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An Evaluation of the Student Testing Program (STP97) Norming Sample

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31 December 2003

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Summary

- The STP97 data set is suitable for use in providing current norms for the 10th, 11th, and 12th grade students
  - Current Population Survey (CPS) and STP critical demographics agree
  - National Assessment of Educational Progress (NAEP) and STP score changes from 1980 to 1997 agree
- The STP data set for 2-year college students is problematic
- Options for developing STP norms are outlined

This slide summarizes the results of our evaluation of the Student Testing Program (STP) Norming Sample. First, STP97 is a suitable data set to use to provide current norms for students in grades 10 through 12. Second, the STP data set for 2-year college students has problems and might be improved by reweighting. Third, we present four options for developing STP norms.

Background

- The STP provides a form of ASVAB to high schools and postsecondary schools for use in career exploration
- National norms are provided for students in
  - Grades 10, 11, 12
  - Postsecondary (2-year) colleges
- Current STP norms are based on data from PAY80 and are thought to be dated

The Department of Defense sponsors the STP, which provides a form of the Armed Services Vocational Aptitude Battery (ASVAB) for use in high schools and postsecondary schools. The test scores are used for career exploration in the schools and may also be used to enlist in the armed forces.

National norms are provided for students in grades 10, 11, and 12 as well as for postsecondary (2-year) colleges. These norms enable students to know how their scores compare with a national sample of youth in their particular grades.

Current STP norms are based on data collected in 1980 as part of the Profile of American Youth (PAY80) data collection. PAY80 was a national data collection sponsored by the Department of Labor (DOL) and the Department of Defense (DOD). These norms are thought to be dated.

STP norms are used to provide career counseling information to students in thousands of high schools each year. It is important that these norms be correct. To this end, the Defense Manpower Data Center (DMDC) asked CNA to evaluate the suitability of STP data for use in providing norms for 10^{th} through 12^{th} grade students and 2-year college students, and to summarize the options for developing STP norms.

Background (continued)

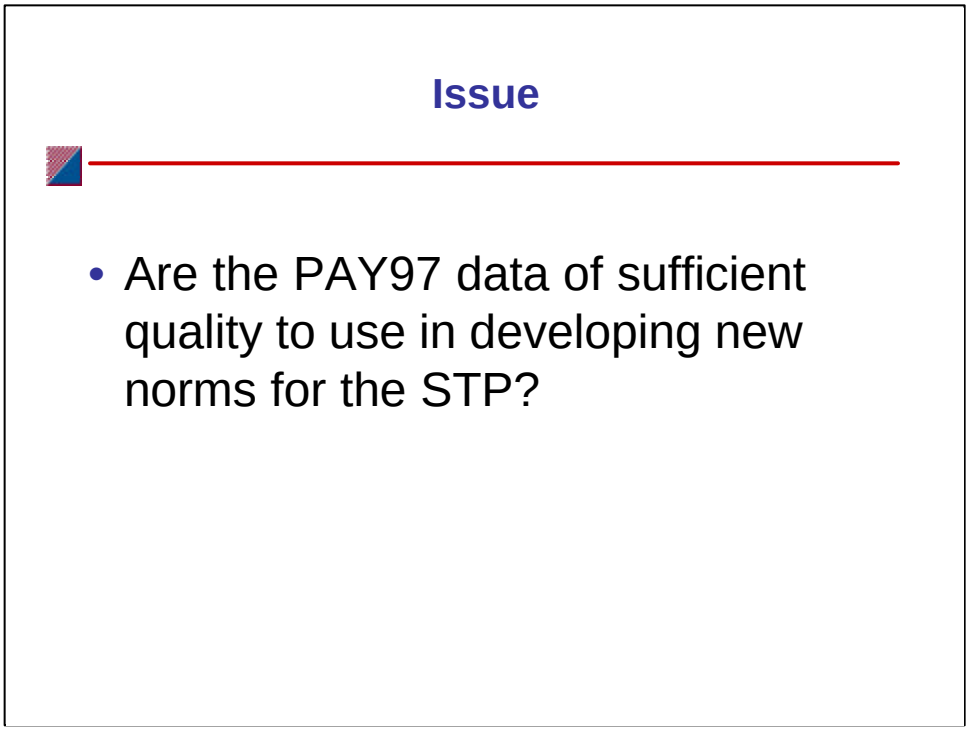
- New ASVAB data are now available from tests administered as part of the PAY97
  - STP97, grades 10, 11, and 12 in fall of 1997
  - ETP97, ages 18-23 on June 1, 1997

New ASVAB data are now available from tests administered in 1997 as part of a joint DOL/DOD effort known as PAY97. This data collection was done by the National Opinion Research Center (NORC) and is part of the National Longitudinal Survey of Youth (NLSY97).

We will examine two subsets of the PAY97 data:

- STP97, which contains ASVAB scores for students expected to be in grades 10, 11, and 12 during the fall of 1997
- Enlistment Testing Program 97 (ETP97), which contains scores of older youth ages 18-23 on June 1, 1997. We will use this data set, although not called "STP97" in official documentation of the PAY97 data set,[1] to examine data for youth in 2-year colleges.

1. Whitney Moore, Steven Pedlow, and Kirk Wolter. *Profile of American Youth 1997 (PAY97) Technical Sampling Report*, NORC, Aug 1999.

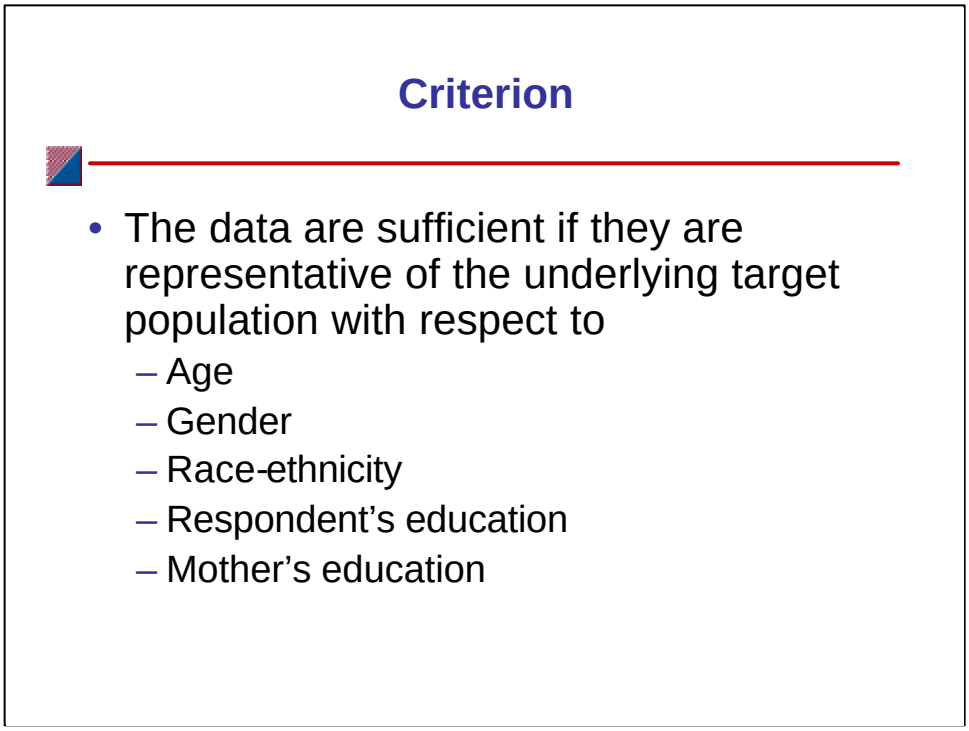


We will address the issue of whether the PAY97 data are of sufficient quality to use in developing new norms for the STP.

In previous reports,[2] we have raised serious questions about the quality of the ETP97 data intended for use in developing norms for the 18- to 23-year-old age group.

2. William H. Sims and Catherine M. Hiatt. *Analysis of NLSY97 Test Scores*, Jul 1999 (CNA Annotated Briefing 99-66).

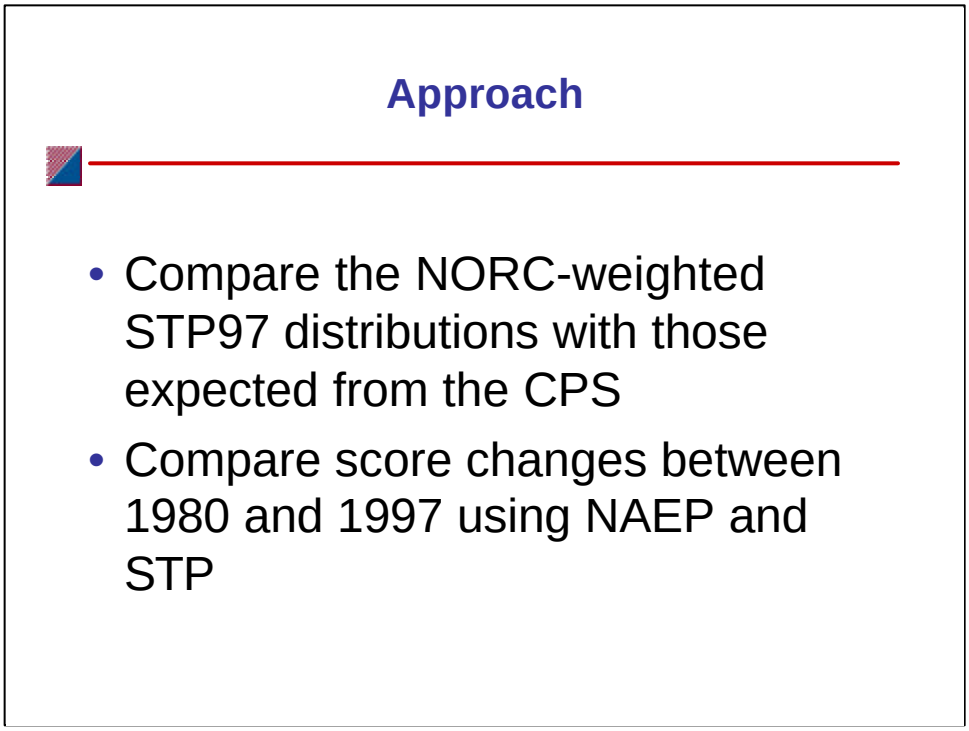
William H. Sims and Catherine M. Hiatt. *Follow-on Analysis of PAY97 Test Scores*, Jul 2001 (CNA Annotated Briefing D0003839.A2).



In a recent report,[3] we show that, in general, norming data must be representative of the underlying target population with respect to the demographic variables of age, gender, race-ethnicity, respondent's education, and mother's education.

We will consider the STP97 data sufficient if they are representative of the underlying target population with respect to these five demographic variables.

3. William H. Sims and Catherine M. Hiatt. *On the Representativeness of Norming Samples for Aptitude Tests*, Oct 2002 (CNA Annotated Briefing D0007188.A1).



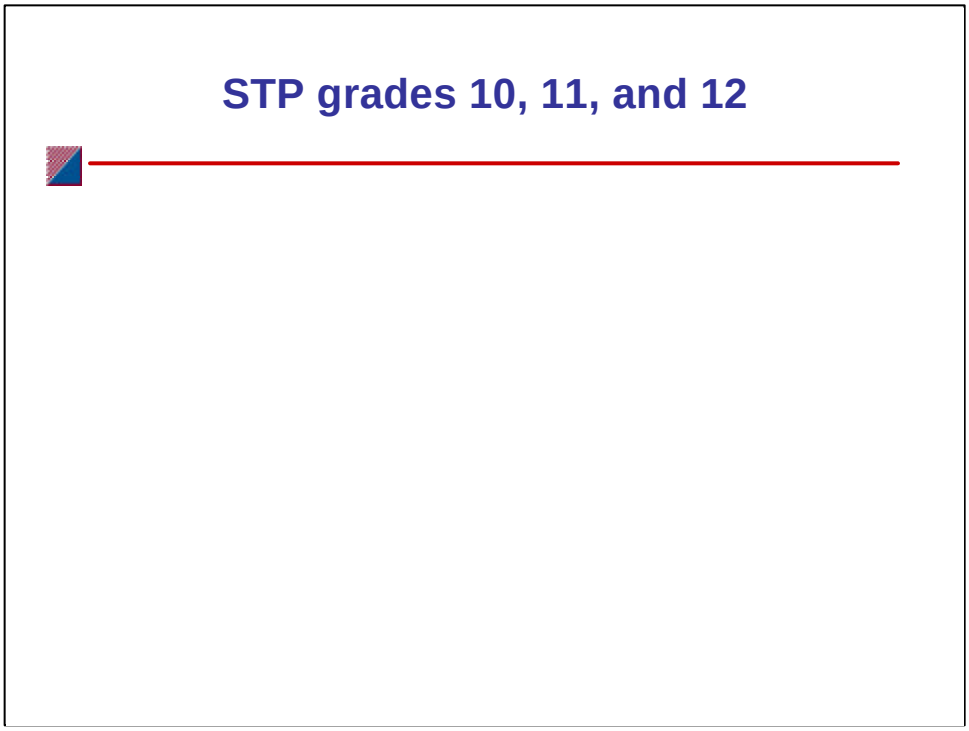
Our approach has two main thrusts.

First, we will compare the distributions of the five critical demographic variables using population weighted (by NORC) STP97 data with distributions of the same variables from the Current Population Survey (CPS).[4]

In addition, we will compare STP score changes between 1980 and 1997 with those seen in an independent assessment of ability from the National Assessment of Educational Progress (NAEP).[5]

4. Bureau of Labor Statistics/Bureau of the Census. Current Population Survey (Series).

5. National Council on Educational Statistics (NCES), *NAEP 1999 Trends in Academic Progress*, 2000.



First, we will address the STP data for students entering grades 10, 11, and 12 in the fall of 1997.

Selection for grades 10, 11, and 12

- STP sample with NORC poststratification weights by gender and grade
- Selections
  - Eligs ='s'
  - Wt6s >0
  - Fgrade97=10, 11, or 12
  - 4,652 cases

We selected a data sample that had been poststratification weighted by NORC on gender and grade. A total of 4,652 cases were found with the proper eligibility code, positive case weights, and expected grade in fall 1997 of 10, 11, or 12.

Minor issue

- Unlike ETP, the STP sample was not reconfigured and reweighted to include language barrier cases and exclude outliers
- If STP were reconfigured and reweighted as was ETP, we estimate that it would reduce the mean AFQT by 0.33 percentile point
- We have ignored this issue in the following analysis

Before we examine the data in detail, we must dispense with a minor issue.

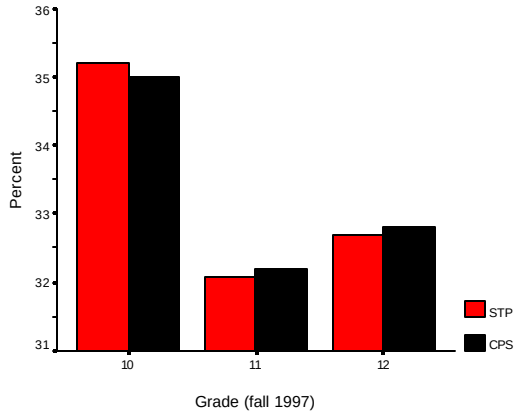
Planners of PAY97 had intended that all persons eligible for testing be tested regardless of their ability to speak or read English. Late in the data collection, however, we discovered that test administrators had not administered the test to about 250 persons who were considered not to have a functional facility with the English language. These persons are referred to as "language barrier" cases. The ETP sample has been reconfigured with an option to use special weights and imputed data for these cases.

Unlike the ETP, the STP sample was not reconfigured and reweighted to include language barrier cases and to exclude outliers. We estimate that, if STP were reconfigured and reweighted as was ETP, the mean AFQT would be reduced by about 0.33 percentile point. This is a very small amount, and we have ignored this issue in the following analysis.

Comparison of STP and CPS demographics

In this section, we compare distribution of STP and CPS data with regard to the five critical demographic variables.

STP vs. CPS by grade



Good agreement!

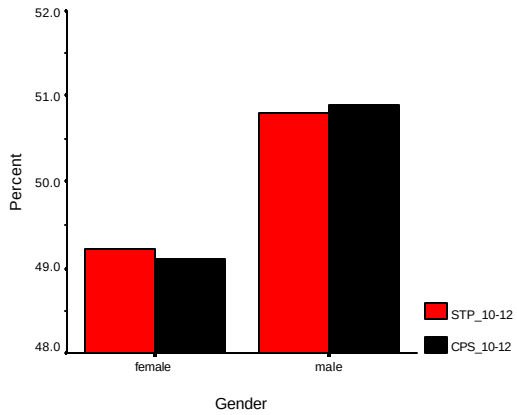
This result was expected given that NORC weighted grade and gender to CPS97

In this chart, we compare STP and CPS distributions by grade of youth in the fall of 1997. Differences are small (about 0.2 percentage point) and the agreement is good. This result was expected given that NORC had done post-stratification weighting by grade and gender.

STP vs. CPS by gender: grades 10-12

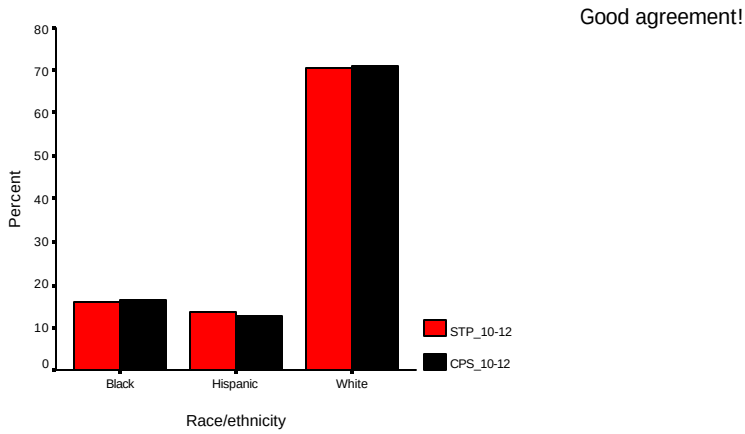
Good agreement.

This result was expected given that NORC weighted gender and grade to CPS 97



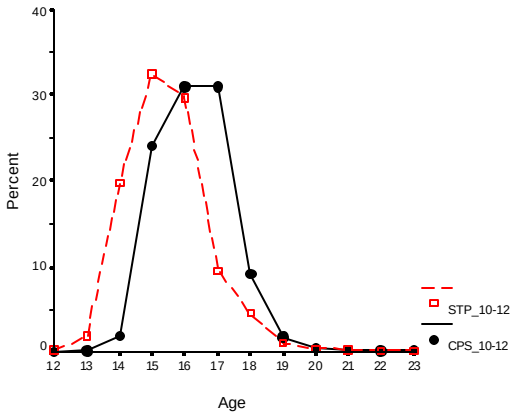
In this chart, we compare STP and CPS distributions by gender of youth. The differences between STP and CPS are very small (less than 0.2 percentage point), and the agreement is good. This result was expected given that NORC had done poststratification weighting by grade and gender.

STP vs. CPS by race /ethnicity: grades 10-12



In this chart, we compare STP and CPS distributions by race/ethnicity of youth. The agreement is good.

STP vs. CPS by age: grades 10-12



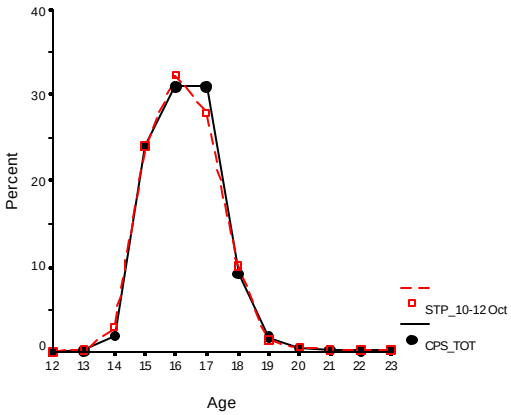
Poor agreement!

As a result of definition of "fagestp" age variable in SCF

In this chart, we compare STP and CPS distributions by age of youth. At first glance, the agreement is poor! On closer inspection, however, we traced the discrepancy to the complex and unsuitable definition of the "fagestp" variable in the sample control file (SCF).

We recomputed the age variable in the STP sample to be age as of October 1997 (same date used by the CPS) and show the results on the following slide.

STP vs. CPS by age in October 1997: grades 10-12



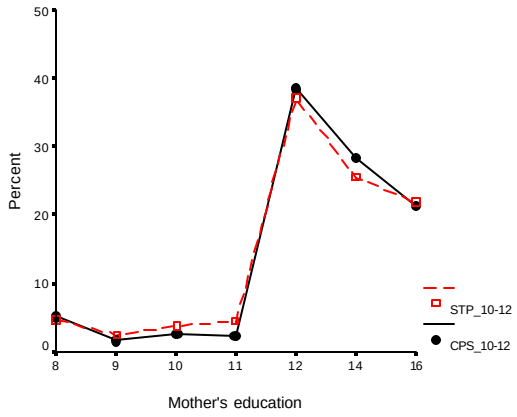
Good agreement!

STP age variable redefined as of October 1997

In this chart, we compare STP and CPS distributions by age of youth in the fall of 1997. The agreement is good.

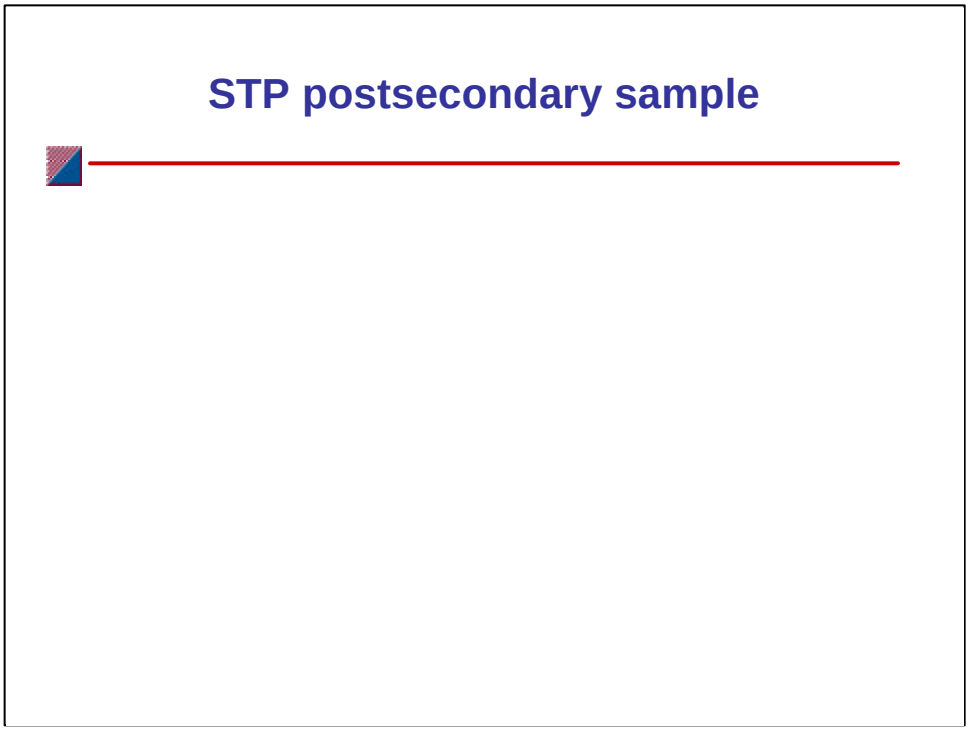
STP vs. CPS by mother's education: grades 10-12

Good agreement!

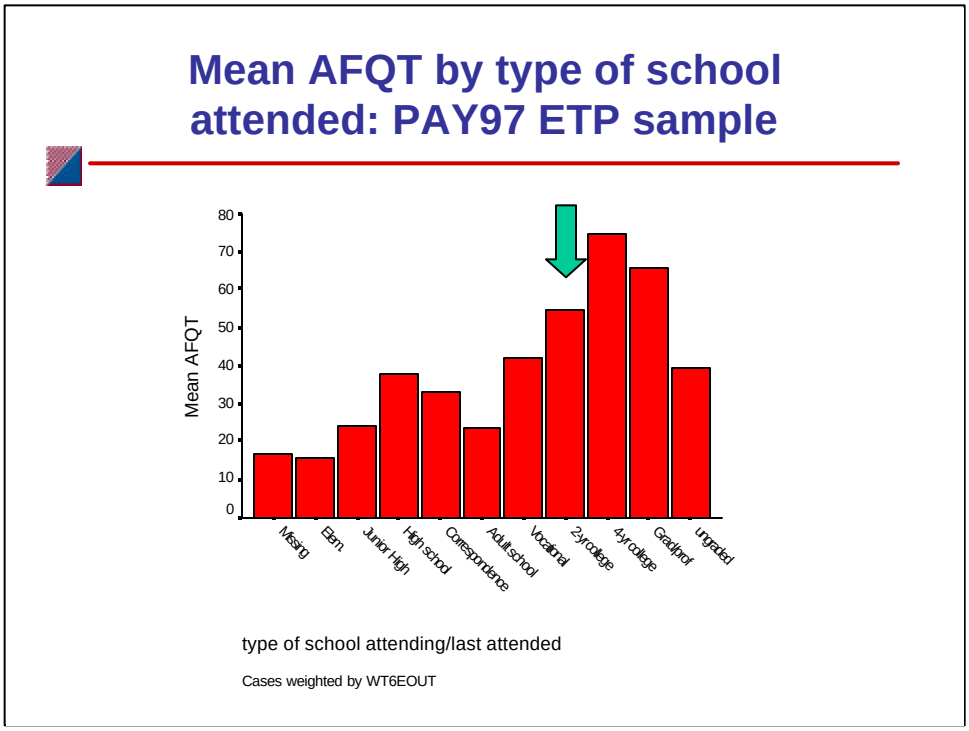


In this chart, we compare STP and CPS distributions by mother's educational level. The agreement is good.

In appendix C, we evaluate alternative data sets for estimating mother's educational level from CPS. We conclude that the CPS97 data (used here) are preferred.



We now address the STP postsecondary sample.



The STP refers to 2-year colleges as postsecondary schools. This chart shows the mean AFQT score by type of school attending or last attended. The 2-year-college students appear to be a unique group and are not appropriate for combining with other educational groups. Their AFQT scores fall between those of persons in vocational schools and those in 4-year colleges.

Selection for 2-yr college (aka postsecondary schools)

- ETP sample with NORC poststratification weights by age, gender, and race/ethnicity
- Selections:
  - Eligeout = 'e'
  - Wt6eout >0
  - 1,202 cases
  - Online questionnaire, question #3
    - What type of school are you now attending, or did you last attend? Option 7 (2-yr college)
- Same selections as in STP80

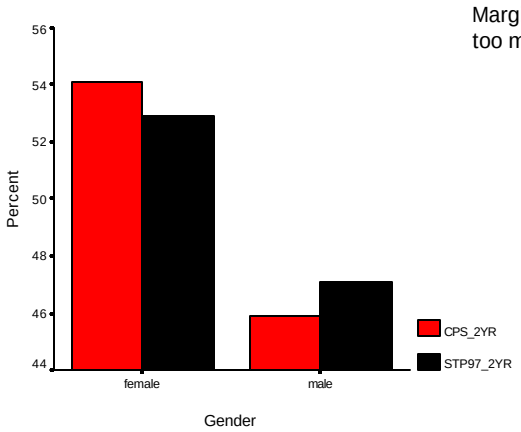
This slide describes the data selections we made to get the 2-year college sample. These selections are the same as those used in STP80.

There is inconsistency in nomenclature that may lead to some confusion. Department of Defense literature[6] describes the STP as consisting of persons in grades 10, 11, and 12 and in 2-year colleges and makes available norms for each group. However, NORC NLSY97/PAY97 documentation[7] considers persons in grades 10, 11, and 12 to be in the STP and those in 2-year colleges to be in the ETP. In this report, we adhere to the DOD definition. Hence, we will be using the PAY97/ETP data for STP persons in 2-year colleges.

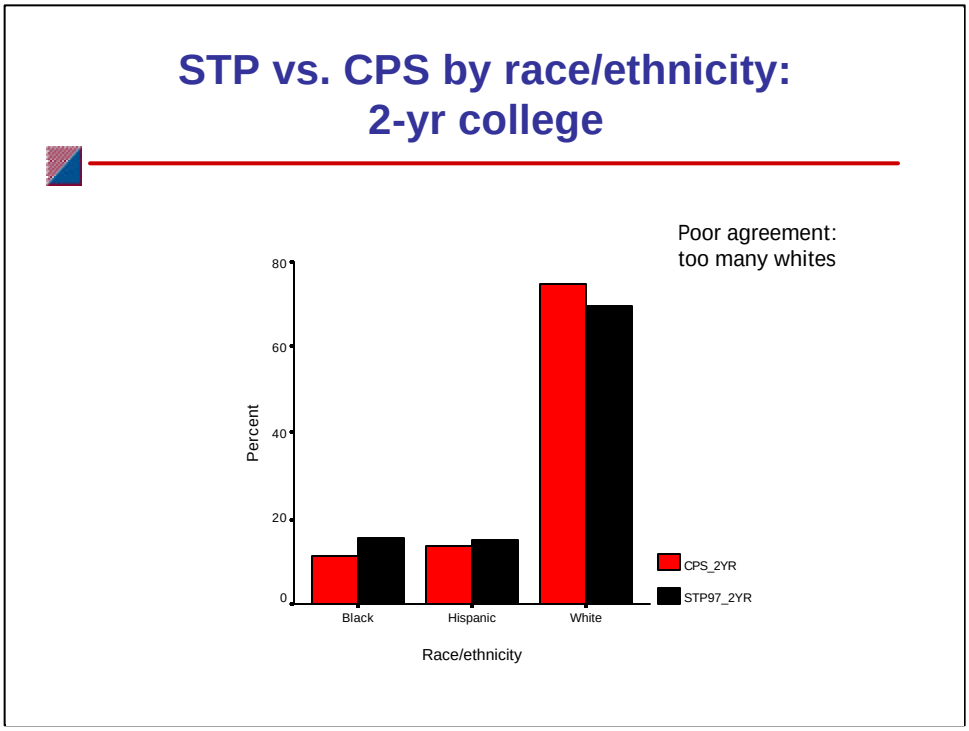
6. *Technical Manual for the ASVAB 18/19 Career Exploration Program*, U.S. Department of Defense, 1994.

7. Whitney Moore, Steven Pedlow, and Kirk Wolter. *Profile of American Youth 1997 (PAY97) Technical Sampling Report*, NORC, Aug 1999.

STP vs. CPS by gender: 2-yr college

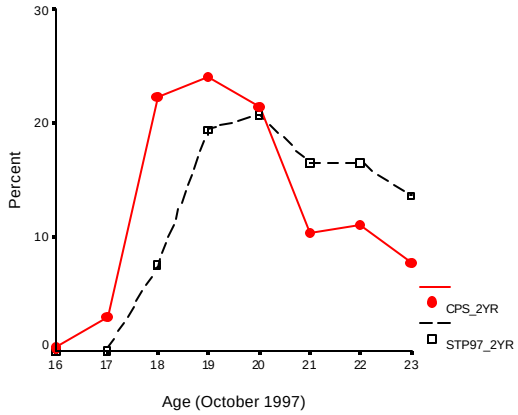


This slide compares STP data by gender with the distributions expected from CPS97. The agreement is marginal. The STP data show about 1 percentage point too many males.



This slide compares STP data by race/ethnicity with the distributions expected from CPS97. The agreement is poor. The STP data show about 5 percentage points too many whites.

STP vs. CPS by age in October 1997: 2-yr college

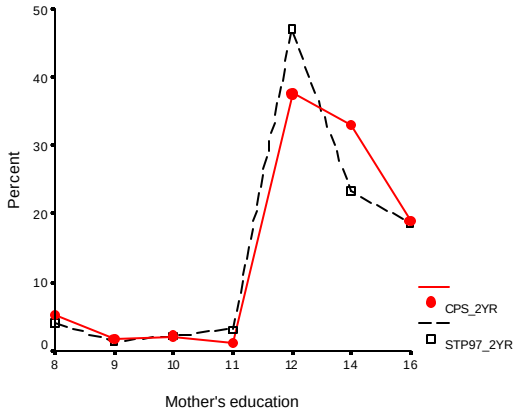


Poor agreement, but is an artifact due to the broad definition of 2-yr college group

This slide compares STP data by age with the distributions expected from CPS97. Superficially, the agreement is poor. However, this is an artifact due to the broad definition of the 2-year college group.

In keeping with current DOD/STP practice (and the precedent set with STP80), we defined the 2-year group as those now attending or who have last attended a 2-year college. Obviously, this is a somewhat older group than the CPS group—that is, those attending a 2-year college in the fall of 1997. We do not consider the difference in age distributions to be a serious problem.

STP vs. CPS by mother's education: 2-yr college

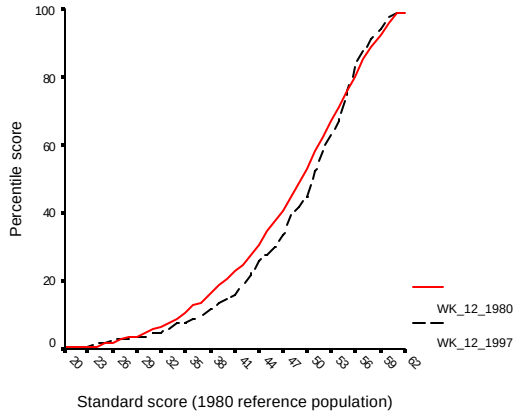


Poor agreement: missing children of highly educated mothers

This slide compares STP data by mother's education with the distributions expected from CPS97. The agreement is marginal. The STP data set appears to be missing children of highly educated mothers.

There is some disagreement about which CPS data set provides the best target populations. We examine this issue in appendix C and conclude that the various alternatives overestimate highly educated mothers by about 0.8 to 2.2 percentage points. We find that the CPS97 is preferred to the alternatives.

Illustrative STP97 norm table: 12th grade combined gender norms for WK



It takes a higher score in 1997 to reach the same cumulative percentile. 12th grade students in 1997 scored somewhat higher than those in 1980.

This slide illustrates what an STP norming table might look like. The slide shows 12th grade combined gender norms for the Word Knowledge (WK) subtest from ASVAB.

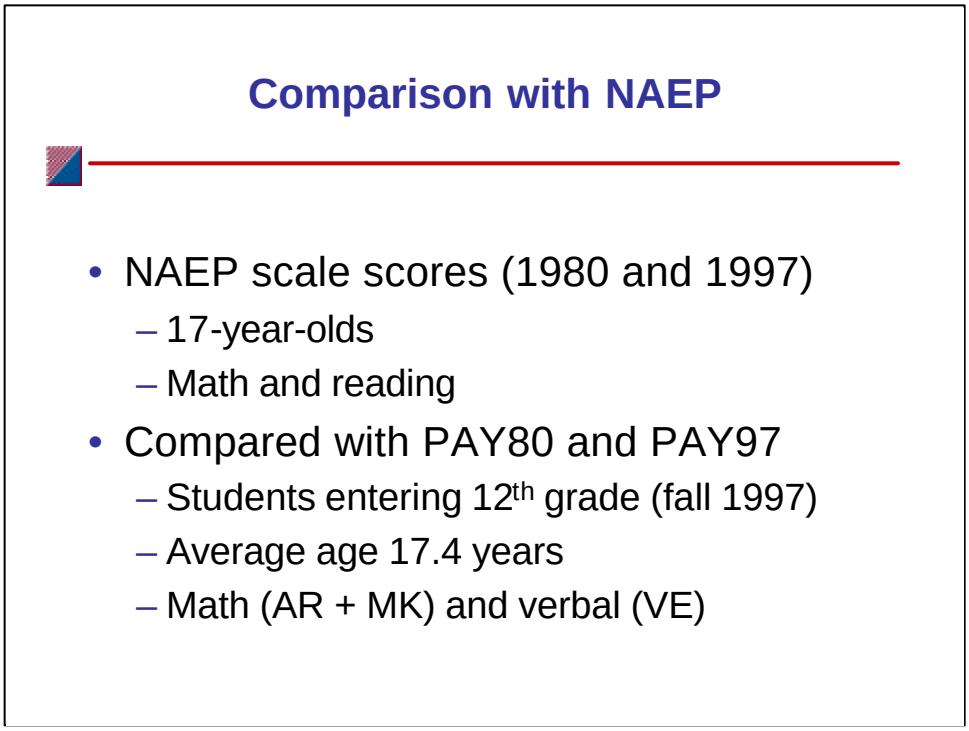
The solid line shows the current STP norms (STP80). We developed the dashed line from STP97 data described in this analysis. Near the middle of the distribution, standard scores (x- axis) translate into lower percentile scores in the 1997 sample than in the 1980 sample. This means that the 1997 sample scored somewhat higher on the WK subtest than the 1980 sample (i.e., it takes a higher standard score in 1997 to reach the same cumulative percentile of 12th grade students).

Mean scores 1980 vs. 1997: STP 12th grade norming samples

	Mean		Difference
Test/subtest	1980	1997	(std. dev. units)
AFQT percentile score	46.98	49.60	.09
General Science (GS)	48.76	49.38	.06
Arithmetic Reasoning (AR)	49.18	48.92	-.03
Word Knowledge (WK)	48.33	49.26	.09
Paragraph Comprehension (PC)	49.48	47.82	-.17
Numerical Operations (NO)	49.31	51.73	.24
Coding Speed (CS)	48.54	50.91	.24
Auto & Shop Information (AS)	47.51	43.92	-.36
Math Knowledge (MK)	50.17	53.05	.29
Mechanical Comprehension (MC)	48.87	46.80	-.21
Electrical Information (EI)	47.71	44.83	-.29
Verbal (VE)	48.63	48.75	.01

This slide compares the mean scores for 12th grade students in 1980 and 1997. We also show the difference in the mean values expressed in standard deviation units.

Mean scores on some subtests went up between 1980 and 1997, and some went down. Note the large increases in NO, CS, and MK and the large decreases in PC, AS, MC, and EI.

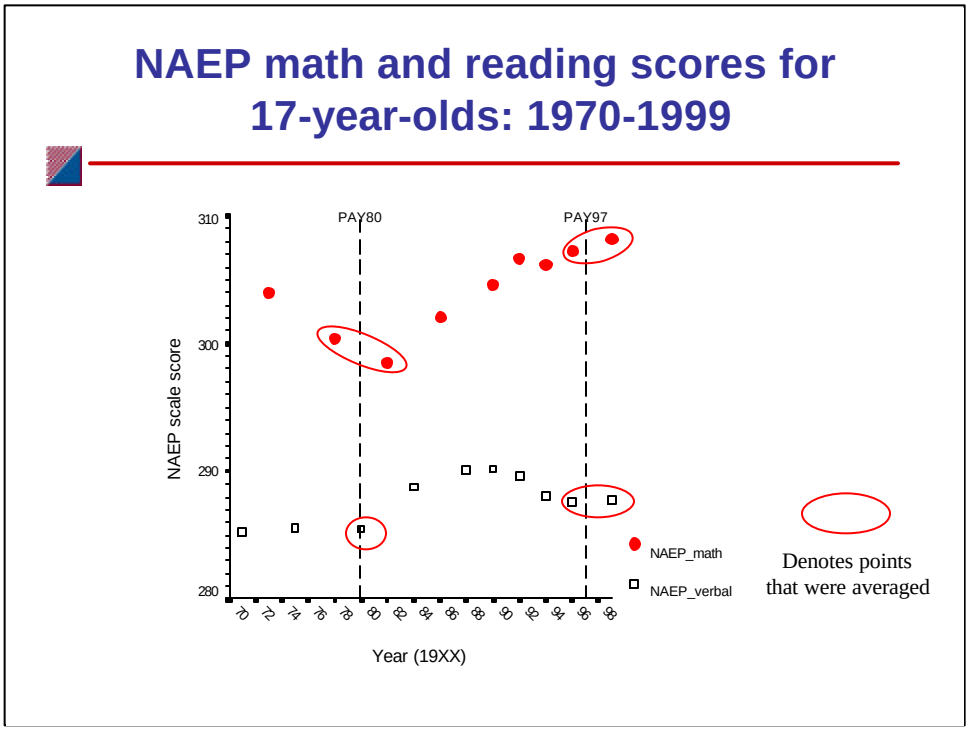


In this section, we compare changes in ASVAB scores over time with changes in an external benchmark test.

We will use the scale score data from the National Assessment of Educational Progress[8] as an external benchmark. The data cover 17-year-old youth tested in the spring of various years on math and reading skills. The math and verbal scale scores on the NAEP have been shown to be highly correlated to ASVAB (Bloxom).

We will compare NAEP scores with ASVAB math and verbal scores of persons entering 12th grade in the fall of 1997. These persons have an average age of 17.4.

8. National Council on Educational Statistics, *NAEP 1999 Trends in Academic Progress*, 2000.



This chart shows math and verbal scale scores for 17-year-old youth from 1970 through 1999. The chart also shows years when PAY (ASVAB) data were collected. In most cases, the years of NAEP testing did not correspond to years of PAY testing. We average the NAEP data from years that bracket the PAY years.

NAEP and ASVAB show very similar changes from 1980 to 1997

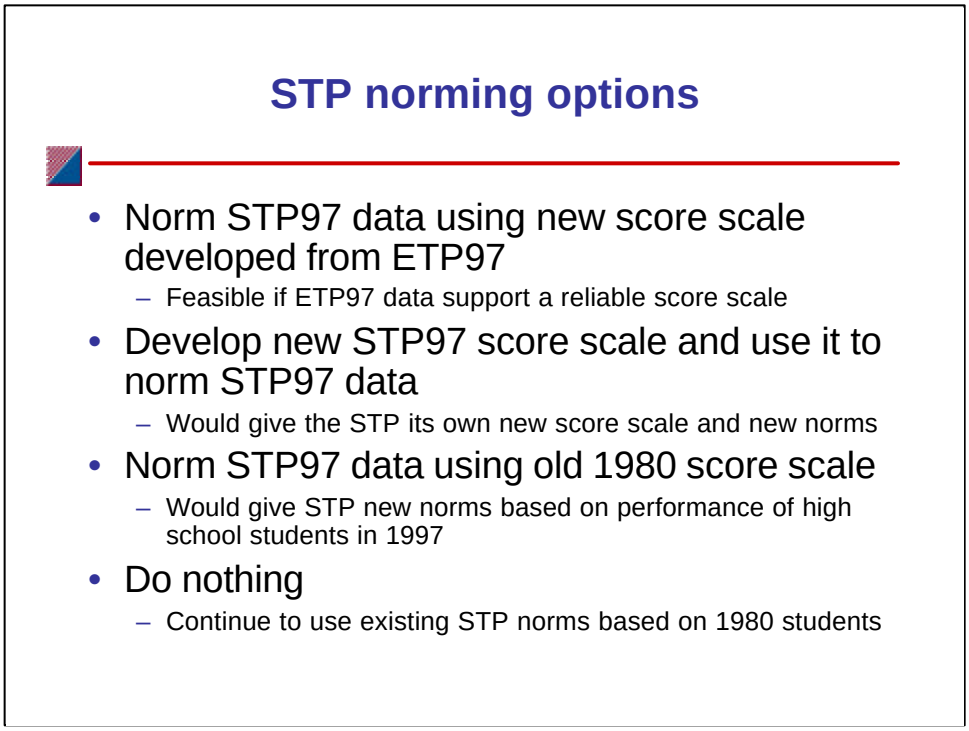
					Change: 1980 to 1997	
Category	Test	Age	"1980"	"1997"	Points	Std.dev. units
Math	NAEP math	17	299.5	307.7	8.20	.12
	ASVAB AR	17.4	49.18	48.92	-.26	-.03
	ASVAB MK	17.4	50.17	53.05	2.88	.29
	ASVAB (MK+AR)/2	17.4				.13
Verbal	NAEP reading	17	285.5	287.7	2.20	.03
	ASVAB VE	17.4	48.63	48.75	0.12	.01

Source: *NAEP 1999 Trends in Academic Progress*, NCES
Inferred NAEP verbal std. dev. =75.2, math std. dev. = 71.4

This chart shows mean NAEP and PAY (ASVAB) scores for the "1980" and "1997" testing for youth of comparable ages.

We used the PAY97 STP weights for this analysis. The average increase in NAEP math scores was 0.12 standard deviation. The average change in ASVAB math scores was 0.13 standard deviation. The average change in NAEP verbal scores was 0.03 standard deviation, and that for ASVAB verbal was 0.01. All ASVAB scores are on the 1980 score scale.

These changes in scores over this 17-year interval are very consistent between the two tests, and they support our conclusion that the STP 97 sample is a good one.



Based on the foregoing discussion, it seems that there are four broad options for STP norms:

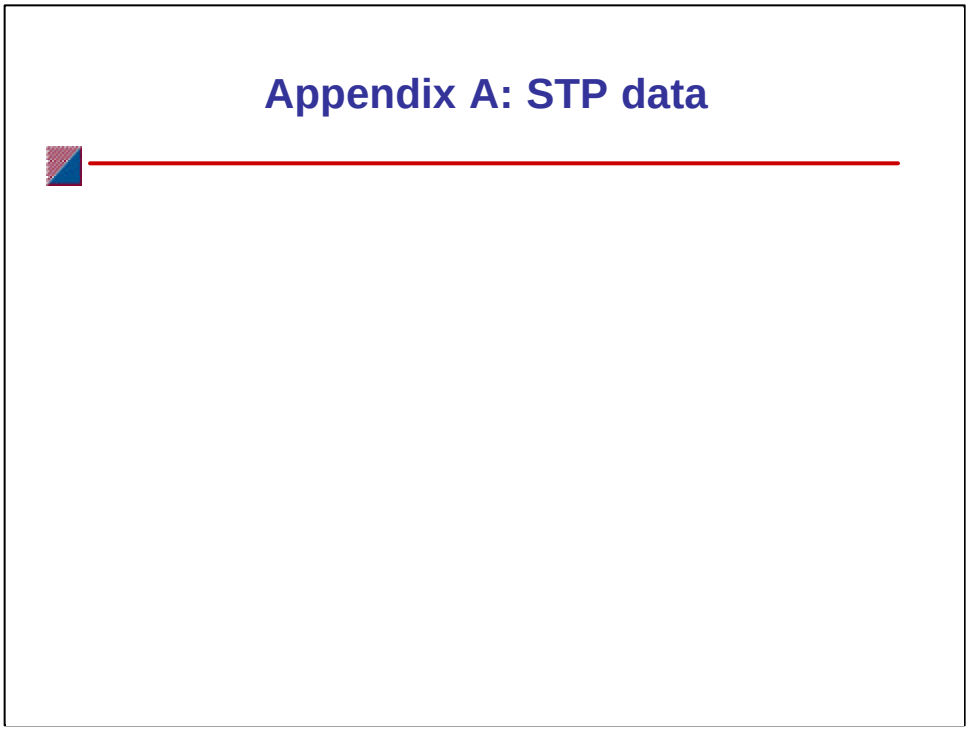
- Norm STP97 data expressing subtest standard scores in a new score scale developed from ETP97. This is feasible only if the ETP data are of sufficient quality to support a reliable score scale.
- Develop a new STP score scale and express subtest standard scores in it to norm STP97 data. This would give the STP its own score scale and new norms.
- Norm STP97 data expressing subtest standard scores on the old 1980 score scale. This would give the STP new norms based on the performance of high school students in 1997. Of course, the intermediate step in forming the norms would use an old score scale, but that should not present any technical problems.
- Do nothing. DOD could continue to use the STP80 norms.

Summary

- The STP97 data set is suitable for use in providing current norms for the 10th, 11th, and 12th grade students
  - CPS and STP critical demographics agree
  - NAEP and STP score changes from 1980 to 1997 agree
- The STP data set for 2-year college students is problematic
- There are several norming options

We conclude that (a) the STP97 data set is suitable for use in providing current norms for the 10th, 11th, and 12th grade students, (b) the STP data set for 2-year college students might be improved by reweighting, and (c) four norming options exist.

Questions?



In this appendix, we tabulate the Student Testing Program (STP) data.

Disposition of STP97 eligibles

CNTCCD	Description	WT6S = 0	WT6S > 0	Total
Blank	Not in sample	207		207
30	Parent refused	71		71
31	Respondent refused	108		108
32	No show, not rescd.	19		19
33	Canceled by Sylvan	225		225
35	Other no show	801	1	802
36	Unlocatable	43		43
40	Showed up for test	44	4651	4695
	Total	1518	4652	6170

STP data: distribution in age

	STP percentage by age by grade in fall 1997				
Age (10/97)	10th	11th	12th	Total 10-12	2-yr. college
12	.00	.00	.10	.00	
13	.50	.10	.10	.20	
14	7.40	.50	.30	2.90	
15	58.50	10.00	.80	24.10	
16	27.80	61.90	8.10	32.30	.00
17	4.30	23.10	57.90	27.90	.00
18	.90	3.20	26.40	10.00	7.50
19	.30	.40	3.80	1.40	19.40
20	.10	.30	.90	.50	20.70
21	.10	.20	.70	.30	16.50
22	.00	.10	.50	.20	16.50
23	.10	.10	.40	.20	13.60
24					5.60
Total	100.00	100.00	100.00	100.00	100.00

STP data: distribution in race/ethnicity

	STP percentage by race/ethnicity by grade in fall 1997				
Race/ Ethnicity	10th	11th	12th	Total 10-12	2-yr. college
Non-Black non-Hispanic	68.40	72.00	71.00	70.40	69.40
Black	17.20	14.80	15.90	16.00	15.50
Hispanic	14.30	13.30	13.00	13.60	15.10
Total	100.00	100.00	100.00	100.00	100.00

STP data: distribution in gender

	STP percentage by gender by grade in fall 1997				
Gender	10th	11th	12th	Total 10-12	2-yr. college
Male	51.40	50.70	50.40	50.80	47.10
Female	48.60	49.30	49.60	49.20	52.90
Total	100.00	100.00	100.00	100.00	100.00

STP data: distribution in mother's education

	STP percentage by mother's education by grade in fall 1997				
Mother's education	10th	11th	12th	Total 10-12	2-yr. college
8	4.6	5.0	4.5	4.7	4.2
9	3.1	2.7	1.6	2.5	1.4
10	3.8	3.6	4.0	3.8	2.2
11	5.2	4.1	4.3	4.5	3.2
12	34.7	39.1	37.9	37.1	47.0
14	27.2	23.7	25.3	25.5	23.4
16	21.4	21.8	22.4	21.8	18.6
Total	100.0	100.0	100.0	100.0	100.0

STP data: distribution in grade

Grade in fall 1997	STP
10	35.2
11	32.1
12	32.7
Total	100.0

Appendix B: CPS data

In this appendix, we show the Current Population Survey (CPS) data.

CPS data: distribution in age

	CPS percentage by age by grade in fall 1997				
Age (10/97)	10th	11th	12th	Total 10-12	2-yr. college
12	.00	.00	.00	.00	
13	.10	.20	.10	.10	
14	4.60	.30	.20	1.80	
15	62.50	6.50	.60	24.10	
16	27.10	60.70	6.00	31.00	.30
17	4.50	26.60	63.60	31.00	3.00
18	.70	4.40	22.80	9.20	22.30
19	.10	.70	4.50	1.70	24.00
20	.10	.30	1.20	.50	21.40
21	.10	.20	.40	.20	10.30
22	.00	.00	.30	.10	11.00
23	.20	.00	.40	.20	7.70
24					
Total	100.00	100.00	100.00	100.00	100.00

CPS data: distribution in race/ethnicity

	CPS percentage by race/ethnicity by grade in fall of 1997				
Race/ Ethnicity	10th	11th	12th	Total 10-12	2-yr. college
Non-Black non-Hispanic	70.40	70.40	72.10	71.00	74.90
Black	16.60	16.10	15.90	16.20	11.40
Hispanic	13.00	13.50	12.00	12.80	13.70
Total	100.00	100.00	100.00	100.00	100.00

CPS data: distribution in gender

	CPS percentage by gender by grade in fall of 1997				
Gender	10th	11th	12th	Total 10-12	2-yr. college
Male	51.40	50.70	50.50	50.90	45.90
Female	48.60	49.30	49.50	49.10	54.10
Total	100.00	100.00	100.00	100.00	100.00

CPS data: distribution in mother's education

	CPS percentage by mother's education by grade in fall 1997				
Mother's education	10th	11th	12th	Total 10-12	2-yr. college
8	5.5	5.5	4.4	5.1	5.3
9	2.4	1.4	1.2	1.7	1.8
10	3.4	2.2	2.3	2.7	2.1
11	2.9	2.2	2.2	2.4	1.1
12	38.9	37.9	38.5	38.4	37.6
14	27.5	28.8	28.5	28.3	33.0
16	19.3	22.0	23.0	21.4	19.0
Total	100.0	100.0	100.0	100.0	100.0

CPS data: distribution in grade

Grade in fall 1997	CPS
10	35.0
11	32.2
12	32.8
Total	100.0

Appendix C: Evaluation of data on mother's education in the target population

This appendix describes our evaluation of available data on mother's education in the target population.

Possible target data sources for mother's education

- CPS97
  - The standard population survey
  - Misses mothers whose children are no longer living in the household
- CPS 1995 Marriage and Fertility
  - Ties the mother to five of her children by age of child regardless of whether the child is in the household
  - Latest data are from 1995 and introduce error if the percentage of highly educated mothers is growing rapidly over time

The CPS97 is the standard population survey. It misses mothers whose children are no longer living in the household.

The 1995 CPS Marriage and Fertility Supplement data set ties the mother to up to five of her children regardless of whether the child is still in the household. It introduces error if the percentage of highly educated mothers is growing rapidly over time.

Both data sets appear to be somewhat imperfect for our purposes. We will attempt to estimate the errors in distributions of mother's education for the target population made using each data set.

Percentage of youth missing mother's education by age of youth in CPS97

	Youth group		
Age of youth	Age 18-23	2- or 4-yr college	Grades 10-12
13			0.0
14			2.3
15		0.0	4.3
16		0.0	6.0
17		15.5	7.5
18	21.9	15.2	18.9
19	32.8	18.5	39.0
20	41.5	29.2	59.8
21	49.5	36.0	44.0
22	61.0	51.1	100.0
23	69.4	56.7	100.0
Total	45.4	30.9	8.4

The development of target distributions in mother's education from CPS97 requires the construction of a "household roster" in the data for each household. The youth in the household are then assigned the educational level of the mother in the household. Unfortunately, many older children leave the household before the age of 23 and are invisible to this procedure. In this slide, we show the percentage of youth who do not have an identifiable mother in the data set by age of youth. Mother's education computed from CPS97 will be missing for these youth.

The percentage of missing data increases with age of the youth. This is as expected because, the older the youth, the more likely it is that they have left home and set up a separate household. We see that 45.4 percent of the 18- to 23-year-old group is missing mother's education information. The percentage missing drops to 30.9 percent for those in college. These large losses may be problematic.

Only 8.4 percent are missing for those mothers whose children are in grades 10 through 12. This result suggests that the data from CPS 97 are probably suitable for use in developing target distributions for the STP sample.

The next question is, Do the mothers that we find have a distribution in education that is radically different from that of the total population?

Educational distribution of mothers we would miss if we used CPS97

	1995 CPS Marriage and Fertility file (Mothers with children ages 18-23)		
Mother's education	All	Mothers we would find in CPS97	Mothers we would miss[1] in CPS97
Less than high school	6.4	6.3	7.0
Some high school	8.7	8.3	10.7
High school graduate	41.6	41.3	42.7
Some college	26.6	26.3	27.5
College graduate	16.7	17.8	12.1
Total	100.0	100.0	100.0

1. Mothers with children 18-23 not living in household. As a result, our target distribution of mother's education from CPS 97 would have about 0.8% too many highly educated mothers.

We use the 1995 CPS Marriage and Fertility (M&F) data set to see if the mothers we are missing by using the CPS97 data are different from those we are not missing.

We categorize the mothers we would miss as those who have one or more children age 18-23 not living in the mother's household. Those mothers whose children live in her household will be categorized as "found."

The difference between what we would find using CPS97 (column labeled "mothers we would find in CPS97") and the correct answer (column labeled "All") overestimates the number of highly educated mothers by about 0.8 percentage point (26.3 + 17.8 - 26.6 -16.7 = 0.8). This is a rather small error. Even though CPS97 misses a large percentage of highly educated mothers, the educational distribution of those found is very close to that of the total population.

Time trend in mother's education from CPS Marriage & Fertility files

	Mothers with children of indicated age			
	18-23			16-21 in 1995
Mother's education	1985	1990	1995	1995
Less than high school	9.0	7.9	6.7	6.2
Some high school	15.1	11.4	9.2	8.8
High school graduate	48.3	47.3	41.4	41.0
Some college	15.8	18.3	26.6	26.7
College graduate	11.7	15.1	16.2	17.3
Total	100.0	100.0	100.0	100.0

We are somewhat concerned that using the 1995 CPS M&F files may miss some growth in the educational level of mothers between 1995 and 1997. To examine this possibility, we calculated distributions in mother's education using CPS M&F files from 1985, 1990, and 1995. We see that the fraction of highly educated (some college or college graduate) mothers has been rising steadily.

In an attempt to capture part of that rise, we recalculated the mother's education distribution for mothers whose children were ages 16 to 21 in 1995. These children would have aged to 18 to 23 in 1997 when the NLSY97 data were collected. We observe that the percentage of highly educated mothers increases by about 1 percent with this 2-year time shift. This adjustment only goes part way in correcting for the use of 1995 data versus 1997 data.

On the next slide, we examine the rise in the percentage of highly educated mothers in more detail.

Changes in percentage of highly educated[1] mothers with children age 18-23: CPS M&F files

Period	% Change / period	% Change / year	% Change / 2 years
1985 to 1990	5.7	1.1	2.2
1990 to 1995	9.4	1.9	3.8
1995 with youth 18-23 to 1995 with youth 16-21	1.2	0.6	1.2

1. College graduates or some college

This slide focuses on the change in percentage of highly educated mothers over time. We define highly educated mothers as college graduates or those with some college. The data are derived from the previous slide.

We see that the percentage of highly educated mothers has risen between 1 and 2 percentage points per year from 1985 through 1995. Hence, it seems plausible that it may have risen 2 to 4 percentage points during the 2 years between 1995 (latest year of good M&F files) and 1997 (year of NLSY97).

Estimated overestimation in percentage of highly educated mothers with children age 18-23 in 1997

Data source	Overestimation Error (percentage points)
1995 CPS M&F (youth age 18-23 in 1995)	2.2 to 3.8
1995 CPS M&F (youth age 16-21 in 1995)	1.0 to 2.6
1997 CPS (youth age 18-23)	0.8

This slide summarizes the estimated overestimation error that is likely made in the target populations of highly educated mothers with children age 18-23 in 1997 from various data sources.

The first line, taken from the previous slide, shows that the error likely ranges between 2.2 and 3.8 percentage points. If we select children age 16-21 (who will be age to 18-23 by 1997), the estimate error is reduced by 1.2 percentage points to a range of 1.0 to 2.6 percentage points.

The estimated error in using CPS97 directly is taken from slide 49 and is 0.8 percentage point. These errors are rather small and are in the same direction (overestimation of the percentage of highly educated mothers). We favor the estimate from the CPS97 because the estimated error is slightly smaller, and the data come from the same standard database that we use for other demographic variables.

CPS- and ETP-based estimates of mother's education

	Percent of mothers by mothers education	
Mother's education	CPS M&F 1995 Mothers with children age 16-21	CPS 1997 Mothers with children age 18-23
Less than high school	6.2	7.5
Some high school	8.8	7.7
High school grad	41.0	38.6
Some college	26.7	25.4
College grad	17.3	20.8
	44.0	46.2
Total	100.0	100.0

In this slide, we compare target population distributions for mothers of children age 18-23 in 1997 from two sources. One source is the 1995 CPS Marriage and Fertility file, which we have modified slightly to select children age 16-21 in 1995 so that they will be age 18-23 in 1997. The other is the standard CPS97 file.

The two results are actually quite similar. If we consider "highly educated" mothers to be either college graduates or those with some college, the results differ by only about 2 percentage points. These differences are within the estimated range of errors in slide 51.

Limitations on CPS M&F data files

- Useful in telling us what the distribution of mother's education should look like in NLSY97
- Not so useful in fixing any problem discovered in NLSY demographics
  - Will only directly support weights by gender, age, and mother's education
  - Will not directly support weights by race or youth education
- May possibly be combined with regular CPS files using conditional probabilities

It appears that the 1995 CPS M&F data are useful to tell us if the NLSY97 is representative of the underlying population with respect to mother's education.

However, it does not appear to be particularly useful in fixing a problem with this variable should one be found. This is because the structure of the file does not permit us to develop a self-contained multidimensional matrix of what the population should look like in terms of the five critical demographic variables of age, race, gender, youth education, and mother's education. It appears to be capable of supporting weighting corrections based on age, gender, and mother's education but not on race or youth education.

It may be possible to circumvent the above limitation by combining data from the 1997 CPS file and the 1995 CPS M&F file using conditional probabilities. Such an approach would seem likely to introduce additional sampling error.

Findings with respect to data on mother's education

- CPS data on mother's education are unsatisfactory, in general
  - No one CPS data set has good information on all 5 critical demographics
    - CPS97 data are good for age, gender, race, and youth education, but **are missing** mother's education for many youth
    - CPS95 Marriage & Fertility file is good for youth age, gender, and mother's education, but **has no information on** race or youth education and is 2 years too early in time
- However, the errors made in estimating mother's education level by either method are not large and range from 0.8 to 2.2 percentage points.
    - We favor the use of CPS97 for estimating mothers education

In general, existing CPS data on mother's education are unsatisfactory. No single CPS data set has good information on all five critical demographics. The CPS97 data are good for age, gender, race, and youth education but are missing mother's education for youth who are not living in the mother's household. The CPS95 Marriage and Fertility file is good for youth age, gender, and mother's education, but provides no information of the race or education of the mother's children.

However, the good news is that the errors made in estimating mother's education level by either method are not large and range from 0.8 to 2.2 percentage points. We favor the use of CPS97 for estimating mother's education because it seems to have the smallest error.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