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The Impact of School-to-Work Programs on Minority Youth

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INTRODUCTION

School-to-Work (STW) programs seek to integrate school-based learning with work-based learning by fostering a variety of linkages between schools and workplaces. Through the combination of curriculum reform with systemic school reform efforts, the STW movement has rapidly grown in the United States since the late 1980s. From career exploration and job immersion to apprenticeships and internships, STW activities have spread rapidly across the country in recent years. This chapter examines the differences in the participation of ethnic and racial minorities in STW programs. It also analyzes the impact that these programs have had on the schooling and work of racial and ethnic minorities in the U.S.

The difficulties of the transition from school to work in the United States have been a topic of discussion and a policy concern for many years. In his Education Message to Congress in 1968, President Lyndon B. Johnson noted that about 1.5 million young men and women would leave high school and enter the labor force that year. As in previous years, he said, the transition to work for many of them would be very difficult. He concluded: "the irony of this situation is that it has occurred in the country with the most highly developed and the most costly system of education in the world and in a period of unusual prosperity, high employment, and skill shortages" (as cited in Arnow et al., 1968, p 3).

The situation has not improved since President Johnson made his remarks more than 30 years ago. The average unemployment rate of teenagers in 1968 (16 to 19 years old) was 11.6 %, but in August 2000 it was 14.4%, declining from the recession peak of over 20% in 1992 (these and other labor-force statistics below are from Bureau of Labor Statistics, 2001). Since overall unemployment rates in both 1968 and August 2000 were around 4%, the gap between the

unemployment experience of youth and the rest of the population has widened since 1968. The situation is worse among minorities. The unemployment rate among Black teenagers (16 to 19 years old) was 22.1% in 1968, but it had grown to 27.8% in August 2000, down from a whopping 42% in 1992.

The earning power of the young has also eroded, compounding the difficult unemployment situation. The median weekly earnings of full-time wage and salary workers aged 16 to 24 dropped from $369 in 1985 to $334 in 1998 for men, and from $323 to $305 for women (adjusted for inflation, measured in 1998 constant dollars). The incomes of young workers who do not finish high-school has also declined compared to both high school and college graduates, as evidenced by rising rates of return for post-secondary education (see Katz & Autor, 1999).

The problematic transition from school to work in the United States has reflected in the frequent job-hopping of young workers, often referred to as "churning." Studies in the past decade have shown that the average high-school graduate between the ages of 18 and 27 who did not pursue tertiary education held almost six different jobs and experienced four or more spells of unemployment (Zemsky, Shapiro, Iannozzi, Cappelli, & Bailey,1998; see also Topel & Ward, 1992). There is also substantial instability in the transition from school to work, with enrolled high-school students hopping among various part-time jobs and between full-time employment and school.

In aiming chiefly to improve the transition from school to work for American youth, STW programs have followed the vocational-education movement, which has had a prominent history since its expansion at the turn of the twentieth century. Evaluations of the success of traditional vocational-education programs, however, have provided sobering results. This is reflected in the following statement from Kantor and Tyack (1982): "the majority of studies have

concluded that there is little economic advantage to vocational training, as opposed to non-vocational, at the high school level" (p. 2). The American Association of University Women (1992) shared this view, concluding that "vocational education was originally designed to give work skills to high school boys who were not planning to attend college. But research indicates that it may not serve either males of females very well in the current environment" (p. 72). These statements are based on a variety of studies carried out over the years which offer sometimes conflicting but ultimately skeptical results on the impact of traditional vocational-education programs on the careers of young people (see Cuban,1982; Desy, Campbell, & Gardner, 1984; Rivera-Batiz, 1995b, 1995c, 1998; Schug & Western, 2000). Researchers repeatedly found that the lack of collaboration between employers and schools, the substitution of basic academic courses for practical job training, and the tracking and segregation of students into training for specific, low-skilled jobs caused many of these programs to offer low-quality education for their clients.

Picking up momentum in the 1990s, the STW movement has reacted to these deficiencies, redefining the vocational-education movement and offering innovative programs that strengthen the bonds between employers and schools and reintegrate academics with work content (see, for instance, Berryman & Bailey, 1992; Murnane & Levy, 1996). School-to-work links have been fostered by school–employer partnerships, academic curricula with work content offered by employers, apprenticeships and internships, and career academies (see Grubb, 1995; Pauly, Kopp, & Haimson, 1995; Stern, Raby, & Dayton, 1992). In 1994, the movement obtained strong federal support through the School-to-Work Opportunities Act, which provided grants to states to implement school-to-work systems. All 50 states have received STW implementation funds and have organized local partnerships to create school-to-work systems. In addition, in

anticipation of the end of federal funding in 2001, 71% of all states have instituted programs supporting their STW initiatives (National School-to-Work Office, 2000).

This study has used data collected in the 1997 National Longitudinal Survey of Youth (NLSY97). The survey, sponsored by the U.S. Department of Labor, followed the transition from school to work of 8,984 young people who were between 12 and 16 years of age in 1996. This paper uses data currently available from the NLSY97, including the initial interviews in 1997 and the first follow-up in 1998. Both Black and Hispanic youth were oversampled to ensure adequate sample sizes for analysis. Overall, NLSY97 included 4,096 Whites, 2,204 Blacks, and 1,771 Hispanics. The remaining participants belonged to Asian, Native American, and other groups whose small sample sizes have not allowed a robust analysis of their situation (for more details on NLSY97, see Center for Human Resource Research, 2000; U.S. Department of Labor, 2000).

The chapter first investigates the differences in the participation in STW programs of the major racial and ethnic groups in the population. Included are a discussion of the variation in participation rates and an analysis of the determinants of this variation. Next, evidence is offered on the effects of STW programs on the academic and work experiences of White, Black, and Hispanic youth. Finally, conclusions are presented.

INVOLVEMENT OF RACIAL AND ETHNIC MINORITIES IN STW PROGRAMS

The expansion of STW programs in the1990s has been widely documented. According to the 1996 School Administrator's Survey, sponsored by the National School-to-Work Office, 64.2% of all schools with a 12^{th} grade offered at least one school-to-work program; in addition,

26% of schools surveyed offered three or more STW programs (see Joyce and Neumark, 2000). The strong involvement of employers in STW has turned out to contradict the critics skeptical of this aspect of STW activity. Studies using the National Employer Surveys have found that the percentage of employers participating in formal school-to-work partnerships accelerated in the 1990s. By 1997, 25% of employers surveyed were participating in STW programs and this increased to 37% in 1998 (National Center on the Educational Quality of the Workforce 1997; Shapiro, 1998). On the other hand, it also appears that both schools and employers with STW programs have generally adopted the least intensive forms of work-based learning activities, such as job-shadowing and mentoring (Joyce & Neumark, 2000; Shapiro, 1998; Silverberg, 1997).

What has been the involvement of racial and ethnic minorities in STW programs? Looking back at traditional vocational-education programs, one finds that the participation of minorities in them exceeded the average for the overall population, although women had significantly lower participation rates. For instance, data from the 1992 National Adult Literacy Survey indicated that the proportion of non-Hispanic Whites in the U.S. population who completed a high-school program with a vocational, technical, or trade focus was 15.3% for men and 12.3% among women in the early 1990s. By comparison, the equivalent figures for non-Hispanic Blacks were 23.9% for men and 19.6% for women. Among male Hispanics, 20.1% attended a high school with a vocational focus, while 17.1% of Hispanic women did (Rivera-Batiz, 1998). Conversely, the participation of White men and women in college-preparatory high-school programs was much greater than that of Black and Hispanic youth.

What is the experience of the more recent STW programs? Recent studies have shown that non-Hispanic Black youth have participated to a greater extent than other groups in STW

programs, but not Hispanics. For instance, in a recent analysis of STW-program participation using the 1996 School Administrator's Survey, Joyce and Neumark (2000) found that "schools in which 25 to 75% of the student body is Black tended to have higher incidence rates for any school-to-work programs than did schools where less than 25% of the student body is Black" and that "the provision of school-to-work programs does not appear to vary systematically by the percentage of Hispanic students" (p. 8). The same authors examined the initial 1997 interviews of the NLSY97 to determine the participation of racial and ethnic minorities in STW programs. They concluded that "Black youths [were] more likely than other racial groups to participate in at least one school-to-work program. . . . Hispanics, on the other hand, were less likely than non-Hispanics to participate in at least one school-to-work program" (p. 13).

What determines the observed differences in STW participation rates among the major racial and ethnic groups in the population? I have examined this issue using the recently released second-year follow-up of the NLSY97, which includes data from both 1997 and 1998. Thus I was able to examine whether the trends for 1996 and 1997 just presented remained in 1998.

The NLSY97 work examined the participation of high-school students in various school-to-work transition programs. Table 10.1 (Center for Human Resource Research, 2000; all tables that follow are derived from NLSY97 data) names and defines these programs. The survey made a distinction between two types of programs: career-major programs, which were defined as including a coherent sequence of courses based upon an occupational goal, and STW-preparatory programs, which included programs that schools have offered to help students prepare for the world of work. As Table 10.1 shows, the latter type included seven different programs, with increasing intensity of the school–work linkages: job-shadowing (where students follow employees at work for one or more days), worksite visits (where students spend some time

visiting a worksite during the school day or after school), mentoring (where employees oversee the performance of students in their academic work), school-sponsored enterprises (where students produce goods and services under the supervision of an enterprise), cooperative education (where students alternate academic and vocational studies at school with jobs), tech-prep programs (where a comprehensive program of study with a defined career focus linking secondary and postsecondary education is followed), and internships or apprenticeships (where students systematically stay at a worksite for a short period).

The involvement of high-school students in school-to-work programs is substantial, and it increased sharply between 1997 and 1998. Table 10.2 shows participation rates by race and ethnicity. In 1997, approximately one out of three students in ninth grade or higher had participated in one or more career-major or STW-preparatory programs at the time of interview. By 1998, close to half the students had participated in these programs. There were, however, significant differences among the three racial and ethnic groups considered. Non-Hispanic Blacks tended to have greater participation rates than both non-Hispanic Whites and Hispanics. On the other hand, Hispanics tended to have lower participation rates than other groups. In 1998, for example, 41% of Hispanic teenagers having attained the ninth grade or higher had participated in career-major or STW-preparatory programs, while 47.1% among non-Hispanic Whites and 51.2% among non-Hispanic Blacks had participated.

Table 10.2 also presents data on the participation rates of American youth in the two major types of STW transition program. The racial and ethnic pattern of participation observed for the combination of programs also held for each type of program separately. Young Black people generally had greater participation rates than other groups, while Hispanics tended to have lower rates. Despite the lower participation rate of Hispanics in STW programs in general,

there was no evidence that minority youth were being channeled into less comprehensive and intensive STW-preparatory programs than were others.

Moreover, participation in STW programs increased with each grade a student was enrolled in. Using NLSY97 data for 1998, Table 10.3 presents the participation rates first for students in grades 9 and 10 and second for students who were enrolled in—or had completed—grade 12. For all ethnic and racial groups considered, STW participation rates rose sharply in high school. For instance, among non-Hispanic Black students in 9th and 10th grade, 37.8% participated in one or more career-major or STW-preparatory programs up to the time of interview in 1998. But for students enrolled in or having completed 12th grade, the rate of participation in one or more STW programs was 66.7%. As Table 10.3 shows, this pattern held also for each type of STW-transition program separately.

An analysis of the participation of high-school students in STW programs on the basis of gender did not produce any major, systematic differences. Actually, the proportion of female students involved in STW programs was slightly higher than the proportion for men. Among non-Hispanic Whites, 47.6% of women and 46.6% of men were enrolled or had been enrolled in at least one STW program (either career-major or STW-preparatory). For Hispanics, the corresponding proportions were 41.4% for women and 40.6% for men. For non-Hispanic Blacks, women had a 53.5% participation rate and men a 49% rate.

One goal of the STW movement has been to improve the transition from school to work for all students, particularly minority students in urban school systems. This goal was incorporated in the School to Work Opportunities Act of 1994, which explicitly emphasized the need of STW programs to "increase opportunities for minorities, women, and individuals with disabilities, by enabling individuals to prepare for careers that are not traditional for their race,

gender, and disability." The greater participation of Black youth in STW programs is therefore not surprising. What is of some concern, however, is the substantially lower participation of Hispanic youth in STW programs. What explains this lower participation?

To examine the reasons for the lower Hispanic involvement in STW (a result that held for both men and women), I carried out a probit analysis of the determinants of the likelihood that a high-school student would participate in one or more of the career major and STW-preparatory programs described earlier. This methodology explored how a set of demographic, socioeconomic, and school-based variables affected the probability that a person would participate in the programs. The appendix to this chapter presents the technical results of this analysis. The variables introduced as possible explanations for participation or nonparticipation in STW programs included (a) a set of characteristics of the student: gender, race and ethnicity, immigrant status, health, grade level, the number of times the student repeated a grade (a rough measure of academic achievement), and the cumulative hours of work since the first job (a measure of labor market interest or attachment); and (b) a set of characteristics of the school or community where the student resided: residence in a central city, level of discipline in the school, quality of teaching, size of the school, class size, and private or public schooling.

The analysis suggested that immigrant status was critical in accounting for the lower rate of participation of Hispanic youth in STW programs. Immigrant status sharply reduced the likelihood of such participation. Indeed, once immigrant status was taken into account, the Hispanic variable in the probit equation lost its power to explain the likelihood of STW participation. Immigrant status affects Hispanics disproportionately more than other groups, because a greater share of the Hispanic population is born outside the U.S. As much as 43.2% of the Hispanic youth population in NLSY97 was born outside the United States, but only 3.4% of

non-Hispanic Whites and 4.5% of Blacks were. Table 10.4 shows the average STW-participation rates of Hispanic immigrants and nonimmigrants. Overall, 36.1% of Hispanic immigrant youth had participated in a career-major or STW-preparatory program at any time before the survey interview in 1998. This compares to the much higher 47.2% among Hispanic nonimmigrants. `

The lower participation of Hispanic immigrant youth in STW programs may be connected to the issue of English proficiency. In the NLSY97 sample, 65% of Hispanic youth lived in households where the language used was other than English. The NLSY97 data set does not currently include measures of the English proficiency of students in the sample (English reading-test results have not yet been released), but it is likely that language constitutes a major factor affecting STW participation in schools. Students with limited English proficiency (LEP) are generally channeled into special-education programs that are not integrated with STW programs. This may be temporary, as when students enter one-year immigrant academies, but the separation from mainstream curricula may extend for a longer period, as when the students are enrolled in long-term bilingual or special-education programs (see Rivera-Batiz, 1995a, 1996a).

Lower participation of LEP students in STW programs may also arise from a negative reaction of employers to LEP students, which may encourage these students to avoid or withdraw from STW programs. Although I do not have any evidence for this connection, there exists a voluminous literature documenting the dire labor-market consequences of LEP (see, for example, Rivera-Batiz, 1991, 1992b, 1996b). In programs that seek to foster links between school and work, more research is required on how immigrant status and language affect the involvement of youth in these programs, both from the school side and from the worksite side.

THE CONSEQUENCES OF STW PROGRAMS FOR MINORITY YOUTH

A substantial amount of research has attempted in recent years to examine the consequences that participation in STW programs has for various student outcomes. So far this evidence is mixed. Some researchers have that STW programs have significant impacts on job-related skills and expectations but have discovered very little or no evidence of effects on academic achievement or performance (Hamilton & Hamilton, 1999; Kemple, Poglinco, & Snipes (1999); Neumark & Joyce, 2000; Stasz & Brewer, 1998). Other studies have suggested positive effects of STW programs on both work and academic outcomes (Hanser & Stasz, 1999; Hollenbeck, 1996; Hughes, Bailey, & Mechur, 2001; Westchester Institute for Human Services Research, 2000). For instance, using a sample of 725 high school students, the Westchester Institute for Human Service Research found that "students who actively participated in STW programs had higher grade point averages, were absent from school less often, failed fewer academic courses, enrolled in more challenging math and science courses, and were more decisive about their career direction than comparable students with little or no STW exposure" (p. 5).

Much of the existing research showing positive STW impacts, however, cannot establish a causal connection because of the absence of data controlling the characteristics of students before they participate in STW programs. Even the data for the first NLSY97 wave of interviews could not incorporate changes over time. But the 1998 follow-up interviews of the NLSY97 data allow such an analysis. This study has used the 1997 and 1998 interviews of NLSY97 to examine causal relationships, exploring how participation in STW programs in the period between the first and second interviews affected various student outcomes, holding other factors

constant. The analysis has been separated on the basis of race and ethnicity.

Impact on Math and Science Courses Taken by Students in High School

The effects of STW programs on the math and science courses taken by high-school students are a key issue, since White and minority youth have displayed a huge gap in this regard. For instance, in the NLSY97 sample of high-school seniors or graduates, 26.9% of the White youth population had taken courses in precalculus, calculus, or more advanced math during the year before the interview in 1998. But this figure was only 18.2% among Black youth and 16.1% among Hispanics.

By including more math and science courses in their career-oriented curriculum, STW programs may increase the intensity of math and science instruction directly. This is the case argued by Pauly et al. (1995): "Most of the school-to-work programs examined here apparently induce their students to take more science, math and technical courses than are required for graduation, and more of these courses than they would be likely to take if they were not enrolled in the school-to-work program. For example, the Socorro health academy requires students to take algebra and science courses earlier than many of their regular high school peers, and pushes them to take additional math and science courses thereafter" (p. 31).

There may be other, indirect –but perhaps as powerful—mechanisms involved. Work-based learning may provide incentives and motivation that stimulate student interest in science and mathematics. As Hughes, Moore, and Bailey (1999) have remarked, "activities engaged in at the workplace can be used to bring about a better understanding of knowledge or concepts being taught in the classroom" (p. 8). Heckman (2000) has argued that these motivational and incentive

effects lie behind the success of the German apprenticeship system: "the celebrated German Apprenticeship System has been recommended as a model for the U.S. and for many other countries. . . . When stripped to its essentials, the German system differs from the U.S. school system by (1) breaking down the artificial separation between the world of work and the world of learning; (2) giving students and the firms that apprentice them choice among a variety of learning situations; and (3) motivating students to perform well in order to secure the most desirable apprenticeships and motivating many firms to provide valuable training opportunities" (p. 25). These characteristics of STW programs might enhance the motivation of students to take extra courses, raise their grade point averages, and provide access to—and interest in—more stimulating and productive career opportunities (see Bishop, Ruiz and Mane, 2000). As Murnane and Levy (1996) conclude, "Traditional [vocational education] programs teach students the details of a specific job. The new [STW] programs use the specific jobs to motivate a hidden agenda of mathematics, communication and problem-solving—the New Skills valued throughout the economy" (pp. 122–123).

In order to measure the intensity of math and science courses taken by high school students, I used data collected by the 1998 interviews of the NLSY97 about the number of courses in math and science subjects completed by students since their interview a year earlier. Because NLSY97 asked questions about the number—and subject—of introductory and more advanced courses taken by students, ranging from algebra and biology to calculus and advanced mathematics, an index could be constructed that assigned one point to introductory courses in these fields and additional points to more advanced courses in the fields. The idea was to assess the intensity of the effort dedicated by the respondent to the study of science and mathematics. Since basic courses are often required by high-school curriculum standards and do not

necessarily reflect a student's enhanced interest in the subject, I assigned greater value to advanced courses taken by the students, which would truly reflect greater effort and desire to learn math and science. General, basic, or vocational math received one point each, and so did general courses in science, including basic courses in biology, chemistry, physics, or other basic science courses. More advanced courses were assigned greater scores: elementary algebra or algebra I was assigned 2 points, geometry 3, intermediate algebra (or algebra II) 4, trigonometry 5, precalculus or advanced algebra 6, calculus 7, and other advanced mathematics courses 8 points. Overall, the value of the index of math and science course intensity ranged from 0 (if no math and science courses were taken) to 42 points (which represented a student who had taken all science courses listed in NLSY97 and the most advanced mathematics courses).

Table 10.5 compares the scores received by students who had participated in one or more STW programs with the scores of those who had never participated in STW programs. First, the table displays the gaps that exist in math and science course taking on the basis of race and ethnicity. Hispanic students had the lowest scores, followed by non-Hispanic Blacks, while non-Hispanic White youth displayed the highest scores.

Table 10.5 also shows that students who participated in STW programs had substantially higher scores in the math and science course-taking index. The differences were particularly significant among minorities: for both Black and Hispanic youth, students who participated in STW programs had indexes of math and science intensity over one point higher than nonparticipating students had. This corresponds to the difference between having taken precalculus and having taken just algebra II and trigonometry.

The major problem of comparisons such as those reported in this table is that a simple correlation of student outcomes with STW participation may break down when influences of other variables are taken into account. For example, as we noted earlier, students in later grades tended to have a greater rate of participation in STW programs. As a result, the gaps in math and science course taking determined in Table 10.5 may be purely spurious, resulting from the fact that students who participated in STW programs were more likely to be older students, enrolled in higher grades.

This sample selection-bias problem plagues any evaluation study that seeks to compare the performance of students who have participated in a particular program with that of students who have not participated in that program. The characteristics of the two groups must be held constant, since otherwise any measured differential performance may be related to the variation in the characteristics of the two groups and not necessarily to participation in the program. It is essential, then, to carry out a multivariate analysis of the impact of STW programs on student outcomes; that is, an analysis that includes participation in STW programs as an explanatory variable but that holds constant other variables, including, for example, grade level.

A multiple regression analysis of the determinants of math and science course taking was carried out; the technical results are presented in the appendix. The regression methodology explored how both STW participation and a broad set of individual, socioeconomic, school, and community variables—including grade level among them—affected the intensity of the math and science courses taken by students in the NLSY97 sample in 1998 (that is, during the year after their first interview in 1997), as measured by the index discussed earlier. Multivariate analysis allowed me to consider how one specific variable affected course taking while I held constant the characteristics of the individual as well as those of school and community. Here, I focused

exclusively on describing the impact of STW participation on the math and science course-intensity index. The appendix displays the overall results, which considered the effects of other variables.

For non-Hispanic White students, the analysis found no evidence that participation in STW-transition programs increased the intensity of math and science courses taken. However, for minorities, the impact was significant. Participation in STW-transition programs by minority youth at any given time was substantially linked to greater course taking in science and math after participation in such programs. For both non-Hispanic Blacks and Hispanic youth, students who participated in STW programs before their first interview in 1997 had approximately one more point on the math and science course-intensity index for courses taken during the year after the 1997 interview. This result was obtained with other variables constant, including grade level.

Note the causality implied by this analysis: participation in STW programs before the students were interviewed in1997 was strongly linked to greater math and science course taking in the year following such participation. In fact, the correlation between participation in STW programs after 1997 on math and science course taking during the same time period was also positive, but significantly smaller. This suggests that the mechanism through which STW programs enhance the curriculum of many participants is not just by directly requiring more advanced or comprehensive math and science courses but also by motivating students to take those courses in the future. This appears to be the case especially for minority youth.

Impact of STW Participation on Hours Worked

It is to be expected that participation in programs that bring together the worlds of school and work provides students with a motivation to enter the world of work. This suggests that

students who participate in STW programs should have greater labor-market participation. Are STW programs causing students to work longer hours? This is not an easy question to solve empirically, because there is a simultaneity between hours worked and participation in STW programs. If one finds that STW programs are linked to greater hours of work, this may just reflect the fact that the more intensive employment experience can provide an incentive for students to enroll in STW programs. My analysis, however, disentangled the simultaneity involved in participation in the labor force and participation in STW programs. By utilizing the longitudinal nature of the NLSY97, I examined how participation in STW programs before the initial interviews in 1997 was related to hours worked after those interviews during 1998.

Table 10.6 presents the results of this analysis. The outcome variable studied was the number of additional hours that students worked in 1998 over 1997. The first two rows in the table show the average hours worked by students in 1997 and 1998, disaggregated by race and ethnicity. Note first that non-Hispanic White students engaged in substantially more hours of work than non-Hispanic Black and Hispanic youth. In 1997, for example, non-Hispanic Whites worked an average of 252 hours a year, non-Hispanic Blacks 142, and Hispanics 117. These differences in hours worked were related to greater unemployment among minority youth, but further research should be carried out to understand them.

The third row of Table 10.6 shows the additional hours worked in 1998 over 1997. Hours worked in 1998 exceeded those in 1997 for all racial and ethnic groups considered, with Hispanics working 159 additional hours, non-Hispanic Whites 145 additional hours, and non-Hispanic Black youth 109 hours. A multiple regression analysis was carried out, relating the

increased hours worked to a variety of individual, socioeconomic, school, and community

factors. The results of this research are presented in the appendix. We focus here on discussing the specific impact of participation in STW programs.

The analysis indicates that participation in STW programs before 1997 had a significant positive impact on hours worked in 1998. In fact, the methodology utilized allowed us to specify the number of additional hours worked by students in 1998 associated with participation in any career-major or STW-preparatory programs up to the time of interview in 1997. The fourth row of Table 10.6 presents the results of this calculation, showing the number of additional hours worked by students in 1998 that are explained by STW-program participation in previous years. The non-Hispanic Black population had the greatest number of hours explained by STW participation, with 45 hours, followed by Hispanics with 43 hours and non-Hispanic Whites with 36 hours. These results suggest a clear, positive link between participation in STW programs and subsequent participation in the labor market.

Impact on High-School Retention

The previous section provided some evidence suggesting that increased hours of work may be linked to participation in STW programs. But could STW programs then be linked to reduced retention in school, as students drop out to participate in the labor market? Interestingly, a number of studies have found that STW programs such as career academies have instead increased the graduation rates of high-school students. A recent survey found that 91% of STW school-business partnerships believe that "STW experiences have led students to stay in school when they otherwise may have dropped out" (National School-to-Work Office, 2000, p. 3). Other studies, however, have been more skeptical, suggesting that by increasing the attractiveness of work, STW programs have acted to increase the labor-market participation of

participants and reduced high-school graduation rates. Research by Crain et al. (1998) has supported the latter point, showing that "comprehensive schools are graduating four students for every three that career magnets graduate. The career magnets' lower graduation rate and higher dropout rate are both of considerable policy importance and are statistically significant" (p. 1).

To examine the impact of STW-program participation on high-school retention, the NLSY97 data set was used to carry out a probit analysis of the likelihood that a high-school student who last attended 10^{th} grade dropped out before graduation instead of staying in school. A set of demographic, socioeconomic, community, and school-based variables, including STW program participation, were included to explain the probability that a student dropped out of school. The appendix presents the technical results of this analysis.

The analysis indicated that with other factors kept constant, participation in STW-transition programs had a significantly negative impact on the likelihood of dropping out of school. This conclusion is consistent with the results linking participation in STW programs to increased intensity of math and science course taking. In fact, one of the key differences between traditional vocational-education programs and STW-transition programs is that STW programs are intended to stimulate the interests of students in the academic underpinnings of various occupations, which may encourage them to continue their schooling. This result holds despite the fact that, as was just shown, participation in STW programs does act to increase hours worked by exposing students to work activities. For the average young person in the study, the dropout-increasing effects that these programs may have through encouraging increased work effort are more than compensated for by their dropout-reducing effects. When other factors are held constant, students who participate in STW-transition programs have a lower likelihood of dropping out of school.

CONCLUSIONS

This chapter has examined the causes and consequences of participation in STW-transition programs for minority youth, using the initial 1997 interview and the follow-up 1998 interview of NLSY97 to examine the determinants of participation rates in these programs and the programs' impact on various student outcomes. The following conclusions stand out:

1. The involvement of high-school students in STW programs has been substantial and increased sharply between 1997 and 1998. By 1998, close to half of the high school students sampled in the NLSY97 had participated in one of more of these programs. There were significant differences on the basis of race and ethnicity. Non-Hispanic Blacks tended to have greater participation rates than both Non-Hispanic Whites and Hispanics. On the other hand, Hispanics tended to have lower participation rates than other groups. In 1998, for example, 51.2% of Black adolescents having attained ninth grade or higher had participated in career-major or STW-preparatory programs, while 47.1% of non-Hispanic White youth and only 41% among Hispanics had participated.

2. Immigrant status appears to be critical in accounting for the lower rate of participation of Hispanic youth in STW programs. Immigrant status sharply reduced the likelihood of such participation. Overall, 36.1% of Hispanic immigrant youth had participated in a career-major or STW-preparatory program at any time previous to the time of interview in 1998. This compares to the much higher 47.2% among Hispanic non-immigrants. Indeed, once immigrant status is taken into account, the Hispanic identifier is no longer negatively related to STW participation. The reason for this is that fully 43.2% of the Hispanic youth population in NLSY97 was born outside the United States, while only 3.4% of non-Hispanic Whites and 4.5% of Blacks were. As

for the reason for the lower STW participation rates of immigrant youth, one may speculate that immigrant students may not be included in STW programs because of their limited English language proficiency. But this is a matter for future research.

3. Among the various types of STW-preparatory programs, job-shadowing and worksite visits are the most popular. On the other hand, apprenticeships and internships have the lowest participation rates. Hence, the most popular STW programs in place are not the most comprehensive and intensive. On the other hand, there is no evidence in the data analyzed in this paper that minority youth or women are being channeled into less comprehensive and intensive programs.

4. In terms of the consequences of participation on STW programs for student outcomes, the study considered the effects on math and science course taking, hours worked, and high school retention. The longitudinal nature of the NLSY97 data set allowed a more robust analysis of the possible causal impacts involved than previous studies have.

5. A math and science course-taking index was constructed showing the number and level of math and science content courses taken by students during the period between the 1997 and 1998 interviews of the NLSY97. A set of variables was then selected to explain the differences in this math and science course intensity index among the youth in the NLSY97 sample. It was found that participation in STW-transition programs did not appear to raise the number of math and science courses taken by non-Hispanic White students. However, for minorities the impact was significant. Specifically, participation in STW-transition programs undertaken by youth before their first interview in 1997 was substantially linked to greater course taking in science and math in the year after the 1997 interview. This result suggests that STW programs enhance the curriculum experience of many minority participants not only by directly requiring them to

take more advanced or comprehensive math and science courses but even more importantly by motivating then to take those courses in the future. These increased quantitative skills have been shown to have strongly positive effects on the earnings and employment probabilities of youth in the modern American economy (Rivera-Batiz 1991, 1992a).

6. A strong link was discovered between participation in STW programs and subsequent participation in the labor market. For all ethnic and racial groups, a substantial fraction of the additional hours worked during 1998 could be linked to students' participation in STW programs in earlier years.

7. Analysis showed that, when other factors were held constant, participation in career-major and STW-preparatory programs had a strongly positive impact on high-school retention for all ethnic and racial groups considered. Although STW programs may have a negative impact on retention because they expose students to potential job opportunities, they can also increase retention by stimulating students' interest in pursuing additional academic courses that are connected to those future careers. It was also shown that, other factors held constant, students in NLSY97 who participated in STW programs had a lower likelihood of dropping out of school.

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Table 10.1

Types of School-to-Work Transition Programs Examined in NLSY97

Program	Definition
Career Major	A coherent sequence of courses based upon an occupational goal.
School-to-Work Preparatory Programs	Programs that schools offer to help students prepare for the world of work.
Job shadowing	Students following an employee for one or more days to learn about an occupation or industry.
Worksite Visits	Students spending time at a worksite during the school day or after school.
Mentoring	Students being paired with an employee who assesses his or her performance over a period of time, during which the employee helps the student master certain skills and knowledge.
School-Sponsored Enterprise	The production of goods or services by students for sale or use by enterprises, typically involving students in the management of the project.
Cooperative Education	Students alternating or paralleling their academic and vocational studies with a job in a related field.
Tech-Prep	A planned program of study with a defined career focus that links secondary and postsecondary education.
Internship or Apprenticeship	Students working for an employer for a short period to learn about a particular industry or occupation.

Table 10.2

The Participation of High-School Students Enrolled in Ninth Grade or Higher in Career-Major or School-to-Work-Preparatory Programs

	Non-Hispanic White (%)	Non-Hispanic Black (%)	Hispanic (%)
Participation in any Career-Major or STW-Preparatory Programs			
Participated in any Career-Major or STW-Preparatory programs at any time up to 1997 interview	32.1	36.2	28.3
Participated in any Career-Major or STW-Preparatory programs at any time up to 1998 interview	47.1	51.2	41.0
Participation in Career-Major Program			
Participated in a Career-Major program at any time up to 1997 interview	13.4	18.1	11.8
Participated in a Career-Major program at any time up to 1998 interview	21.6	29.5	21.4
Participation in STW-Preparatory Programs			
Participated in any STW-Preparatory programs at any time up to 1997 interview	27.4	30.2	24.4
Participated in any STW-Preparatory programs at at any time up to 1998 interview	40.5	42.5	33.7

Table 10.3

The Participation of High School Students in Career Major or School-to-Work-Preparatory Programs, by Grade

	Non-Hispanic White (%)	Non-Hispanic Black (%)	Hispanic (%)
Participation in Career Major and/or STW-Preparatory Programs			
Students in grades 9–10 who participated in any Career-Major or STW-Preparatory programs at any time up to 1998 interview	33.5	37.8	28.0
Students who had completed grade 11 and participated in any Career-Major or STW-Preparatory programs any time up to 1998 interview	60.0	66.7	57.5
Participation in Career-Major Program			
Students in grades 9–10 who participated in a Career-Major program at any time up to 1998 interview	13.5	20.1	14.0
Students who had completed grade 11 and participated in a Career-Major program at any time up to 1998 interview	29.1	40.2	30.6
Participation in STW-Preparatory Program			
Students in grades 9–10 who participated in any STW-Preparatory programs at any time up to 1998 interview	27.8	28.7	21.3
Students who had completed grade 11 and participated in any STW-Preparatory programs at any time up to 1998 interview	53.5	59.8	50.0

Table 10.4

The Participation of Hispanic Students Enrolled in Ninth Grade or Higher in Career Major or School-to-Work-Preparatory Programs, by Immigrant Status

	Hispanic Nonimmigrants (%)	**Hispanic Immigrants (%)**	**Hispanic Overall (%)**
Participated in any Career-Major or STW-Preparatory programs at any time up to 1998 interview	47.2	36.1	41.0
Participated in a Career-Major program at any any time up to 1998 interview	22.1	20.5	21.4
Participated in any STW-Preparatory programs at any time up to 1998 interview	36.8	29.5	33.7

Table 10.5

Index of Intensity in Math and Science Course Taking in High School

	Non-Hispanic White	**Non-Hispanic Black**	**Hispanic**
Students in ninth grade or higher who participated in any Career-Major or STW-Preparatory programs at any time up to the 1998 interview	6.8	6.5	6.4
Students in ninth grade or higher who *did not* participate in any Career-Major or STW-Preparatory programs at any time up to the1998 interview	6.0	5.4	5.3

Table 10.6

Impact of Participation in STW Programs on Hours Worked in 1998

	Non-Hispanic White	**Non-Hispanic Black**	**Hispanic**
Average hours worked in 1997	252	142	117
Average hours worked in 1998	397	251	276
Additional hours worked in 1998 over 1997	145	109	159
Additional hours worked in 1998 explained by participation in STW-transition programs before the time of interview in 1997	36	45	43

APPENDIX

This appendix presents a summary of the statistical analysis giving rise to the results presented in this chapter. Table 10.A-1 at the end of the appendix displays the definitions of the variables included in the various analyses and the sample means. Sample sizes varied according to the particular analysis carried out; for simplicity, the means in Table 10.A-1 were calculated for the sample used in the analysis presented in Table 10.A-3; more detailed information is available from the author, by request. All analyses and tables in the appendix are based on NLSY97 data.

THE DETERMINANTS OF THE PROBABILITY OF PARTICIPATION IN STW PROGRAMS

For this analysis, a binary probit analysis was carried out in which the dependent variable was equal to one, if the person participated in one or more career-major or STW-preparatory programs at any time up to the moment of interview in 1998, and zero otherwise. A sample of 4,448 high-school adolescents surveyed in NLSY97 was considered in the analysis, with 1,048 having participated in one or more STW programs and 3,440 not participating. This sample excluded individuals for whom there were missing data for at least one of the variables utilized in explaining involvement in STW programs. The independent variables available from NLSY97 and used in the analysis included a set of characteristics of the student (FEMALE, BLACK, HISPANIC, IMMIG, HEALTH, GRADE, REPEAT, HOURSW, and PCINCOME) and a set of characteristics of the school attended or community where the student resided (NODISCIPLINE, TEACHERQ, SIZE, SMALL, PRIVATE, COLLEGE, CENTRAL).

Table 10.A-2 below presents the estimated coefficients, standard errors, and statistical significance of the variables in two probit equations: one excluding the variable IMMIG and another one including it. As can be seen, adding the variable IMMIG to the probit equation caused the HISPANIC variable to become substantially smaller in absolute magnitude, losing its statistical significance in explaining the likelihood of participation in STW programs. By contrast, the IMMIG variable was statistically significant at the 99% level of confidence.

Below the equations are log likelihood values. These values were used to calculate the likelihood-ratio-test statistic for the null hypothesis that all the coefficients of the model with the exception of the constant term were equal to zero. Asymptotically, this statistic had a chi-squared distribution with degrees of freedom equal to the number of independent variables. The hypothesis that the coefficients of the probit equations with the exception of the constant were equal to zero could be rejected with a 99% degree of confidence.

THE IMPACT OF STW-PREPARATORY PROGRAMS ON MATH AND SCIENCE COURSE INTENSITY

For this analysis, a multiple regression analysis was carried out in which the dependent variable was the index of intensity of math and science course taking, calculated for the year after the initial interview, as determined in the follow-up interviews of the NLSY97 in 1998. The potential range of this variable was from 0 to 42. A sample of 4,399 high-school-aged young people surveyed by the NLSY97 was considered in the analysis, with 2,433 non-Hispanic Whites, 1,105 non-Hispanic Blacks, and 861 Hispanics. The sample excluded individuals for whom there were missing data. The explanatory variables used in the analysis included STW97 and STW98 as well as a number of background variables defined earlier.

Table 10.A-3 presents the OLS regression coefficients, standard errors, and statistical significance in separate equations for non-Hispanic Whites, non-Hispanic Blacks, and Hispanics.

THE IMPACT OF STW PARTICIPATION ON HOURS OF WORK

For this part of our research, multiple regression analysis was carried out in which the dependent variable was the number of hours worked in 1998 by an NLSY97 respondent. A sample of 4,462 young people of high-school age was considered in the analysis, with 2,377 non-Hispanic Whites, 1,090 non-Hispanic Blacks, and 836 Hispanics.

The dependent variable in the analysis was HOURS98, the total number of hours worked for pay by high-school students in 1998. The independent variables used in the analysis included background variables as well as two STW-related variables: STW97, a dummy variable equal to one, if the person participated in any career-major or STW-preparatory program up to the initial NLSY97 interview in 1997, and zero otherwise; and STW97*HOURS97, which constituted an interaction term between STW97 and the variable HOURS97, representing the annual hours of work of the respondent in 1997. The latter interaction term was intended to adjust for the significant interdependence between STW97 and HOURS97, which needed to be explicitly considered in the analysis. One would expect that, given limits on the time available to young people for school and work, participation in STW programs during 1997 would have a much smaller impact on hours worked in 1998 for those students who were already employed for a large number of hours in 1997. One would thus predict a negative coefficient for the interaction term between STW97 and HOURS97 on the dependent variable HOURS98.

Table 10.A-4 presents the OLS regression coefficients, standard errors, and statistical significance in the equation for hours worked in 1998.

THE DETERMINANTS OF THE PROBABILITY OF DROPPING OUT OF SCHOOL

For this analysis, a binary probit analysis was carried out in which the dependent variable was equal to one, if the person dropped out of high school, and zero otherwise. A sample of 4,148 respondents of high school age surveyed by NLSY97 was considered in the analysis, with 3,824 enrolled in high school and 324 having dropped out of school. The explanatory variables included STW as well as the background variables discussed in previous analyses.

Table 10.A-4 below presents the estimated coefficients, standard errors, and statistical significance of the variables in two probit equations: one excluding the variable HOURW (Equation 1) and another one including it (Equation 2). Eliminating the variable HOURSW from the probit equation caused the coefficient for the STW variable to become significantly smaller in absolute magnitude. This was to be expected, since the variables HOURSW and STW were positively correlated with each other, and HOURSW increased the likelihood of dropping out of school; with HOURSW excluded from the equation, the STW coefficient incorporated its impact on raising the probability of dropping out of school. Note, however, that both the value of the STW coefficient and its statistical significance were still strong in Equation 1, suggesting that, despite the impact that STW had on raising hours of work (which acted to raise dropout rates), other aspects of STW programs more than offset this impact, having a net negative effect on the probability of dropping out of school.

The log likelihood values implied that the hypothesis that the coefficients of the probit equations with the exception of the constant were equal to zero could be rejected with a 99% degree of confidence.

Table 10.A-1

Variable Definitions and Sample Means

	White	Black	Hispanic	Total
RACE (equal to 1, if in the group, 0 otherwise)	0.55	0.25	0.20	1.00
STW97 (equal to 1, if participated in Career Major or STW-Prep. programs up to 1997)	0.25	0.25	0.20	0.24
STW98 (1 if participated in STW in 1998)	0.34	0.37	0.29	0.34
FEMALE (equal to 1, if female, 0 otherwise)	0.49	0.51	0.48	0.49
IMMIG (equal to 2, if not born in U.S., 0 othrw.)	0.03	0.05	0.49	0.14
GRADE (grade level last attended)	10.7	10.5	10.4	10.6
REPEAT (times respondent repeated a grade)	0.16	0.36	0.24	0.20
PCINCOME (income per person of household)	$14,465	$7,865	$7,373	$11,464
CENTRAL (proportion residing in central city)	0.17	0.44	0.36	0.28
NODISCIPLINE (Index, ranging from 3, if discipline is high to 13, if low discipline)	7.9	8.7	8.0	8.1
TEACHERQ (teacher quality index, ranging from 2, if quality is low, to 8, if quality is high)	6.1	5.8	6.1	6.0
SIZE (average number of students in the school attended by respondent)	760	831	861	799
SMALL (equal to 1, if respondent's school has less than 15 students per teacher)	0.29	0.26	0.15	0.23
PRIVATE (equal to 1, if enrolled in private sch.)	0.03	0.005	0.005	0.006
COLLEGE (percentage of students in respondent's school who would like to go to college)	65%	57%	58%	62%
HEALTH (index, minimum of 1, if poor health, maximum of 5, if excellent health)	4.1	4.1	4.0	4.1
HOURSW (cumulative hours worked since 14)	836	496	469	674
HOURS97 (annual hours worked in 1997)	252	142	117	198
HOURS98 (annual hours worked in 1998)	397	251	276	332

Table 10.A-2

Probit Analysis of the Probability of Participation in STW Programs

Variable	Equation 1		Equation 2	
	Maximum likelihood estimate	**Standard error**	**Maximum likelihood estimate**	**Standard error**
INTERCEPT	-6.9500*	0.3176	-6.9685*	0.3178
FEMALE	0.0454	0.0475	0.0450	0.0476
BLACK	0.0566	0.0609	0.0527	0.0690
HISPANIC	-0.1138**	0.0677	-0.0349	0.0748
IMMIG	–	–	-0.1960	0.0805
HEALTH	-0.0199	0.0262	-0.0214	0.0263
GRADE	0.4934*	0.0233	0.4960*	0.0233
REPEAT	0.0735	0.0483	0.0720	0.0483
HOURSW	0.00009*	0.00002	0.00009*	0.00002
PCINCOME	-.0000005**	-0.0000002	-.0000005**	0.0000002
CENTRAL	0.0244	0.0548	0.0242	0.0548
NODISCIPLINE	0.0671*	0.0123	0.0663*	0.0124
TEACHERQ	-0.0206	0.0227	-0.0182	0.0227
SIZE	0.0005*	0.0001	0.0005*	0.0001
SMALL	0.1887*	0.0586	0.1828*	0.0587
PRIVATE	-0.1681	0.1974	-0.1659	0.1980
COLLEGE	0.0192	0.1121	0.0166	0.1124
No. of observations	4,448		4,448	
Log likelihood value	-1919		-1917	

Note. Dependent variable equal to one, if the respondent participated in one or more STW-transition programs up to the time of interview in 1998, and zero otherwise.

* Represents statistical significance at a 99% level of confidence.
**Represents statistical significance at a 90% level of confidence.

Table 10.A-3

Regression Results for the Math and Science Course-Intensity Index for Students in Ninth Grade or Higher

	Non-Hispanic White		Non-Hispanic Black		Hispanic	
	Coefficient	St. Error	Coefficient	St. Error	Coefficient	St. Error
INTERCEPT	-15.6637*	1.0210	-11.0700*	1.4255	-9.5456*	1.5673
STW97	0.2150	0.2170	0.8006*	0.3075	0.8904*	0.3456
STW98	-0.1169	0.1790	0.1233	0.2476	0.5505**	0.2786
FEMALE	-0.0329	0.1704	0.2838	0.2357	0.2214	0.2496
IMMIG	–	–	–	–	-0.4567	0.2633
GRADE	1.7765*	0.0774	1.4822*	0.1141	1.1242*	0.1160
REPEAT	-1.0478*	0.1999	-0.6362*	0.1884	-0.2644	0.2498
PCINCOME	0.00005*	0.000008	0.00004**	0.00002	0.00006*	0.00002
CENTRAL	-0.2111	0.2291	0.4489	0.2361	0.1831	0.2704
NODISC	-0.0711	0.0469	-0.0042	0.0595	-0.0341	0.0673
TEACHERQ	0.2936*	0.0843	-0.0003	0.1002	0.2426	0.1330
SIZE	0.0003	0.0004	0.0002	0.0006	0.0001	0.0007
SMALL	0.0335	0.4333	0.1474	0.2708	0.5889	0.3722
PRIVATE	1.4357*	0.5600	1.0703	1.5976	2.3097	1.8667
COLLEGE	1.4353*	0.4333	0.3997	0.4985	1.0835**	0.5484
Dependent variable mean		6.2		5.4		4.9
Observations		2,433		1,105		861
Adj.R^2		0.28		0.25		0.19

Note. The index of math and science course intensity ranges from a low of 0 to a high of 39.

* Represents statistical significance at a 99% level of confidence.
**Represents statistical significance at a 95% level of confidence.

Table 10.A-4

Regression Analysis of the Impact of STW Participation on Hours of Work

Variable	Coefficient	Standard error
INTERCEPT	-386.05*	70.5
STW97	57.54*	16.1
STW97*HOURS97	-0.0586**	0.026
UNEMP	-9.72*	2.49
BLACK	-75.52*	14.00
HISPANIC	19.60	16.99
IMMIG	-50.34*	17.90
FEMALE	-42.79*	10.77
GRADE	57.58*	5.24
REPEAT	66.11*	10.90
PCINCOME	-0.0014*	0.00056
CENTRAL	-13.86	12.49
NODISCIPLINE	7.20*	2.86
TEACHERQ	-12.04**	5.17
SIZE	0.0747*	0.0252
SMALL	16.59	13.34
PRIVATE	-6.091	44.66
COLLEGE	9.161	24.98
HEALTH	-4.323	6.000
Number of Observations	4462	
Adjusted R^2	0.55	

Note. *Represents statistical significance at a 99% level of confidence.
**Represents statistical significance at a 90% level of confidence.

Table 10.A-5

Probit Analysis of the Likelihood of Dropping Out of School

Variable	**Equation 1**		**Equation 2**	
	Maximum likelihood estimate	Standard error	Maximum likelihood estimate	Standard error
INTERCEPT	3.0049*	0.4002	-2.6391*	0.4209
STW	-0.4146*	0.0681	-0.4692*	0.0715
FEMALE	-0.0712	0.0637	-0.0207	0.0665
BLACK	-0.0749	0.0810	0.0295	0.0848
HISPANIC	0.1077	0.0960	0.1483	0.1014
IMMIG	-0.2422**	0.1103	-0.1716	0.1128
HEALTH	-0.0648**	0.0333	-0.0746*	0.0344
GRADE	0.2209*	0.0308	0.1675*	0.0333
REPEAT	0.6183*	0.0480	0.5826*	0.0503
HOURSW	–	–	0.0002*	0.00003
PCINCOME	-.00001*	-0.000004	-.00001**	0.000004
CENTRAL	0.1879*	0.0706	0.1961*	0.0726
NODISCIPLINE	0.0229	0.0166	0.0212*	0.0171
TEACHERQ	-0.1168*	0.0296	-0.1118*	0.0302
SIZE	0.0002	0.0002	0.0002	0.0002
SMALL	-0.0543	0.0806	-0.0800	0.0838
PRIVATE	0.1092	0.2859	0.1529	0.2906
COLLEGE	-0.1033	0.1441	-0.0572	0.1486
No. of observations	4,148		4,148	
Log likelihood value	-964		-897	

Note. Dependent variable equal to one, if the respondent dropped out of school before completing high school at the time of interview in 1998, and zero otherwise.

* Represents statistical significance at a 99% level of confidence.
**Represents statistical significance at a 95% level of confidence.