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ABSTRACT

The survey of adult education conducted by the National Center for Educational Statistics in 1972 is analyzed. The following facts are highlighted in the more detailed analysis of 1972 results: (1) The demand for hours of adult education is distributed in proportion to eligibles in each age and education group, (2) persons with lower levels of either education or income, or both, are likely to enroll in courses of longer duration, and (3) their dropout rate is consequently higher. Hence, it is recommended that special attention be given to restructuring courses for persons with lower levels of education to make them shorter. It is suggested that each module should have "some take home value." It was determined that income does not play as important a role in determining either the propensity to enroll, the number of hours contracted for, or the educational institutions in which adult students enroll. The policy implication of these findings is obvious: Additional subsidies to adult education are not a high priority item. The only possible exception to this generalization is the need to increase training opportunities for young, poor Americans. They are least likely to be trained by employers, and depend a great deal upon public moneys to cover their training costs. (Author/HD)

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ADULT EDUCATION 1972, A RE-ANALYSIS

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ABSTRACT

The current study analyzes the survey of adult education conducted by the National Center for Educational Statistics in 1972.

The following facts are highlighted by the more detailed analysis of the results:

1) the demand for hours of adult education is distributed in proportion to eligibles in each age and education group,

2) persons with lower levels of either education or income, or both, are likely to enroll in courses of longer duration,

3) their drop-out rate is consequently higher.

Hence, it is recommended that special attention be given to restructuring courses for persons with lower levels of education to make them shorter. It is suggested that each module should have "some take home value."

It was determined that income does not play as important a role in determining either the propensity to enroll, the number of hours contracted for, or the educational institution in which adult students enroll. The policy implication of these findings is obvious: additional subsidies to adult education are not a high priority item.

The only possible exception to this generalization is the need to increase training opportunities for young, poor Americans. They are least likely to be trained by employers, and depend a great deal upon public moneys to cover their training costs.

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Adult education is a much discussed topic in both Congress and academe. Congress has stressed its interest in adult education by including a special new title dealing with this topic in the Higher Education Act passed last year.[1] Academicians are pinning their hopes on adult students to make up the deficits in enrollments caused by the last two decades' decline in the birth rate. Foundations are stepping up subsidies to a series of activities designed to encourage expanded educational programs for adults,[2] and there is a general feeling that we are on the threshold of becoming a learning society.

This anticipation was fanned by the rapid growth in the enrollment of adults between 1969 and 1972. The number of persons over 17 who took part-time courses increased more than 20 per cent during that period. Subsequently, between 1972 and 1975, adult part-time enrollments grew more slowly, only eight per cent, and the present hopes for a nascent boom are likely to be dashed by these yet unpublished statistics. (Table 1) Nevertheless the slowdown in the growth of adult enrollments is not likely to dampen the ardor of those who advocate the expansion of adult education. On the contrary, it will be cited as a reason for the necessity of federal pump-priming to get enrollments growing again.

We believe that before any decisions are reached about the federal role in adult education, it is urgent both to examine adult enrollment patterns in greater detail and to understand why persons of different

incomes, education and age enroll in part-time programs. The study which follows is designed to provide this kind of information to policy analysts who are faced with the difficult task of defining the federal government's role in an amorphous and fragmented field of education.

The data on which the subsequent analysis is based were collected in 1972 by the U. S. Bureau of the Census for the National Center for Educational Statistics in the Education Division of DHEW. Since 1969 the Center has sponsored three such surveys, at three-year intervals. The rich trove of statistics which these surveys have produced has not begun to be mined energetically enough either to explain why current patterns of enrollments are what they are, or to estimate the resources claimed by different groups of adults. The analysis below is based on special, more detailed tabulations of the survey data. These were prepared especially to throw light on policy issues in adult education. It would be desirable for NCES to replicate some of the tabulations developed here with data collected in 1975. This latest survey became available too late to be processed for this analysis.

I. WHO PARTICIPATES IN ADULT EDUCATION PROGRAMS AND HOW MUCH DO THEY STUDY?

Nearly three times as many people are enrolled in part-time adult education as are enrolled in college full time. Some 13 million persons took adult education courses in 1969, and their numbers increased to 17 million by 1975. In addition, a million full-time students over the age of 17 took some additional part-time education in 1975. It may come

as a surprise to some that one adult American out of ten took some part-time courses in 1969, and that by 1975 this figure had reached one out of eight.

Most of the increase in participation occurred between 1969 and 1972. By this later date, 11.3 per cent of all adults reported participating in some education activity on a part-time basis. The further increase in enrollments by 1975 increased participation rates by an insignificant 0.3 per cent.

The reasons for the initial growth in the propensity of adults to enroll part-time and its subsequent levelling off have not been examined as closely as they deserve to be. The single most important brake on the expansion of enrollment in part-time education after 1972 was the increased propensity of persons between the ages of 17 and 24 to enroll full time. This age group's part-time enrollment jumped from 10.5 per cent to 12.2 per cent of the total age group between 1969 and 1972, but declined by 0.7 per cent between 1972 and 1975. The original spurt in part-time enrollment occurred at the expense of full-time students, and the decline in the later time period took place as the proportion of younger persons opting for full-time studies increased. Between 1972 and 1975, full-time participation in postsecondary education increased from 38.1 to 41.7 per cent. It is probable that the spurt in full-time enrollment was partially due to the economic slowdown between 1972 and 1975, which resulted in an even greater dearth of jobs for young workers. Young

adults seem to have chosen full-time study in preference to unemployment.

Among people aged 25 to 54 there was also a levelling off in the increase of the propensity to take part-time courses between 1972 and 1975. This levelling off was due to (1) the decrease in training taken by blue-collar workers, possibly due to the recession, and (2) the decline in the participation rate of persons with some post-baccalaureate education. (Table 2)

The only persons whose participation in part-time education continued to increase fairly rapidly were 55 or older. This increase was especially steep for persons past the age of 65. Their propensity to enroll increased by one-third during the six years from 1972 to 1975.

Overall, the propensity of persons from different income groups to enroll in part-time studies did not change drastically between 1969 and 1975. All three surveys show a lower-than-average proportion of eligibles from poorer households enrolling in adult education, as well as a higher-than-average proportion of persons from richer households. (Table 3)

A plausible policy objective is to narrow the gap between the old and the young, the poor and the rich, the uneducated and the well-educated, by increasing their participation and increasing the volume of adult education. The detailed analysis of adult education patterns presented below is likely to put a damper on these goals. We shall also show

that the participation rates of the poor and the undereducated are misleading, for they vastly understate these people's resource share of adult education. The poor and the less-well-educated enroll in different types of courses, requiring many more class hours than those attended by the rich and well-educated. We shall also show that old persons enroll for different purposes than the young, and that their enrollment in the type of courses they are likely to choose is already relatively high. Therefore, the outreach of adult education toward the poor, the undereducated and the old is understated when one looks only at participation rates.

Results of a More Detailed Analysis of Enrollments

The findings below were developed with the help of detailed tabulations which were designed to capture two sets of characteristics simultaneously. Thus, in the analysis which follows, we examine the interaction of education and age; education and income; and age and income, as they affect decisions to enroll. An analysis of the interaction of three variables simultaneously was not practicable because of the limitations imposed by the size of the sample. The new tabulations reproduced below make it possible to draw some unexpected conclusions, and are more informative than the ones published so far by NCES, which limit themselves to examining each set of characteristics in turn.

Participation rates and hours. Another important new departure in this study is the analysis of hours of instruction taken by persons

with various levels of education, of different ages, and living in households with different levels of income. These tabulations provide new insights into adult education patterns. Hitherto, policy analysts who looked at the tabulations published by NCES observed the lower participation rates of persons with low incomes, and inferred that most of the resources of adult education were used by the rich. While persons living in households with incomes below $5,000 a year constitute 23 per cent of the adult population, for example, they make up only 11 per cent of enrollees in adult education programs. In other words, they are underrepresented by a factor of 2 to 1. By contrast the well-to-do, who come from households with incomes between 15 and 25 thousand dollars a year, are overrepresented by some 60 per cent.

When the outreach of adult education is measured in terms of "total contracted hours" (the sum of hours in completed, on-going and dropped courses), however, there is not that much difference between different income groups. In 1972, for example, persons from households with incomes below $5,000 enrolled in courses which accounted for over 20 per cent of the total hours offered that year, while persons from a higher income group, representing 15 per cent of the population, took courses amounting to 17 per cent of the total.

Thus the delivery of adult education is not as skewed to the rich as is commonly believed, or as was implied by looking at participation statistics. The less-well-educated receive a more proportionate

share of adult education once hours of instruction are taken as a measure of the amount of service oriented to that group, although those with less than a high school education are underrepresented. The poor and less-well-educated have smaller rates of participation when the measures used are either on-going or, especially, completed courses, because they drop out more often than the average.

It should be stressed that adult education is a young man's game. Over half of the participants are below age 35, and they account for two-thirds of the contracted hours. By contrast, persons over the age of 65 make up 2.4 per cent of all participants, and their share of course hours is less than two per cent of the total.

Participation rates by income. As long as so much of adult education takes place when participants are young, a period when many persons have low incomes, the effect of income on participation becomes crucially important. If those who are young and poor are denied educational opportunities on a part-time basis, this imbalance ought to be remedied by the introduction of special subsidies.

In fact, the disparities in participation rates between the poor and the rich are least for young persons, and widen as eligibles get older. For instance, among those under 25, 16 per cent of eligibles in households with less than $4,000 a year participate in adult education activities, as contrasted to 20 per cent of those with household incomes between $10 and $25 thousand a year. In the 25 to 34 age group, the

disparities become more pronounced: only 12 per cent of eligibles in households with less than $4,000 a year participate compared to 25 per cent of eligibles in the higher income group. (Table 5) However, these disparities are probably more illusory than real, as we will show below, since poorer enrollees take courses which provide twice as many hours of instruction as those taken by the well-to-do.

Participation by education and age. We decided not to carry the analysis of the interaction of income and age very far, for it suffers from a number of weaknesses. In the under-25 age group, college graduates are few in number, since many young persons are still in school, and have not completed the desired level of education. Thus, although their participation rates are high, they account for less than 10 per cent of the enrollments.

By contrast, it may be more significant to look at participation rates of both high school dropouts and high school graduates. Their participation in adult education is highest at younger ages, under 25, when it amounts to 10 and 12 per cent of the eligibles, respectively. By ages 25-34, the participation rate declines to 6 and 9 per cent. However, since they enroll in courses with twice as many scheduled hours of instruction as the average for the group, their share of adult education is highly understated if it is measured by participation rates and compared to the 30 per cent participation estimated to prevail for college graduates. (Table 6)

Thus, when one examines the scheduled hours of courses in which adult-education participants enrolled, rather than their participation rates, one comes away with quite a different impression. For all age groups, over half of the course hours are taken by that half of the population which has not attended college.

In other words, our adult education system delivers the bulk of class hours to young persons whose education is at or below the national median: 58 per cent of the course hours are taken by persons with a high school education or less, and 22 per cent by those with some college credit, but no college degree. The remaining 20 per cent are taken by college graduates. (Table 7 and Table 4)

Participation rates by education and income. As long as educational attainment appears to play such an important role in the decision to enroll or not to enroll in adult education, the effect of income on this decision, keeping educational attainment constant, deserves some analysis.

It does appear that for persons with less than a high school education and with low incomes, the enrollment rates in relation to eligibles are somewhat lower than for higher income earners with the same level of education. Again, this diagnosis of a potential inequity is not clear-cut, since the number of hours per course is higher for that group than it is for richer persons with the same level of education. (Table 8) Similarly, when comparing the participation rates of high school graduates and persons with some college, the hours per course are in most instances

largest for the income groups where the enrollment is lowest.

Participation by men and women. Testing for possible inequities in the distribution of adult education, we examined the delivery of adult education separately for men and for women. Here again, adult education seems to be delivered even-handedly. The participation rates of eligibles are very close--13 per cent for men, and 12 per cent for women. (Table 9) However, males do appear in most instances to take more hours per course than women. (Table 10)

A more detailed examination of the data involving, for example, the participation rates by education level or by income level, indicated that, at least, in adult education, there was considerable parity between the sexes. The only significant difference between the male and female experience in adult education (in either participation rates or hours per course) was observed in the middle-income range. (Table 11) Although female participation rates were lower in the $6,000 to $25,000 income range, they nevertheless in some cases took more courses than their male counterparts, although these courses were generally of shorter duration. In all probability, this difference can be explained by the absence of female apprenticeship programs, which consist of many hours of instruction.

Differences in participation rates between whites and nonwhites. The overall participation rate by nonwhites is lower than that of whites. However, once the participation is standardized by education,

there are few differences in their participation rates. (Table 12) If blacks and other minority groups are underrepresented in the population of adult learners, this is due to their lower educational attainment.

The geography of participation. The variation in participation rates by region, and within different types of residence by region, deserves passing notice. As a rule, participation rates were highest in the West, where they were twice as high as in the South, the region with the lowest level of participation.

Generally, persons living outside of the central city in a metropolitan area had the highest participation rates, and those living on farms the lowest. (Table 13) Possibly the low participation of farmers is due to the exclusion of agricultural extension courses from the survey. Non-SMSA, non-farm residents lagged behind central city residents in participation, except in the Northeast. In that region, participation rates in the central city were unusually low in all three years of the survey. Recent financial crises of these cities should, hence, not be adduced to explain the low level of participation there.

The analysis of participation rates for blacks by region and type of residence produces two interesting results: (1) in Northeast central cities, their participation in adult education is higher than that of whites, while in all other regions and types of residence, it is lower, and (2) the rate of participation of blacks is probably as depressed as it is because such a large proportion of persons of this race live in the rural

South. (Table 14) While the participation rates of blacks there was a little higher than that of whites, these participation rates were one-half and forty per cent, respectively, of the national participation rate.

Conclusions. A more detailed examination of the pattern of delivery of adult education has documented its even distribution across income, education, and age groups. In those cases where participation rates were lowest, the hours scheduled were highest, and it appears that each income, education or age group did get its proportionate, but not necessarily fair, share in adult education.

From a public-policy point of view, it would be desirable to skew the delivery of adult education so as to deliver more than the proportional share of services to the poor and undereducated. This adult education does not do; but neither does it favor the children of the rich, as does the delivery of higher education services to full-time students. Compared to the performance of the conventional full-time higher education sector, adult education is certainly more egalitarian.

Because of misleading participation statistics, we did note that the income of participants in adult education is likely to be higher than that of non-participants. The rich, as we noted, enroll more often--but for courses of shorter duration.

It may be appropriate to ask a different question about the role of adult education. Does it help those who are already well-off in comparison to others in an age/education cohort, by enhancing their

advantage through more training, or is adult education used as a method of catching up for those whose incomes lag behind the average?

If the reported incomes for participants in the survey are compared for each age/education cohort with the median incomes for all persons, it would appear that participants are somewhat poorer than the average. Unfortunately, this finding must be heavily qualified. We know that the reported incomes in most CPS surveys are underreported in comparison to the data used to prepare national estimates. The U. S. Bureau of the Census estimates that only 82 per cent of the income is reported in other months. If one assumes that the same proportion was underreported in each age/education cohort, and adjusts the figures accordingly, the average income of participants in most cases exceeds average incomes. (Table 15)

It is significant that, even after this adjustment, older participants are likely to be poorer than the average for the nation, given certain levels of education. It appears that those who are rich and old fill their spare time with activities other than adult education. One is left, in this case, with a tantalizing question: Is this an unexploited market, or do the well-to-do indulge themselves in other, more interesting ways, and shun adult courses?

Overall, given the weakness of the data, it is only prudent to conclude that after standardizing for age and education, the income of participants' households does not differ significantly from the national

average. In other words, even for homogeneous groups, such as young college graduates, adult education is probably distributed evenly.

II. CHARACTERISTICS OF COURSES

In this section we shall examine information about courses: the purposes for which they are taken, the kind of credit granted, their completion rate and, finally, who pays for their instructional costs.

Purpose of adult education. Roughly fifty per cent of the courses were taken for reasons connected with the work-place, either to get a promotion or to train for a new job, according to reports by the participants. An additional 14 per cent of the courses were taken for general information, many for credit towards a degree.

The younger the participant, the more likely is the course to be taken for a job-related reason. More than half of the participants take courses for these reasons up to the age of 54. Between the ages of 55 and 64, the proportion declines to four out of ten, becoming even less significant for enrollees after age 65. (Table 16)

General information courses appeal to the very young and the old. Persons between 25 and 54 are less likely to enroll in such courses. Overall, one out of seven courses are taken for general information.

Courses taken for family, personal, or social or recreational reasons appeal to a higher proportion of older learners. For those over age 65, almost six out of ten courses are taken for these reasons, more than double the share of these courses for the total population.

Our analysis of courses by purpose and income group shows remarkable stability in the proportion of courses taken for career-oriented reasons by all participants in households with incomes under $25 thousand a year. General information courses varied somewhat without any set pattern, as did other, avocational courses. (Table 17) Enrollees in career related courses with lower incomes, say below $10,000 a year, were more likely to take courses to get a new job, and those with higher incomes were taking courses for job advancement. It may be well to put these figures in perspective, by pointing out that only one in six courses oriented towards obtaining a new job were taken by persons with household incomes of over $15,000 a year. By contrast, the same group took over a third of the courses oriented towards job advancement. (Table 18) Only the highest income group, consisting of persons in households with incomes over $25 thousand a year, broke with the general pattern. These people were less likely to take job-oriented courses (though they still took four out of ten courses for this reason), and significantly more likely to take avocational courses.

Employed persons were more likely to take courses with an occupational training component. Those seeking work appear to favor basic education courses and voc/tech occupations. Persons keeping house took courses for personal and family reasons or recreationally oriented courses. The other participants, not in the labor force, presumably older persons, also gravitated to avocational courses.

Published statistics, not reproduced here, show that there is amazing similarity between the purposes for which courses are taken by males and females, and by blacks and whites.[3]

Courses by credit objective. Another way to assess the objectives of adult education is to examine the type of credit claimed by students for the courses. Adult education is predominantly work and not play, as two-thirds of the courses were taken for academic credit or were job-related, i.e., for a license or some other training. (Table 19)

College-level credit courses predominated: one out of every five participants was taking courses for college credit. Only one out of thirty participants was aiming for a high school certificate.

The job-related courses were split in the following fashion: one out of six participants took courses for skill certification or a license, and one out of four was taking non-credit, job-related training.

It is interesting to compare men's and women's credit objectives. Women participate in college-level training at about the same rate as men, but lag behind men in training for skill certificates and licenses. (Table 20) By contrast, women are more likely to take non-credit courses, below college level, possibly of an avocational nature. (Table 21) Standardizing for labor force participation is not likely to change this conclusion.[4]

A comparison of credit objectives by race emphasizes what serious business adult education is for blacks and other minorities.

Minority students are much less likely than whites to take non-credit courses. (Table 22) Nonwhites account for a third of the enrollment towards a middle-school certificate, and nearly a fifth of the enrollment towards a high school certificate. (Table 23) They are somewhat under-represented in proportion to the general population (but not in proportion to the eligibles) in college-level courses.

Completion rates. If one looks at completion rates either by education or income, one becomes aware of a real problem which is plaguing adult education: Completion rates are much lower for persons in low-income groups, or for those with low levels of education, than for persons who are either well-off or have more education.

The differences are quite startling. For instance, one out of five courses taken by persons with incomes under $4 thousand a year is dropped. (Table 24) One out of seven courses taken by persons from households with incomes above $4 thousand but below $6 thousand a year is dropped. By contrast, in the upper-income range, among persons from households with incomes between $10 and $25 thousand a year, less than one out of 15 courses reported to have been taken in the past year is dropped.

The same dichotomy can be observed in the proportion of courses dropped by high-school dropouts and college graduates. The dropouts abort nearly one out of five courses, while the college-educated complete all but one out of twenty-five. (Table 25) High school graduates

and persons with some college credit drop courses at a rate somewhere in between that of dropouts and of college graduates.

An analysis of dropped courses by occupation shows that persons who never worked and those who are employed by private enterprises are less likely to complete the program than others. (Table 26) The first finding is not surprising, since many of the courses taken by persons who never worked are taken by persons with very little education, and these courses tend to be either long or intensive. The second finding is more puzzling: perhaps private business employment is more demanding, or there are more incentives to complete courses for public sector employees, whose attendance gets immediate reinforcement in terms of increments in salary, time off to attend classes, etc.

Generally, courses paid for by public organizations, courses which we will show are mostly taken by high school dropouts, are most likely to be dropped. (Table 27) This impression is substantiated by the fact that, when courses were broken down by type of credit, courses taken for high school certification were most likely to be dropped. (Table 28) Courses for skill certification or license are also more likely to be dropped than courses for academic credit, since they are likely to be longer.

We asked ourselves whether the more demanding courses were most likely to be dropped. In most cases, however, the ratio of homework hours to class hours was lower for dropped courses than for completed courses. It appeared that dropped courses were easier and

more likely to be avocational than the ones which were completed. The only exceptions were courses given at the college level. There the ratio of homework to class hours was about the same in courses that were dropped and in those that were continuing or completed. (Table 29)

The most valuable clue to determining the probability of completing a course was its length. The higher the scheduled hours for the course, the more likely it was to be dropped. (Table 30) Persons in the low-income groups and those with the least education usually enrolled in courses with twice as many scheduled hours as others, and they dropped these courses three times more often than the average of the population. The second clue was the character of the course: courses not taken for credit were dropped in one case out of ten. Since half of these courses were avocational, it is probable that the drop-out rate in non-career, non-degree courses was quite high.

Women dropped 9.5 per cent of their total courses, while men dropped 7.4 per cent. (Table 31) Much of this difference is due to the higher drop-out rates in avocational courses favored by women. In the case of nonwhites, the drop-out rate was much higher than that of whites, but most of the difference could be explained by the lower educational attainment of nonwhites. (Table 32)

Who pays for courses? With the exception of people in the lowest income groups or the lowest levels of education, roughly one-half of the courses were paid for by the person taking the course or by his

or her family. (Table 33)

Especially in the case of adults with low educational attainment, public organizations played a significant role in paying for adult courses. Participants who had had eight grades of education or less and were under the age of 25 benefited from the support of public organizations in sixty per cent of the cases. The role of public organizations in subsidizing this group declined to slightly over 50 per cent for those aged 25-34 and then dropped to a third for the next oldest group.

Public organizations also played a disproportionately important role in providing support to high-school dropouts. Again, they supported a higher proportion of the young than the old. Some 40 per cent of participants under the age of 25 who had this level of education received support from this source, as contrasted to one-fourth for the 35-to-54-year-olds.

Further up the educational ladder, the role of public organizations was less important. They were payers in 15 to 20 per cent of the cases for high-school graduates, and 12 per cent of the cases for part-time enrollees who had some college. These proportions did not vary significantly with age. In the case of college graduates, as could be expected, public organizations played an insignificant role.

The role of employers in supporting adult learning was somewhat more ambiguous and complex. As a general rule, employers supported some 26 per cent of all participants and roughly one-third of all those employed. While the proportion of part-time learners by age did

not differ significantly overall, it appears that employers subsidize a smaller porportion of younger adults who have less than a high school education. Employers shoulder the highest proportion of the costs for high-school graduates and for those completing an undergraduate college course until the age of 35, and for college graduates between the ages of 25 and 44.[5]

Employers appear to stop support for persons who have less education earlier than they do for college graduates. While those with less than a college degree are unlikely to be supported past the age of 35, considerable employer involvement was reported for college graduates until they reached 55 years of age.

A comparison of the NCES survey figures with national statistics of the labor force leads one to believe that employers often give their heaviest support to (1) workers between the ages of 25 and 34, (2) those with a college degree, and (3) those who earn between $10 and $25 thousand. (Table 34) Employer-paid opportunities appear to be least for the middle-aged, the less-well-educated, and those in households with incomes below the mean.

Conclusions. Our examination of the character, purposes, methods, and sources of payment of courses leads us to some unexceptional, but important, conclusions:

(1) Adult learners behave rationally, with a higher proportion of young adults enrolled in job-oriented courses. Their investment in practical education is thus made at an optimal time.

(2) Adult education is a serious business, especially for minorities. At least two-thirds of the courses offered, and an even higher proportion of hours, are either academically or career-oriented in content.

(3) The packaging of courses for persons who have less than a high-school degree needs to be re-examined. Currently, such courses consist of many more scheduled hours than those of courses taken by persons with higher levels of education, and are more likely to be dropped. Is it not possible to sub-divide these courses into smaller units, each one of which is more likely to be completed?

(4) The important role of public organizations in paying for the courses of the poor and the educationally deprived certainly implies, though we cannot prove it unequivocally, that the levels of enrollment among these groups are influenced by the availability of public funds. The advisability of keeping up the level of public funds for that purpose is further reinforced by our finding that employers play a small role in training young workers who have low levels of education.

III. PROVIDERS OR SPONSORS OF ADULT EDUCATION

A variety of institutions provide instruction for adults Their role is generally described on the basis of either impressions or fragmented data. The NCES-sponsored survey makes it possible to provide a better, statistical description of the part which these providers, or sponsors, as they are called in the survey, play in adult education.

They are identified by the survey in the following fashion:

(1) public grade or high schools,
(2) two-year colleges or vocational and technical institutions,
(3) four-year colleges and universities,
(4) private vocational and technical schools and business colleges,
(5) employers,
(6) community organizations,
(7) labor organizations and professional associations,
(8) tutors or private instructors,
(9) hospitals,
(10) others.

The first six of these sponsors provide the bulk of courses, and the analysis below will focus on their roles in providing different types of programs, be they for general preparation, occupational training, or for other, mostly avocational, purposes. This part of the report is divided into two major sections, with the first examining the shares of each type of institution in providing a given type of training, and the second evaluating its role in serving different education and income groups, helping us to draw conclusions about the effect of income on the choice of sponsors.

Analysis of Sponsors by Type of Course

General preparation. Four-year colleges and universities dominate the general preparation field. Half of the participants taking courses for this purpose are sponsored by this type of institution. (Table 35) An additional quarter of general preparation enrollees attend community colleges and technical institutes. The bulk of the remaining attendance for that purpose, roughly one-sixth, is in public high schools. In other words, conventional academic institutions enroll roughly nine out of ten general preparation students.

It is surprising that community organization, tutors and others play such a small role in the delivery of conventional "culture" to the public. This field is dominated by the conventional academic institutions, and most importantly, by colleges and universities.

Occupational programs. Analysts should be aware of the role

which different sponsors play in occupational programs. The most important sponsor in this field is the employer, who offers programs to about a third of all students in that field. In fact, employers provide training to as many participants as two-year and four-year colleges combined. These last two groups are equal in providing this type of offering. Few adults receive their occupational training in high school--only six per cent of the total. The total conventional educational sector, colleges, both two-year and four-year, and high schools enroll roughly a third of all participants in occupational programs.

The other providers of occupational training are private vocational and technical schools and business colleges. They enroll roughly 15 per cent of all participants. Labor and professional groups are sponsors for fewer than one in ten adults in occupational training. Other groups, such as community organizations and private tutors are not significant.

Other instruction. Community organizations dominate the enrollments of persons who report that they are enrolled for other reasons. (The students who attend courses for neither general preparation nor occupational purposes usually take courses of an avocational nature.) Community organizations enroll one out of four students in this field. Running neck and neck with community organizations in enrolling this type of student are public grade and high schools. One of five students enrolled for that purpose attended courses sponsored by this type of institution.

The conventional higher education sector is the sponsor for another 17 per cent of these students. Nine per cent are enrolled in junior colleges, and the remaining 8 per cent in four-year institutions. Tutors and private instructors provide sponsorship for an additional 12 per cent.

Summary. The conventional academic sector dominates the enrollments for general preparation courses, and plays an important role in the provision of occupational training. Its share of students in avocational courses is high, but not dominating.

The role of employers in providing an important segment of the occupational training is highlighted by the above analysis. This resource is often ignored in planning adult education. Community organizations are important in the avocational field, and play a less significant role in either academic programs or in imparting job-oriented skills.

Sponsors and Their Missions

What kind of students enroll in each type of institution? How important are they in determining the mission of each sponsor in adult education? This type of analysis is rife with surprises. For instance, enrollees for avocational purpose are the largest single group of students in public grade and high schools, and account for one-half of the enrollment. (Table 36) About a third of the students sponsored by this type of institution take general preparation courses, and only a fifth are enrolled in occupational programs.

By contrast, the commitment of two-year colleges to occupational programs is much more pronounced. Forty-three per cent of all students enrolled there take occupational courses. General education enrollees are not far behind, with 38 per cent of the students taking courses for that purpose. Avocational courses are taken by fewer than one in five of all participants.

Four-year colleges and universities are most strongly committed to general preparation programs. Some 6 out of 10 participants are enrolled in courses for that purpose. The occupational programs for adults play a smaller role there, with 3 out of 10 participants taking this type of course. Avocational programs are of little significance; 1 of 8 participants takes this type of program.

As could be expected, employers, labor and professional associations are predominantly in the business of offering vocational training. Eight out of ten participants are enrolled in this type of course sponsored by these groups.

At precisely the opposite end of the spectrum are community organizations. Eight out of ten participants there are enrolled in other, avocational courses. Roughly the same proportion of avocational courses are provided by private tutors.

Thus, we can conclude that in the conventional academic sector, the high school is more avocationally oriented than either the two- or four-year college, and that two-year institutions are more heavily

committed to occupational training than four-year schools. Outside of the educational establishment, the offerings are polarized, with employers, labor and professional organizations specializing in job-oriented training, and community centers and tutors devoted to serving more personal needs.

The Effect of Income on Institutional Choice

A policy analyst concerned with support to those institutions which cater mostly to the poor or the economically weak will not find firm guidelines in the pattern of attendance by income group documented by the adult education survey. For instance, among persons with household incomes of less than $5,000, 23 per cent attended courses sponsored by an employer or community organization, and between 18-19 per cent were found in either public grade or high schools or two-year institutions. (Table 37) Nevertheless, 14 per cent did attend four-year colleges.

In the next highest income group, in households with incomes between $5,000 and $10,000, employers and community organizations still played the predominant role in offering courses to a quarter of the participants. Grade and high schools, two-year colleges and four-year colleges and universities played an equal role of enrolling one out of six students each.

Among the higher income groups, those with more than $10,000 in income, colleges and universities start playing a more important role, basically at the expense of junior colleges. Nevertheless, public grade and high schools still enroll over 10 per cent of all students, and the share

of employers does not vary significantly from one income group to another.

The only institution that seems to have significantly higher shares among lower and middle-income groups than among the truly affluent (those with household incomes over $15,000 a year) are the private vocational, technical and business schools. They enroll one in ten students among those with household incomes under $10,000, one in twelve and one in sixteen among those with incomes between $10,000 - $15,000 and over $15,000, respectively.

Between two-fifths and one-half of all enrollees in public grade and high schools, junior colleges and private vocational, trade and business schools come from households with incomes below $10,000, in contrast to the fact that a third of the participants for all sponsors are in the $10,000 to $15,000 income bracket. (Table 38) Public grade schools, junior colleges and community organizations have one out of five students in the $15,000 to $25,000 income bracket, and the vocational and trade schools one out of six. Colleges, universities and employers cater to somewhat higher income groups. More than a quarter of enrollees in their courses come from the $15,000 - $25,000 group.

A better picture of the opportunities offered by different institutions to persons with different incomes emerges from a description of enrollments by income level and level of education. It is only natural that persons with low levels of education are blocked, except in certain exceptional cases, from attendance in institutions which cater to persons

with more impressive credentials.

Persons with less than eight grades of education. The highest proportion of enrollees in adult education in this group are sponsored by employers. Between one-third and two-fifths of the enrollment at all income groups is in courses provided by these organizations. (Table 39) An additional 25 per cent of participants, again irrespective of income group, take courses sponsored by public grade or high schools. The ten per cent who attend junior colleges are also evenly spread in the income range, with the exception of the $10,000 to $15,000 income group.

Persons with nine to eleven years of education. Poor high school dropouts are slightly more likely to attend programs in high schools than their more well-to-do counterparts. For levels above $5 thousand a year, the proportion of students enrolled in high school remains relatively constant, and accounts for less than one-third of the total.

The ten per cent who attend junior college are spread relatively evenly by income group as well, up to the income group $25,000 and over. The main providers of occupational training, employers and other organizations, support the same proportion of enrollees except in the lowest income group.

High school graduates. A little less than a third of high school graduates who have not earned any college credit attend courses sponsored by employers. The proportion of participants in the lowest income group is somewhat less than in others.

Junior colleges, the next most important institution offering instruction for this group, claims about the same proportion of enrollees irrespective of income. Surprisingly, so do public high schools, third in the list of sponsors.

Persons with 13-15 years of education. The poor, those with incomes under $5 thousand a year, split their attendance evenly between junior colleges and four-year institutions, while the relatively affluent, living in households with over $10,000 a year income, show a decided preference for four-year institutions. Persons with incomes between $5 and $10 thousand a year fall somewhere between the cracks, and are more likely to attend the cheaper, two-year institutions. The proportion of the enrollment attending courses of other sponsors does not vary significantly from one group to another.

Persons with 16 years of education. As could be expected, the majority of adult learners who have attended college for four years continue to enroll in four-year institutions. Some 40 per cent in all income groups attended this type of institution in 1972. Among those with incomes under $5 thousand, fourteen per cent were enrolled in junior colleges, compared to 8 per cent or less for other income groups. By contrast, the poorest college graduates are less likely to take public high school courses, presumably of an avocational nature, while one out of ten of those above $5,000 per year do.

Persons with some graduate school credit. Attendance patterns

by income for persons with some graduate school credit break down neatly between those with household incomes of less than $15,000 a year and those with incomes above this point. Nearly six out of ten in the lower income group can be expected to attend a four-year institution. In the higher income group, only four out of ten do so. The difference between attendance rates is readily explained by differences in participation in programs sponsored by employers and professional organizations. These attract somewhat fewer than 20 per cent of enrollees with incomes under $15,000 and over 30 per cent of those with incomes above that line.

Summary and conclusions. Conventional educational institutions offer a variety of courses to adult learners. It is surprising that as much as 50 per cent of the offerings at grade and high schools are of an avocational nature, and that higher proportions of courses in either two- or four-year colleges are non-skill related. The adult education activities appear to be grafted on to the traditional functions of different institutions. With the exception of the high school, institutions offer the kind of offerings they are accustomed to deliver to full-time learners.

Patterns of enrollments outside of the school sector are equally predictable. Employers, etc., offer career oriented education, and community centers mostly avocational subjects.

No institution caters to a well defined education or income group. The only possible exception to this generalization are private vocational, technical and business colleges which recruit students somewhat

below the average income and educational attainment. Thus, institutional support cannot be channelled or targeted to a particular income group.

Most surprising, income does not seem to affect materially choices of persons with a given level of education faced with different alternatives. For instance, among different education groups, the percentage of those enrolling in more expensive four-year schools was not materially different from those who enrolled in less expensive two-year institutions. Other factors besides financial considerations affect choices of institutions.

IV. REGRESSION AND LOGIT ANALYSES

Two types of statistical analysis were used in an attempt to uncover more complex relationships between the variables which determine the demand for adult education than were revealed by tabular analysis. The first, multiple regression analysis, was used exhaustively in an attempt to find associations between a variety of student characteristics and the amount of time spent in class or in class and on homework. The second, conditional logit analysis, a relatively new and sophisticated technique, was used to predict the probability of participation in adult education.

Regression analysis. Two different regression approaches were tried. In the first instance, we attempted to explain the number of class hours demanded by the age, education, and income of participants. These three variables explained less than five per cent of the variance. (See Table 40.)

In a second approach, we tried to explain the total number of class hours and homework hours and attempted to develop demand functions for more carefully segmented portions of the adult learner population. In this instance, two quantitative independent variables and a large number of dummy variables were entered into the equation. The two quantitative variables were income of the respondent's household in the year preceding the interview, and the number of weeks of unemployment for those coded as still unemployed during the survey week. The dummy variables included the following items: age group, sex, race, educational attainment, region of residence, residence in a metropolitan area (SMSA), residence in the central city of a metropolitan area, and occupation group. The dummy variables were set up in such a way as to allow them to affect both the intercept and the slope of the quantitative variables.

Despite, or more likely because of the sophisticated analysis design, no more than two per cent of the variance of total hours spent in class and on homework in either completed, dropped, or all courses was explained. (For further details, see Tables A-1 through A-3 in Appendix II and the accompanying discussion.)

The low levels of R^2 of the regressions imply either (1) that there is virtually no regularity in the adult education process, and the number of hours demanded in completed and dropped courses is determined randomly, or (2) that the important determinants of the demand for adult education were not included in the survey data. Perhaps attitudinal variables

not covered in the survey could have contributed to the explanation of either participation or number of hours of classroom time or homework.

Despite the low level of explanation provided by the regression equations, the coefficients of determination and of the regression itself are statistically significant at the .01 level. Hence it may be useful to examine the effect of the dummy variables on the intercept of the regression equation.

For instance, larger incomes are associated with increases in hours spent in adult education, either in completed, dropped or all courses. Persons under age 25 behave somewhat differently than the rest with regard to income. For this age group there is a sharper increase in hours completed as income rises than among other age groups, and a decrease in hours dropped. For other age groups, the effect of income is less pronounced on courses dropped than on courses completed. It comes as no surprise, since education and income are related, that persons with lower education are less likely to complete courses than those with higher levels of educational attainment. (Table 41)

The effect of age on adult education demand is shown in Table 42. Generally, younger age groups show a higher participation rate, and it tapers off for older persons.

An interesting result was obtained by examining the effect of unemployment on the demand for training. The propensities of younger workers to take training decrease with length of unemployment, especially

for completed courses. In mid-life, however, length of unemployment is positively associated with higher demand for training.

Logit analysis. Logit analysis was used in an attempt to explain the probability of enrollment in adult education. The observations were grouped in clusters with similar demographic/financial characteristics. Appendix II details the methodology and explains in detail the concepts underlying conditional logit analysis. Here we shall merely note that 87 per cent of the variation of the relative frequency of participation was explained by the logit analysis.

The three variables which contributed to the explanation, age, education, and occupational level, exhibited the following characteristics: (1) participation tended to increase from the youngest to the next youngest group, and then decline, (2) participation increased both with educational attainment, and with the status of the occupation. Additional variables did not contribute to the explanatory power of the equation. (Table 43)

The results of this exercise merely confirm the analysis of tabular data: Income is a less important variable in explaining participation in adult education than education, age, or occupation.

V. ADULT EDUCATION IN PERSPECTIVE--A CONCLUSION

By 1972, adult part-time education reached nearly 16 million adults who enrolled in 6 million courses scheduled for 2.5 billion student contract hours. This is truly a mighty enterprise, and to put it in perspective, it may be well to compare it to full-time instruction at the higher

education level. It is estimated that full-time students numbered fewer than six million, enrolled in 50 million courses, and required 3.0 billion student contact hours. In terms of work load, measured in student contact hours, adult education was equal to some 80 per cent of full-time postsecondary activity.

Given this impressive commitment of resources, it is surprising that more attention has not been paid to customizing this segment of the education industry. After perusing the statistics collected by the NCES-sponsored survey, one is left with the impression that many academic sponsors are in adult education merely as an extension of their traditional activities. For instance, colleges and universities deliver the kind of general preparation courses they offer to full-time students, and others merely extend their offerings to non-working hours. The only exception to this generalization is the public grade and high school, which also acts as a landlord for a large number of avocational students.

Also disturbing is the inflexibility of current offerings oriented to those students with less than a high school education. The less well-educated enroll in courses which require a commitment to a large number of contact hours, and drop-out at higher rates than other students, with more education, who have the opportunity to take shorter or less intensive courses. The need to subdivide these courses into smaller units, each with a "take home" value, is probably highest on the agenda of part-time adult education.

Another issue which requires more attention than it has received is the dynamics of participation by different adult occupational groups. This understanding may be the key to evaluating the future growth of adult education.

The number of blue-collar workers in adult education remained constant between 1972 and 1975, as promotional opportunities and job openings were unfavorably affected by the slowdown in economic activity. We also noted that the participation rate of persons with graduate education seems to have declined during the same time-period. Both these trends need more detailed analysis than can be performed with the information in the current survey.

In the future, both the level of employment and, possibly equally important, the type of employment by occupation will determine the level of demand for adult education by persons with some graduate education. For instance, the proportion of professionals who took some part-time training is quite high overall, 33.5 per cent of professionals in 1972, and 34 per cent of the same group in 1975. The participation by different occupational groups within the professions is quite different. (Table 44) Thus, 46 per cent of elementary and secondary teachers participated in some adult education in 1972, but only 31 per cent of all engineers did so. Medical and health professionals and technicians also participated in 31 per cent of the cases. With the anticipated continuation in the decline in elementary and secondary enrollments, there is little

doubt that the number of teachers below the college level will either stabilize or decline, and an important source of demand for part-time, or part-year, educational services will do likewise. Will this slack be taken up by other professions?

Finally, we would be remiss not to comment on some of the implications of current patterns of enrollment, and the way they agree with postulates of human capital theory. For instance, the lion's share of adult education for vocational purposes is taken during the early years, certainly below the age of 35, with learners investing in themselves in order to enjoy returns for a long time. Older participants, by contrast, take fewer occupationally oriented courses, and concentrate instead on avocational subjects.

With such a large part of part-time adult education being devoted either to attain recognized credentials, or to enhance one's value in the job market, it may be reasonable to examine more closely the extent to which part-time studies supplement, and are used as a substitute for full-time education. In the higher education sector alone, over half a million student contact hours were devoted to the attainment of degrees at either the undergraduate or the graduate level. Thus, roughly 15 per cent of all student contact hours were contracted for in this type of part-time, adult education.

As long as one of the major costs of attending postsecondary institutions is foregone income, the possibility of part-time study and

full-time work certainly reduces the cost of acquiring additional schooling. If one were to assume that the living costs are no different for persons attending school and working, it is quite possible that this cost is reduced by two-thirds.

Under the circumstances, these economies must be balanced off against the cost of postponement of beginning a career which requires a postsecondary degree. We have very little information on this score. Most of the analyses of adult education have assumed that persons postpone full-time study until a later time, and come to the conclusion that these postponements are likely to be expensive to the student. The only study of wage developments which differentiates between the experience of persons who receive their degrees before or after joining a firm is less easy to translate into advice to the average student.[6] This particular study examined the effect of a number of other factors, such as selectivity, grade average, and major of the student, as well as certain attitudes to explain wage levels after graduation. If any conclusion can be drawn from the data based on the experience of a very large company, it is that factors other than late completion are the most important influences on the wage level.

Under these circumstances, it is probably more realistic to look at the role of adult part-time education as a substitute for full-time education, rather than as an addition to the possible market for students in postsecondary institutions. This conclusion applies best to colleges

and universities, especially private colleges and universities, which have not entered the avocational field to any extent, and thus are not likely to appeal to older persons likely to take courses.

Today the average, part-time, adult student earning credit for a college degree takes some 30 per cent of the full-time work load. It would thus take him some three times longer to obtain a degree. This estimate is probably misleading because many adult students attend college part-time after having earned some credits via full-time study.

This examination of the education patterns of adults has led us to the following conclusions: (1) part-time adult education is not likely to be a panacea which will lead us to a learning society, (2) it is unlikely to solve the work-load problems of academic institutions, (3) it is a slow way of getting a degree, and (4) it is probably not very suitable as a means of effecting a drastic change of career for older persons.

The reanalysis of the statistics has led us to drop a number of prejudices about adult education. It is delivered in a much less elitist manner than we believed. On the contrary, its recruiting efforts result in students from various educational levels, and at different points in the income distribution, participating roughly in proportion to their representation in the population. If it lagged anywhere, it was with the undereducated, more likely to be poor than the average American, and more likely to rely on public support for their education. This finding will give comfort to the advocates of more training to the disadvantaged, which is championed by the present administration.

FOOTNOTES

[1]See 1976 P.L. 94-482, The Educational Amendments of 1976, Title I, Part B, Sections 131-4.

[2]For instance, the Ford Foundation has supported a "lifelong learning" study program in New York State's Education Department, and another program at the George Washington University, Institute for Educational Leadership is sponsored by the Fund for the Improvement of Postsecondary Education, DHEW.

[3]U.S. DHEW, Education Division, National Center for Education Statistics, Participation in Adult Education, Final Report, 1972, U. S. Government Printing Office, Washington, D. C., 1976, Table 8, p. 42.

[4]Cf., ibid., Table 8, p. 43.

[5]Cf., ibid., Table 18, p. 63.

[6]David A. Wise, "Academic Achievement and Job Performance," The American Economic Review, Vol. LXV, Number 3, (June 1975) pp. 350 ff.

TABLE 1

PARTICIPATION RATES IN FULL- AND PART-TIME EDUCATION BY AGE GROUP AND TOTAL NUMBER OF PARTICIPANTS IN ADULT EDUCATION, 1969, 1972, AND 1975
(per cent of population in age group)

Age	1969			1972			1975		
	Part-Time	Full-Time	Total	Part-Time	Full-Time	Total	Part-Time	Full-Time	Total
17 - 24	10.5	40.8	51.3	12.2	38.1	50.3	11.4	41.7	52.1
25 - 34	18.5	2.4	20.9	19.9	3.4	23.3	20.5	3.5	24.0
35 - 44	13.2	--	13.2	14.9	--	14.9	15.0	--	15.0
45 - 54	9.0	--	9.0	10.2	--	10.2	10.5	--	10.5
55 - 64	4.3	--	4.3	5.3	--	5.3	5.8	--	5.8
65	1.5	--	1.5	1.7	--	1.7	2.3	--	2.3
Average, all age groups	10.0	--	10.0	11.3	--	11.3	11.6	--	11.6
Total (000's)	13,041			15,734			17,059		

Sources: Participation in Adult Education: Final Report, 1969, D.H.E.W., U.S.O.E., N.C.E.S., U. S. Government Printing Office, Washington, D. C., 1974.
Participation in Adult Education: Final Report, 1972, D.H.E.W., U.S.O.E., N.C.E.S., U. S. Government Printing Office, Washington, D. C., 1976.
1975: Unpublished NCES data.

TABLE 2

PARTICIPATION IN ADULT EDUCATION BY LEVEL OF EDUCATION, 1969, 1972 AND 1975
(per cent of total number of persons with given attainment level)

Educational Attainment	1969	1972	1975
0 - 8	2.1	2.1	2.0
9 - 11	7.7	5.4	4.6
12	11.3	11.9	11.9
13 - 15	16.6	18.3	17.6
16	25.4	27.1	27.0
16+	29.6	32.9	30.4

Note: Percentages for 1969 may be slightly overstated, due to apparent errors in NCES statistics for that year.

Sources: See Table 1.

TABLE 3

PARTICIPATION IN ADULT EDUCATION BY INCOME GROUP, 1969, 1972 AND 1975
(per cent of total persons in income group)

	1969	1972	1975
Less than $3,000	4.2	4.9	4.8
$3,000 - $3,999	4.5	5.7	6.0
$4,000 - $4,999	5.8	6.7	8.1
$5,000 - $5,999	7.1	8.8	
$6,000 - $7,499	9.7	8.9	9.5
$7,500 - $9,999	11.1	11.0	12.1
$10,000 - $14,999	12.7	14.1	13.6
$15,000 - $24,999	12.7	17.2	16.7
$25,000 or more	14.3	17.0	19.0
Not available	20.7	7.2	6.9

Sources: See Table 1.

TABLE 4

DISTRIBUTION OF ELIGIBLES AND PARTICIPANTS, AND COURSE HOURS, TOTAL AND BY COMPLETION STATUS, BY AGE, EDUCATION AND INCOME, 1972
(per cent)

			Hours			
Age	Eligibles	Participants	Total	Completed	In Progress	Dropped
17-24	13.1	20.8	35.7	32.8	34.1	51.9
25-29 30-34	20.0	33.6	32.0	33.1	32.3	27.2
35-39 40-44	17.6	21.2	18.1	18.1	19.8	13.4
45-54	18.6	15.6	9.5	11.1	8.8	4.7
55-59 60-64	14.9	6.4	3.3	4.0	2.9	1.7
65+	15.7	2.4	1.3	.9	2.2	1.0
	100.0	100.0	100.0	100.0	100.0	100.0
Educational Attainment						
8 years or less	22.5*	3.9*	4.1	2.1	5.7	8.5
9-11 years	17.2	9.2	13.1	7.8	16.5	27.1
12 years	37.5	37.6	40.6	37.6	45.3	41.6
13-15 years	11.6	21.4	21.7	24.5	18.2	18.6
16 years	7.2	16.4	11.5	15.7	8.2	2.3
More than 16 years	4.0	11.4	9.0	12.3	6.2	1.9
	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 4 (Cont'd)

DISTRIBUTION OF ELIGIBLES AND PARTICIPANTS, AND COURSE HOURS, TOTAL AND BY COMPLETION STATUS, BY AGE, EDUCATION AND INCOME, 1972
(per cent)

Income	Eligibles	Participants	Hours			
			Total	Completed	In Progress	Dropped
Less than $3,000	11.6	4.5	10.4	6.8	11.8	21.8
$3,000 - $3,999	6.0	2.7	5.2	3.6	6.0	10.0
$4,000 - $4,999	5.7	3.3	4.8	3.5	4.9	9.8
$5,000 - $5,999	6.2	4.4	6.2	5.0	8.0	6.8
$6,000 - $9,999	24.6	21.3	23.3	22.6	25.1	21.3
$10,000 - $14,999	25.7	31.9	27.7	31.0	26.5	17.2
$15,000 - $24,999	15.4	24.1	17.2	20.1	14.6	11.1
$25,000 and over	4.8	7.8	5.4	7.5	3.0	2.1
	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Special tabulations from Adult Ecucation Survey Data.

*Participation in Adult Education: Final Report, 1972, D.H.E.W., U.S.O.E., N.C.E.S., U. S Government Printing Office, Washington, D. C., 1974.

TABLE 5

PARTICIPATION RATES AND NUMBER OF PARTICIPANTS IN ADULT EDUCATION BY AGE AND INCOME, 1972
(per cent of eligibles, participants in thousands)

Income	Age						Number of Participants (000's)
	Under 25	25-34	35-44	45-54	55-64	65+	
Less than $3,000	16.8	11.5	7.5	2.4	2.1	.9	708
$3,000 - $3,999	16.3	12.1	5.3	2.7	2.3	1.2	425
$4,000 - $4,999	13.9	12.1	7.2	5.9	2.3	1.7	488
$5,000 - $5,999	17.7	12.6	6.5	4.9	2.5	2.2	708
$6,000 - $9,999	16.3	15.0	9.1	6.8	3.8	2.3	3,257
$10,000 - $14,999	19.5	21.5	14.2	9.5	6.4	2.9	4,799
$15,000 - $24,999	21.7	27.3	20.1	13.8	7.9	3.5	3,619
$25,000 or more	25.9	26.8	23.2	18.1	10.3	2.9	1,164
Not available							566
Average, all income groups	17.9	19.0	13.6	9.4	4.8	1.7	11.3
Number of Participants (000's)	3,430	5,224	3,351	2,376	991	378	15,734

TABLE 6

PARTICIPATION RATES IN ADULT EDUCATION BY AGE AND EDUCATION, 1972
(per cent of eligibles)

Education	Age						Average
	Under 25	25-34	35-44	45-54	55-64	65+	
8 years or less	4.9	3.6	3.7	2.0	1.0	.6	1.6
9-11 years	9.6	5.8	4.8	3.4	2.1	.9	3.3
12 years	12.0	9.4	5.6	4.7	3.6	1.8	6.6
13-15 years	17.8	16.9	13.7	10.2	6.1	3.3	12.9
16 years	29.4	34.4	23.7	22.2	9.4	5.3	23.7
More than 16 years	39.6	39.1	31.1	24.9	16.0	5.2	29.1
Average, all education groups	17.9	19.0	13.6	9.4	4.8	1.7	11.3

TABLE 7

TOTAL CONTRACTED HOURS IN ADULT EDUCATION BY AGE AND EDUCATION, 1972
(per cent of total hours)

Educational Attainment	Age						Total
	Under 25	25-34	35-44	45-54	55-64	65+	
8 years or less	.9	.9	.7	.7	.4	.4	4.1
9-11 years	5.6	3.7	2.4	.9	.4	.2	13.1
12 years	17.2	12.5	6.4	3.2	1.0	.3	40.6
13-15 years	8.4	6.5	3.8	2.1	.6	.2	21.7
16 years	3.2	4.5	2.4	1.2	.2	.1	11.5
More than 16 years	.4	4.1	2.4	1.4	.7	.1	9.0
Total, all educational groups	35.7	32.2	18.1	9.5	3.3	1.3	100.0

TABLE 8

DISTRIBUTION OF TOTAL CONTRACTED ADULT EDUCATION HOURS AND COURSES, BY INCOME AND LEVEL OF EDUCATION, 1972

Number of Hours (millions)	Less Than $3,000	$3,000-3,999	$4,000-4,999	$5,000-5,999	$6,000-7,499	$7,500-9,999	$10,000-14,999	$15,000-24,999	$25,000 and over	Row Total
8 years or less	32	10	9	8	14	10	11	9	0	103
9-11 years	67	36	28	35	32	41	67	20	2	328
12 years	105	64	40	74	88	150	300	156	39	1,015
13-15 years	40	12	31	22	61	81	154	112	28	541
16 years	9	6	10	9	16	47	84	75	31	288
More than 16 years	7	2	1	7	5	36	76	56	35	224
Total, all education groups	259	130	119	155	217	364	693	429	134	2,500
Number of Courses (thousands)										
8 years or less	108	78	65	54	108	102	144	62	4	724
9-11 years	281	159	120	176	199	418	527	231	26	2,139
12 years	410	280	283	405	711	1,336	2,961	1,690	478	8,556
13-15 years	247	95	183	292	486	844	1,971	1,600	475	6,194
16 years	94	92	115	114	197	619	1,427	1,494	518	4,665
More than 16 years	69	25	18	53	62	374	890	1,159	641	3,290
Total, all education groups	1,209	729	784	1,094	1,763	3,693	7,920	6,236	2,142	25,568
Hours Per Course										
8 years or less	292	132	136	148	127	100	79	141	62	142
9-11 years	238	224	236	201	163	98	127	87	71	154
12 years	256	227	141	182	124	112	101	92	81	119
13-15 years	162	128	168	77	126	96	78	70	58	87
16 years	94	65	86	82	83	76	59	51	59	62
More than 16 years	100	92	63	125	85	95	85	48	54	68
Average, all education groups	214	178	152	142	123	99	88	69	63	98

TABLE 9

PARTICIPATION RATES IN ADULT EDUCATION BY SEX AND LEVEL OF EDUCATION, 1972
(per cent of eligibles)

al Attainment	Male	Female
[illegible] 12 years	4.2	4.0
[illegible]	13.5	11.6
[illegible]	24.3	21.6
[illegible] years	28.9	32.6
[illegible] groups	13.3	11.6

[illegible]rticipation in Adult Education: Final Report, 1972, D.H.E.W., [illegible].E., N.C.E.S., U. S. Government Printing Office, Washington, D. C., 1976, Table 5, p. 29.

TABLE 10

TOTAL HOURS AND COURSES, BY SEX AND COMPLETION STATUS, 1972

	Completed		Continuing		Dropped	
	Male	Female	Male	Female	Male	Female
Hours (millions)	747	615	467	3..	173	154
Courses (thousands)	9,467	9,036	2,431	2,651	844	1,137
Hours per course	79	68	192	130	205	136

TABLE 11

PARTICIPATION RATES BY SEX AND INCOME, 1972
(per cent of eligibles)

Income	Male	Female
Less than $3,000	5.2	5.2
$3,000 - $3,999	5.7	6.3
$4,000 - $4,999	6.5	7.6
$5,000 - $5,999	9.0	9.2
$6,000 - $7,499	9.7	9.4
$7,500 - $9,999	12.3	11.3
$10,000 - $14,999	16.9	14.0
$15,000 - $24,999	20.2	18.9
$25,000 and over	18.8	21.7
Not available	7.8	7.7
All income groups	13.3	11.6

Source: Participation in Adult Education: Final Report, 1972, D.H.E.W., U.S.O.E., N.C.E.S., U. S. Government Printing Office, Washington, D. C., 1976, Table 6, p.31.

TABLE 12

PARTICIPATION RATES IN ADULT EDUCATION
BY RACE AND EDUCATION, 1972
(per cent of eligibles)

Educational Attainment	White	Nonwhite
Less than 12 years	4.1	4.1
12 years	12.5	11.0
13-15 years	23.2	19.5
16 years or more	30.5	29.7
Average, all education levels	12.8	8.8

Source: Participation in Adult Education: Final Report, 1972, D.H.E.W., U.S.O.E., N.C.E.S., U. S. Govetnment Printing Office, Washington, D. C., 1976, Table 1, p. 24.

TABLE 13

PARTICIPATION RATES IN ADULT EDUCATION BY REGION AND METROPOLITAN STATUS, 1969, 1972, AND 1975

	All			Central City			SMSA, Not Central City		
	1969	1972	1975	1969	1972	1975	1969	1972	1975
Northeast	10.8	10.8	11.4	7.9	8.3	8.8	12.8	12.7	13.5
North Central	12.8	13.1	12.6	10.6	12.7	11.8	16.5	16.0	15.3
South	9.7	9.9	11.4	10.1	11.3	12.7	12.3	12.4	14.5
West	18.4	17.9	19.0	14.5	17.5	17.7	20.5	19.2	21.1

	SMSA, Non-Farm			SMSA, Farm		
	1969	1972	1975	1969	1972	1975
Northeast	6.2	NA	11.1	10.0	NA	7.1
North Central	6.7	NA	10.6	10.4	NA	8.3
South	4.2	NA	8.7	7.6	NA	4.8
West	10.7	NA	16.9	14.6	NA	14.0

NA: Not available.

Sources: See Table 1.

TABLE 14

PARTICIPANTS, ELIGIBLES AND PARTICIPATION RATES IN ADULT EDUCATION, BY REGION, RACE, AND METROPOLITAN STATUS, 1972

	All			Central City		
	Participants (000's)	Eligibles (000's)	Participation Rate	Participants (000's)	Eligibles (000's)	Participation Rate
Northeast	3,433	31,898	10.8	930	11,177	8.3
North Central	4,546	34,571	13.1	1,382	10,902	12.7
South	3,879	39,115	9.9	1,249	11,009	11.3
West	3,876	21,679	17.9	1,314	7,492	17.5
Whites						
Northeast	3,246	29,272	11.1	812	9,192	8.8
North Central	4,291	31,922	13.4	1,189	8,815	13.5
South	3,379	32,484	10.4	983	8,287	11.9
West	3,601	19,842	18.1	1,152	6,284	18.3
Blacks						
Northeast	168	2,431	6.9	110	1,859	5.9
North Central	234	2,554	9.2	180	2,043	8.8
South	469	6,450	7.3	246	2,674	9.2
West	140	1,024	13.7	92	751	12.3

TABLE 14 (Cont'd)

PARTICIPANTS, ELIGIBLES AND PARTICIPATION RATES IN ADULT EDUCATION, BY REGION, RACE, AND METROPOLITAN STATUS, 1972

	SMSA, Not Central City			Non-SMSA		
	Participants (000's)	Eligibles (000's)	Participation Rate	Participants (000's)	Eligibles (000's)	Participation Rate
Northeast	1,837	14,447	12.7	666	6,274	10.6
North Central	2,009	12,518	16.0	1,159	11,157	10.4
South	1,307	10,504	12.4	1,323	17,602	7.5
West	1,818	9,455	19.2	740	4,746	15.6
Whites						
Northeast	1,792	13,920	12.9	643	6,161	10.4
North Central	1,957	12,098	16.2	1,146	11,010	10.4
South	1,223	9,451	13.0	1,173	14,765	7.9
West	1,739	8,934	19.5	709	4,461	15.9
Blacks						
Northeast	38	468	8.1	19	103	18.4
North Central	45	398	11.3	8	112	7.1
South	78	1,053	7.4	145	2,732	5.3
West	46	258	17.8	2	15	13.3

Source: Participation in Adult Education: Final Report, 1972, D.H.E.W., U.S.O.E., N.C.E.S., U. S. Government Printing Office, Washington, D. C., 1976, Table 4, p. 28.

TABLE 15.1

RATIO OF MEDIAN FAMILY INCOME OF ADULT EDUCATION PARTICIPANTS TO MEDIAN FAMILY INCOME, 1971

Calculated Ratio

Educational Attainment	Under 25*	25-34	35-44	45-54	55-64	65+
8 years or less	-	1.113	.739	.955	.697	.813
9-11 years	-	1.033	.948	.904	.795	.926
12 years	-	.800	.995	.895	.795	.688
13-15 years	-	1.023	.950	.907	.791	.865
16 years	-	.991	.929	.681	.646	.507
More than 16 years	-	.969	.912	.779	.932	1.044
All education groups	-	1.167	1.168	1.121	1.128	1.177

TABLE 15.2

RATIO OF MEDIAN FAMILY INCOME OF ADULT EDUCATION PARTICIPANTS TO MEDIAN FAMILY INCOME, 1971

Adjusted Ratio

Educational Attainment	Under 25	25-34	35-44	45-54	55-64	65+
8 years or less	-	1.4	.9	1.2	.9	1.0
9-11 years	-	1.3	1.2	1.1	1.0	1.1
12 years	-	1.0	1.2	1.1	1.0	.8
13-15 years	-	1.2	1.2	1.1	1.0	1.1
16 years	-	1.2	1.1	.8	.8	.6
More than 16 years	-	1.2	1.1	1.0	1.1	1.3
All education groups	-	1.4	1.4	1.4	1.4	1.4

*Not available.

Sources: U. S. Department of Commerce, Bureau of the Census, Current Population Reports, "Money Income in 1971 of Families and Persons in the United States" (Series P-60, #85), U. S. Government Printing Office, Washington, D. C., 1972, Table 28, p. 71.

Special tabulations from Adult Education Survey data.

Note: All families are included, not just those where the head was a year-round, full-time worker.

TABLE 16

REASONS FOR TAKING COURSE, BY AGE, 1972
(per cent of participants)

Reason	Under 25	25-34	35-44	45-54	55-64	65+	Total
General information	15.3	12.3	14.1	14.1	18.0	18.4	14.1
Job advancement	33.5	44.2	43.6	42.7	33.2	13.7	40.1
Get new job	19.9	9.3	8.3	7.0	4.8	2.3	10.6
Community action	.8	2.0	3.2	2.0	3.3	4.0	2.1
Personal-Family	15.7	20.3	20.5	23.1	28.6	47.0	20.9
Social-Recreational	2.4	5.7	4.7	5.7	6.3	9.8	4.9
Other	12.3	6.3	5.6	5.4	5.8	4.8	7.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 17

REASONS FOR TAKING COURSE, BY INCOME, 1972
(per cent of participants)

Reason	Less Than $3,000	$3,000-3,999	$4,000-4,999	$5,000-5,999	$6,000-7,999	$8,000-9,999	$10,000-14,999	$15,000-24,999	$25,000 or more	All Incomes
General information	14.0	12.5	14.8	11.5	14.9	14.9	12.6	14.8	18.1	14.1
Job advancement	26.3	29.7	27.6	35.7	32.5	40.9	44.4	45.2	35.7	40.1
Get new job	25.9	20.4	17.5	17.3	15.0	11.2	9.0	6.4	5.1	10.6
Community action	1.7	2.8	2.5	1.3	2.9	2.2	2.1	2.0	2.0	2.1
Personal-Family	23.8	18.2	24.8	20.5	22.0	20.5	20.6	19.7	23.5	20.9
Social-Recreational	3.9	2.1	2.1	4.8	4.8	3.8	4.8	5.1	9.9	4.9
Other	10.5	14.4	10.7	8.8	7.8	6.6	6.5	6.8	5.8	7.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 18

REASONS FOR TAKING COURSE, BY INCOME, 1972
(per cent of participants)

Reason	Income Group					
	Less Than $5,000	$5,000-9,999	$10,000-14,999	$15,000-24,999	$25,000 or more	Total
General information	10.5	26.4	28.2	25.1	9.8	100.0
Job advancement	6.7	24.6	35.0	26.9	6.8	100.0
Get new job	22.1	32.9	26.9	14.4	3.7	100.0
Community action	11.4	27.7	31.0	22.6	7.2	100.0
Personal-Family	11.5	26.1	31.2	22.5	8.7	100.0
Social-Recreational	6.3	22.6	30.7	24.8	15.6	100.0
Other	16.9	26.4	28.4	22.2	6.1	100.0
All reasons	10.7	26.1	31.6	23.9	7.7	100.0

TABLE 19 -

ADULT EDUCATION BY TYPE OF CREDIT,
1969, 1972 AND 1975
(per cent of participants)

Type of Credit	1969	1972	1975
No credit (Job related (Other	52.6	53.7	28.5 29.9
8th grade certificate	.3	.1	.2
High school completion	3.9	3.5	2.7
Skill certificate or license	17.9	16.1	12.2
College degree	19.6	21.6	17.2
Other credit	5.6	3.7	3.3
Not reported	.9	1.3	.7
Credit not used	-	-	5.3
	100.0	100.0	100.0

Note: 1969 and 1972 percentages were adjusted to equal 100 per cent. They added to more than 100 in original data because a participant may have taken more than one course for different types of credit.

Sources: See Table 1.

TABLE 20

TYPE OF CREDIT BY SEX, 1972
(Percent of participants)

Type of Credit	Female	Male	Total
Credit	59.3	50.0	54.7
For 8th grade credit	0.1	0.0	0.1
For high school certification	4.5	2.8	3.7
For skill certification or license	12.4	20.1	16.2
For two- or four-year college degree	12.5	13.7	13.1
For post-graduate or profession degree	8.1	9.6	8.8
Other	3.1	3.7	3.4
Total	100.0	100.0	100.0

TABLE 21

TYPE OF CREDIT, BY SEX, 1972
(per cent breakdown)

Type of Credit	Female	Male	Total
No credit	55.1	44.9	100.0
For 8th grade credit	70.4	29.6	100.0
For high school certification	62.2	37.8	100.0
For skill certification or license	39.0	61.0	100.0
For two- or four-year college degree	48.6	51.4	100.0
For post-graduate or profession degree	46.8	53.2	100.0
Other	45.9	54.1	100.0
Total	50.8	49.2	100.0

TABLE 22

TYPE OF CREDIT, BY RACE, 1972
(per cent of participants)

Type of Credit	Race		
	Nonwhite	White	Average
No credit	44.1	55.6	54.7
For 8th grade credit	.3	.1	.1
For high school certification	8.6	3.3	
For skill certification or license	23.1	15.7	16.2
For two- or four-year college degree	11.	13.2	13.1
For post-graduate or profession degree	9.3	8.8	8.8
Other	2.9	3.4	3.4
Total	100.0	100.0	100.0

TABLE 23

TYPE OF CREDIT BY RACE, 1972
(per cent breakdown)

Type of Credit	Race		
	Nonwhite	White	Average
No credit	6.2	93.8	100.0
For 8th grade credit	29.5	70.5	100.0
For high school certification	18.0	82.0	100.0
For skill certification or license	11.0	89.0	100.0
For two- or four-year college degree	7.0	93.0	100.0
For post-graduate or profession degree	8.1	91.9	100.0
Other	6.4	93.6	100.0
Average	7.7	92.3	100.0

TABLE 24

COURSES BY COMPLETION STATUS, BY INCOME, 1972
(per cent of courses)

	Less Than $3,000	$3,000-3,999	$4,000-4,999	$5,000-5,999	$6,000-7,999	$8,000-9,999	$10,000-14,999	$15,000-24,999	$25,000 or more	Average, All Incomes
Course completed	50.7	51.8	57.5	57.3	62.5	68.2	72.4	74.5	78.3	6 .3
Still taking course	29.8	28.4	28.8	28.2	29.7	23.3	21.0	19.0	16.8	22.3
Dropped course	19.5	19.7	13.6	14.5	8.7	8.5	6.6	6.5	4.9	8.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 25

COURSES BY COMPLETION STATUS, BY EDUCATIONAL ATTAINMENT, 1972
(per cent of courses)

Completion Status	8 Years Or Less	9-11 Years	12 Years	13-15 Years	16 Years	More Than 16 Years	All Education Groups
Completed	45.5	52.2	65.4	71.4	80.4	84.8	69.3
Continuing	35.1	31.1	25.0	21.8	15.4	11.9	22.3
Dropped	19.4	16.7	9.7	6.8	4.1	3.3	8.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 26

COURSES BY COMPLETION STATUS, BY EMPLOYER TYPE, 1972
(per cent of courses)

Completion Status	Private	Government	Self-Employed	Unpaid Family	Never Worked	All Employment Classifications
Course completed	67.7	78.5	76.1	70.7	65.1	71.2
Still taking course	22.2	17.0	18.9	25.9	24.1	20.6
Dropped course	10.2	4.5	5.1	3.4	10.8	8.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 27

COURSES BY COMPLETION STATUS, BY SOURCE OF SUPPORT, 1972
(per cent of courses)

Completion Status	Self or Family	Employer	Public Support	Private Organizat[illegible]	Other	All Sources of Support
Course completed	67.8	82.2	55.6	72.7	64.3	69.3
Still taking course	27.6	15.4	29.0	23.9	27.5	22.3
Dropped course	4.5	2.4	15.3	3.4	8.2	8.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 28

COURSES BY COMPLETION STATUS OF COURSES, BY TYPE OF CREDIT, 1972
(per cent of courses)

	Completion Status			
	Course Completed	Still Taking Course	Dropped Course	Total
No credit	66.9	21.3	11.7	100.0
For 8th grade certification	14.1	85.9	0.0	100.0
For high school certification	50.0	33.0	17.0	100.0
For skill certification or license	64.4	31.1	4.5	100.0
For two- or four-year college degree	78.4	18.0	3.6	100.0
For post-graduate or professional degree	84.2	14.8	1.0	100.0
Other	79.3	18.4	2.3	100.0
All types of credit	69.3	22.3	8.4	100.0

TABLE 29

MEAN OF RATIO: HOMEWORK TO CLASS HOURS, BY COMPLETION STATUS AND EDUCATIONAL ATTAINMENT, 1972

Educational Attainment	Completed	In Progress	Dropped
8 years or less	1.68	.84	.64
9-11 years	3.25	.91	1.02
12 years	1.09	1.16	.82
13-15 years	1.14	1.40	1.47
16 years	1.34	1.35	1.46
More than 16 years	1.77	2.08	.91
	1.41	1.23	1.01

TABLE 30

AVERAGE NUMBER OF SCHEDULED HOURS PER COURSE, BY EDUCATIONAL ATTAINMENT AND INCOME OF PARTICIPANTS

Educational Attainment	Less Than $3,000	$3,000-3,999	$4,000-4,999	$5,000-5,999	$6,000-7,499	$7,500-9,999	$10,000-14,999	$15,000-24,999	$25,000- or more	Average, All Income Groups
Completed Courses										
8 years or less	239	147	81	198	68	66	42	64	24	91
9-11 years	147	108	52	114	137	87	108	65	81	101
12 years	196	159	113	134	89	75	78	81	69	89
13-15 years	102	102	109	53	118	76	65	59	58	71
16 years	51	63	76	88	57	67	55	47	58	56
More than 16 years	75	88	33	77	84	85	78	41	55	59
Average, all education groups	139	119	96	98	96	74	71	57	59	74
Courses In Progress										
8 years or less	229	127	211	177	205	183	143	109	-	175
9-11 years	268	540	238	295	162	100	131	142	41	192
12 years	409	335	243	261	193	196	166	123	99	186
13-15 years	270	169	108	160	108	107	135	101	66	131
16 years	248	87	209	33	207	128	89	76	73	101
More than 16 years	574	109	152	588	95	348	133	103	41	135
Average, all education groups	308	296	206	246	167	169	143	107	74	159
Courses Dropped										
8 years or less	405	113	67	102	58	115	35	437	100	193
9-11 years	285	176	531	204	254	133	233	60	63	228
12 years	253	284	110	232	168	194	123	109	142	166
13-15 years	476	195	743	104	270	92	90	129	34	166
16 years	23	-	-	67	-	50	44	43	31	45
More than 16 years	102	-	57	-	25	28	112	39	54	65
Average, all education groups	300	209	329	168	193	141	117	101	81	165

TABLE 31

COURSES BY COMPLETION STATUS OF COURSES, BY SEX, 1972
(per cent of courses)

	Female	Male	Both Sexes
Course completed	67.9	70.8	69.3
Still taking course	22.7	21.9	22.3
Dropped course	9.5	7.4	8.4
	100.0	100.0	100.0

TABLE 32

COURSES BY COMPLETION STATUS, BY RACE, 1972
(per cent of courses)

Completion Status	Race		All Races
	Nonwhite	White	
Course completed	55.9	70.4	69.3
Still taking course	28.5	21.8	22.3
Dropped course	15.6	7.8	8.4
	100.0	100.0	100.0

TABLE 33

PER CENT OF PAYERS, FIRST COURSES, BY EDUCATIONAL LEVEL OF PARTICIPANT BY PAYER, 1972
(per cent of courses)

Educational Attainment	Age					
	Under 25	25-34	35-44	45-54	55-64	65+
8 years or less	100	100	100	100	100	100
Self or family	24	30	32	31	38	51
Employer	4	12	11	22	18	2
Public organization	60	53	38	28	22	24
Private organization	8	0	5	9	13	15
Other	4	6	11	9	9	7
9-11 years	100	100	100	100	100	100
Self or family	44	43	37	39	35	35
Employer	8	13	27	28	18	7
Public organization	39	33	24	24	24	20
Private organization	3	4	7	7	9	29
Other	7	6	5	3	13	9
12 years	100	100	100	100	100	100
Self or family	56	46	49	46	54	67
Employer	18	25	25	31	15	8
Public organization	18	20	16	11	13	8
Private organization	3	5	6	7	11	11
Other	6	5	5	5	7	6

TABLE 33 (Cont'd)

PER CENT OF PAYERS, FIRST COURSES, BY EDUCATIONAL LEVEL OF PARTICIPANT BY PAYER, 1972
(per cent of courses)

Educational Attainment	Age					
	Under 25	25-34	35-44	45-54	55-64	65+
13-15 years	100	100	100	100	100	100
Self or family	69	54	55	57	59	51
Employer	15	27	25	24	19	14
Public organization	11	12	11	9	10	7
Private organization	2	3	5	5	9	14
Other	4	3	3	5	2	14
16 years	100	100	100	100	100	100
Self or family	69	58	55	55	47	66
Employer	19	27	33	24	22	5
Public organization	6	8	9	10	17	15
Private organization	3	4	8	6	8	14
Other	3	3	4	6	7	0
More than 16 years	100	100	100	100	100	100
Self or family	78	60	56	57	67	66
Employer	6	25	28	19	16	19
Public organization	6	7	8	10	5	4
Private organization	6	6	6	8	11	10
Other	6	3	1	6	1	0

TABLE 34

ROLE OF EMPLOYERS IN FINANCING PART-TIME ADULT EDUCATION
(per cent of eligible workers)

Age	Per Cent of Eligible Workers	Education	Per Cent of Eligible Workers	Income	Per Cent of Eligible Workers
Under 25	4.1[1]	8 years or less	.7[2]	Less than $3,000	.7[3]
25 - 34	9.2	9-11 years	1.9	$3,000-$3,999	1.4
35 - 44	6.1	12 years	4.9	$4,000-$4,999	2.2
45-54	4.4	13-15 years	8.5	$5,000-$5,999	3.0
55-64	1.8	16 years)		$6,000-$7,499	2.8
		)	12.8		
65+	1.0	More than 16 years)		$7,500-$9,999	3.9
				$10,000-$14,999	5.3
				$15,000-$24,999	5.2
				$25,000 or more	4.3

[1]Estimate based on labor force and unemployment rates for each age group in 1971.
[2]Estimate based on labor force for 1970.
[3]Estimates of number of eligibles for income is higher than in AE survey, because included in CPR totals were all individuals who worked in the previous year, whereas AE survey included only those who had worked in the previous week.

TABLE 34 (Cont'd)

ROLE OF EMPLOYERS IN FINANCING PART-TIME ADULT EDUCATION
(per cent of eligible workers)

Sources: Current Population Reports, "Money Income in 1971 of Families and Persons in the United States" (Series P-60, #85), U. S. Department of Commerce, Bureau of the Census, U. S. Government Printing Office, Washington, D. C., 1972, Table 29, p. 79.

U. S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Report 125 "Educational Attainment of Workers, March 1969, 1970", U. S. Government Printing Office, Washington, D. C., 1970, p. 10.

U. S. Department of Labor, Bureau of Labor Statistics, Monthly Labor Review, January 1973, U. S. Government Printing Office, Washington, D. C., 1973, Table 7, p. 9.

Participation in Adult Education: Final Report, 1972, D.H.E.W., U.S.O.E., N.C.E.S., U. S. Government Printing Office, Washington, D. C., 1976, Table 18, p.63.

TABLE 35

REASON FOR TAKING COURSE, BY SPONSOR, 1972
(per cent of participants)

	Reason			
	General Preparation	Occupational	Other	All Reasons
Public Grade or High School	17.6	6.1	19.9	13.4
Two-Year College Vocational Institutions	24.1	15.2	8.9	15.3
Private Vocational, Technical, Business School	2.2	14.5	4.2	8.2
Four-Year College, University	48.3	13.4	7.7	20.1
Employer	2.0	28.6	5.6	14.6
Community Organization	2.5	2.6	27.4	10.6
Labor Organization, Professional Association	.3	8.5	2.6	4.6
Tutor, Private Instructor	.3	1.8	11.8	4.7
Other	2.8	8.8	11.4	8.2
Hospital	0.0	.4	.5	.3
Total	100.0	100.0	100.0	100.0

TABLE 36

REASONS FOR TAKING COURSE, BY SPONSOR, 1972
(per cent of participants)

	Reason			
	General Preparation	Occupational	Other	Total
Public Grade or High School	32.1	19.6	48.3	100.0
Two-Year College, Vocational Institution	38.4	42.8	18.8	100.0
Private Vocational, Technical, Business School	6.7	76.6	16.7	100.0
Four-Year College, University	58.8	28.7	12.5	100.0
Employer	3.3	84.3	12.4	100.0
Community Organization	5.7	10.7	83.6	100.0
Labor Organization, Professional Association	1.8	79.8	18.4	100.0
Tutor, Private Instructor	1.3	16.9	81.8	100.0
Other	8.4	46.5	45.1	100.0
Hospital	0.0	49.5	50.5	100.0
All Sponsors	24.5	43.1	32.4	100.0

TABLE 37

SHARE OF SPONSORS OF COURSES BY INCOME GROUP, 1972
(per cent of participants)

Sponsor	Less Than $5,000	$5,000-9,999	$10,000-14,999	$15,000-24,999	$25,000 or more
Public grade, high school	18.9	14.6	12.7	10.9	12.1
Two-year college, vocational institution	18.0	17.0	15.0	14.2	10.5
Private vocational, trade, business school	10.7	10.5	8.0	5.8	6.1
Four-year college, university	13.8	15.6	21.3	24.3	26.0
Employer, community organization	22.7	25.2	26.5	26.0	21.2
Labor organization, professional association	1.9	3.6	4.2	6.1	8.2
Tutor, other	13.9	14.0	12.2	12.3	15.5
Total	100.0	100.0	100.0	100.0	100.0

Note: Hospitals are not included in this tabulation.

TABLE 38

DISTRIBUTION OF PARTICIPANTS BY SPONSOR AND INCOME, 1972
(per cent of participants)

Sponsor	Less Than $5,000	$5,000-9,999	$10,000-14,999	$15,000-24,999	$25,000 or more	Total
Public grade, high school	15.2	28.4	30.1	19.4	6.9	100.0
Two-year college, vocational institution	12.6	29.0	30.9	22.1	5.3	100.0
Private vocational, trade, business school	14.1	32.3	31.0	16.8	5.8	100.0
Four-year college, university	7.3	20.4	33.4	29.0	9.9	100.0
Employer	5.6	26.0	35.8	27.9	4.7	100.0
Community organization	15.3	26.3	29.6	19.9	8.9	100.0
Labor organization, professional association	4.6	20.5	29.3	31.9	13.7	100.0
Tutor, private instructor	10.8	24.5	29.1	23.5	12.1	100.0
Other	10.9	29.7	29.4	22.0	7.9	100.0
	2.7	26.4	28.7	29.8	12.4	100.0

TABLE 39

SPONSOR OF ADULT EDUCATION CLASSIFIED BY INCOME GROUP AND EDUCATIONAL ATTAINMENT, 1972
(per cent of participants)

Educational Attainment	Less Than $5,000	$5,000-9,999	$10,000-14,999	$15,000-24,999	$25,000 or more
Less than 8 years	100.0	100.0	100.0	100.0	100.0
Public high school	29.8	24.5	11.5	33.3	-
Two-year college, vocational institution	10.5	9.4	3.8	8.3	-
Private vocational, trade, business school	12.1	7.5	15.4	8.3	-
Four-year college, university	.8	3.8	7.7	-	-
Employer, community organization	33.9	35.8	38.5	33.3	100.0
Labor organization, professional association	.8	1.9	3.8	-	-
Tutor, other	12.1	17.0	19.2	16.7	-
9-11 years	100.0	100.0	100.0	100.0	100.0
Public high school	35.6	29.0	27.5	23.7	0.0
Two-year college, vocational institution	12.9	11.5	7.5	15.8	28.6
Private vocational, trade, business school	9.9	10.7	11.3	10.5	7.1
Four-year college, university	3.5	2.3	5.0	2.6	28.6
Employer, community organization	18.3	27.5	31.3	23.7	28.6
Labor organization, professional association	2.5	3.8	2.5	7.9	0.0
Tutor, other	17.3	15.3	15.0	15.8	7.1

TABLE 39 (Cont'd)

SPONSOR OF ADULT EDUCATION CLASSIFIED BY INCOME GROUP AND EDUCATIONAL ATTAINMENT, 1972
(per cent of participants)

Educational Attainment	Less Than $5,000	$5,000-9,999	$10,000-14,999	$15,000-24,999	$25,000 or more
12 years	100.0	100.0	100.0	100.0	100.0
Public high school	15.0	15.0	14.0	14.1	17.7
Two-year college, vocational institution	22.6	18.6	16.9	19.9	15.2
Private vocational, trade, business school	14.5	13.4	10.5	8.0	11.0
Four-year college, university	8.4	6.9	8.1	9.0	7.2
Employer, community organization	21.3	27.4	32.1	30.1	23.6
Labor organization, professional association	2.1	4.1	4.0	5.4	4.2
Tutor, other	16.1	14.6	14.3	13.5	21.1
13-15 years	100.0	100.0	100.0	100.0	100.0
Public high school	9.4	7.4	9.8	9.0	13.5
Two-year college, vocational institution	24.6	27.4	7.4	5.9	14.9
Private vocational, trade, business school	7.6	9.3	4.3	4.1	7.0
Four-year college, university	20.5	17.7	41.1	38.0	24.7
Employer, community organization	29.0	23.3	21.5	26.7	21.4
Labor organization, professional association	1.8	2.8	4.9	5.0	4.7
Tutor, other	12.3	12.1	11.0	13.1	14.0

TABLE 39 (Cont'd)

SPONSOR OF ADULT EDUCATION CLASSIFIED BY INCOME GROUP AND EDUCATIONAL ATTAINMENT, 1972
(per cent of participants)

Educational Attainment	Less Than $5,000	$5,000-9,999	$10,000-14,999	$15,000-24,999	$25,000 or more
16 years	100.0	100.0	100.0	100.0	100.0
Public high school	6.0	9.8	9.8	9.0	10.5
Two-year college, vocational institution	14.3	7.3	7.4	5.9	8.0
Private vocational, trade, business school	2.4	4.1	4.3	4.1	4.2
Four-year college, university	48.8	40.7	41.1	38.0	32.8
Employer, community organization	23.8	20.3	21.5	26.7	22.7
Labor organization, professional association	0.0	4.1	4.9	5.0	6.3
Tutor, other	4.8	13.8	11.0	11.3	15.5
More than 16 years	100.0	100.0	100.0	100.0	100.0
Public high school	5.3	6.3	6.4	7.2	8.7
Two-year college, vocational institution	2.6	6.3	5.3	3.3	4.8
Private vocational, trade, business school	5.3	9.4	3.2	3.3	3.1
Four-year college, university	57.9	53.1	58.5	44.4	37.4
Employer, community organization	15.8	10.9	12.8	23.3	17.0
Labor organization, professional association	5.3	3.1	5.3	7.8	16.3
Tutor, other	7.9	10.9	8.5	10.6	12.8

Note: Hospitals are not included in the tabulation.

TABLE 40

REGRESSION FOR TOTAL HOURS
(standard errors in parentheses)

TOTAL HOURS = 17.05312 - .87054 LAGE - 0.28690 LINGRP
(.00129) (.00069)

+ 0.13482 LGGRADE
(.00117)

R^2 = .04654

LAGE = lag of age of participants

LINGRP = lag of income of household, mid-point of income group range

LGGRADE = lag of number of years of school completed

TABLE 41

DIFFERENCES IN ADULT EDUCATION ASSOCIATED WITH INCOME AND UNEMPLOYMENT
BY SELECTED CHARACTERISTICS OF STUDENTS (COMPARED TO BASE GROUP
FOR WHICH VALUE WAS SET AT 0)

	Differences associated with increase in income of $1,000			Differences associated with increase of 1 week of unemployment		
	Hours Completed	Hours Dropped	Hours Demanded	Hours Completed	Hours Dropped	Hours Demanded
Age:						
Under 25	3	-2	3	-3.1	0	-0.8
25-34	0	0	0	-1.7	-0.6	0
35-44	2	1	6	0.6	1.8	7.0
45-54	2	1	5	0	0.3	2.5
55-64	0	0	3	0	0	5.0
65 and over	0		0	0	0	0
Occupation:						
Engineers, Professionals, etc.	0	1	0	-4.0	-0.9	-4.7
Managers	3	1	0	-6.9	0	-8.7
Sales, Clerical, Office	2	0	0	-3.6	-1.4	-7.6
Craftsmen & Operatives	0	1	-2	-3.8	1.1	-7.8
Nonfarm Laborers & Service Workers	4	2	3	-2.5	-0.4	-4.6
Farm	-28,330		-.2	0	-9.9	0
Education:						
8 Years Or Less	-2	-6	-9	0.7	-2.7	-3.0
9-11 Years	2	0	2	1.6	-0.9	1.9
12 Years	-.3	1	0	1.5	0	1.1
13-15 Years	0	0	0	5.0	1.6	5.5
16 Years Plus	0		0	0	0	0

TABLE 41 (Cont'd)

DIFFERENCES IN ADULT EDUCATION ASSOCIATED WITH INCOME AND UNEMPLOYMENT BY SELECTED CHARACTERISTICS OF STUDENTS (COMPARED TO BASE GROUP FOR WHICH VALUE WAS SET AT 0)

	Differences associated with increase in income of $1,000			Differences associated with increase of 1 week of unemployment		
	Hours Completed	Hours Dropped	Hours Demanded	Hours Completed	Hours Dropped	Hours Demanded
Employment Sector:						
Private Sector, Not Self-Employed	-1	0	0	0	0	0
Public Sector	0	0	0	7.0	-0.6	7.3
Self-Employed	0	0	0	-5.2	-2.2	-1.9
Unpaid Family Worker	1	0	.7	0	0	0
Never Worked	0	0	0	0	0	0
SMSA:						
In SMSA, in Central City	-3	0	-2	-0.8	0.6	-0.5
In SMSA, not in Central City	-1	0	0	0	0.2	0
Not SMSA, Farm	0	0	0	-33.9	-11.4	-26.3
Not SMSA, not Farm	0	0	0	0	0	0
Region:						
Northeast	-1	-.3	-2	2.8	-0.5	2.2
North Central	0	0	0	4.6	0.7	7.4
West	1	.3	-1	2.9	-1.5	0.9
South	0	0	0	0	0	0
Sex:						
Male	-2	-1	-4	0	0	1.1
Female	0	0	0	0	0	0
Race:						
White	0	0	-2	0	0	0
Nonwhite	0	0	0	0	0	0

TABLE 42

INTERCEPT INCREMENTS ASSOCIATED WITH DIFFERENT AGE, OCCUPATION, EDUCATION, EMPLOYMENT STATUS, SMSA, REGION, SEX AND RACE

	Hours Completed	Hours Dropped	Total Hours
Age:			
Under 25	46.83	80.58	140.19
25-34	43.60	22.71	102.22
35-44	0	0	0
45-54	0	17.48	0
55-64	2.19	0	0
65 and over	0	0	0
Occupation:			
Engineers and Professionals	57.68	0	0
Managers	0	0	-16.00
Sales, Clerical and Office	0	12.20	-28.12
Craftsmen and Operatives	8.47	4.81	0
Nonfarm Laborers and Service Workers	0	0	0
Farm Workers	23.22	-20.85	-34.38
Education:			
8 Years or Less	-25.72	126.95	95.73
9-11 Years	0	34.01	0
12 Years	0	0	-8.53
13-15 Years	32.91	6.56	27.76
16 Years or More	0	0	0
Employment Sector:			
Private Sector, Not Self-Employed	-8.64	-25.82	-20.65
Public Sector	0	-26.51	-12.13
Self-Employed	-35.67	-16.46	-37.23
Unpaid Workers	-35.40	-17.59	-35.25
Never Worked	0	0	0

TABLE 42 (Cont'd)

INTERCEPT INCREMENTS ASSOCIATED WITH DIFFERENT AGE, OCCUPATION, EDUCATION, EMPLOYMENT STATUS, SMSA, REGION, SEX AND RACE

	Hours Completed	Hours Dropped	Total Hours
SMSA:			
In SMSA, in Central City	37.61	12.65	60.05
In SMSA, not in Central City	0	8.24	9.71
Not in SMSA, on Farm	5.04	3.78	5.81
Not in SMSA, not on Farm	0	0	0
Region:			
Northeast	0	0	0
North Central	-13.51	-9.06	-42.38
West	0	0	0
South	0	0	0
Sex:			
Male	51.30	26.74	112.44
Female	0	0	0
Race:			
White	8.64	5.46	-0.64
Nonwhite	0	0	0

Note: The basic intercepts for the three equations are: (a) 46.88 for completed hours, (b) -18.84 for dropped hours, and (c) 102.10 for total hours. The increments are added to the intercept values depending upon the dummy variable values of one or zero. The intercept for any particular group of participants can be calculated by adding the relevant values from this table.

TABLE 43

MEANS AND STANDARD DEVIATIONS OF RANKS OF PARTICIPATION PROBABILITIES, AND OF PARTICIPATION PROBABILITIES, BY AGE, EDUCATION AND OCCUPATION GROUPS

		Estimated Probability of Participation (f):			
		Mean Rank f	Standard Deviation Rank f	Mean Value f	Standard Deviation of f
Age:	Under 25	12.89	8.22	.1969	.0916
	25-44	10.67	8.00	.2371	.1048
	45-64	19.78	7.89	.1297	.0649
	65 and over	30.67	4.36	.0477	.0261
Education:	12 Years or less	26.25	7.10	.0790	.0492
	13-15 Years	16.17	9.79	.1698	.0964
	16 Years or more	13.08	10.18	.2097	.1142
Occupation:	Unskilled and Never Worked	22.92	9.21	.1072	.0724
	White Collar and Skilled	18.33	10.46	.1506	.0973
	Managers and Professionals	14.25	10.86	.2008	.1226

TABLE 44

PARTICIPATION IN ADULT EDUCATION BY OCCUPATION, 1972 AND 1975
(per cent of total in each occupation group)

Occupation	1972	1975
Professional/Technical	33.5	34.0
Engineers	30.7	NA
Medical/Health	31.2	NA
Teachers, except college	46.0	42.6
Other Professional, Technical	27.1	30.3
Farmers, Farm Managers, Laborers and Foremen	5.7	6.0
Managers and Administrators	16.7	16.3
Sales	14.9	16.3
Clerical	14.8	16.7
Craftsmen and Kindred	13.6	13.6
Operatives	7.4	6.9
Service Workers	9.6	12.6
Unemployed or not in labor force	6.4	7.4

Source: Participation in Adult Education, Final Report, 1972, D.H.E.W., U.S.O.E., N.C.E.S., U. S. Government Printing Office, Washington, D. C., 1974.

1975: Unpublished NCES data.

APPENDIX I

The results of special tabulations below may differ slightly from published figures. In order to increase the effectiveness of retabulation by multiple characteristics, missing data was imputed. The imputation was controlled by age, sex, and income (or two of the three variables, when the third was missing). In other words, a record with missing data was assigned the needed information from a randomly chosen record which corresponded most closely in age, sex, and income group. Since missing items did not exceed five per cent of the records, the distribution of responses before and after imputation was not affected materially.

Many of the tables reproduced below are derived from the tape of the survey conducted in 1972, with non-response imputed. Sources for these tables are not cited separately.

APPENDIX II

REGRESSION ANALYSIS

Despite the low levels of explanation forthcoming from the regression, we have learned something. The individual regression coefficients are all significantly different from zero, beyond the .001 level of significance.[1] Moreover, the values of R^2, for the three equations, are also significantly different from zero, far beyond the .001 level of significance.[2]

The equations presented in Tables A-1, A-2, and A-3 look much more complex than they really are. The large number of the variables (those whose names are underlined) are dummy variables which act as "on-off switches." That is, they can take on only the values '0' or '1'. The effect of a switch being "off" (the variable having the value '0') is that the coefficient which is associated with that variable has no effect. When the switch is "on" (when the variable has the value '1'), the coefficient is operative. These switches take on their values in accordance with the membership ("on") or nonmembership ("off") of the respondent in a particular age (AG1 to AG5), Occupation (JB1 to JB6), Education (GR1 to GR4), Employment Sector (EM1 to EM4), SMSA residency (SM1 to SM3), Region (RG1 to RG3), Sex or Race group.

Let us consider a very simple, hypothetical case. Suppose we have the following variables:

TOTL = hours spent in all adult education courses during the preceding year

IN = income received during the preceding year

$$S = \begin{matrix} 0 \text{ if female} \\ 1 \text{ if male} \end{matrix}$$

$$A1 = \begin{matrix} 0 \text{ if not under 35 years old} \\ 1 \text{ if under 35 years old} \end{matrix}$$

$$A2 = \begin{matrix} 0 \text{ if not 35-55} \\ 1 \text{ if 35-55} \end{matrix}$$

Note that A1 and A2 are related. It is not possible for both to be "on" (i.e., for both to have the value '1'). So, we can have the following configurations of values for these two dummy variables:

A1	A2	Age Group
1	0	under 35 and not 35-55 = under 35
0	1	not under 35 and 35-55 = 35-55
0	0	not under 35 and not 35-55 = over 55

Note that we have only two age-group dummy variables, but that there are three age-groups. In general, if there are n categories to be dealt with by a cluster of dummy variables, n-1 dummy variables will suffice.

Suppose, in this example, we are trying to account for the variation of TOTL in terms of IN and the three dummy variables, S, A1 and A2. The three dummy variables give us six groups, one for each sex in each of the three age groups. If we estimate the regression equation in the following fashion

$$TOTL = a_0+a_1S+a_2A1+a_3A2+(b_0+b_1S+b_2A1+b_3A2)IN$$

then, when we observe the operations of the switches we have one distinct regression equation for each of the six age-sex groups, thus:

$$TOTL \text{ (female, under 35)} = (a_0+a_2)+(b_0+b_2)IN$$

for while A1 = 1, S and A2 = 0

TOTL (female, 35-55) = $(a_0+a_3)+(b_0+b_3)IN$

for while A2 = 1, S and A1 = 0

TOTL (female, over 55) = a_0+b_0IN

for all three dummy variables are = 0

TOTL (male, under 35) = $(a_0+a_1+a_2)+(b_0+b_1+b_2)IN$

for S and A1 = 1, while A2 = 0

TOTL (male, 35-55) = $(a_0+a_1+a_3)+(b_0+b_1+b_3)IN$

for S and A2 = 1, while A1 = 0

TOTL (male, over 55) = $(a_0+a_1)+(b_0+b_1)IN$

for S = 1, while A1 and A2 = 0

In the equations we have estimated there are six clusters of dummy variables, and two simple ones. Their definition and coding are given below.

AGE CLUSTER

Variable Values and Names					Age Range
AG1	AG2	AG3	AG4	AG5	
1	0	0	0	0	under 25 years
0	1	0	0	0	25-34 years
0	0	1	0	0	35-44 years
0	0	0	1	0	45-54 years
0	0	0	0	1	55-64 years
0	0	0	0	0	65 and older

OCCUPATION CLUSTER

Variable Names and Values						Occupation Group
JB1	JB2	JB3	JB4	JB5	JB6	
1	0	0	0	0	0	Engineers, Health Workers, Teachers, Technicians, Professionals
0	1	0	0	0	0	Managers
0	0	1	0	0	0	Sales, Clerical and Office Workers
0	0	0	1	0	0	Craftsmen and Operatives
0	0	0	0	1	0	Nonfarm Laborers and Service Workers
0	0	0	0	0	1	Farm Workers
0	0	0	0	0	0	Never Worked

EDUCATION CLUSTER

Variable Names and Values				Attainment Level
GR1	GR2	GR3	GR4	
1	0	0	0	8th grade or less
0	1	0	0	9-11th grade
0	0	1	0	12th grade (high scholl graduate)
0	0	0	1	13-15th grade (some college, no 4 yr. degree)
0	0	0	0	16th grade or more (4 yr. degree or some graduate work)

EMPLOYMENT SECTOR CLUSTER

Variable Names and Values				Employment Sector
EM1	EM2	EM3	EM4	
1	0	0	0	private sector, not self-employed nor unpaid
0	1	0	0	public sector
0	0	1	0	self-employed
0	0	0	1	unpaid family worker
0	0	0	0	never worked

SMSA CLUSTER

Variable Names and Values			SMSA Residence Group
SM1	SM2	SM3	
1	0	0	In SMSA and in Central City
0	1	0	In SMSA and not in Central City
0	0	1	Not in SMSA and on Farm
0	0	0	Not in SMSA and not on Farm

REGION CLUSTER

Variable Names and Values			Region
RG1	RG2	RG3	
1	0	0	Northeast
0	1	0	Northcentral
0	0	1	West
0	0	0	South

SEX		RACE	
0	Female	0	Nonwhite
1	Male	1	White

Embedded in each of the regression equations shown in Tables A-1, A-2, and A-3 are many simple equations--so many that presenting them separately would serve no useful purpose. Within each group of parentheses in the equations are presented the coefficients associated with all the dummy in a cluster--that is, all the dummy variables which are so related that at most one can be switched "on" at any time. Thus, only one of those coefficients within a pair of parentheses can be operative at any time. So we are in a position to make comparisons of the responsiveness of various sorts of persons, in terms of demand for, completion of and dropping of hours of adult education, to differences in income and

length of unemployment.

Unfortunately, these two variables, stratified by the demographic variables which have been used to set up the dummies, do not explain much of the variation of hours in adult education.

LOGIT ANALYSIS

Conditional logit analysis is one of a class of procedures designed to estimate the probability that an event will occur, as a function of a set of independent classificatory variables. It involves regression but has to face the issue that the dependent variable (in this case the probability that an event will or will not occur) is strictly limited in variability (between 0 and 1). Ordinary regression procedures are not subject to such constraints. Logit analysis takes advantage of the fact that the logistic function

$$(1) \qquad g(X) = \left(1 + e^{-\beta' X}\right)^{-1}$$

is so constrained and is very similar in shape to the normal ogive (cumulative normal distribution function). As X moves from $-\infty$ to $+\infty$ g(X) moves from 0 to 1. If we allow X to be a vector of observed variables, and β a vector of coefficients to be estimated, we can construct a predictor of the probability that y = 1, given X, $P(y = 1 \mid X)$

The procedure is described herewith:

Let $y_j = \begin{cases} 0 \text{ if the } j^{th} \text{ respondent does not participate in adult education} \\ 1 \text{ if the } j^{th} \text{ respondent does participate in adult education} \end{cases}$

and let m_j = the population weight[3] associated with the j^{th} respondent.

Cells are formed, one for each distinct combination of values of the independent variables (X), which must be classifications, not continuous variables. There are r such distinct combinations, so there are r cells. The X values which define the k^{th} cell are $X_1^{(k)}, \ldots, X_m^{(k)}$, where m is the number of independent variables. All individuals are thus assigned to a cell, and for each cell is computed the population-weighted participation frequency.

(2) $p_k = \frac{1}{n_k} \left(\sum_{\substack{\text{all } j \text{ in} \\ \text{cell } k}} m_j y_j \right)$ where $n_k = \sum_{\substack{\text{all } j \text{ in} \\ \text{cell } k}} m_j$

The theoretical model is

(3) $f_k = P(y_k = 1 \mid X^{(k)}) = \left(1 + e^{-\alpha - \beta' X^{(k)}}\right)^{-1}$

(4) $1 - f_k = P(y_k = 0 \mid X^{(k)}) = e^{-\alpha - \beta' X^{(k)}} \cdot \left(1 + e^{-\alpha - \beta' X^{(k)}}\right)^{-1}$

The odds ratio enables us to separate the exponential term:

(5) $L_k = \frac{f_k}{1 - f_k} = e^{\alpha + \beta' X^{(k)}}$

(6) $L_k = \ln \frac{f_k}{1-f_k} = \alpha + \beta' X^{(k)}$

If we let p_k be a proxy for f_k then we can estimate α and β by regressing $X^{(k)}$ against L_k

(7) $L_k = \ln \frac{f_k}{1-f_k}$, L is called the logit.

So, we would assume

(8) $L_k = \alpha + \beta' X^{(k)} + u_k$

But this specification does not meet a fundamental assumption of regression analysis, the homoscedasticity of the error terms. In order to correct for this a weighted regression procedure is used,[4] with weights W_k equal to the inverse of the variance of L_k[5]

(9) $W_k = N_k f_k (1-f_k)$

So we perform the weighted regression

(10) $L_k = \alpha + \beta' X^{(k)}$, using the W_k as weights.

The initial run using this procedure was done with seven independent classificatory variables.[6] A total of 1728 cells were thereby generated, with approximately 85000 individuals for whom there was complete data being distributed among them. Of the 1728 cells, only 980 had five individuals or more in them, and so these were the only ones analyzed. When all of the fourteen dummy variables[7] were used in attempting to account for the variation of the logit, it developed that 79 per cent

of the variance of the logit was explained. But the first seven dummy variables which were entered in the stepwise procedure (i.e., the seven which were most efficacious in accounting for the variance of the logit) themselves accounted for 75 per cent of the variance, and these first dummies were all the variables associated with age, education and occupation. Therefore, a second run was carried out, with 36 cells formed on these variables alone, and adding approximately 8000 cases which had earlier been excluded for lack of income data. This new run accounts for 95 per cent of the variance of the logit. The F test shows this coefficient of determination to be significant far beyond the .001 level.[8]

But what we are attempting to account for, ultimately, is not $\hat{\mathcal{L}}$, but f, the probability of participation. The square of the coefficient of correlation between the forecast and actual values of f, on the 36 cells based on the expanded population, (the forecast values of f being derived from estimates of $\hat{\mathcal{L}}$[9]) turns out to be .873. So 87 per cent of the variance of f is accounted for. If we apply the regression relationship based upon the augmented population broken into 36 cells, to the 980 cells into which the original population was split, the coefficient of determination between actual and predicted f is .492.[10]

The estimated regression equation is

$$(11)\ \hat{\mathcal{L}}_k = -2.61 + \underset{(.097)}{.25}A_2^{(k)} - \underset{(.116)}{.52}A_3^{(k)} - \underset{(.244)}{1.63}A_4^{(k)} + \underset{(.096)}{.91}E_2^{(k)} + \underset{(.111)}{1.19}E_3^{(k)} + \underset{(.093)}{.41}O_2^{(k)} + \underset{(.110)}{.79}C_3^{(k)}$$

where $A_2^{(k)} = \begin{cases} 1 & \text{if the age group for cell k is 25-44} \\ 0 & \text{otherwise} \end{cases}$

$A_3^{(k)} = \begin{cases} 1 & \text{if the age group for cell k is 45-64} \\ 0 & \text{otherwise} \end{cases}$

$A_4^{(k)} = \begin{cases} 1 & \text{if the age group for cell k is 65 or older} \\ 0 & \text{otherwise} \end{cases}$

$E_2^{(k)} = \begin{cases} 1 & \text{if educational attainment for cell k is 13-15 years completed} \\ 0 & \text{otherwise} \end{cases}$

$E_3^{(k)} = \begin{cases} 1 & \text{if the education attainment for cell k is 16 years or more completed} \\ 0 & \text{otherwise} \end{cases}$

$O_2^{(k)} = \begin{cases} 1 & \text{if the occupation group for cell k is [illegible], operatives, craftsmen} \\ 0 & \text{otherwise} \end{cases}$

$O_3^{(k)} = \begin{cases} 1 & \text{if the occupation group for cell k is managers or professionals} \\ 0 & \text{otherwise} \end{cases}$

Since an increase in $\mathcal{L}$ implies an increase in the participation probability[11] we can draw some conclusions from the signs of the regression coefficients concerning the effect of category membership on participation probability.

From note 11 we can conclude that

$$(12) \quad \Delta f = \Delta \mathcal{L} \cdot [f(1-f)]$$

so, other things being equal (specifically, the participation probabilities being equal) the effect on f of membership in any of the age ranges but

25-44 is to reduce f. The reduction associated with the lowest age range is difficult to assess quantitatively, since it is confounded with the effect due to membership in the lowest education and occupation groups. But, other things being equal, the reduction due to membership in the 45-64 group is only one-third of that due to being 65 or older (-.52 vs. -1.63).

The effects of education and occupation are simpler. Membership in the 13-15 years-of-education-group is associated with an increase in f. Being in the 16-years-or-more education group will increase f by about 30 per cent more than did membership in the 13-15 years group (1.19 vs. .91).

A similar set of effects is associated with Occupation groups. Membership in the Clerical-Operatives-Craftsmen group is associated with a higher f than is membership in the Unskilled or Never Worked group. Membership in the Managers or Professionals group is associated with nearly twice as large increment over the least skilled group as is the clerical-operatives-craftsmen group (.79 vs. .41).

The negative constant term (the intercept coefficient of -2.61) implies that being in the lowest age, education or skill group (or any combination of them) lowers the probability of participation. Indeed, membership in all three of those categories implies a forecast participation probability of .07.

Membership in the age range 25-44 instead of the under 25 range increases the participation probability to .09. Table A-4 gives the

forecast f's for all 36 cells.

In Tables A-5, A-6 and A-7 are shown the differences in participation probability for pairs of cells which differ only in respect to one of the three variables (Table A-5 for differences in age group, Table A-6 for differences in educational attainment group and Table A-7 for differences in occupation group).[12]

Looking at Table A-5, we find that persons in the 25-44 age group are more likely to participate than those in the younger group. Their average estimated participation probability is .0413 higher (see Table A-8). The difference is greater for those with more education and in the higher skill occupation groups. But persons in the 45-64 age group are less likely to participate. Their estimated average participation probability is .1074 less than that of the 25-44 age group. And the effect is more marked for the higher education and skill groups than for the lower. And persons in the 65-or-older group are even less likely to participate. Their estimated average participation probability is .082 less than that of the 45-64 group, and 1894 less than that of the 25-44 group. Again, the effect is more marked as education and occupation skill increases.

Turning now to Table A-6, we find that persons with 13 to 15 years of education are more likely to participate than those who had 12 years or less of completed education (the average difference in the estimated participation probabilities is .0908). The effect is more marked

for higher skill groups, although it declines in both directions away from the 25-44 age group. And the same pattern is visible in the comparison between those who have had 13-15 years of education and those who have had 16 years or more of education. Here the difference between the averages of the estimated probabilities is .0398.

Finally, we look at Table A-7. Here we find that moving from lower to higher skill groups is accompanied by an increase in the average estimated probability (of .0434 when shifting from the lowest to the middle occupation group, and of .0502 when moving from group 2 to group 3). The effect is stronger for more highly educated groups, and shows the same single-peaked pattern for age differences as was found when looking at Table A-6.

We can gain some insight into the statistical significance of these differences in participation probabilities by looking at the statistical significance of differences between the regression coefficients. The standard errors of these βs are given in parentheses below the regression coefficients themselves in (11). If the standard error of a regression coefficient is significantly smaller than the value of the corresponding β (or if the standard error of the difference between two βs is significantly smaller than the difference between the βs) then we would say that the β (or the difference) is statistically significantly different from zero. The standard error of the difference between two βs is[13]

$$(13)\quad SE(\hat{\beta}_i - \hat{\beta}_j) = \left\{[SE(\hat{\beta}_i)]^2 + [SE(\hat{\beta}_j)]^2\right\}^{1/2}$$

So we can compute standard errors for the relevant differences of the β's. These, along with the standard errors of the β's (recorded in that table as shifts involving the lowest age, education or occupation-skill group) are given in Table A-9, along with the ratios of the differences to the standard errors. An examination of those ratios reveals that the smallest of them is just under 2, with most ranging from 2.5 to 9.5. Clearly, the differences are significant. The results presented in Tables A-5, A-6 and A-7 can be accepted without cavil.

Tables A-10 and A-11 drive the point home. With respect to two of the three variable clusters (education and occupation), it becomes apparent that with increasing education and with increasing skill, there is a greater likelihood that the estimated participation probability (and the actual, since the correlation coefficient of the two is .934) will be high, and conversely. With age the matter is a bit more complex, although if we remove the under 25 group then the relationship simplifies somewhat, and again, there is a nearly monotone relationship, with declining likelihood of high participation probability as age increases.

This suggests that if the objectives of policy are to increase involvement in adult education in order to equalize incomes, the target groups obviously should be the very young, those of least education, and the unskilled or unemployed.

REFERENCES

[1] Daniel McFadden, "Conditional Logit Analysis of Qualitative Choice Behavior," in P. Zarembka, Frontiers in Econometrics, 105-142 Academic Press, New York, 1974.

[2] Henri Theil, "On the Estimation of Relationships Involving Qualitative Variables," American Journal of Sociology, v. 76, 1970, pp. 103-154.

TECHNICAL NOTE

Another way of estimating the quantitative relationships among different cells is to estimate discrete derivatives of the cell-defining variables, and to examine their statistical properties.

Recall that in (3) we assumed

$$(3)\quad f_k = \left(1 + e^{-\alpha - \beta' X^{(k)}}\right)^{-1}$$

now, we can state

$$(A1)\quad \hat{f}_k = \left(1 + e^{-\hat{\alpha} - \hat{\beta}' X^{(k)}}\right)^{-1}$$

$$(A2)\quad \frac{\partial f_k}{\partial X_i^{(k)}} = \frac{\partial}{\partial X_i^{(k)}} \left(1 + e^{-\hat{\alpha} - \hat{\beta}' X^{(k)}}\right)^{-1}$$

$$= \hat{\beta}_i f_k (1 - f_k)$$

Within each cluster of X_j (e.g., all those pertaining to age, to education and to occupation) only one member of each cluster can have a nonzero value in any cell. Thus, the significance of partial derivatives must be explored a bit. Each of these clusters has a natural order within the cluster: age and education are obvious, and occupation seems to yield an ordering on skill. In order to find some sensible meaning in the discrete derivatives we must understand that when one particular dummy

variable is "switched on" a specific other dummy variable is "switched off," as we move in one direction, and vice versa when we move in the other.

Thus, to speak of the discrete derivative of, for example, A_2, a convention must be established. A_1 is not mentioned--it is an implicit dummy variable (and the same is true of E_1 and O_1). The effect of A_2 changing in value from 0 to 1 should be conventionally understood as the effect of moving from age under 25 ($A_1 = 1$; $A_2 = 0$; $A_3 = 0$; $A_4 = 0$) to ages in the range 25-44 ($A_1 = 0$; $A_2 = 1$; $A_3 = 0$; $A_4 = 0$). Since A_1 is implicit, the discrete derivative will be

$$(A3) \quad \frac{\Delta f_k}{\Delta A_2^{(k)}} = \hat{\beta}_{A_2} f_k (1 - f_k)$$

But for A_3, since when A_3 changes from 0 to 1 (as we move in the increasing direction) and A_2 changes from 1 to 0, we must "switch off" A_2, the derivative now is

$$(A4) \quad \frac{\Delta f_k}{\Delta(A_2^{(k)} \text{ to } A_3^{(k)})} = \left(\hat{\beta}_{A_3} - \hat{\beta}_{A_2}\right)\left[\bar{f}\,(1 - \bar{f})\right] \qquad 14$$

These derivatives have been computed, and the results are presented in Table A-12. The results are not significantly different from those shown in Tables A-5, A-6 and A-7.

FOOTNOTES

[1]The critical value of F (for 1 and ∞ degrees of freedom, at the .001 level) is 10.8. The values of F associated with the regression coefficients range from 22.4 to 61600.0, with most being in the thousands.

[2]Values of F were:

for completed courses:	6063 (with 53 and ∞ d.f.)
for dropped courses:	4138 (with 50 and ∞ d.f.)
for all courses:	7119 (with 55 and ∞ d.f.)

The critical value of F, for significance level of .001, lies between 1.99 (with 30 and ∞ d.f.) and 1.66 (with 60 and ∞ d.f.).

[3]Assigned to the stratum by the U. S. Bureau of the Census, based upon sample design considerations.

[4]That is, we act as if there are W_k as many identical cases as there were, each bearing the values $\hat{x}_i$ and $X^{(k)}$, for each cell.

[5][2] pp. 137-8.

[6]The variables, and their categories, are:

1. SMSA residential status (3 categories)
   - 1-In SMSA and in Central City
   - 2-In SMSA and not in Central City
   - 3-Not in SMSA
2. Race (2 categories)
   - 1-white
   - 2-nonwhite
3. Sex (2 categories)
   - 1-male
   - 2-female
4. Age group
   - 1-under 25 years of age
   - 2-25-44 years of age
   - 3-45-64 years of age
   - 4-65 years of age or older
5. Educational attainment (3 categories)
   - 1- 12 years or fewer completed
   - 2- 13-15 years of school completed
   - 3- 16 years or more completed

6. Income group
   1-Under $7,500
   2-$7,500-$14,999
   3-$15,000-$24,999
   4-$25,000 or over
7. Occupation group
   1-laborer or never worked
   2-clerical, operative, craftsman
   3-manager or professional

[7] $\sum_{i=1}^{7} (d_i - 1)$, where d_i is the number of categories in the i^{th} variable.

[8] As in original text except that the very last number is 12.5 rather than 11.7.

[9] $\hat{\mathcal{L}} = \ln \frac{f}{1-f}$, so $\hat{L} = e^{\hat{\mathcal{L}}} = \frac{f}{1-f}$, so $\hat{L}(1-f) = f$

and $f = \frac{\hat{L}}{1+\hat{L}}$

[10] In this case F 132.7. The critical value of F, for 7 and 972 degrees of freedom, at the .001 level of significance, lies between 12.7 and 11.7. Clearly, R^2 is significant far beyond the .001 level. The larger value of R^2 for the 36-cell case is due simply to the fact that there are far fewer observations (36 against 980) and hence far fewer degrees of freedom, but in all cases the significance level is far beyond .001. Hence no question can be raised about the statistical significance of any of these relationships.

[11] From (5) we have

$$e^{\mathcal{L}} = \frac{f}{1-f}, \text{ hence } f = \frac{e^{\mathcal{L}}}{1+e^{\mathcal{L}}}$$

$$\frac{\partial f}{\partial \mathcal{L}} = f - f^2 = f(1-f) > 0 \text{ since } 0 < f < 1$$

[12] See Technical Note for an alternative approach to this problem.

13 $[SE(\hat{\beta}_{i\cdot} - \hat{\beta}_{j\cdot})]^2 = E[(\hat{\beta}_{i\cdot} - \hat{\beta}_{j\cdot}) - E(\hat{\beta}_{i\cdot} - \hat{\beta}_{j\cdot})]^2$

$= E[(\hat{\beta}_{i\cdot} - \hat{\beta}_{j\cdot})^2] - [E(\hat{\beta}_{i\cdot} - \hat{\beta}_{j\cdot})]^2$

$= E[\hat{\beta}_{i\cdot}^2 - 2\hat{\beta}_{i\cdot}\hat{\beta}_{j\cdot} + \hat{\beta}_{j\cdot}^2] - [E(\hat{\beta}_{i\cdot}) - E(\hat{\beta}_{j\cdot})]^2$

$= E[(\hat{\beta}_{i\cdot})^2] + E[(\hat{\beta}_{j\cdot})^2] - 2E(\hat{\beta}_{i\cdot}\hat{\beta}_{j\cdot})$

$- [E(\hat{\beta}_{i\cdot})^2 + E(\hat{\beta}_{j\cdot})^2 - 2E(\hat{\beta}_{i\cdot})E(\hat{\beta}_{j\cdot})]$

$= [E(\hat{\beta}_{i\cdot}^2) - E(\hat{\beta}_{i\cdot})^2] + [E(\hat{\beta}_{j\cdot}^2) - E(\hat{\beta}_{j\cdot})^2]$

$- 2[E(\hat{\beta}_{i\cdot}\hat{\beta}_{j\cdot}) - E(\hat{\beta}_{i\cdot})E(\hat{\beta}_{j\cdot})]$

$= \mathrm{var}\,\hat{\beta}_{i\cdot} + \mathrm{var}\,\hat{\beta}_{j\cdot} - 2\,\mathrm{cov}\,\hat{\beta}_{i\cdot}\hat{\beta}_{j\cdot}$

but, by assumption, $\mathrm{cov}\,\hat{\beta}_{i\cdot}\hat{\beta}_{j\cdot} = 0$, so

$[SE(\hat{\beta}_{i\cdot} - \hat{\beta}_{j\cdot})]^2 = \mathrm{var}\,\hat{\beta}_{i\cdot} + \mathrm{var}\,\hat{\beta}_{j\cdot} = [(SE\hat{\beta}_{i\cdot})^2 + (SE\hat{\beta}_{j\cdot})^2]$

$SE(\hat{\beta}_{i\cdot} - \hat{\beta}_{j\cdot}) = [(SE\hat{\beta}_{i\cdot})^2 + (SE\hat{\beta}_{j\cdot})^2]^{1/2}$

14 $\bar{f}(1-\bar{f})$ is the mean of the $f(1-f)$'s for the two involved cells.

TABLE A-1

REGRESSION EQUATION: DEPENDENT VARIABLE = HOURS COMPLETED OF ADULT EDUCATION: HOMEWORK PLUS CLASSWORK

$$
\begin{aligned}
TCHRS = {} & 46.88+(46.83AG1+43.60AG2+2.19AG5)+(57.68JB1+8.47JB4+23.22JB6) \\
& +(-[illegible].72GR1+32.91GR4)+(-8.64EM1-35.67EM3-35.40EM4) \\
& +(37.61SM1+5.04SM3)-13.51RG2+51.30SEX+8.64RACE \\
& +INC/(.003AG1+.002AG3+.002AG4)+(.003JB2+.002JB3+.004JB5-28.33JB6) \\
& +(-.002GR1+.002GR2-.0003GR3)+(-.001EM1-.001EM4) \\
& +(-.003SM1-.001SM2)+(-.001RG1+.001RG3)-.002SEX/ \\
& +WKSUN/(-3.09AG1-1.66AG2+.56AG3)+(-3.98JB1-6.91JB2-3.57JB3-3.75JB4 \\
& -2.47JB5-.001JB6) \\
& +(.70GR1+1.59GR2+1.49GR3+5.04GR4)+(6.97EM2-5.20EM3) \\
& +(-.81SM1-33.90SM3)+(2.80RG1+4.62RG2+2.93RG3)/
\end{aligned}
$$

$R^2 = .0204$

Note: Only one coefficient in any pair of parentheses is operative for any observation. All others are "switched off." Variables are explained in text.

TABLE A-2

REGRESSION EQUATION: DEPENDENT VARIABLE = HOURS DROPPED OF ADULT EDUCATION: HOMEWORK PLUS CLASSWORK

$$
\begin{aligned}
TDHRS = {} & -18.84+(80.58AG1+22.71AG2+17.48AG3)+(12.20JB3+4.81JB4-20.85JB6) \\
& +(126.95GR1+34.01GR2+6.56GR4)+(-25.82EM1-26.51EM2-16.46EM3-17.59EM4) \\
& +(12.65SM1+8.24SM2+3.78SM3)-9.06RG2+26.74SEX+5.46RACE \\
& +INC\,[(-.002AG1+.001AG4+.001AG5)+(.001JB1+.001JB2+.001JB5+.002JB6) \\
& +(-.006GR1+.001GR3)+(-.0003RG1-.0003RG3)-.001SEX] \\
& +WKSUN\,[(-.62AG2+1.76AG3+.32AG4)+(-.92JB1-1.38JB3+1.14JB4-.37JB5-9.94JB6) \\
& +(-2.69GR1-.88GR2+1.65GR4)+(-.57EM2-2.24EM3) \\
& +(.55SM1+.23SM2-11.43SM3)+(-.50RG1+.71RG2-1.49RG3)]
\end{aligned}
$$

$R^2 = .0135$

Note: Only one coefficient in any pair of parentheses is operative for any observation. All others are "switched off." Variables are explained in text.

TABLE A-3

REGRESSION EQUATION: DEPENDENT VARIABLE = TOTAL HOURS OF ADULT EDUCATION: HOMEWORK PLUS CLASSWORK

TOTHRS = 102.10 +(140.19AG1+102.22AG2)+(-16.00JB2-28.12JB3-34.38JB6)

+(95.73GR1-8.53GR3+27.76GR4)+(-20.65EM1-12.13EM2-37.23EM3-35.25EM4)

+(60.05SM1+9.71SM2+5.81SM3)-42.38RG2+12.44SEX-.64RACE

+INC*[-.003AG1+.006AG3+.005AG4+.003AG5)+(-.002JB4+.003JB5-.0002JB6)

+(-.009GR1+.002GR2)-.0007EM4-.002SM1+(-.002RG1-.001RG3)-.004SEX-.002RACE]

+WKSUN*[-.81AG1+7.00AG3+2.49AG4+4.97AG5)+(-4.74JB1-8.66JB2-7.57JB3-7.77JB4-4.64JB5)

+(-2.99GR1+1.89GR2+1.12GR3+5.50GR4)+(7.28EM2-1.90EM3)+(-.52SM1-26.26SM3)

+(2.20RG1+7.35RG2+.89RG3)+1.05SEX]

$R^2 = .0243$

Note: Only one coefficient in any pair of parentheses is operative for any observation. All others are "switched off." Variables are explained in text.

TABLE A-4

FORECAST PARTICIPATION PROBABILITIES BY AGE, EDUCATION, AND OCCUPATIONAL GROUPS

Age	Education	Occupation	Estimated Participation Probability
Under 25 (1)	12 years or less (1)	Unskilled, Never Worked (1)	.068
		White Collar or Skilled (2)	.100
		Manager or Professional (3)	.139
	13-15 years (2)	Unskilled, Never Worked	.154
		White Collar or Skilled	.216
		Manager or Professional	.287
	16+ years (3)	Unskilled, Never Worked	.194
		White Collar or Skilled	.267
		Manager or Professional	.347
25-44	12 years or less	Unskilled, Never Worked	.086
		White Collar or Skilled	.125
		Manager or Professional	.172
	13-15 years	Unskilled, Never Worked	.190
		White Collar or Skilled	.261
		Manager or Professional	.340
	16+ years	Unskilled, Never Worked	.236
		White Collar or Skilled	.319
		Manager or Professional	.405

TABLE A-4 (Cont'd)

FORECAST PARTICIPATION PROBABILITIES BY AGE, EDUCATION, AND OCCUPATIONAL GROUPS

Age	Education	Occupation	Estimated Participation Probability
45-64	12 years or less	Unskilled, Never Worked	.042
		White Collar or Skilled	.062
		Manager or Professional	.088
	13-15 years	Unskilled, Never Worked	.098
		White Collar or Skilled	.141
		Manager or Professional	.193
	16+ years	Unskilled, Never Worked	.125
		White Collar or Skilled	.178
		Manager or Professional	.240
65+	12 years or less	Unskilled, Never Worked	.014
		White Collar or Skilled	.021
		Manager or Professional	.031
	13-15 years	Unskilled, Never Worked	.034
		White Collar or Skilled	.051
		Manager or Professional	.073
	16+ years	Unskilled, Never Worked	.045
		White Collar or Skilled	.066
		Manager or Professional	.094

TABLE A-5

EFFECTS OF AGE DIFFERENCES ON PARTICIPATION PROBABILITY, WITHIN OCCUPATION-EDUCATION GROUPS

Education Group	Occupation Group	Difference in Participation Probability Between Age Groups*		
		1 and 2	2 and 3	3 and 4
12 years or less	Unskilled	.018	-.044	-.028
	White Collar or Skilled	.025	-.063	-.041
	Manager or Professional	.033	-.084	-.057
13-15 years	Unskilled	.046	-.092	-.064
	White Collar or Skilled	.045	-.120	-.090
	Manager or Professional	.053	-.147	-.120
16 years +	Unskilled	.042	-.111	-.080
	White Collar or Skilled	.052	-.141	-.112
	Manager or Professional	.058	-.165	-.146

*Age Group 1 = Under 25
Age Group 2 = 25-44
Age Group 3 = 45-64
Age Group 4 = 65 and older

TABLE A-6

EFFECTS OF EDUCATION DIFFERENCES ON PARTICIPATION PROBABILITY, WITHIN OCCUPATION-AGE GROUPS

Age Group	Occupation Group	Difference in Participation Probability Between Education Groups *	
		1 and 2	2 and 3
Under 25	Unskilled	.086	.040
	White Collar or Skilled	.116	.051
	Manager or Professional	.148	.060
25-44	Unskilled	.104	.046
	White Collar or Skilled	.136	.058
	Manager or Professional	.168	.065
45-64	Unskilled	.056	.027
	White Collar or Skilled	.079	.037
	Manager or Professional	.105	.047
65 or over	Unskilled	.020	011
	White Collar or Skilled	.030	.015
	Manager or Professional	.042	.021

*Education Group 1 = 12 years or less
Education Group 2 = 13-15 years
Education Group 3 = 16 years or more

TABLE A-7

EFFECTS OF OCCUPATION GROUP DIFFERENCES ON PARTICIPATION PROBABILITY, WITHIN EDUCATION-AGE GROUPS

Age Group	Education Group	Difference in Participation Probability Between Occupation Groups*		
		1 and 2	2 and 3	1 and 3
Under 25	12 years or less	.032	.039	.071
	13-15 years	.062	.071	.133
	16 years +	.073	.080	.153
25-44	12 years or less	.039	.047	.086
	13-15 years	.071	.079	.150
	16 years +	.083	.086	.169
45-64	12 years or less	.020	.026	.046
	13-15 years	.043	.052	.095
	16 years +	.053	.062	.115
65 or over	12 years or less	.007	.010	.017
	13-15 years	.017	.022	.039
	16 years +	.021	.028	.049

*Occupation Group 1 = Unskilled or Never Worked
Occupation Group 2 = Clerical, Operatives & Craftsmen
Occupation Group 3 = Managers and Professionals.

TABLE A-8

MEANS AND STANDARD DEVIATIONS OF THE DIFFERENCES IN PARTICIPATION PROBABILITIES ASSOCIATED WITH DIFFERENCES IN GROUP VARIABLES

Difference In	From	To	The Mean of the Differences in Participation Probability	The Standard Deviation of the Differences in Participation Probability
Age Group	1	2	.0413	.0134
	2	3	-.1074	.0403
	3	4	-.0820	.0388
Education Group	1	2	.0908	.0474
	2	3	.0398	.0180
Occupation Group	1	2	.0434	.0250
	2	3	.0502	.0256
	1	3	.0936	.0505

TABLE A-9

ARE DIFFERENCES BETWEEN THE GROUP VALUES SIGNIFICANT IN THEIR EFFECTS ON THE PARTICIPATION PROBABILITIES?

Difference In	From	To	The Standard Error of ΔB	ΔC	ΔC / Std. Err. ΔB
Age	1	2	.099	.25	2.53
	2	3	.153	-.768	5.04
	3	4	.270	-1.114	4.12
Education	1	2	.096	.910	9.48
	2	3	.147	.278	1.89
Occupation	1	2	.093	.413	4.44
	2	3	.144	.277	1.92
	1	3	.110	.790	7.18

TABLE A-10

ROUNDED PARTICIPATION PROBABILITY FOR THIRTY-SIX CELLS

Age	Education	Occupation	Rank	$\hat{p}$
25-44	16+ years	Manager or Professional	1	.405
Under 25	16+ years	Manager or Professional	2	.347
25-44	13-15 years	Manager or Professional	3	.340
25-44	16+ years	White Collar or Skilled	4	.319
Under 25	13-15 years	Manager or Professional	5	.287
Under 25	16+ years	White Collar or Skilled	6	.267
25-44	13-15 years	White Collar or Skilled	7	.261
45-64	16+ years	Manager or Professional	8	.240
25-44	16+ years	Unskilled, Never Worked	9	.236
Under 25	13-15 years	White Collar or Skilled	10	.216
Under 25	16+ years	Unskilled, Never Worked	11	.194
45-64	13-15 years	Manager or Professional	12	.193
25-44	13-15 years	Unskilled, Never Worked	13	.190
45-64	16+ years	White Collar or Skilled	14	.178
25-44	12 years or less	Manager or Professional	15	.172
Under 25	13-15 years	Unskilled, Never Worked	16	.154
45-64	13-15 years	White Collar or Skilled	17	.141
Under 25	12 years or less	Manager or Professional	18	.139
25-44	12 years or less	White Collar or Skilled	19	.125
45-64	16+ years	Unskilled, Never Worked	19	.125
Under 25	12 years or less	White Collar or Skilled	21	.100
45-64	13-15 years	Unskilled, Never Worked	22	.098
65+	16+ years	Manager or Professional	23	.094
45-64	12 years or less	Manager or Professional	24	.088
25-44	12 years or less	Unskilled, Never Worked	25	.086
65+	13-15 years	Manager or Professional	26	.073
Under 25	12 years or less	Unskilled, Never Worked	27	.068
65+	16+ years	White Collar or Skilled	28	.066
45-64	12 years or less	White Collar or Skilled	29	.062
65+	13-15 years	White Collar or Skilled	30	.051
65+	16+ years	Unskilled, Never Worked	31	.045
45-64	12 years or less	Unskilled, Never Worked	32	.042
65+	13-15 years	Unskilled, Never Worked	33	.034
65+	12 years or less	Manager or Professional	34	.031
65+	12 years or less	White Collar or Skilled	35	.021
65+	12 years or less	Unskilled, Never Worked	36	.014

TABLE A-11

NUMBER OF CELLS WITH INDICATED CHARACTERISTICS BY RANK OF CELLS (RANKED ACCORDING TO ESTIMATED PARTICIPATION PROBABILITY) IN QUARTERS (9 CELLS PER QUARTER)

Cell-Defining Variables	Number in Top Quarter	Number in Second Quarter	Number in Third Quarter	Number in Bottom Quarter
Age Groups				
Under 25	3	4	2	0
25-44	5	2	2	0
45-64	1	3	3	2
65 or over	0	0	2	7
Education Groups				
16 yrs. or more	6	2	2	2
13-15 yrs.	3	5	2	2
12 yrs. or less	0	2	5	5
Occupation Groups				
Manager or Professional	5	3	3	1
White Collar or Skilled	3	4	2	4
Unskilled or Never Worked	1	2	4	4

TABLE A-12

DISCRETE DERIVATIVE VALUES

Education	Occupation	Age: Shift from 1 to 2 $\Delta f/\Delta x$	Age: Shift from 2 to 3 $\Delta f/\Delta x$	Age: Shift from 3 to 4 $\Delta f/\Delta x$
1	1	.019	-.046	-.026
1	2	.027	-.059	-.038
1	3	.035	-.083	-.060
2	1	.033	-.117	-.095
2	2	.046	-.122	-.129
2	3	.049	-.141	-.135
3	1	.033	-.120	-.094
3	2	.044	-.131	-.112
3	3	.066	-.166	-.146

Age	Occupation	Education: Shift from 1 to 2 $\Delta f/\Delta x$	Education: Shift from 2 to 3 $\Delta f/\Delta x$
1	1	.065	.022
1	2	.132	.043
1	3	.144	.059
2	1	.122	.051
2	2	.134	.057
2	3	.162	.063
3	1	.071	.034
3	2	.081	.034
3	3	.104	.048

TABLE A-12 (Cont'd)

DISCRETE DERIVATIVE VALUES

Age	Occupation	Education: Shift from 1 to 2 $\Delta f/\Delta X$	Education: Shift from 2 to 3 $\Delta f/\Delta X$
4	1	.028	.013
4	2	.055	.025
4	3	.055	.022

Age	Education	Occupation: Shift from 1 to 2 $\Delta f/\Delta X$	Occupation: Shift from 2 to 3 $\Delta f/\Delta X$	Occupation: Shift from 1 to 3 $\Delta f/\Delta X$
1	1	.037	.034	.078
1	2	.052	.049	.103
1	3	.045	.052	.128
2	1	.038	.034	.090
2	2	.078	.056	.157
2	3	.083	.063	.168
3	1	.019	.018	.044
3	2	.050	.039	.109
3	3	.052	.044	.126
4	1	.005	.007	.018
4	2	.033	.027	.054
4	3	.024	.020	.044