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INCENTIVES FOR LEARNING: WHY AMERICAN HIGH SCHOOL STUDENTS COMPARE SO POORLY TO THEIR COUNTERPARTS OVERSEAS

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EXECUTIVE SUMMARY: **INCENTIVES FOR LEARNING**

by John Bishop, Cornell Univ.

Research Findings: In math and science the gap between Japanese, Canadian, English and Finnish high school graduates and white American high school graduates is more than twice the size of the 2 to 3 grade level equivalent gap between blacks and whites in the US.

American high school students do poorly in these comparisons primarily because they devote a lot less time and energy to the task of learning. Parents are apathetic as well. Even though American children learn substantially less in school, American parents are more satisfied with the performance of their local schools than parents in Japan and Taiwan.

In Canada, Australia, Japan and Europe, students study harder and parents demand more of their schools because labor market success is determined by how much is learned in high school. National or provincial examinations assessing grasp of the high school curriculum determine admission to university and into programs preparing for high paying careers. Grades on these exams appear on one's resume for decades. Large firms in Japan and Europe hire many entry level workers directly out of high school and base their selections on grades and exam scores.

In the US, by contrast, credentials signifying time spent in school are well rewarded but **most students realize few benefits from studying hard while in school.** This is a consequence of four phenomena:

* The labor market fails to adequately reward effort and achievement in high school. Even though achievement in math, science and English has large effects on job performance in clerical, technical, service and blue collar jobs, analysis of NLS Youth data demonstrates that during the first 8 years after high school graduation these competencies have no effect on the wage rates and earnings of young men. For young women, mathematical reasoning has a positive effect on wage rates but the effect is significantly smaller than the productivity effects of this competency. Many high schools do not send high school transcripts to employers when ex students request them to.

* Admission to selective colleges is not based on an absolute or external standard of achievement in high school subjects. It is based instead on aptitude tests which do not assess the high school curriculum and on such measures of student performance as class rank and grade point averages, which are defined relative to classmates' performances not relative to an external standard in the way scout merit badges or the English 'O' level exams are. AS A RESULT:

* The peer group actively discourages academic effort because studying hard shifts the grading curve up and makes it harder for classmates.

* Parents do not demand higher standards because this will not improve their child's GPA, rank in class or SAT score and it would put at risk what is really important--the diploma.

Policy Recommendations: The key to motivation is recognizing and rewarding learning effort and achievement. Learning accomplishments need to be described on an absolute scale (so that improvements in the quality and rigor of the teaching and greater effort by all students makes everybody better off) and signaled to employers. The following specific reforms are recommended:

* **Institute statewide achievement exams** which require essays and other extended answers (similar to NY's Regents Exams) and base college admissions decisions and merit scholarships on the results.
* **Establish new graduation credentials** ("Career Passport", "Competency Profile") which signal the student's learning accomplishments (measured by a criterion referenced scale) to the labor market.
* **Expand the Advanced Placement Program** by arranging for a large number of selective colleges to "strongly recommend" that applicants take and pass AP exams in both their junior and senior year and by awarding $100. AP Excellence Awards to students who pass the exams and funding summer training institutes for the AP teachers.
* **Replace the SAT exam**. Using scores on AP exams and state achievement exams to make college admission decisions will generate incentives to study and to upgrade one's local school.
* After 40 years it is time to **modernize the cognitive content of the GATB** by adding subtests measuring algebra, geometry, technical and scientific knowledge. This increases validity and strengthens incentives to study.
* **Employers should be encouraged to use high school grades and broad spectrum achievement tests like the ASVAB for hiring selections.**
* **All applicants for civil service jobs should be required to submit high school and college transcripts.**
* **Base Selection into the armed forces on competence in science and technical subjects not just English and math.**
* **Keep schools operating until 5 PM and all summer** offering enrichment programs to all students.

* **Require students who are lagging behind to attend remedial programs after school and during the summer.**
* **Institute Cooperative Learning.** Classroom recognition of team performance results in students urging other team members to study hard.

2/27/89

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by

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The scientific and mathematical competence of American high school students is generally recognized to be very low. The National Assessment of Educational Progress (NAEP) reports that only 7.5 percent of 17 year old students can "integrate specialized scientific information" (NAEP 1988a p.51) and 6.4 percent "demonstrated the capacity to apply mathematical operations in a variety of problem settings." (NAEP 1988b p. 42)

There is a large gap between the science and math competence of young Americans and their counterparts overseas. In the 1960s, the low ranking of American high school students in such comparisons was attributed to the fact that the test was administered to a larger proportion of American than European and Japanese youth. This is no longer the case. Figures 1 to 4 plot the scores in Algebra, Biology, Chemistry and Physics against proportion of the 18-year old population in the types of courses to which the international test was administered. In the Second International Math Study, the universe from which the American sample was drawn consisted of high school seniors taking a college preparatory math course. This group represents 13 percent of the age cohort, a proportion that is roughly comparable to the 12 percent of Japanese youth who were in their sample frame and is considerably smaller than the 19 percent of youth in the Canadian province of Ontario and the 50 percent of Hungarians who took the test. In Algebra, the mean score for this very select group of American students was about equal to the mean score of the much larger group of Hungarians and substantially below the Canadian achievement level (McKnight et al 1987).

The findings of the Second International Science Study are even more dismal. For example, the 25 % of Canadian 18-year olds taking chemistry know just as much chemistry as the very select 1 % of Americans high school seniors taking their second

FIGURE 1

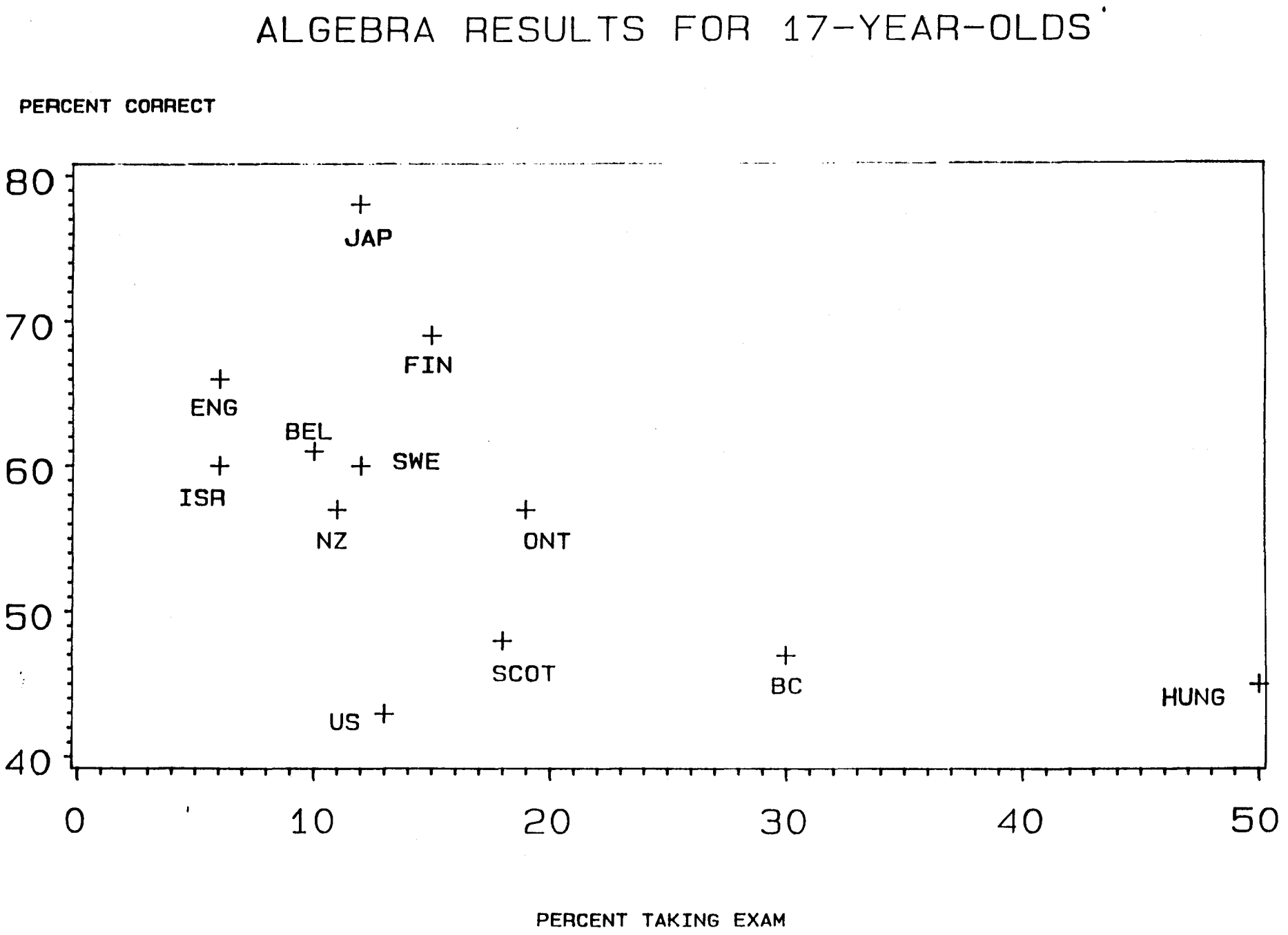

ALGEBRA RESULTS FOR 17-YEAR-OLDS
PERCENT CORRECT
80
70
60
50
40
0
10
20
30
40
50
JAP
FIN
ENG
BEL
SWE
ISR
NZ
ONT
SCOT
BC
HUNG
US
PERCENT TAKING EXAM

FIGURE 2

BIOLOGY RESULTS FOR 18-YEAR-OLDS

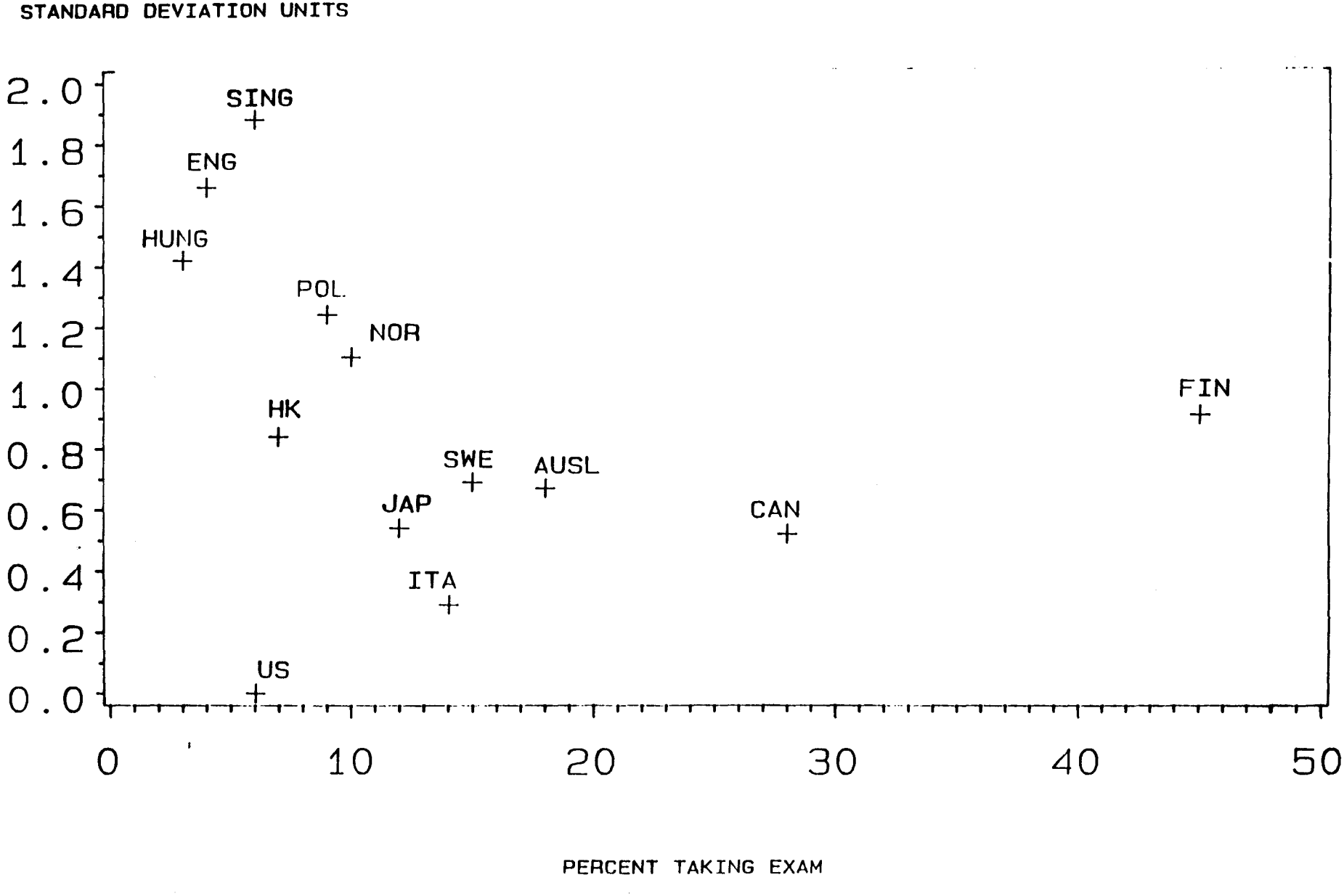


FIGURE 3

CHEMISTRY RESULTS FOR 18-YEAR-OLDS

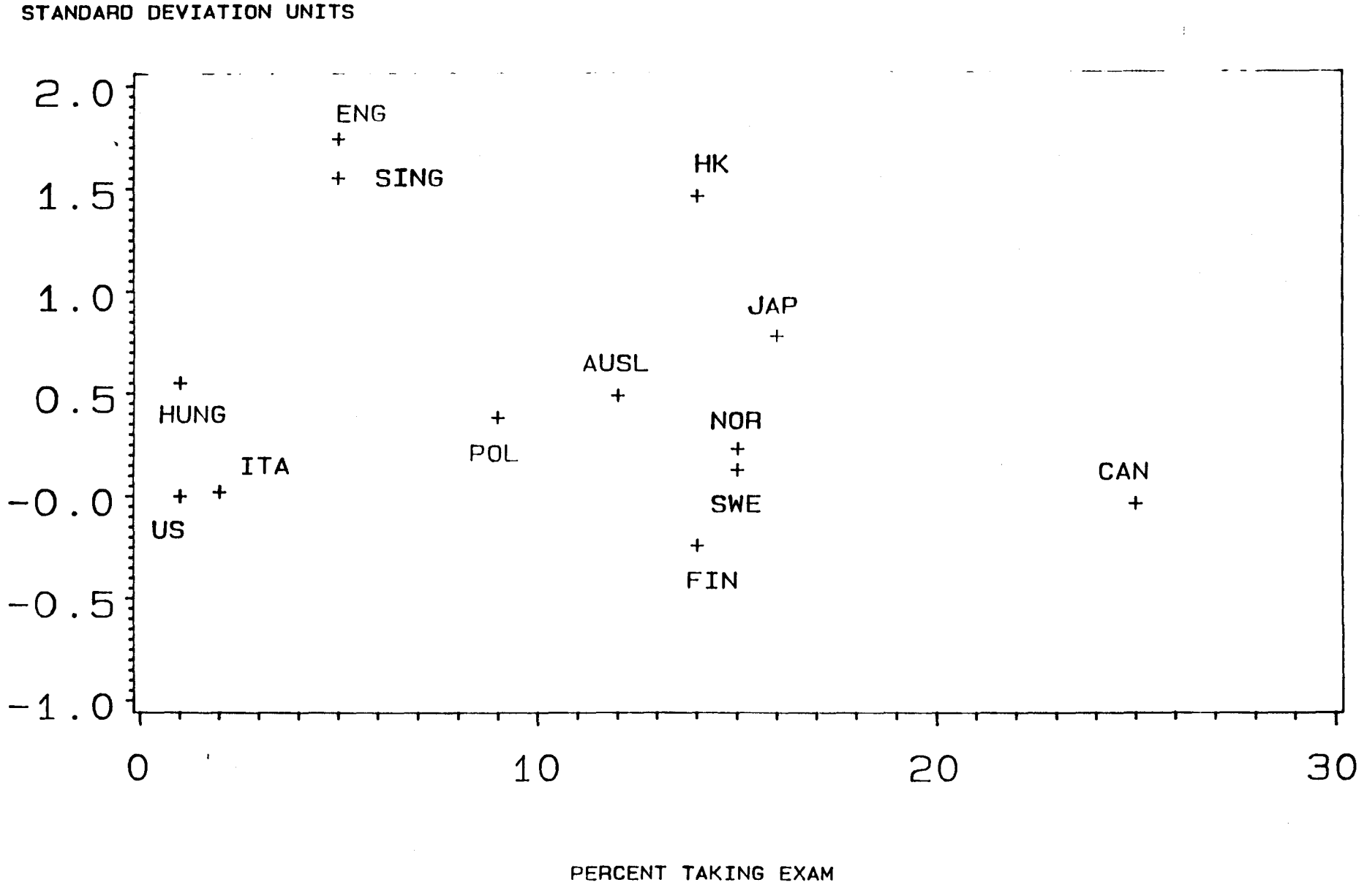
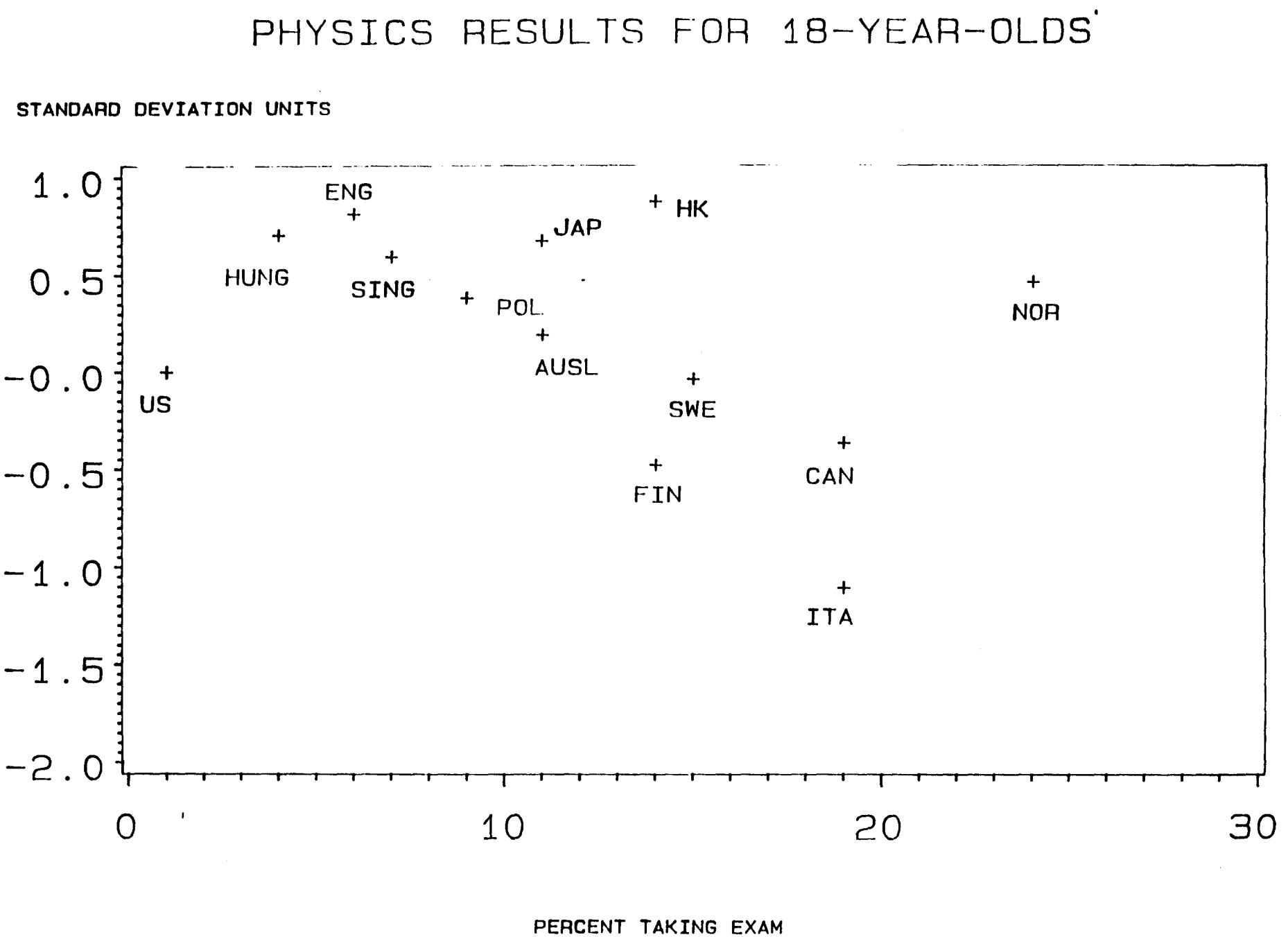


FIGURE 4


PHYSICS RESULTS FOR 18-YEAR-OLDS
STANDARD DEVIATION UNITS
1.0
0.5
-0.0
-0.5
-1.0
-1.5
-2.0
0
10
20
30
ENG
HK
JAP
HUNG
SING
POL
NOR
AUSL
US
SWE
CAN
FIN
ITA
PERCENT TAKING EXAM

chemistry course (most of whom are in "Advanced Placement"). The 28 % taking biology know much more than the 6 % of American 17-18 year olds who are taking their second biology course (International Association for the Evaluation of Educational Achievement, 1988).

(Figure 1-4 about here)

The poor performance of American students is sometimes blamed on the nation's "diversity". Many affluent parents apparently believe that their children are doing acceptably by international standards. This is not the case. In Stevenson, Lee and Stigler's (1986) study of 5th grade math achievement, the best of the 20 classrooms sampled in Minneapolis was outstripped by every single classroom studied in Sendai, Japan and by 19 of the 20 classrooms studied in Taipeh, Taiwan. The nation's top high school students rank far behind much less elite samples of students in other countries. In math and science the gap between Japanese high school students and their white American counterparts is more than twice the size of the two to three grade level equivalent gap between blacks and whites in the US. The learning deficit is pervasive.

The costs in terms of competitiveness and living standards of these educational deficits is very large. Bishop (1989) applied a growth accounting methodology to a related issue--the cost of the test score decline--and using conservative assumptions calculated the resulting reduction in GNP to be $86 billion in 1987 projected in real terms to double by the year 2000. The test score decline between 1967 and 1980 was only 1.25 grade level equivalents on average across all academic subjects; the deficit with respect to Japan in math and science (the only two subjects for which there are recent international comparisons) is more than 4 US grade level equivalents at the end of high school. Analysis of the NLS Youth Cohort data on wages and earnings and GATB revalidation data and military data on the association between tests and job performance has found that mathematical competencies are better predictors of job performance and wages than verbal competencies in the great bulk of blue collar and clerical jobs (Bishop 1987b, 1988b). If this is the case and the deficit is not substantially made up in college, extrapolations from the test score decline study would imply that the educational deficit could on its own produce a productivity differential between Japan and the United States of more than 10 percent. (At the exchange rate prevailing in February 1989, Japanese manufacturing workers

are paid roughly -- percent more than American manufacturing workers.)

This paper examines the causes of this learning deficit and then recommends policy measures for remedying the problems identified. Section 1 presents evidence that American students devote considerably less time and energy to learning in high school than their counterparts abroad.

Section 2 attributes the differences in learning effort to differences across societies in the structure and magnitude of the rewards for academic achievement. It is demonstrated that the US labor market under rewards learning achievements in high school and that the failure to signal learning achievements to employers is at the root of the American learning deficit. Section 3 examines the consequences for incentives to learn and the sorting of workers to jobs (both its efficiency and distributional ramifications) of the signals that employers base their hiring selections on. Section 4 sets forth a series of policy recommendations designed to improve student incentives to devote time and energy to learning and to strengthen parental incentives to demand that local schools be upgraded.

I. APATHY: THE PROXIMATE CAUSE OF THE LEARNING DEFICIT

American high school students do poorly in these international comparisons primarily because they devote a lot less time and energy to the task of learning. American students average nearly 20 absences a year; Japanese students only 3 a year (Berlin and Sum 1988). School years are longer in Europe and Japan. Forty-five percent of Japanese junior high school students attend Juku, private schools which provide tutoring in academic subjects (Leestma 1987). Thomas Rohlen has estimated that Japanese high school graduates average the equivalent of four more years in a classroom and studying than American graduates.

Studies of time use and time-on-task show that American students actively engage in a learning activity for only about half the time they are in high school. A study of schools in Chicago found that public schools with high-achieving students averaged about 75 % of class time for actual instruction; for schools with low achieving students, the average was 51 % of class time (Frederick, 1977). Other studies have found that for reading and math instruction the average engagement rate is about 75 % (Fischer et al., 1978; Goodlad, 1983; Klein, Tyle, and Wright, 1979;). Overall, Frederick, Walberg and

Rasher (1979) estimated 46.5 percent of the potential learning time was lost due to absence, lateness, and inattention.

In the High School and Beyond Survey students reported spending an average of 3.5 hours per week on homework. When homework is added to engaged time at school, the total time devoted to study, instruction, and practice is only 18-22 hours per week -- between 15 and 20 % of the student's waking hours during the school year. By way of comparison, the typical senior spent 10 hours per week in a part-time job and about 24 hours per week watching television (A. C. Neilsen unpublished data). Thus, TV occupies as much time as learning. Students in other nations spend much less time watching TV: 60% less in Switzerland and 44% less in Canada (Organization of Economic Cooperation and Development, Table 18.1, 1986). Japanese 5th graders spend 32.6 hours a week involved in academic activities while American youngsters devote only 19.6 hours to their studies (Stevenson, Lee and Stigler 1986). Science and mathematics deficits are particularly severe because most students do not take rigorous college preparatory courses in these subjects. The high school graduating class of 1982 took an average of only .43 credits of Algebra II, .31 credits of more advanced mathematics courses, .40 credits of chemistry and .19 credits of physics (Meyer 1988 Table A.2).

Even more important than the time devoted to learning is the intensity of the student's involvement in the process. At the completion of his study of American high schools, Theodore Sizer (1984) characterized students as, **"All too often docile, compliant, and without initiative.**(p. 54)" John Goodlad (1983) described: **"a general picture of considerable passivity among students...**(p. 113)". The high school teachers surveyed by Goodlad ranked "lack of student interest" and "lack of parental interest" as the two most important problems in education.

The student's lack of interest makes it difficult for teachers to be demanding. Sizer's description of Ms. Shiffe's class, illustrates what sometimes happens:

> Even while the names of living things poured out of Shiffe's lecture, no one was taking notes. She wanted the students to know these names. They did not want to know them and were not going to learn them. Apparently no outside threat--flunking, for example--affected the students. Shiffe did her thing, the students chattered on, even in the presence of a visitor....Their common front of uninterest probably made examinations moot. Shiffe could not flunk them all, and, if their performance was uniformly shoddy, she would have to pass them all. Her desperation was as obvious as the students cruelty toward her."(p. 157-158)

How does a teacher avoid this treatment? Sizer's description of Mr. Brody's class provides one example.

> He signaled to the students what the minima, the few questions for a test, were; all tenth and eleventh-graders could master these with absurdly little difficulty. The youngsters picked up the signal and kept their part of the bargain by being friendly and orderly. They did not push Brody, and he did not push them. The classroom was tranquil and bland. By my watch, over a third of the time was spent on matters other than history, and two-thirds of the classes ostensibly devoted to the subject were undemanding. Brody and his class had agreement, all right, agreement that reduced the efforts of both students and teacher to an irreducible and pathetic minimum.(p. 156)

Some teachers are able to overcome the obstacles and induce their students to undertake tough learning tasks. But for most, the student's lassitude is demoralizing. Everyone in the system recognizes the problem, but each group fixes blame on someone else. As one of my students put it:

> As it stands now, there is an unending, ever increasing cyclic problem. Teacher and administrator disinterest, apathy, and their lack of dedication results in students becoming even more unmotivated and docile, which in turn allows teachers to be less interested and dedicated. If students don't care, why should teachers? If teachers don't care, why should the students? (Krista, 1987)

Yes, it is a classic chicken versus egg problem. Teachers are assigned responsibility for setting high standards but we do not give them any of the tools that might be effective for inducing student observance of the academic goals of the classroom. They finally must rely on the force of their own personalities. All too often teachers compromise academic demands because the bulk of the class sees no need to accept them as reasonable and legitimate.

The Apathy of Parents and School Boards

The second major reason for the low levels of achievement by American students is parental and school board apathy. Japanese families allocate 10 percent of the family's income to educational expenses; American families only 2 percent. If American parents were truly dissatisfied with the performance of their local public schools, they would send their children to tuition financed schools offering an enriched and rigorous curriculum and

tutoring after school would be as common as it is in Japan. Most parents who send their children to private schools appear to be attracted by their stricter discipline and religious education not more rigorous academics and better qualified teachers.[1] Private school students do not learn at an appreciably faster rate than public school students (Cain and Goldberger 1983).

A comparative study of primary education in Taiwan, Japan and United States found that even though American children were learning substantially less in school, American parents were the most satisfied with the performance of their local schools (Stevenson, Lee and Stigler, 1986). Clearly American parents hold their children and schools to lower academic standards than Japanese and Taiwanese--as well as European--parents.

II. INCENTIVES: THE REAL CAUSE OF THE LEARNING DEFICIT

Incentives for Effort and Learning in High School

The fundamental cause of student and parental apathy is the absence of good signals of effort and learning in high school and a consequent lack of rewards for effort and learning. Signals of learning like years of schooling are handsomely rewarded. In 1985 25 to 34 year old male (female) college graduates working full time full year earned 38 (40) percent more than comparable high school graduates and high school graduates earned 23 (16) percent more than high school dropouts. These rewards have significant effects on student enrollment decisions. When the payoff to a college degree for white males fell in the early 1970s, the college attendance rates of white males fell substantially (Freeman 1976b). When the payoff to college rose again during the late 1970s and 1980s, male college attendance rates rose as well. Years of schooling is only a partial measure of learning accomplishment, however.

In contrast to years spent in school, the effort devoted to learning in high school and the actual competencies developed in high school are generally not well signaled to colleges and employers. Consequently, while students are generously rewarded for staying in school, most students realize few benefits from working hard while in school. The lack of incentives for effort and learning accomplishment is a consequence of three phenomena:

* The labor market fails to reward effort and achievement in high school.
* The peer group actively discourages academic effort.

* Admission to selective colleges is not based on an absolute or external standard of achievement in high school subjects. It is based instead on aptitude tests which do not assess the high school curriculum and on such measures of student performance as class rank and grade point averages, which are defined relative to classmates' performances not relative to an external standard.

2.1 The Absence of Major Economic Rewards for Effort in High School

Students who plan to look for a job immediately after high school typically spend less time on their studies than those who plan to attend college. In large part, most see very little connection between how much they learn and their future success in the labor market. Less than a quarter of 10th graders believe that geometry, trigonometry, biology, chemistry and physics are needed to qualify for their first choice occupation (Longitudinal Survey of American Youth 1988). Statistical studies of the youth labor market confirm their skepticism about the benefits of taking tough courses and studying hard:

° Employers rank "reading, writing, math and reasoning ability" number 5 on a list of 6 abilities they look for when hiring (Survey of the National Federation of Independent Business [NFIB] membership)[2].

° For students seeking part-time employment while attending high school, grades and performance on academic achievement/aptitude tests have essentially no impact on labor market success. They have -
  -- no effect on the chances of finding work when one is seeking it during high school, and
  -- no effect on the wage rate of the jobs obtained while in high school (Hotchkiss, Bishop & Gardner, 1982).

° As one can see in table 1, for those who do not go to college full-time, high school grades and test scores had -
  -- no effect on the wage rate of the jobs obtained immediately after high school in Kang and Bishop's (1984) analysis of High School and Beyond seniors and only a 1 to 4.7 % increase in wages per standard deviation improvement in test scores and grade point average in Meyer's (1982) analysis of Class of 1972 data.
  -- a moderate effect on wage rates and earnings after 4 or 5 years [Gardner (1982) found an effect of 4.8 % per standard deviation of achievement and Meyer (1982) found an effect of 4.3 to 6.0 % per standard deviation of achievement],
  -- a small negative effect on the risk of unemployment immediately after high school.

[Figure 5 and 6 about here]

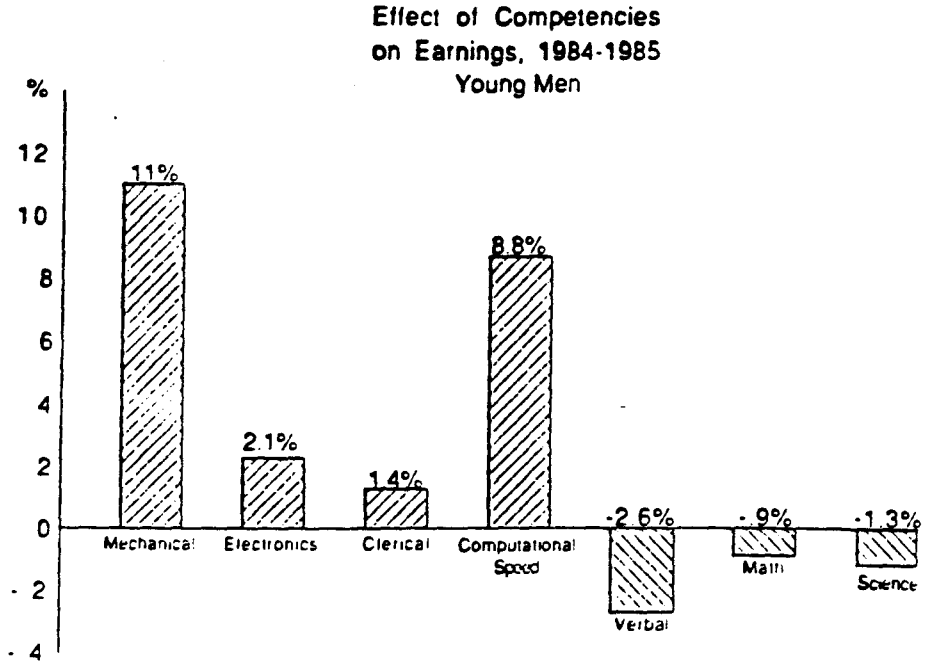
Table 1

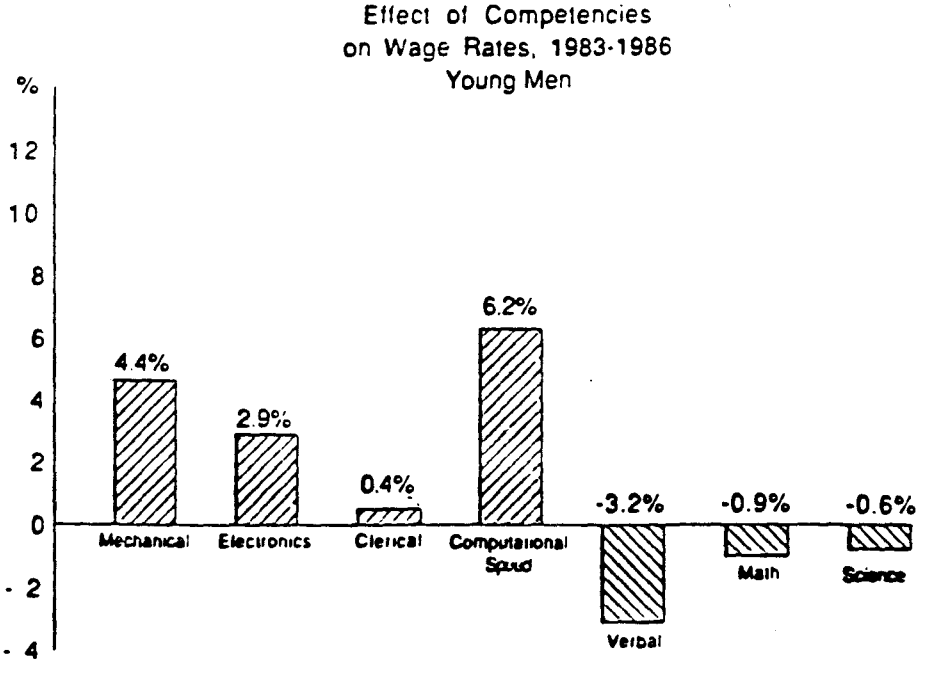
Effect of Academic Achievement
on the Wage Rates of High School Graduates

Study and Data Set	Date of Graduation	Age	Achievement Measures	Percent Change in Wage Rate Male	Female
Wage Rates					
Kang & Bishop (1985)	1980	19	Test-Math,Voc,Read	-1.9	-.5
High School & Beyond			GPA in Grade 12	.6	2.2
Gardner (1983)	1976-1982	19-24	AFQT	4.8	4.8
NLS Youth					
Daymont & Rumberger	1976-1979	19-21	GPA in Grade 9	.3	2.7
NLS Youth (1982)					
Meyer (1982)	1972	19	Class Rank Grade 12	0.0	2.5
(Weekly earnings)			Test Composite	1.2	2.2
Class of 1972					
Earnings					
Hause (1975)	1961	19	IQ,Test-Math	-3.7	--
Project Talent (white)		23	IQ,Test-Math	6.1	--

The table reports the percentage response of the wage rate or earnings to a one standard deviation improvement in a measure of academic achievement. For high school seniors a one standard deviation differential on an achievement test is about equal to 3.5 grade level equivalents or 110 points on the Verbal SAT. For GPA, one standard deviation is about .7 when C's = 2.0, B's = 3.0 and A's = 4.0.

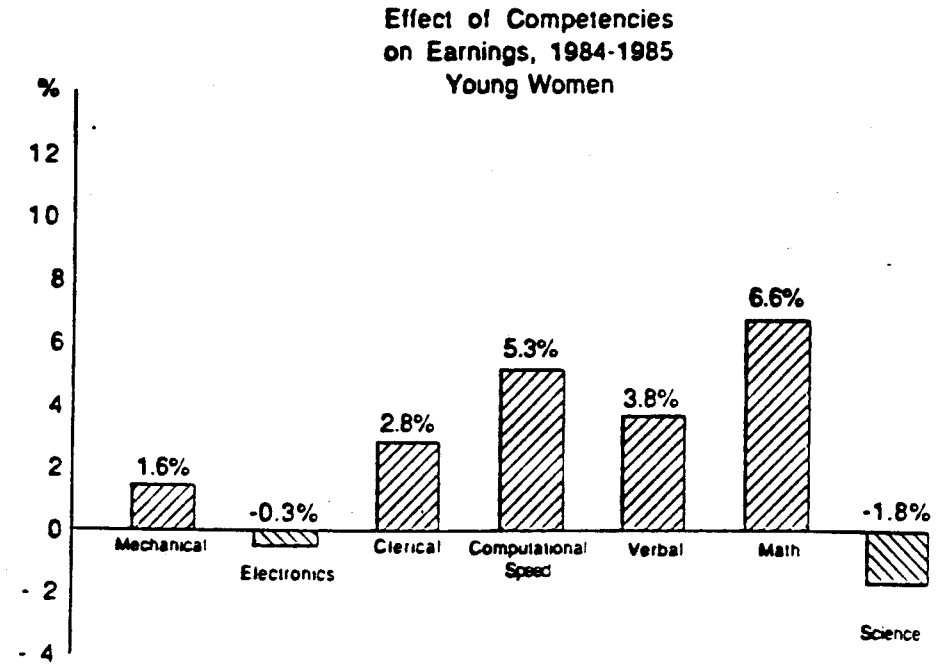
FIGURE 5

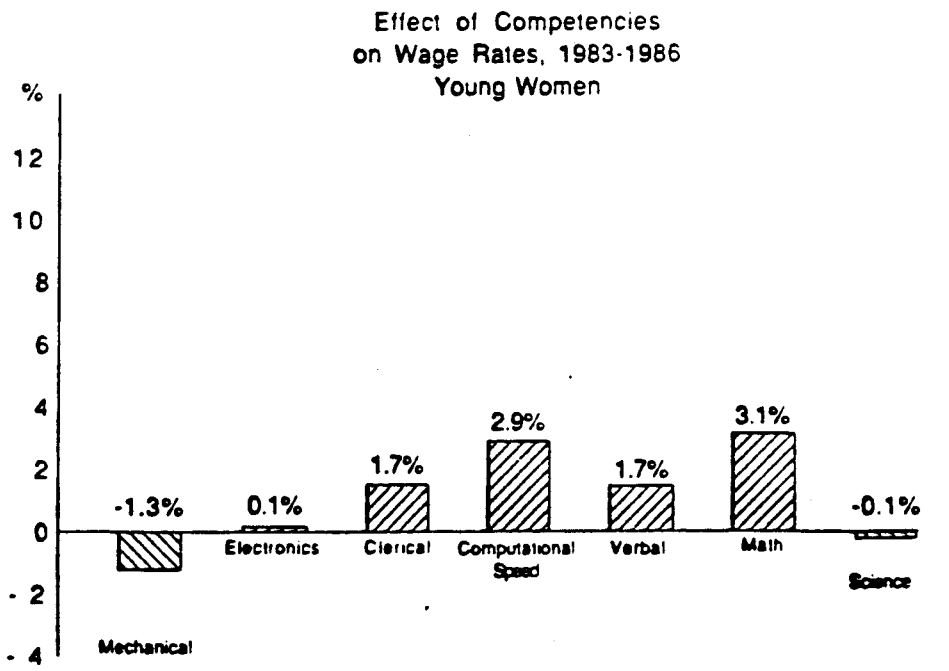




Source Analysis of NLS Youth data The figure reports the effect of a one population standard deviation increase in Armed Services Vocational Aptitude Battery subtest while controlling for schooling, school attendance, age, work experience, region, SMSA residence and ethnicity

FIGURE 6





Source Analysis of NLS Youth data The figure reports the effect of a one population standard deviation increase in Armed Services Vocational Aptitude Battery subtest while controlling for schooling, school attendance, age, work experience, region, SMSA residence and ethnicity

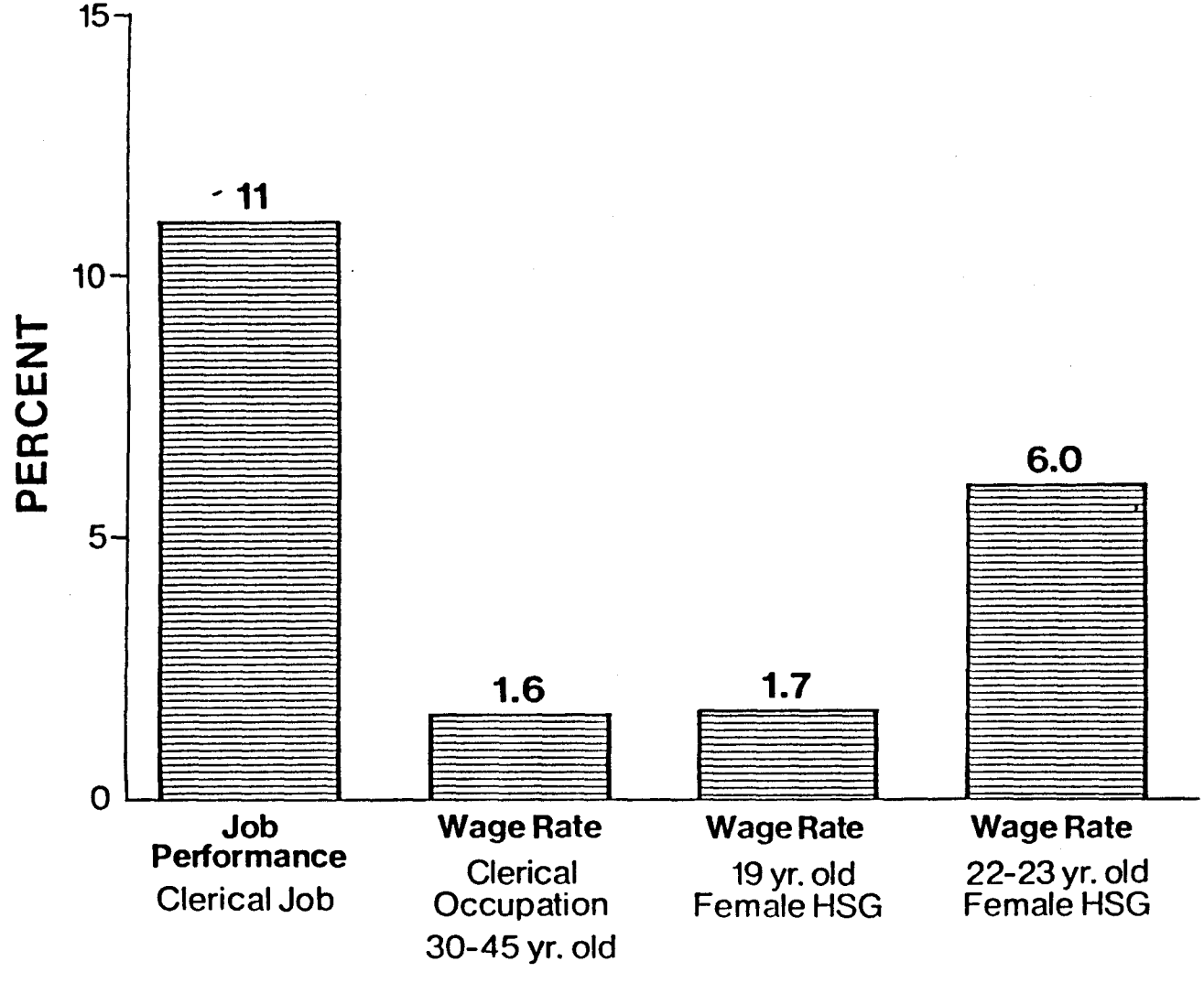
- Results of an analysis of the Youth Cohort of the National Longitudinal Survey are summarized in figures 5 and 6 (Bishop, 1988). It was found that during the first 8 years after leaving high school, young men received **no** rewards from the labor market for developing competence in science, language arts and mathematical reasoning. The only competencies that were rewarded were speed in doing simple computations (something that calculators do better than people) and technical competence (knowledge of mechanical principles, electronics, automobiles and shop tools). For the non-college bound female, there were both wage rate and earnings benefits to learning advanced mathematics but no benefits to developing competence in science or the technical arena. Competence in language arts did not raise wage rates but it did reduce the incidence of unemployment. The payoff to science, language arts and mathematical reasoning competency was higher for female college graduates than for female high school graduates. For both males and females, age increased the payoff to computational speed but had no effect on the payoff to the verbal, scientific and mathematical reasoning competencies.

The long delay before labor market rewards are received is important because most teenagers are short sighted and liquidity constrained, so benefits promised for 10 years in the future may have little influence on their decisions.

Although the economic benefits of higher achievement to the employee are quite modest and do not appear until long after graduation, the benefits to the employer (and therefore, to national production) are immediately realized in higher productivity. Over the last 80 years, industrial psychologists have conducted hundreds of studies, involving hundreds of thousands of workers, on the relationship between productivity in particular jobs and various predictors of that productivity. They have found that scores on tests measuring competence in reading, mathematics, science and problem solving are strongly related to productivity in almost all of the civilian jobs studied[3](Ghiselli 1973; Hunter and Hunter 1983). Studies conducted by the military similarly find that scientific, technical and mathematical reasoning competencies have large effects on both paper and pencil measures of job knowledge and hands-on measures of job performance (Hunter, Crosson and Friedman 1985; Bishop 1988b).

Figure 7 compares the percentage effect of mathematical and verbal achievement (specifically a difference of three grade level equivalents in test scores or .7 GPA points (on a 4 point scale) on the productivity of a clerical worker, on wages of male clerical workers (Taubman & Wales, 1975), and on the wages of young women who have not gone to college (Kang & Bishop, 1984; Meyer, 1982). Productivity clearly increases much more

Figure 7


15
10
5
0
PERCENT
11
1.6
1.7
6.0
Job Performance
Clerical Job
Wage Rate
Clerical Occupation
30-45 yr. old
Wage Rate
19 yr. old Female HSG
Wage Rate
22-23 yr. old Female HSG

than wage rates.[4] Apparently, when a non-college-bound student works hard in school and improves his or her competence in language arts, science and mathematical reasoning, the youth's employer reaps much of the benefit. The youth is more likely to find a job, but not one with an appreciably higher wage.

(Figure 7 about here)

Reasons for the Discrepancy between Wage Rates and Productivity on the Job

Why doesn't competition between employers result in much higher wages for those who achieve more in high school? The lack of objective information available to employers on applicant accomplishments, skills, and productivity explains much. Tests are available for measuring competency in reading, writing, mathematics, science, and problem solving, but EEOC guidelines resulted in a drastic reduction in their use after 1971. A 1987 survey of a stratified random sample of small-and medium-sized employers who were members of the National Federation of Independent Business [NFIB] found that aptitude test scores had been obtained in only 2.9 % of the hiring decisions studied.

Other potential sources of information on effort and achievement in high school are transcripts and referrals from teachers who know the applicant. Both are under-used. In the NFIB survey, transcripts had been obtained prior to the selection decision for only 14.2 % of the high school graduates hired. If a student or graduate has given written permission for a transcript to be sent to an employer, the Buckley amendment obligates the school to respond. Many high schools are not, however, responding to such requests. The experience of Nationwide Insurance, headquartered in Columbus Ohio, is probably representative. The company obtains permission to get high school records from all young people who interview for a job. It sent over 1,200 signed requests to high schools in 1982 and received only 93 responses. The company reported that colleges were more responsive. Most high schools have apparently designed their systems for responding to requests for transcripts around the needs of college-bound students rather than the students who seek jobs immediately after graduating.

There is an additional barrier to the use of high school transcripts in selecting new employees--when high schools do respond, it takes a great deal of time. For Nationwide

Insurance the response almost invariably took more than 2 weeks. Given this time lag, if employers required transcripts prior to making hiring selections, a job offer could not be made until a month or so after an application had been received. Most jobs are filled much more rapidly than that.

The only information about school experiences requested by most employers is years of schooling, diplomas and certificates obtained, and area of specialization. Only 15 percent of the NFIB employers asked applicants with 12 years of schooling to report their grade point average. The lack of questions about school performance on the job application does not reflect an employer belief that school performance is a poor predicator of job performance. When employers have grade point average information, it has a major effect on the ratings employers assign to job applicants in policy capturing experiments (Hollenbeck and Smith, 1984). The absence of questions about grades from most job applications probably reflects the low reliability of self reported data, the difficulties of verifying it, and the fear of EEO challenges to such questions.

Hiring on the basis of recommendations by high school teachers is also uncommon. In the NFIB survey, when a high school graduate was hired, the new hire had been referred or recommended by vocational teachers only in 5.2 % of the cases and referred by someone else in the high school in only 2.7 %.

Clearly, hiring selections and starting wage rates often do not reflect the competencies and abilities students have developed in school. Instead, hiring decisions are based on observable characteristics (such as years of schooling and field of study) that serve as signals for the competencies the employer cannot observe directly. A study of how individual wage rates varied with initial job performance found that when people hired for the same or very similar jobs are compared, someone who is 20 % more productive than average is typically paid only 1.6 % more. After a year at a firm, better producers received only a 4% higher wage at nonunion firms with about 20 employees, and they had no wage advantage at unionized establishments with more than 100 employees or at nonunion establishments with more than 400 employees (Bishop, 1987a).

Employers have good reasons for not varying the wage rates of their employees in proportion to their perceived job performance. All feasible measures of individual productivity are unreliable and unstable. In most cases measurement must be subjective.

Workers are risk averse and reluctant to accept jobs in which the judgement of one supervisor can result in a large wage decline in the second year on the job (Hashimoto and Yu 1980; Stiglitz 1974). Most productivity differentials are specific to the firm, and this reduces the risk that not paying a particularly productive worker a comparably higher salary will result in him going elsewhere (Bishop, 1987a), Pay that is highly contingent on performance can also weaken cooperation and generate incentives to sabotage others (Lazear 1986). Finally, in unionized settings, the union's opposition to merit pay will often be decisive.

Despite their higher productivity, young workers who have achieved in high school do not receive appreciably higher wage rates after high school. The student who works hard must wait many years to reap rewards, and even then the magnitude of the wage and earnings effect--a 1 to 2 % increase in earnings per grade level equivalent on achievement tests--is hardly much of an incentive. It is considerably smaller than the actual gain in productivity that results.

2.2 The Zero-Sum Nature of Academic Competition in High School

The second root cause of high school students' poor motivation is peer pressure against studying hard. The primary reason for peer pressure against studying is that pursuing academic success forces students into a zero-sum competition with their classmates. Their achievement is not being measured against an absolute, external standard. In contrast to scout merit badges, for example, where recognition is given for achieving a fixed standard of competence, the schools' measures of achievement assess performance relative to fellow students through grades and class rank. When students try hard to excel, they set themselves apart, cause rivalries and may make things worse for friends. When we set up a zero sum competition among close friends, we should not be surprised when they decide not to compete. All work groups have ways of sanctioning "rate busters." High school students call them "brain geeks," "grade grubbers," and "brown nosers."

Young people are not lazy. In their jobs after school and on the football field, they work very hard. In these environments they are part of a team where individual efforts are