences to their testability, which marks them as useful tools in the school's role as a social selector. The different approaches, which are not mutually exclusive, agree that the enhancement of the status of the sciences has been accompanied by a decline in the status of the humanities.

The decline in the status of the humanities in terms of time allocation has been attributed to the expansion of education and the incorporation of lower-status students into the education system (Kliebard, 1992). The humanities, defined as high culture appropriate for the elite only and associated with leisure activity, have been partly replaced by other, more practical subjects (Kliebard, 1992; Labaree, 1988). This, however, is true mainly for public education. The humanities, which have a major role in the acquisition of "cultural capital" (in Bourdieu's, 1984, terms) and are perceived as a means of social exclusion (Eggelston, 1977), are still emphasized in private schools. Cookson and Persell (1985), for example, report that elitist boarding schools in the U.S. offer their students a rich curriculum in the humanities in addition to the usual emphasis on mathematics and the sciences.

Student Characteristics

A correspondence between the value attached to different kinds of knowledge and the social identity of the students who are allowed access to them has been found in numerous societies (Young, 1971; see also Bourdieu & Passeron, 1990, for France; Goodson, 1983, for Britain; Oakes, 1985, for the U.S.). Similar correspondence is reported in Israel, where schools with higher percentages of students belonging to the underprivileged Jewish ethnic group less often offer higher-level courses in the highly valued school subjects (Ayalon, 1994a).

The link between the stratification of school subjects and the stratification of the students who study them suggests that the emphasis on mathematics and the sciences, as compared with the humanities and the social sciences, may affect the social composition of the students who specialize in either area of study. Existing empirical research does not tend to deal with the social profile of students who take higher-level courses in the humanities nor with comparisons between the two areas of study. However, numerous studies deal with inequality in course-taking of mathematics and the sciences as indicated by the gender, socioeconomic status (SES), and ethnicity of students who take higher-level courses in this area.

The research on gender differences in mathematics and the sciences concentrates more often on achievement and not on course-taking (e.g., Gamoran, 1987). Still, there is clear evidence that female students are less often found in higher-level mathematics and science courses (Croxford, 1994; Hallinan & Sorensen, 1987; Lamb, 1996; Oakes, 1990; Sells, 1980; Vanfossen, Jones, & Spade, 1987). The differential course placement of males and females is not explained by variations in their ability (Hallinan & Sorensen, 1987; Vanfossen et al., 1987). This suggests that female students may refrain from choosing higher-level mathematics and sciences because of sex-role socialization, which marks these instrumental subjects as "masculine." It also suggests that schools may use different policies of grouping for male and female students (Hallinan & Sorensen, 1987; Oakes, 1990).

Higher-SES and non-minority students are found more often in higher-level mathematics and science courses (Croxford, 1994; Gamoran, 1987; Lamb, 1996; Oakes, 1990; Sells, 1980). The link between social origin and course-taking in mathematics and the sciences disappears when students' ability or prior achievement is controlled (Gamoran, 1987; Oakes, 1990). We can assume, hence, that the disadvantage of lower-status students in course-taking in mathematics and the sciences stems primarily from their lower achievement.

School Policy, Size, and Composition

A comprehensive analysis of inequality in course-taking among students who differ by either ability, gender, ethnic origin, or socioeconomic status requires a direct examination of school policy and characteristics. Recent research indicates that school policy, size, social composition, and ability composition affect both the curriculum and the course placement of students (see, for example, Ayalon, 1994a, for Israel; Gamoran, 1996, for Scotland; Lamb, 1996, for Australia; Useem, 1992, for the U.S.).

The analysis of the effect of school policy on course-taking assumes that schools differ in practices of assigning students to courses. This assumption is supported by several empirical studies (Delany, 1991; Garet & Delany, 1988; Hallinan, 1992; Lamb, 1996; Useem, 1992). Garet and DeLany compared course-taking in mathematics and the sciences in four American high schools and found a school effect independent of students' characteristics. They attributed this finding to different policies regarding the offerings of higher-level courses and the relationship of placement in one subject to placement in others. Delany (1991), who investigated the same schools, concludes that the process of matching students is a story of construct and organizational choices more than of intentions and individual choices.

In her analysis of 34 middle schools in the U.S., Hallinan found that the effect of students' ability and ascribed characteristics on placement in mathematics and English varies among schools. She attributed this finding to the schools' tendency to maintain a stable number of students taking each of the different courses. The policy of assigning students to courses is affected by this organizational consideration. Useem reported that differences in administrative policy regarding enrollment in eighth-grade algebra and high school calculus are responsible for a significant variation between school districts in participation in accelerated mathematics courses. Lamb, who analyzed four high schools in Australia, reports that in schools with more liberal policies of curriculum access, the gender gap in the taking of higher-level courses in mathematics narrows.

Differential policy may also explain the well-reported differences in course-taking between public and Catholic schools in the U.S. Catholic schools encourage students to take more academic courses, hence the greater exposure of their students to academic knowledge and better instruction (Bryk, Lee, & Holland, 1993; Gamoran, 1993a, 1993b).

The effect of school size on course-taking is not straightforward. Larger schools usually offer a richer curriculum (see Ayalon, 1994a, for Israel; Bryk et al., 1993, for the U.S.). However, the effect of size on course-taking varies among school subjects and among students with divergent abilities. According to Monk and Haller (1993), who examined the effect of size on the taking of different school subjects, increasing size serves the needs of the less talented students in mathematics, but not in English. They attribute this finding to different policies regarding the two subjects: Larger schools tend to invest more resources in remedial classes in mathematics and in higher-level courses in English.

Another school-level factor that has been established as affecting the curriculum and the placement of students into courses is school composition in terms of ability, socioeconomic status, and ethnic origin. Schools with more able, higher-status, and non-minority students provide more opportunities, but are more competitive. Consequently, the probability of placement in higher-level courses is reduced for some groups of students (see Ayalon, 1994b; Hallinan & Sorensen, 1983; Kilgore, 1991; Kilgore & Pendelton, 1993).

Mathematics and the Sciences Versus the Humanities and Social Sciences in Israeli High Schools

Secondary education in Israel is characterized by a notable between-subject differentiation. Schools offer various academic subjects, and students choose their areas of specialization. Usually academic-track students are expected to specialize in either mathematics and the sciences or in the humanities and social sciences.[1]

Before the introduction of high school reform in the late 1970s, academic-track students were divided in the 11th grade into strictly structured streams (*megamot*), and they took the matriculation exams accordingly.[2] The reform eliminated the structured streams and enabled students to create their own combinations of subjects, enroll in the appropriate courses, and take the matriculation examinations accordingly. The high school curriculum is now composed of compulsory and optional subjects. Students must take the compulsory subjects but are free to choose the optional ones.[3] Each subject may be offered at different levels, usually ranging from one to five units of study. One unit is defined as one weekly hour for three years or three weekly hours for one year. The time devoted to each subject corresponds, of course, to the level and degree of difficulty of the subject matter. With the exception of English and mathematics, which are compulsory at the three-unit level, subjects are compulsory at their lowest level (one or two units) only. The optional subjects are usually taken at higher levels (four or five units). Subjects that are compulsory at the lower level may be offered as optional at higher levels. To qualify for a matriculation diploma, a student has to pass national exams that total 20 units of study. A four- or five-unit optional subject is not a necessary component of the diploma. However, the universities demand at least one four-unit subject from their candidates and offer bonuses for each subject taken at the four- or five-unit level.[4] Usually students take one or two higher-level optional subjects in addition to English (which is usually taken at the four- or-five unit level).

As a result of the reform, the Israeli academic-track students are offered a remarkable number of subjects and are expected to make their own choices. During the planning of the reform, this aspect aroused concern about a possible decline in the popularity of the scientific subjects, which are considered more difficult. In Israel, as elsewhere, mathematics and the sciences are perceived as crucial for the development of the economy; thus several committees were appointed to look into the status of the sciences in the Israeli high schools and the achievement of students in these subjects (ICBS, 1989; Israel Ministry of Education and Culture, 1992).

The actual consequences of the reform were the exact opposite of these expectations. As shown in Table 1, the proportion of students who choose to specialize in mathematics and the sciences has increased steadily since the beginning of the 1980s, from about 32% in 1983 to 44% in 1989.[5] The decrease in the proportion of students who specialize in the humanities and the social sciences is particularly striking—from 54% to 35%.[6]

How can we explain the increase in the proportion of students who specialize in mathematics and the sciences in light of the opportunity given to students not to take higher-level scientific subjects, which are considered highly demanding? There are several possible explanations. One quite obvious explanation is the common belief that scientific and technological education is the best response to the needs of the economy. If this explanation were true, we would have expected a high demand for majoring in mathematics and the sciences in the university. In fact, the departments of physics, chemistry, biology, and even mathematics and engineering suffer a lack of suitable candidates.[7] In other words, most students who specialize in mathematics and sciences in high school do not tend to major in these areas in the university. These figures support our alternative explanation: During the last decade, we have witnessed the development of a view that holds that high school graduates who specialize in math-

TABLE 1
Twelfth-Grade Students According to Areas of Study, 1983–1989

Year	Total	MS	HSS	MS + HSS	Other
1983	13,893	31.7	53.6	9.3	5.4
1985	14,459	30.5	55.9	11.8	1.8
1987	18,878	41.1	46.3	10.7	1.9
1989	22,291	43.8	36.4	17.5	2.4

Source: 1983–1987—ICBS 1989; 1989—ICBS 1990.
Note: The areas of study are defined, according to the ICBS, as follows: MS—student takes mathematics or at least one scientific subject at the four- or five-unit level and no higher-level subject in the humanites or the social sciences. HSS—student takes at least one four- or five-unit-level subject in the humanities or the social sciences and no higher-level mathematics or any scientific subject. MS + HSS—student takes at least one high-level subject in each area of study.

ematics and the sciences are more easily accepted to the universities to all departments, including those in greatest demand—law, business, medicine, and psychology. This view is partly a myth: The departments of law, business, and psychology do not require either higher-level mathematics or any higher-level scientific subject from the candidates, and the school of medicine requires a single three-level science subject.[8] Another belief prevailing among students, parents, and even teachers is that the sciences get higher bonuses (see note four) than the humanities and social sciences, thus providing the students with an advantage when applying to the universities (Ayalon & Yogev, 1994). In fact, the humanities, the social sciences, and the sciences are awarded similar bonuses by the universities (as noted, mathematics gets higher bonuses). This near-myth, together with another near-myth that specialization in mathematics and the sciences in high school provides graduates with better chances for higher occupational and economic attainments,[9] encourages students to specialize in the sciences even when they do not plan to major in these areas in the future and, in fact, find the humanities and the social sciences more interesting.

Multi-level Analysis of Course-Taking of the Different Areas of Study

To estimate the relationship between students' characteristics and course-taking in the two subject areas, and the effects of school characteristics on this relationship, we conducted a multilevel analysis. In the following section, we describe the research design and elaborate on the models we used for the analysis.

Data and Sample

The data are based on a survey conducted by the Israeli Central Bureau of Statistics (ICBS) for the Israel Ministry of Education and Culture in 1989. The survey included all 12th-graders in academic programs. A questionnaire was addressed to the school principals, who were asked to provide information on the subjects studied by each student during the entire high school career. Eighty-five percent of the school principals responded to the questionnaire. The study refers to the data on Jewish students only. The original data set included 208 Jewish schools that offer matriculation-oriented academic programs. Seven schools, which did not provide information on ethnic composition, were excluded from the analysis. The final analysis is based on 19,047 students distributed among 201 schools.

Method and Variables

The study required two levels of analysis: (a) the student level, which examined the effects of student characteristics on course of study within schools, and (b) the school level, which explored between-school differentiation in mean number of units and in the impact of student characteristics on the course of study. To address these two levels, we used hierarchical linear modeling (HLM) (Bryk & Raudenbush, 1992). Each level included a different set of variables, as follows.

Student-level variables. Two variables represented the student's course of study.

- Number of units in mathematics and the sciences (MS units), which is the sum of the student's units in mathematics, physics, chemistry, biology, and computer science.

- Number of units in the humanities and social sciences (HSS units), which is the sum of the student's units in literature, history, geography, arts, philosophy, the Bible, oral law, and the social sciences. Languages were not defined as a part of the humanities because in Israel the high school curriculum on these subjects concentrates on the technical aspects—grammar and vocabulary—and less on literature.

The student characteristics were

- Gender, a dummy variable coded 1 for males.

- Ethnicity, coded 1 for Mizrachim (Jews of Asian and North African origin, the disadvantaged Jewish ethnic group in Israel) and 0 for Ashkenazim (Jews of European and American origin) and second-generation Israelis.

- Ability, represented by the number of units taken in the English language. We use this measure as a proxy because the data lack a direct measure of ability. The decision to use units in English language for this purpose is based on the centrality of this subject in Israeli secondary education and on its power in predicting future achievement. Israeli schools offer English at three- to seven-unit levels. Because the universities demand at least four-unit English as a prerequisite and give a particularly high bonus to the four-, five-, six-, and seven-unit levels (see note 4), students who are considered suitable for higher education are encouraged to take the higher-level English upon starting high school even if they have difficulties with this subject. In addition, students' matriculation grades in English prove to be a reliable predictor of their achievement in post-secondary education. English is also tested as a part of the psychometric test (see note two). Of all the components of the test, English emerges as the most powerful predictor of students' later achievements in the university (Beller & Ben-Shakhar, 1981). Based on this evidence, we believe that the number of units students take in English is a reliable proxy for their general ability.

School-level variables.

- Sector, coded 1 for secular public schools, 0 for religious public schools.

- Size, defined as the number of 12th-graders in school.

- Percent of male students in school (% male). This variable, which is not common in the research on course-taking, needs some clarification. Variation in the gender composition of the schools stems from two sources: (a) sector—63 of the 87 religious schools in the sample are composed of single-sex students only (36 are all female and 27 all male), and (b) the differential popularity of vocational education in the community—there are not single-sex schools in secular education, but the percentage of male students in this sector ranges from 12% to 68%. This variation is due to the variance in the proportion of students in the community who attend vocational education. Because the higher-level programs in vocational education in Israel cater mainly to male students (Yogev & Ayalon, 1991), a strong system of vocational education reduces the percentage of male students in the academic track. Previous research indicates that the school's gender composition is linked to its curriculum. For example, male-dominated schools more often offer higher-level courses in physics, whereas female-dominated schools more often offer high-level courses in literature (Ayalon, 1994a).

- Percent of Mizrachim students in school (% Mizrachim).

- Mean ability in school, defined as the mean number of units in English.

The descriptive statistics pertaining to the variables at both levels and their correlations are presented in Table 2.

Equations. At the student level, the number of units (in either mathematics and the sciences or the humanities and the social sciences) of student i in school j is predicted as follows:

$$(N\text{ units})_{ij} = \beta_{0j} + \beta_{1j}(\text{gender})_{ij} + \beta_{2j}(\text{ethnicity})_{ij} + \beta_{3j}(\text{ability})_{ij} + r_{ij}. \quad (1)$$

The intercept (β_{0j}) and the slopes of gender (β_{1j}), ethnicity (β_{2j}), and ability (β_{3j}) are allowed to vary among schools. All three slopes are significantly random,[10] implying that schools indeed differ in patterns of inequality in course-taking of the two areas of study. The intercept and the slopes serve as the dependent variables in the second-level analysis.

The school-level analysis includes four equations. The first defines the intercept as a function of the school-level variables and a random error:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{sector})_j + \gamma_{02}(\text{size})_j + \gamma_{03}(\%\text{ male})_j + \gamma_{04}(\%\text{ Mizrachim})_j + \gamma_{05}(\text{mean ability})_j + v_{0j}. \quad (2)$$

Equations 3 to 5 define the slopes of the three student-level variables as a function of school characteristics.

TABLE 2
Descriptive Statistics and Correlations

a. Student-level variables

	(2)	(3)	(4)	(5)	*M*	*SD*
Gender (male) (1)	–0.05	–0.02	0.15	–0.09	0.38	0.49
Ethnicity (Mizrachim) (2)		–0.15	–0.12	0.08	0.36	0.48
Ability (3)			0.26	–0.12	4.70	0.66
No. of MS units (4)				–0.44	9.59	3.78
No. of HSS units (5)					12.82	3.71

Note: N = 19,047 students; MS units—units in mathematics and the sciences; HSS units—units in the humanities and social sciences.

b. School-level variables

	(2)	(3)	(4)	(5)	*M*	*SD*
Sector (secular) (1)	0.48	–0.03	–0.30	0.30	0.57	0.50
Size (2)		–0.03	–0.37	0.45	94.39	89.05
% male (3)			–0.03	–0.16	0.39	0.30
% Mizrachim (4)				–0.30	0.45	0.26
Mean ability (5)				—	4.48	0.55

Note: N = 201 schools.

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{sector})_j + \gamma_{12}(\text{size})_j + \gamma_{13}(\%\ \text{male})_j + v_{1j}. \quad (3)$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}(\text{sector})_j + \gamma_{22}(\text{size})_j + v_{2j}. \quad (4)$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}(\text{sector})_j + \gamma_{32}(\text{size})_j + \gamma_{42}(\text{mean ability})_j + v_{3j}. \quad (5)$$

All slopes are modeled as a function of sector and size, which represent school policy and resources, and a random error. To estimate the effect of school composition on the slopes, % male is included in the equation of the gender slope, and mean ability is included in the equation of the ability slope. At first, we included % Mizrachim in the equation of the ethnicity slope. However, the models that included it hardly reached convergence, and because the effect of % Mizrachim was found to be insignificant, we decided to exclude it from the final model.[11]

The student-level variables are centered around the school means.[12] Consequently, the first level intercept (β_{0j}) represents, for each school, the number of units taken by a student with average characteristics (Bryk & Raudenbush, 1992).

The continuous school-level variables are centered around their means, while sector is included as a dummy variable. Consequently, the second-level intercept (γ_{00}) represents the average N of units in a school with average size, average % male, average % Mizrachim, and average ability that belongs to the religious sector.

Findings

The findings pertaining to number of units are presented in Table 3. Two equations were computed for each dependent variable. The first is a student-level equation, which estimates the effects of gender, ethnicity, and ability on MS units—the number of units taken in mathematics and the sciences (column one)—and on HSS units—the number of units taken in the humanities and the social sciences (column three). The second, the multi-level equation, estimates the effects of school sector, size, and composition on the intercept and the student-level slopes for mathematics and the sciences (column two) and the humanities and social sciences (column four).

Units in Mathematics and the Sciences

All student-level variables affect units in mathematics and the sciences, with male and non-Mizrachim students taking more units. The effect of gender predominates that of ethnicity: The average advantage of male students exceeds one unit, while the disadvantage of Mizrachim totals about 0.40 unit. The effect of ability on MS units is in the expected direction: More able students take more units in mathematics and the sciences with each

TABLE 3

Gamma Coefficients from HLM Analysis of Number of Units in Mathematics and the Sciences (MS units) and in the Humanities and Social Sciences (HSS units)

	MS units		HSS units	
Student level	(1)	(2)	(3)	(4)
Mean *N* of units	8.954***	8.894***	13.622***	16.513***
	(0.150)	(0.227)	(0.239)	(0.287)
Gender—male	1.095***	0.995***	–0.465***	0.116
	(0.088)	(0.294)	(0.080)	(0.250)
Ethnicity—Mizrachim	–0.409***	–0.259**	0.233***	0.104
	(0.066)	(0.130)	(0.047)	(0.098)
Ability	1.646***	1.007***	–0.592***	–0.222
	(0.127)	(0.211)	(0.096)	(0.170)
School level				
Effects on *N* units				
Sector—secular		0.058		–5.082***
		(0.319)		(0.403)
Size		0.004**		0.000
		(0.002)		(0.002)
% male		0.439		–0.682
		(0.467)		(0.586)
% Mizrachim		–0.880		–1.150
		(0.579)		(0.734)
Mean ability		1.039***		0.816**
		(0.283)		(0.363)
Effects on gender inequality				
Sector—secular		0.154		–0.798**
		(0.319)		(0.273)
Size		0.002**		0.001
		(0.001)		(0.001)
% male		–1.649**		–0.591
		(0.850)		(0.750)
Effects on ethnic inequality				
Sector—secular		–0.130		0.133
		(0.171)		(0.124)
Size		–0.002**		0.001
		(0.001)		(0.000)
Effects on ability inequality				
Sector—secular		1.250***		–0.675**
		(0.263)		(0.213)
Size		–0.004**		–0.000
		(0.001)		(0.001)
Mean ability		0.795**		–0.279
		(0.297)		(0.240)

Note: MS units—units in mathematics and the sciences; HSS units—units in the humanities and social sciences.
***$p < .001$. **$p < .05$.

unit in English being equivalent, on average, to about 1.6 MS units. It is obvious that mathematics and the sciences are taken more often by the higher achievers, males, and students who belong to the privileged ethnic group.

The inclusion of the school-level variables (column two) reduces the effect of the student-level variables, but they all retain their statistical significance. This implies that in an average school that belongs to the religious sector, males, non-Mizrachim, and more able students have an advantage regarding the taking of higher-level courses in mathematics and the sciences. This advantage varies with school size, sector, average ability, and gender composition.

School size appears as more significant than sector regarding the taking of mathematics and science courses. Size increases both ethnic and gender inequality, but decreases inequality based on ability.[13] The fact that students in larger schools take more units in mathematics and the sciences implies that these schools offer more courses in these subjects. These better offerings appear to reduce the selectivity of the science courses and to open them to less able students. However, because size increases inequality based on ascriptive characteristics, it seems that males and non-Mizrachim students are the ones to take advantage of that reduction in selectivity. We may speculate that by increasing the opportunity of less able students to take more courses in mathematics and the sciences, larger schools increase gender and ethnic inequality.

Sector, the second school-level variable included in all three equations pertaining to the different slopes is effective only in the equation of the ability slope. The findings reveal that the link between ability and MS units is moderated in the public religious sector. Other things being equal, each level of ability, which is equivalent, on average, to about one MS unit in the religious sector, equals much more—about 2.3 units (1.007 + 1.250)—in the secular education system. This suggests that the higher-level courses in mathematics and the sciences in the public religious schools are less selective. We believe that the moderating effect of religious education on inequality stems mainly from the special attitude of religious education toward school subjects. As noted, religious education is primarily committed to school subjects that are connected to Jewish tradition. This major commitment, along with the threat that some scientific subjects pose to the religious viewpoint, probably reduces the emphasis on scientific subjects that are not perceived as central and opens them to less able students. However, we must keep in mind that in our study ability is measured by number of units in English language. It is possible that the current findings simply reflect a differentiation in the centrality of this subject in the two sectors. Obviously, we are unable to test these alternative explanations in the framework of this study.

Inequality based on ability is also affected by the school's average ability. The link between ability and MS units is intensified in more able environments. This finding is in accordance with previous research that indicates that more able environments are more competitive and hence more selective (e.g., Hallinan & Sorensen, 1983). It is important to note that school's average ability has no effect on the link between ability and HSS units (column four). This finding seems to support our belief that in Israeli high schools, competition and selectivity are relevant mainly to the taking of mathematics and science courses, and not the humanities and the social sciences.

Another composition variable that affects inequality in MS units is % male, which is included in the equation of the gender slope. Gender inequality decreases as the proportion of male students in a school increases. This intriguing finding is hard to explain. We considered several possible explanations. The first was that female students in male-dominated schools, which are perhaps science-oriented, follow the dominant pattern and take more courses in mathematics and the sciences. The second explanation is based on pre-selection: Girls who prefer scientific subjects attend male-dominated schools, which perhaps offer a richer curriculum in that area. These explanations are based on the assumption that students in male-dominated schools take more units in mathematics and the sciences. However, this assumption is not supported by the data. We have already seen that % male has no effect on a school's mean number of MS units. One possible explanation that does not assume a link between % male and MS units is that a higher percentage of male students indicates that more male than female students of lower ability are present in the academic track. (As noted, the vocational track, which usually absorbs less able students, caters mainly to male students.) Because less able students usually do not take higher-level courses in the sciences, girls in the academic track of schools with a higher percentage of academic-track male students may be more easily accepted into these courses. Although this explanation is supported somewhat by the negative correlation (–0.16) between % male and mean ability presented in Table 2, it is obvious that further research is needed to gain a better understanding of the link between gender composition and gender inequality in course-taking of mathematics and the sciences.

Between-school variance in mean number of MS units is linked to two school-level variables—school size and mean ability. Larger schools, which usually have more resources (see Kilgore, 1991), offer more units in mathematics and the sciences. Does this represent a general pattern in which these schools offer a richer curriculum in all subjects? A comparison with the equation pertaining to the humanities and social sciences (column four of Table 3) reveals no effect whatsoever of size on HSS units. This suggests that schools that possess more resources prefer to invest them in developing a richer curriculum in mathematics and the sciences, but not in the humanities and social sciences.

The second characteristic that is linked to the mean number of MS units is the school's mean ability. The pattern of this link is not surprising—schools with higher average ability have higher means of both MS units and HSS units. Still, mean ability is more clearly linked to the mean number of units in mathematics and the sciences. Each level of ability increases the mean of MS units by 1.039 (about 11.7%), whereas the parallel increase for HSS units is much lower (4.9%).

The findings point to the students' personal traits as a central factor in the shaping of their curriculum in mathematics and the sciences. This conclusion is supported by the variance partition model, presented in Table 4. According to this model, which partitions the outcome variance into between-school and within-school components, only 27% of the total variance of number of units in mathematics and the sciences is due to between-school differentiation, while 73% is due to within-school variation.

Units in the Humanities and Social Sciences

The effects of the student-level variables on the number of units in the humanities and social sciences (column three of Table 3) are opposite in direction and smaller in magnitude compared with those obtained in the analysis pertaining to mathematics and the sciences. More HSS units are taken by female students, by students of Mizrachi origin, and by less able students. Male students take, on the average, half as many HSS units as their female counterparts; Mizrachim take about one quarter more units than non-Mizrachim; and for each increase in ability level, average HSS units decreases by about 0.60.

Because the mean of HSS units is higher than the mean of MS units, the discrepancy between the slopes pertaining to the two areas of study is, in fact, underestimated. This implies that students characteristics, which are central in determining their access to courses in mathematics and the sciences, are less dominant in the humanities and so-

TABLE 4
Summary Statistics from HLM Models

Statistics	Outcome: MS units	Outcome: HSS units
Variance within schools	11.23	6.02
Variance between schools	4.23*	11.30*
Proportion of total variability between schools	0.27	0.65
Proportion of parameter variance explained by school-level variables		
Intercept	0.18	0.48
Gender slope	0.15	0.13
Ethnicity slope	0.12	0.05
Ability slope	0.29	0.13

Note: MS units—units in mathematics and the sciences; HSS units—units in the humanities and social sciences. The variance partitioning and the reliability are from fully unconditional models. The proportion of explained variance is computed by subtracting residual parameter variance in the multilevel model (columns two and four in Table 3) from the variance in the student-level model (columns one and three in Table 3) and dividing it into the second variance.
$*p < .001$.

cial sciences. This conclusion is supported by the variance partitioning model (Table 4); it indicates that only a minor part of the total variance of HSS units, 35%, is due to within-school differentiation, whereas the major part (65%) of this variance stems from between-school variation. As we have already seen, the respective figures for MS units are very different—73% for within-school and 27% for between-school variance.

The inclusion of the school-level variables (column four of Table 3) eliminates all student-level effects. This implies that in an average school that belongs to the religious sector, there is no ethnic, gender, or ability inequality in course-taking of the humanities and social sciences. This pattern does not apply to the secular sector. To estimate the average value of the slopes in secular education, we add the proper effect of sector to each of the slopes presented in the table. For example, the gender-HSS units slope in an average school that belongs to the religious sector (presented in the table) equals 0.116. The average difference between the slopes of the two sectors equals –0.798. Thus, when a school with the same average characteristics belongs to the secular sector, girls take about 0.68 (0.116 – 0.798) more HSS units than boys. Similar calculations reveal that in secular education each ability level is attached to an average reduction of 0.90 HSS units, compared to a reduction of 0.22 in the religious sector.

The effect of sector on the slopes of gender, ability, and, to a certain extent, ethnic origin marks religious education as more egalitarian. Other things being equal, there is no individual-level inequality in HSS units in the religious sector. We can conclude, hence, that the pattern revealed in the student-level equation—where less able students, females, and students who belong to the disadvantaged ethnic group appear to take more units in the humanities—is true mainly for secular education.

The significance of sector regarding the humanities and social sciences is also manifested in its effect on the mean. The average difference between the two sectors in the mean number of units in the humanities is about 5.00. Because the adjusted mean for the schools in the religious sector is around 16.5 HSS units, it appears that, on average, students in secular education take about 30% less units in the humanities.

The different pattern of course-taking in the two sectors is a consequence of different policies. While secular education does not express any particular commitment either to the humanities or to the social sciences, religious education attaches extreme value to the transmission of the Jewish cultural heritage and to the exposure of all students to this knowledge. Naturally, the transmission of the religious cultural capital to the groups defined as the school elite—males, non–Mizrachim, and more able students—is considered of particular value. These same groups are not considered to be the appropriate clientele for the humanities in the secular sector, where the sciences prevail.

Discussion

The study reveals that different types of students tend to specialize in the two subject areas within the academic curriculum of Israeli high schools and that school policy is particularly relevant to course-taking in the humanities and social sciences. The higher-level courses in mathematics and the sciences are taken mainly by more able students and by students who belong to more prestigious social groups. The opposite is true for the humanities and social sciences in secular education. In religious education, we do not find any inequality in course-taking of this area.

The findings support the view that mathematics and the sciences have higher status than the humanities and social sciences. This view has mainly rested on studies of curricular time allocation, and our research substantiates it by examining course-taking patterns. In Israel, and particularly in secular education, selectivity and excellence apply primarily to mathematics and the sciences. When students choose optional subjects and when schools assign students to courses, achievement seems to be more relevant to the taking of higher-level courses in mathematics and the sciences.[14]

As noted, the Israeli setting, where students specialize in either area of subjects, is unique. However, the differences in the status of the two areas of study can affect the behavior and the attitudes of students in different systems, even those, like the American, where the two areas are structurally balanced. Students may get the notion that the humanities and social sciences are less important, assign less value to these subject areas, and consider their achievements in mathematics and the sciences more important. Curricular and social implications that are true for the more extreme Israeli setting are equally plausible in such settings. One possible implication refers to the curriculum. We know from previous research that teachers and curriculum decisionmakers tend to adjust the content of school subjects to the assumed interests and capacities of the students (Kliebard, 1992; Oakes, 1985; Raudenbush, Rowan, & Cheong, 1993). If the current trend continues, the humanities and social sciences may become recognized as particularly relevant for students who are unable to cope with mathematics and the sciences. Eventually, the humanities as school subjects could be detached from prestigious cultural capital. There is some evidence of the beginning of such a process. For example, Israeli studies on current curriculum in literature indicate that it stresses the emotional side of literature and not its intellectual and cultural aspects (Yaoz & Iram, 1987).

If this process intensifies, schools will cease to function as central agents of the transmission of the socially esteemed cultural capital, so-called high culture. This may have implications on social inequality. High culture serves as a means of social exclusion by differentiating between insiders and outsiders, in Max Weber's (1946) terms. Students may obtain the knowledge required for the acquisition of a high-status profession, but they need to prove familiarity with high culture to legitimize an elite position (DiMaggio & Useem, 1982). If public education fails to distribute this knowledge, youngsters can acquire it in private schools or rely more heavily on their families and social environment. This will affect mainly students who belong to the lower social strata. Higher-status families, who are the major clients of private education, are also principal agents of cultural capital. Thus, their offspring are less dependent on the public system for exposure to high culture. Lower-strata families are less able to transmit high culture to their offspring, for whom public school becomes the major agent of cultural capital. Thus, the deterioration of the humanities in the curriculum may become an additional source of social inequality.

These possible implications of the differential status of mathematics and the sciences versus the humanities and social sciences lead to the conclusion that some serious changes of policy are imperative. At the school level, there is a need for more balance between the two areas of study in terms of time and resource allocation and the messages delivered to the students on the value of each. As noted, education systems vary in the degree of balance between these two areas. As our study shows, even within a given system, schools may vary in this respect. However, all systems can benefit from a change in schools' attitudes toward excellence in the two areas of study and the assignment of greater value to achievements in the humanities and social sciences.

We are aware that changes in policy at the school level cannot occur without changes in the attitude of the public toward the two areas of study. Here we refer mainly to the view, shared by many industrial societies, that mathematics and the sciences constitute the major pathway to higher educational, occupational, and economic attainments and that the sciences alone are functional for the benefit of society (Iram, 1995). Such a change requires substantial effort, but is not beyond reach. The case of Israeli religious high schools supports the notion that when an education system develops a certain ethos, it is capable of adhering to its values.

Our conclusions are based on findings pertaining to the Israeli educational system. As we already noted, we believe that principles drawn from the Israeli example are applicable to other societies. Obviously, further research is needed to trace the specific impacts of this trend on the process of schooling in different educational systems.

Notes

We wish to thank the anonymous reviewers for their helpful comments.

[1]In Israel, there is a clear distinction between the academic and the vocational track. Vocational education, which includes about 50% of high school students, has a different curriculum. In this article, we deal with the academic track only.

[2]The matriculation exams are standard national tests. The matriculation diploma is a prerequisite for higher education in Israel, and only students who have an acceptable diploma can apply to the university. However, the diploma is not the only criteria for selecting among the candidates. Candidates for higher education are selected according to personal scores based on a combination of the average grade in the matriculation diploma and their scores in the psychometric test, which is supposed to measure general aptitude. As a rule, the decision to accept a candidate is based only on this personal score. Except for the faculties of exact sciences and engineering, which have special demands regarding mathematics and the sciences, the universities do not prefer any specific school subject in the process of admission, either officially or nonofficially.

[3]Although students do get the chance to choose their optional subjects, the final decision is made by the school. Schools take students' preferences into consideration, but the assignment of students into courses also depends

on scholastic ability, school policy, and other factors.

[4]In calculating a student's average achievement for the matriculation diploma, the universities add 10 points to the original grade for each four-unit-level subject and 20 points to each five-or-more-unit-level subject (provided that the original grade is at least 60 out of 100 possible points). English and mathematics get higher bonuses: 12.5 points for the four-unit level and 25 points for the five-or-more-unit level. These bonuses are highly significant for the students because of the competition among candidates, which is particularly severe for the most popular areas of study.

[5]These figures are based on surveys of the study trends of 12th-grade students during their four years in high school, conducted by the ICBS (1989, 1990) until 1989. No similar surveys have been conducted since that period.

[6]Of special interest is the increase in the proportion of students who specialize in both areas of study (from 9% in 1983 to about 18% in 1989). This increase is found primarily in the religious public education system. About 29% of the academic-track students in public religious education specialized in both areas of study in 1989, compared to 14% in 1983. The respective proportions for secular education are 14% in 1989 and 9% in 1983. Religious education in Israel has a special commitment to school subjects that are attached to Jewish tradition. Consequently, 75% of the students in the public religious sector take higher-level courses in the Bible, and 97% take higher-level courses in oral law, two major religious subjects (Ayalon & Yogev, 1996) that are defined as humanities in Israeli high schools (ICBS, 1989). The respective figures for students in secular schools are 8.7% for the Bible and 0.1% for oral law (Ayalon & Yogev, 1996). In spite of their commitment to religious studies, the religious schools cannot ignore the general demand for scientific subjects and have adapted by allowing students to specialize in both areas of study.

[7]In 1980, 8.3% of the undergraduate students majored in mathematics; in 1995, 8.5%. The parallel figures for physics are 3.6% and 2.6%; for biology, 3.7% and 3.4%; for engineering, 12.6% and 9.5% (ICBS, 1996).

[8]We must note, however, that students who took higher-level mathematics in high school get better scores in the psychometric test, which includes a mathematics part. The better achievements of these students may stem from their experience in higher-level mathematics courses. However, it is equally and even more probable that the link between taking higher-level mathematics courses in high school and getting better scores in the psychometric test is a result of a third factor—ability. More able students both take higher-level mathematics courses and do better in the psychometric test.

[9]In a study based on a survey of participants of the labor force with post-secondary education conducted by the Israeli Central Bureau of Statistics in 1984, we found a very low net effect of the area of specialization in high school on occupational prestige and no effect at all on income (Ayalon & Yogev, 1994).

[10]An empirical test of the decision to allow a slope to vary among schools is performed by comparing the deviance of a model in which the slope is allowed to vary to an identical model in which the slope is fixed (Bryk & Raudenbush, 1992). All the tests that we performed (for each of the three slopes in each equation) indicate that the deviance of the model in which the slope is allowed to vary is significantly smaller than the deviance of the respective model with the fixed slope.

[11]We tried to estimate models where all school-level variables are included in the equations pertaining to each slope. These models hardly converged. Consequently, we decided to present parsimonious models. All the coefficients that were not included in the final model were statistically insignificant.

[12]When the student-level variables are centered around the school means and the means of these variables (in our case, % male, % Mizrachim, and mean ability) are introduced in the equation, the centering enables the partitioning of the effect of each variable to within-school and between-school parameters (Kreft, de Leeuw, & Aiken, 1995).

[13]However, more able students still retain an advantage in larger schools. For example, the estimated ability slope for students in a religious school with average ability and size of one standard deviation above the mean is 0.651 (1.007 – 0.004 x 89.050), which is lower than the slope pertaining to schools with average size, but is still substantial.

[14]One could argue that achievements seem more relevant to mathematics and the sciences because courses in this area of study are more sequential than those of the humanities and social sciences. This may be true for certain education systems, but not for Israel, where the higher-level courses in the two subject areas depend on students' previous experience. We must also keep in mind that our measure of ability refers to English, which is relevant to the two areas of study (and perhaps even more to the humanities and social sciences). We believe that the higher status of mathematics and the sciences is a more plausible explanation of why students who take more units in English tend to specialize in these school subjects than the sequence of this subject area.

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