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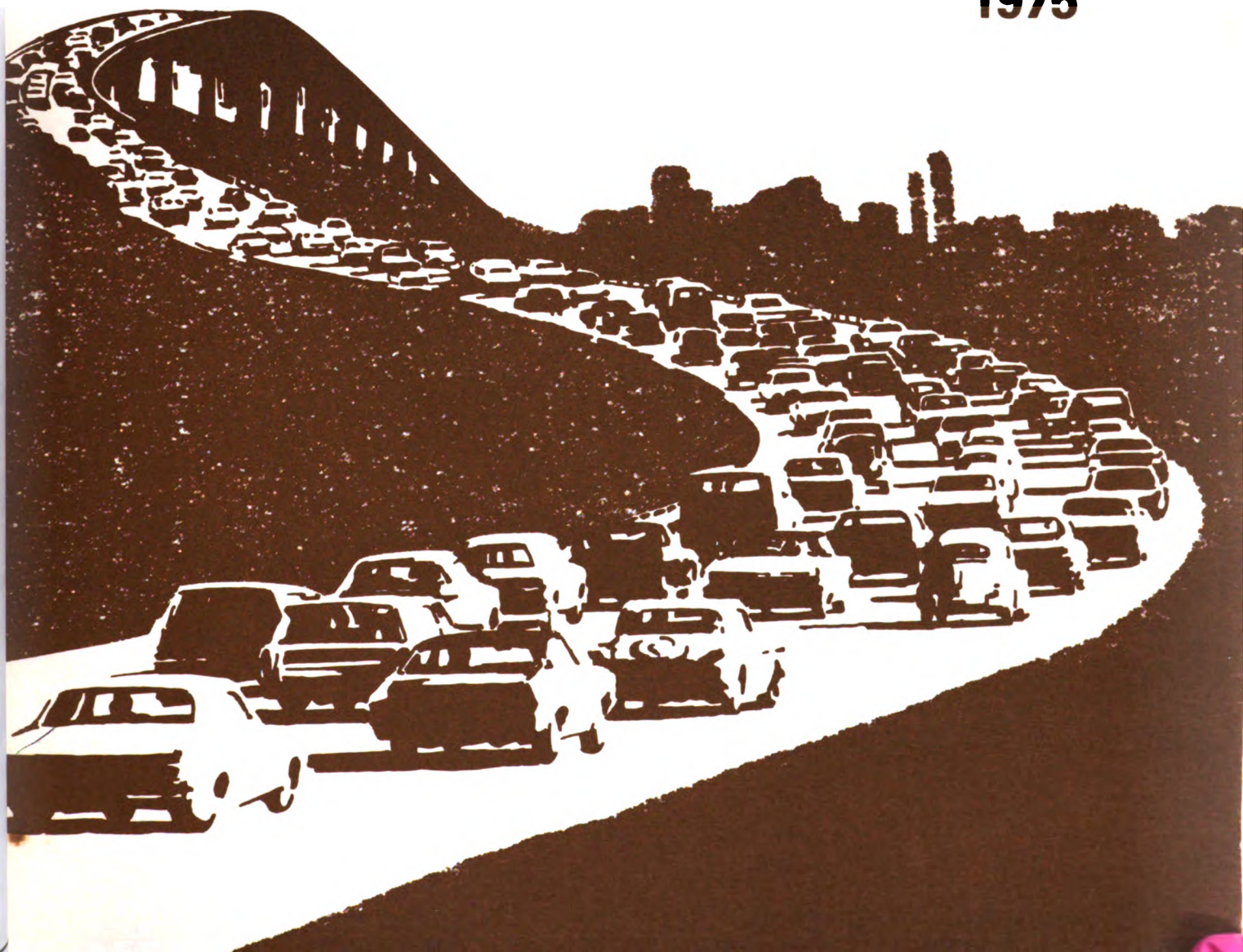
the Journey to Work in the UNITED STATES: 1975



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the Journey to Work in the UNITED STATES: 1975

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SYMBOLS USED IN TABLES

— Represents zero.
... Not applicable.

The Journey to Work in the United States: 1975

INTRODUCTION

This report is one of a series of publications from the Travel-to-Work Supplement to the Census Bureau's Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation. The AHS is conducted for the U.S. Department of Housing and Urban Development. The report is a special study of commuting in the United States, based on interviews of households from the AHS national sample, completed during the period of October through December 1975.

HIGHLIGHTS

- Workers who both lived and worked in the suburbs made up the largest group of commuters within metropolitan areas in 1975. Such workers numbered about 19,300,000 compared to the 9,600,000 persons who commuted from the suburbs into central cities to work.
- Metropolitan areas attracted 2 million workers from nonmetropolitan areas, about twice the approximately 1 million workers who lived in metropolitan areas but worked at nonmetropolitan jobs.
- About 6,700,000 workers, 8 percent of all workers in the United States, regularly worked at different locations and had no fixed place of work.
- The proportion of both central city and suburban residents who worked in the suburbs increased between 1970 and 1975, while the proportion working in central cities declined during the same period for both groups.
- About 65 percent of all workers in the United States drove to work alone in an automobile or truck in 1975. About 19 percent were in carpools, 6 percent used public transportation, and the rest walked, worked at home, or used some other means of transportation.
- Workers who lived and worked within a central city had the highest rate of public transportation use, about 16 percent, among workers in major commuting flows.
- Workers who lived in the suburbs, regardless of their work-trip destination, were more likely to drive alone than other workers. Two-thirds or more of those persons living in the suburbs and working in central cities, suburbs, or in nonmetropolitan territory drove to work alone.
- Workers living in nonmetropolitan territory and working in central cities or suburbs demonstrated especially high rates of carpooling compared with the Nation as a whole.
- The use of public transportation for commuting to work among workers using vehicles declined by about 3 percentage points, from 10 percent to 7 percent, between 1970 and 1975.
- The average commuting trip in the United States was about 9 miles in 1975. Workers who drove alone traveled an average of 8 miles to work, compared with 11 miles for workers in carpools. Public transportation users averaged 9 miles to work.
- The average work trip took about 20 minutes from home to work. Workers who drove alone took an average of 18 minutes to get to work, compared with 23 minutes for workers in carpools. Public transportation users spent an average of 40 minutes getting to work.

COMMUTING PATTERNS IN THE UNITED STATES

Major U.S. commuting flows. Tables A and B present the daily volume of worker travel in major U.S. commuting flows in 1975 and the percentage distribution of workers by place of residence among places of work.

Contrary to the common notion of commuters pouring out of suburban residential areas each day onto jammed streets and expressways enroute to downtown workplaces, workers who both lived and worked in the suburbs actually made up the largest group of commuters within U.S. standard metropolitan statistical areas (SMSA's) in 1975. Such workers numbered approximately 19,300,000, about twice the 9,600,000 persons who traveled from the suburbs into central cities to work. Most workers who lived in central cities worked in central cities (79 percent of all workers residing in central cities), although about 4 million workers living in central cities (19 percent) traveled out to suburban jobs.

Metropolitan areas attracted twice as many commuters from nonmetropolitan territory as the reverse in 1975. About 2,100,000 workers living in nonmetropolitan territory (9 percent) worked in a metropolitan area, while about 1 million workers living in metropolitan areas (2 percent) were working at nonmetropolitan jobs.

Commuters with no fixed place of work. The survey results also provide an indication for the first time of the number of people such as traveling salesmen, construction workers, or laborers who have no fixed place of work. The data show that in 1975, about 6,700,000 employed persons, 8 percent of all workers in the United States, neither worked at the same location each day, nor regularly reported to one central location before traveling to their work site.

Net commuter movement. Table C provides a summary comparison of the daily net gain or loss of workers for each geographic area, and the worker/resident ratio for each sector—the ratio of persons working in the area to the number of workers who live in the area. Ratios over 1.00 result when the amount of employment within a sector is greater than its resident labor force, and ratios under 1.00 result when the sector's resident labor force is larger than the number of jobs available there. The table shows that despite the fact that suburb-to-suburb commuters made up the

Table A. Place of Residence by Place of Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside SMSA's			In nonmetropolitan area		
			Total	Inside central cities	Outside central cities			
All workers.....	80,125	72,733	51,507	27,116	24,391	21,226	6,724	668
Inside SMSA's.....	55,418	50,425	49,420	26,119	23,301	1,005	4,512	481
Inside central cities..	22,760	20,846	20,568	16,528	4,040	278	1,700	214
Outside central cities.	32,658	29,579	28,852	9,592	19,261	727	2,811	267
In nonmetropolitan area..	24,707	22,308	2,087	997	1,090	20,221	2,212	187

Table B. Place of Residence by Percentage Distribution in Places of Work

(For the United States: 1975. Workers 14 years old and over. SMSA's as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside SMSA's			In nonmetropolitan area		
			Total	Inside central cities	Outside central cities			
All workers.....	[100.0]	100.0	70.8	37.3	33.5	29.2	[8.4]	[0.8]
Inside SMSA's.....	[100.0]	100.0	98.0	51.8	46.2	2.0	[8.1]	[0.9]
Inside central cities..	[100.0]	100.0	98.7	79.3	19.4	1.3	[7.5]	[0.9]
Outside central cities.	[100.0]	100.0	97.5	32.4	65.1	2.5	[8.6]	[0.8]
In nonmetropolitan area..	[100.0]	100.0	9.4	4.5	4.9	90.6	[9.0]	[0.8]

Note: Percents in brackets [ ] are of all workers.

Source: Table A.

Table C. Net Commuter Movement Between Geographic Areas

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census)

Geographic area	Workers living in area who reported a fixed place of work	Workers working in area	Worker/resident ratio	Total in-commuters	Total out-commuters	Net commuting
SMSA's.....	50,425	51,507	1.02	2,087	1,005	1,082
Inside central cities..	20,846	27,116	1.30	10,589	4,318	6,271
Outside central cities.	29,579	24,391	0.82	5,130	10,319	-5,189
Nonmetropolitan areas....	22,308	21,226	0.95	1,005	2,087	-1,082

Source: Table A.

largest major commuting flow within metropolitan areas in 1975, central cities were primarily employment areas and suburbs were primarily residential areas. Central cities had a worker/resident ratio of 1.30 in 1975, resulting from a daily net gain of nearly 6,300,000 commuters. In contrast, suburban areas exhibited a worker/resident ratio of .82, reflecting their daily net loss of about 5,200,000 commuters.

Changes in major U.S. commuting flows: 1970 to 1975. Comparing the results of the survey with the 1970 census, the data show that although central cities were still the primary location of jobs in 1975, the trend between 1970 and 1975 was toward the growing incidence of suburban employment (table D). The proportion of persons working in the suburbs increased for both central city residents (3

Table D. Place of Residence by Place of Work: 1975 and 1970

(For the United States. Number of workers in thousands. 1975 data pertain to workers 14 years old and over. 1970 data pertain to workers 16 years old and over. SMSA's as of the 1970 census. For explanation of symbols, see text)

Years	Living in SMSA central cities					
	Number		Percent of reported workers working --			
			In SMSA of residence			
	Total	Reported place of work	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area
1975 travel-to-work survey.....	22,760	20,846	78.4	17.9	2.4	1.3
1970 census.....	24,155	22,133	80.7	15.2	3.1	1.0
Percentage point change, 1970-75[1]..	...	...	-2.3	2.7	-0.7	0.3

Years	Living in SMSA's, outside central cities					
	Number		Percent of reported workers working --			
			In SMSA of residence			
	Total	Reported place of work	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area
1975 travel-to-work survey.....	32,658	29,579	30.2	60.9	6.5	2.5
1970 census.....	27,839	26,216	32.8	59.4	6.0	1.8
Percentage point change, 1970-75[1]..	...	...	-2.6	1.5	0.5	0.7

Years	Living in nonmetropolitan area				
	Number		Percent of reported workers working --		
			In SMSA's		
	Total	Reported place of work	Inside central cities	Outside central cities	In nonmetropolitan area
1975 travel-to-work survey.....	24,707	22,308	4.5	4.9	90.6
1970 census.....	21,723	20,017	4.4	4.1	91.5
Percentage point change, 1970-75[1]..	...	...	0.1	0.8	-0.9

[1]For limitations on comparison between the survey data and census data, see text.

percentage points) and suburban residents (2 percentage points) during the period, while the proportion of persons working in central cities declined at about the same rate for both groups (2 percentage points for central city residents and 3 percentage points for workers living in suburban areas).

MEANS OF TRANSPORTATION TO WORK

Principal means of transportation. Nearly 85 percent of all workers in the United States traveled to work in an automobile or truck in 1975 (table E). About 65 percent drove alone and 19 percent were members of carpools. Another 6 percent used public transportation to get to work, 5 percent walked to work, and 3 percent worked at home. Bicycle and motorcycle riders combined accounted for about 1 percent of all commuters.

Table E. Principal Means of Transportation to Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands)

Means of transportation	Number	Percent
All workers	80,125	100.0
Automobile or truck	67,869	84.7
Drive alone	52,294	65.3
Automobile	44,830	56.0
Truck	7,464	9.3
Carpool	15,575	19.4
Automobile	13,828	17.3
Truck	1,747	2.2
Public transportation	4,825	6.0
Bus or streetcar	3,100	3.9
Subway or elevated	1,179	1.5
Railroad	405	0.5
Taxicab	141	0.2
Bicycle	471	0.6
Motorcycle	297	0.4
Walk only	3,778	4.7
Other means	299	0.4
Work at home	2,585	3.2

Means of transportation used by workers in major commuting flows. More than one-half of the workers living in each geographic sector—central cities, suburbs, and nonmetropolitan areas—drove alone to work in 1975 (table F). Workers living in the suburbs were most likely to drive alone (70 percent), while workers living in nonmetropolitan areas had the highest rate of carpooling (22 percent), and workers living in central cities exhibited the highest rate of public transportation use (14 percent). However, considerable variation in this pattern is evidenced when the type of commuting trip is taken into account.

Workers who lived and worked within the same central city, work trips for which public transportation is most likely available and accessible, demonstrated the highest rate of transit use (16 percent) among workers in the various commuting flows and comparatively low rates of commuting by automobile or truck. In contrast, central city residents who worked in the suburbs or nonmetropolitan areas had much lower rates of public transportation use and a significantly higher incidence of commuting by automobile or truck. This differential presumably results, in large part, from the orientation of public transportation service toward getting people to work on heavily traveled intracity and suburb-to-city routes rather than on less traveled routes out of central cities. Workers residing in central cities and working at nonmetropolitan jobs were also more likely to be members of carpools than those who worked within the metropolitan area.

Workers who lived in the suburbs in 1975, regardless of their work-trip destination, were more likely to drive alone than workers in most flows originating either in central cities or nonmetropolitan areas. About two-thirds or more of those living in the suburbs and working in central cities, suburban areas, or in nonmetropolitan territory drove alone to work. Workers who commuted into the central city of their metropolitan area were more likely to take public transportation to work (10 percent) than suburban residents who worked in the suburbs or in nonmetropolitan areas. Among those workers living and working in suburban areas, the largest group of metropolitan commuters, only 2 percent used public transportation to get to work. Such a low percentage may reflect the difficulty of public transportation to efficiently serve the complex commuting trips which result from low density residential and employment patterns in suburban areas.

Although the rate of carpooling among workers living and working in nonmetropolitan areas (21 percent) was about the same as that of all workers in the United States, the rates for commuters who resided in nonmetropolitan areas but worked in central cities or the suburbs of metropolitan areas were considerably higher (39 percent and 37 percent, respectively). The high rates for these groups may be an indication of the effect of workers who have moved from metropolitan to nonmetropolitan areas, retained their jobs in the metropolitan areas, and compensated for the more difficult trip by joining carpools. Workers living in nonmetropolitan territory were the most likely to be working at home, the large majority presumably on farms.

Viewing the use of major transportation modes from a different perspective, the survey results show the degree to which the use of public transportation for commuting to work was concentrated within central cities in 1975, compared to the use of private vehicles. Table G shows that 59 percent of all workers using public transportation lived and worked within central cities, while 55 percent of all workers in carpools and 57 percent of all workers who drove alone both lived and worked outside central cities, either in the suburbs or in nonmetropolitan territory.

Recent changes in means of transportation to work. Most workers surveyed had not altered their principal means of commuting to work in the 12 months prior to enumeration. However, among the workers who did change transportation

Table F. Place of Residence by Place of Work, by Means of Transportation to Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census. For explanation of symbols, see text)

Place of residence by place of work	Total	Automobile or truck			Public transportation	Other means[1]	Worked at home
		Total	Drive alone	Carpool			
NUMBER							
All workers	80,125	67,869	52,294	15,575	4,825	4,845	2,585
Living in SMSA central cities[2]	22,760	17,558	13,622	3,935	3,188	1,645	370
Working in central city of same SMSA	16,338	11,823	9,152	2,671	2,674	1,472	370
Working in same SMSA, outside central cities	3,724	3,464	2,684	780	209	51	-
Working in another SMSA	506	439	316	123	54	13	-
Working in nonmetropolitan area	278	254	170	84	10	14	-
Living in SMSA's, outside central cities[2]	32,658	28,940	22,756	6,185	1,437	1,571	709
Working in central city of same SMSA	8,932	7,972	5,965	2,007	862	97	-
Working in same SMSA, outside central cities	18,001	15,720	12,523	3,197	318	1,254	709
Working in another SMSA	1,919	1,682	1,266	416	185	53	-
Working in nonmetropolitan area	727	672	495	177	5	49	-
Living in nonmetropolitan area[2]	24,707	21,371	15,916	5,455	201	1,628	1,506
Working in central cities	997	944	559	385	37	16	-
Working in SMSA's, outside central cities	1,090	1,059	659	400	10	22	-
Working in nonmetropolitan area	20,221	17,083	12,928	4,155	140	1,491	1,506
PERCENTAGE DISTRIBUTION							
All workers	100.0	84.7	65.3	19.4	6.0	6.0	3.2
Living in SMSA central cities[2]	100.0	77.1	59.9	17.3	14.0	7.2	1.6
Working in central city of same SMSA	100.0	72.4	56.0	16.3	16.4	9.0	2.3
Working in same SMSA, outside central cities	100.0	93.0	72.1	20.9	5.6	1.4	-
Working in another SMSA	100.0	86.8	62.5	24.3	10.7	2.6	-
Working in nonmetropolitan area	100.0	91.4	61.2	30.2	3.6	5.0	-
Living in SMSA's, outside central cities[2]	100.0	88.6	69.7	18.9	4.4	4.8	2.2
Working in central city of same SMSA	100.0	89.3	66.8	22.5	9.7	1.1	-
Working in same SMSA, outside central cities	100.0	87.3	69.6	17.8	1.8	7.0	3.9
Working in another SMSA	100.0	87.6	66.0	21.7	9.6	2.8	-
Working in nonmetropolitan area	100.0	92.4	68.1	24.3	0.7	6.7	-
Living in nonmetropolitan area[2]	100.0	86.5	64.4	22.1	0.8	6.6	6.1
Working in central cities	100.0	94.7	56.1	38.6	3.7	1.6	-
Working in SMSA's, outside central cities	100.0	97.2	60.5	36.7	0.9	2.0	-
Working in nonmetropolitan area	100.0	84.5	63.9	20.5	0.7	7.4	7.4

[1] Includes workers using bicycles, motorcycles, walking to work, and workers using other means not shown separately.

[2] Includes workers with no fixed place of work and workers who did not report a place of work not shown separately.

Table G. Workers Using Selected Means of Transportation to Work, by Percentage Distribution in Major Commuter Flows

(For the United States: 1975. Workers 14 years old and over. SMSA's as of the 1970 census)

Commuter flows	Auto or truck		Public transportation
	Drive alone	Carpool	
All workers[1] (thousands)	46,718	14,395	4,505
Percent	100.0	100.0	100.0
Living in SMSA central cities:			
Working in central city of same SMSA	19.6	18.6	59.4
Working in same SMSA, outside central cities	5.7	5.4	4.6
Working in another SMSA	0.7	0.9	1.2
Working in nonmetropolitan area	0.4	0.6	0.2
Living in SMSA's, outside central cities:			
Working in central city of same SMSA	12.8	13.9	19.1
Working in same SMSA, outside central cities	26.8	22.2	7.1
Working in another SMSA	2.7	2.9	4.1
Working in nonmetropolitan area	1.1	1.2	0.1
Living in nonmetropolitan area:			
Working in central cities	1.2	2.7	0.8
Working in SMSA's, outside central cities	1.4	2.8	0.2
Working in nonmetropolitan area	27.7	28.9	3.1

[1]Workers who reported a fixed place of work.

modes during the period, the survey results are indicative of the type of changes that were occurring between the fall of 1974—about 6 months after the end of the Organization of Petroleum Exporting Countries oil embargo—and the fall of 1975 1 year later.

Table H shows that 99 percent of the workers who had used an automobile or truck and 88 percent of those who had used public transportation to get to work in 1974 were still using the same mode in 1975. Workers who had been using public transportation in 1974 were more likely to be using an automobile or truck in 1975 than the reverse; 10 percent of those riding public transportation in 1974 were using an automobile or truck to get to work in 1975, whereas less than 1 percent of the workers who used an automobile or truck in 1974 were using public transportation in 1975.

Among automobile and truck users, the rate of change from carpooling to driving alone was greater than that in the opposite direction; 5 percent of the workers who had previously been in carpools had changed to driving alone, while 2 percent of those who had driven alone were in carpools 1 year later. Among workers who had been using other means in 1974, 10 percent were using an automobile or truck in 1975, and about 1 percent had changed to public transportation.

Changes in the use of public transportation: 1970 to 1975. Detailed comparison of the survey data with 1970 census data is limited by the lack of comparability between several of the means of transportation categories used in the two enumerations. However, since the public transportation categories (i.e., bus or streetcar, subway or elevated, railroad, and taxicab) are the same for both time periods, it is possible to assess the changes in public transportation use for home-to-work travel that have occurred in the United States between 1970 and 1975.

The survey results indicate that the use of public transportation decreased by 3 percentage points, from 10 percent to 7 percent, between 1970 and 1975 among all vehicle users (table I). Most of this decline was attributable to workers living in central cities where the proportionate use of transit for commuting to work decreased 7 percentage points, from 22 percent to 15 percent. Public transportation use among workers living and working in the same central city declined by 6 percentage points and among workers living in central cities and working in the suburbs of their metropolitan area by 4 percentage points between 1970 and 1975.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation to work. The average commuting trip from home to work in the United States was 9 miles in 1975 (table J). Workers who drove alone traveled an average of 8 miles to work, compared with 11 miles for workers in carpools. Public transportation users averaged 9 miles to work, but there was considerable variation among the transit modes. Workers riding a bus or streetcar averaged 7 miles from home to work while those commuting by railroad averaged 24 miles. It should be noted that data on trip length for public transportation riders must

Table H. Means of Transportation Last Year, by Percent Using Current Means

(For the United States: 1975. Workers 14 years old and over)

Means of transportation last year (1974)	Current means of transportation (1975)						
	All workers[1] (thousands)	Total (percent)	Automobile or truck			Public transportation	Other means[3]
			Total	Drive alone	Carpool		
All workers reporting means used last year..	79,342	100.0	84.9	65.4	19.4	5.9	9.2
Automobile or truck[2].....	67,111	100.0	98.5	76.2	22.3	0.5	1.0
Drive alone.....	50,828	100.0	98.7	97.2	1.6	0.4	0.9
Carpool.....	14,888	100.0	98.2	4.5	93.7	0.8	1.0
Public transportation.....	4,854	100.0	10.4	6.1	4.2	88.3	1.3
Other means[3].....	7,377	100.0	9.7	6.8	2.9	0.8	89.4

[1]All workers who reported current means of transportation.
[2]Includes a small number of workers using an automobile or truck but not specifying type of riding arrangement.
[3]Includes workers using bicycles or motorcycles, workers who walked to work or worked at home, and workers using other means not listed.

Table I. Change in Commuter Use of Public Transportation: 1970 and 1975

(For the United States. Number of workers in thousands. 1975 data pertain to workers 14 years old and over. 1970 data pertain to workers 16 years old and over. SMSA's as of the 1970 census. For explanation of symbols, see text)

Place of residence by place of work	1975			1970			Percentage point change in public transportation use, 1970-75[1]
	Vehicle users			Vehicle users			
	Total	Using public transportation		Total	Using public transportation		
		Total	Percent		Total	Percent	
All workers.....	73,762	4,825	6.5	66,529	6,662	10.0	-3.5
Living in SMSA central cities[2]...	21,034	3,188	15.2	22,052	4,850	22.0	-6.8
Working in central city of same SMSA.....	14,704	2,674	18.2	16,093	3,872	24.1	-5.9
Working in same SMSA, outside central cities.....	3,700	209	5.6	3,296	312	9.5	-3.9
Working in another SMSA.....	498	54	10.8	655	121	18.5	-7.7
Working in nonmetropolitan area	267	10	3.7	200	10	5.0	-1.3
Living in SMSA's, outside central cities[2].....	30,823	1,437	4.7	25,899	1,506	5.8	-1.1
Working in central city of same SMSA.....	8,909	862	9.7	8,485	824	9.7	-
Working in same SMSA, outside central cities.....	16,315	318	1.9	13,923	405	2.9	-1.0
Working in another SMSA.....	1,892	185	9.8	1,543	162	10.5	-0.7
Working in nonmetropolitan area	687	5	0.7	465	6	1.3	-0.6
Living in nonmetropolitan area[2]..	21,904	201	0.9	18,578	306	1.6	-0.7
Working in central cities.....	987	37	3.7	861	50	5.8	-2.1
Working in SMSA's, outside central cities.....	1,079	10	0.9	810	14	1.7	-0.8
Working in nonmetropolitan area	17,493	140	0.8	15,448	211	1.4	-0.6

[1]For limitations on comparison of survey data with census data, see text.
[2]Includes workers with no fixed place of work and workers who did not report a place of work not shown separately.

Table J. Means of Transportation by Distance to Work

(For the United States: 1975. Workers 14 years old and over. For explanation of symbols, see text)

Means of transportation to work	Total[1] (thousands)	Percentage distribution by distance to work (miles)								
		Total	Less than 1 mile	1 to 2 miles	3 to 4 miles	5 to 9 miles	10 to 14 miles	15 to 24 miles	25 miles or more	Mean
All workers[1].....	70,816	100.0	12.3	16.0	17.2	21.6	13.5	12.3	7.1	8.5
Automobile or truck.....	61,657	100.0	8.1	16.3	17.9	22.9	14.1	13.1	7.6	9.0
Drive alone.....	47,188	100.0	8.7	16.9	18.8	23.5	13.8	12.1	6.0	8.3
Carpool.....	14,470	100.0	6.0	14.4	15.0	20.7	15.0	16.0	12.8	11.4
Public transportation....	4,587	100.0	2.8	14.3	21.3	24.1	16.9	13.5	7.0	9.1
Bus or streetcar.....	2,958	100.0	3.1	18.0	26.1	25.7	15.2	8.7	3.3	7.1
Subway or elevated.....	1,124	100.0	1.3	5.6	15.8	28.2	26.0	18.7	4.2	10.1
Railroad.....	387	100.0	-	2.1	0.8	3.9	8.3	39.8	45.7	24.3
Taxicab.....	118	100.0	18.6	45.8	22.0	11.0	3.4	-	-	2.4
Bicycle.....	432	100.0	41.4	43.1	10.0	4.2	1.6	-	-	1.4
Motorcycle.....	285	100.0	11.2	19.3	17.2	19.3	15.8	12.6	4.6	7.5
Walk only.....	3,645	100.0	91.4	8.3	0.2	0.1	-	-	-	0.1
Other means.....	210	100.0	27.1	31.4	8.1	19.0	10.0	3.8	-	3.9

[1]Excludes workers with no fixed place of work and workers who worked at home.

be interpreted with caution since such workers often do not have precise knowledge of the odometer distance of the trip.

Average travel distance in major commuting flows. Suburban residents generally traveled farther to work than did central city residents (table K). Workers who lived in suburban areas went 10 miles to work, on the average, compared with 7 miles for workers who lived in central cities. Workers who both lived and worked in a central city had an average commuting distance of 6 miles, in contrast to 8 miles for workers who lived and worked in the suburbs. Similarly, workers who journeyed out from central cities to suburban jobs averaged about 10 miles, while those commuting into cities from the suburbs averaged 12 miles in their work trip.

As could be expected, due to the relative distance between the geographic sectors, workers living in central cities and working in nonmetropolitan areas had an average commuting trip of 23 miles, and workers who lived in the suburbs and worked in nonmetropolitan areas had an average trip of 18 miles. Persons living and working in nonmetropolitan areas traveled 7 miles to work on the average. However, those commuting from nonmetropolitan areas to central cities and suburbs averaged 30 and 25 miles, respectively.

Travel time by means of transportation to work. The average commuting trip from home to work in the United States took 20 minutes in 1975 (table L). Workers who drove alone took an average of 18 minutes to get to work, compared with 23 minutes for workers in carpools. Public transportation users spent an average of 40 minutes getting to work with the variation in average travel times among transit modes (35 minutes for bus or streetcar riders versus 62 minutes for workers who used the railroad) accounted for by differences in average travel distances.

Average travel time in major commuting flows. Despite the fact that suburban residents generally traveled farther to work than did central city residents, the average travel time for the groups was about the same. Workers living in suburban areas took an average of 22 minutes to get to work, compared with 21 minutes for central city residents (table M). This may be attributed to the greater incidence of automobile and truck use, especially that of workers driving alone, among workers who lived in the suburbs.

Although workers who lived and worked within a central city traveled a shorter distance to work, on the average, than workers who lived and worked within the suburbs, the commuting trip of the former group generally took longer than that of the latter group. Workers living and working in a central city took an average of 20 minutes getting to work compared with 17 minutes for workers who lived and worked in the suburbs. Consistent with their differential average commuting distance, workers who traveled into the central city from the suburbs took longer to get to work (27

Table K. Place of Residence by Place of Work, by Means of Transportation and Average (Mean) Distance to Work

(For the United States: 1975. Workers 14 years old and over. SMSA's as of the 1970 census)

Means of transportation by average (mean) distance to work (miles)	Living in SMSA central cities				
		Working --			
		In SMSA of residence			
	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area
All workers[2]	7.3	5.8	10.3	20.8	23.4
Drive alone	7.1	5.5	9.9	20.9	20.9
Carpool	8.5	6.1	11.9	23.1	29.2
Public transportation	7.2	6.8	8.0	16.3	21.7
Other means[3]	4.0	3.3	6.5	11.6	8.0

Means of transportation by average (mean) distance to work (miles)	Living in SMSA's, outside central cities				
		Working --			
		In SMSA of residence			
	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area
All workers[2]	9.9	11.9	7.5	19.2	18.1
Drive alone	9.4	11.3	7.3	18.1	17.0
Carpool	11.6	13.1	8.9	21.0	21.9
Public transportation	13.0	13.8	3.6	23.5	14.6
Other means[3]	4.4	7.6	2.9	10.0	11.4

Means of transportation by average (mean) distance to work (miles)	Living in nonmetropolitan area			
		Working --		
		In SMSA's		
	Total[1]	Inside central cities	Outside central cities	In nonmetropolitan area
All workers[2]	9.2	30.1	25.3	7.0
Drive alone	7.9	28.2	22.6	6.3
Carpool	13.3	32.9	30.2	9.9
Public transportation	10.9	32.7	18.5	4.8
Other means[3]	2.9	9.7	8.0	2.5

[1] Includes workers with place of work not reported not shown separately.
[2] Excludes workers with no fixed place of work, and workers who walked to work or worked at home.
[3] Includes workers using bicycles, motorcycles, and all other means not listed.

Source: Table 1.

Table L. Means of Transportation by Travel Time to Work

(For the United States: 1975. Workers 14 years old and over. For explanation of symbols, see text)

Means of transportation to work	Total[1] (thousands)	Percentage distribution by travel time (minutes)								Mean
		Total	Less than 10 minutes	10 to 14 minutes	15 to 24 minutes	25 to 29 minutes	30 to 34 minutes	35 to 49 minutes	50 minutes or more	
All workers[1]	70,816	100.0	21.5	18.2	30.5	4.6	11.6	8.4	5.3	19.9
Automobile or truck	61,657	100.0	20.5	19.0	32.3	4.9	11.6	7.8	3.9	19.1
Drive alone	47,188	100.0	22.3	19.9	32.8	4.8	10.7	6.6	2.8	17.8
Carpool	14,470	100.0	14.5	16.2	30.5	5.3	14.6	11.6	7.2	23.2
Public transportation	4,587	100.0	2.9	5.6	17.9	3.5	19.1	22.9	28.1	39.5
Bus or streetcar	2,958	100.0	2.9	6.5	23.3	4.6	21.1	21.5	20.1	35.4
Subway or elevated	1,124	100.0	0.7	1.1	8.6	1.6	19.9	30.7	37.4	45.0
Railroad	387	100.0	1.3	1.0	3.1	0.8	5.9	18.1	69.8	62.4
Taxicab	118	100.0	28.8	41.5	21.2	2.5	3.4	-	2.5	13.2
Bicycle	432	100.0	38.4	23.4	28.5	2.1	4.4	2.8	0.7	12.1
Motorcycle	285	100.0	28.1	18.9	30.2	3.9	12.3	5.6	1.1	16.0
Walk only	3,645	100.0	59.3	19.9	15.3	0.7	2.7	1.7	0.3	8.7
Other means	210	100.0	22.4	11.4	29.0	2.4	4.8	7.1	22.4	29.5

[1]Excludes workers with no fixed place of work and workers who worked at home.

Table M. Place of Residence by Place of Work, by Means of Transportation and Average (Mean) Travel Time to Work

(For the United States: 1975. Workers 14 years old and over. SMSA's as of the 1970 census)

Means of transportation by average (mean) travel time to work (minutes)	Living in SMSA central cities				
		Working --			
		In SMSA of residence			
	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area
All workers[2]	21.4	19.7	24.0	38.0	38.5
Drive alone	17.6	15.5	21.6	33.8	34.1
Carpool	21.4	18.3	26.3	41.0	43.0
Public transportation	37.1	35.9	46.5	55.8	70.8
Other means[3]	19.6	18.4	20.1	38.8	52.7

Means of transportation by average (mean) travel time to work (minutes)	Living in SMSA's, outside central cities				
		Working --			
		In SMSA of residence			
	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area
All workers[2]	21.6	26.8	16.7	35.8	29.8
Drive alone	19.4	23.6	15.9	31.1	27.4
Carpool	24.0	27.9	19.2	36.5	36.8
Public transportation	44.7	46.0	29.0	66.5	35.6
Other means[3]	17.0	27.6	12.5	32.0	23.6

Means of transportation by average (mean) travel time to work (minutes)	Living in nonmetropolitan area			
		Working --		
		In SMSA's		
	Total[1]	Inside central cities	Outside central cities	In nonmetropolitan area
All workers[2]	17.9	45.8	37.6	15.2
Drive alone	15.8	42.4	34.0	13.6
Carpool	23.6	47.3	43.3	19.6
Public transportation	37.9	85.5	60.3	24.2
Other means[3]	15.5	31.2	21.3	14.9

[1]Includes workers with place of work not reported not shown separately.
[2]Excludes workers with no fixed place of work, and workers who walked to work or worked at home.
[3]Includes workers using bicycles, motorcycles, and all other means not listed.

Source: Table 2.

minutes) than workers who made the reverse commute (24 minutes).

As could be expected, commuters going from central cities to nonmetropolitan jobs took an average of 39 minutes to get to work, compared with suburb-to-nonmetropolitan commuters who averaged 30 minutes. Persons living and working in nonmetropolitan areas spent only 15 minutes, on the average, traveling between home and work. However, those who lived in a nonmetropolitan area and worked in a central city or its suburbs spent an average of 46 minutes and 38 minutes getting to work respectively.

SELECTED CHARACTERISTICS OF COMMUTERS BY TRAVEL-TO-WORK CHARACTERISTICS

Means of Transportation to Work by Characteristics of Commuters

Sex. Women were more likely to use carpools or public transportation to get to work, and less likely to drive alone to work than men in 1975 (table N).

Race. Black workers were more likely to use carpools or public transportation to get to work, and less likely to drive alone to work than White[1] workers. About 16 percent of all Black workers in the United States used public transportation compared with 5 percent of all White workers.

Household relationship. Female household heads were more likely to use public transportation to get to work and less likely to drive alone or use carpools than male household heads in 1975. This may be attributed in part to the relatively low rate of availability of automobiles among female household heads. About 14 percent of the female household heads used public transportation to get to work compared with 4 percent of the male household heads.

Comparing working wives with female household heads, the data show that wives were not nearly as dependent upon public transportation to get to work as female household heads, but instead wives evidenced a higher rate of carpooling to get to work. This may reflect, to some extent, wives being dropped off by their husbands on their way to work.

Earnings. Workers who drove alone to work generally had higher earnings than those using carpools or public trans-

[1] The racial category "White and other races" is referred to as "White" in the text for convenience.

Table N. Means of Transportation to Work by Selected Characteristics of Commuters

(For the United States: 1975. Workers 14 years old and over. For explanation of symbols, see text)

Characteristics	All workers (thousands)	Percent by means of transportation						
		Total	Auto or truck		Public transportation	Walk only	Other means	Work at home
			Drive alone	Carpool				
All workers	80,125	100.0	65.3	19.4	6.0	4.7	1.3	3.2
SEX								
Male	49,106	100.0	68.8	17.7	4.6	3.9	1.8	3.3
Female	31,019	100.0	59.6	22.2	8.3	6.1	0.6	3.1
RACE								
White and other	72,782	100.0	66.7	18.9	5.0	4.6	1.4	3.4
Black	7,343	100.0	51.4	25.0	16.0	5.6	0.8	1.2
HOUSEHOLD RELATIONSHIP								
Head	49,011	100.0	69.2	16.8	5.8	3.9	1.2	3.1
Male	41,825	100.0	70.7	17.2	4.3	3.3	1.3	3.3
Female	7,186	100.0	60.9	14.8	14.3	7.5	0.5	2.1
Wife of head	18,441	100.0	61.3	24.3	5.5	4.7	0.5	3.7
Other member	12,673	100.0	55.7	22.5	7.8	7.9	3.1	3.0
EARNINGS								
Without earnings or not reported	7,168	100.0	55.4	13.7	3.3	6.3	1.2	20.1
With earnings	72,957	100.0	66.2	20.0	6.3	4.6	1.3	1.6
$1 to $1,999	9,293	100.0	53.3	22.2	6.5	10.2	3.3	4.6
$2,000 to $3,999	7,867	100.0	59.4	21.9	7.3	7.3	1.8	2.4
$4,000 to $5,999	9,022	100.0	60.7	23.6	7.4	5.7	1.0	1.6
$6,000 to $7,999	9,344	100.0	64.4	21.8	7.5	4.2	1.1	1.0
$8,000 to $9,999	8,054	100.0	69.2	19.4	5.9	3.8	0.8	0.8
$10,000 to $11,999	7,880	100.0	71.6	18.6	5.5	2.7	0.9	0.8
$12,000 to $14,999	9,193	100.0	73.6	18.1	4.5	2.2	1.0	0.6
$15,000 to $19,999	7,150	100.0	74.9	16.8	5.0	1.5	1.0	0.8
$20,000 to $24,999	2,738	100.0	75.2	16.3	5.7	1.1	0.8	0.9
$25,000 or more	2,417	100.0	74.5	12.8	8.6	1.8	1.0	1.2
Median	$8,237	...	$9,090	$7,363	$7,282	$4,568	$5,061	$3,542
Mean	$9,207	...	$9,876	$8,185	$8,954	$5,678	$8,524	$5,842

portation in 1975. The median earnings of those who drove alone was about $9,100 compared to about $7,400 for workers in carpools and about $7,300 for workers using public transportation. The median earnings of the latter two groups of workers were not significantly different.

Characteristics of Commuters by Distance to Work

Sex. Men generally traveled farther to work than women in 1975 (table O). The average commuting trip for male workers was about 10 miles, while a comparable trip for female workers was about 7 miles.

Race. The survey results suggest that White workers traveled farther to work than Black workers, but the difference is negligible. The average work trip among White workers was about 9 miles, compared to about 8 miles for Black workers.

Household relationship. Male household heads typically made longer commuting trips than either female heads or working wives. The average work trip of male household heads was about 11 miles, while the average trip for both female household heads and working wives was about 7 miles.

Earnings. The survey results show that workers' earnings were directly related to their average travel distance to work in 1975. Workers with higher earnings tended to live farther from work, while workers with lower earnings tended to live closer to work. Such a pattern points up the ability of higher-paid workers to afford the cost of commuting to work from areas more distant from their job site which offer desirable residential amenities.

Means of Transportation by Race for Workers in Major Commuting Flows

Using the proportion of Black workers living within a geographic sector (i.e., central cities, suburbs, nonmetropolitan area) as the proportion also expected to be found in commuting flows originating from that sector, it is possible to examine whether Black workers were overrepresented or underrepresented among commuters in the particular flows. The data in table P suggest that Black workers did not tend to be overrepresented or underrepresented in most commuting flows in 1975. In fact, the only notable deviations from expected levels of Black involvement occurred among central city-to-nonmetropolitan area and nonmetropolitan area-to-central city commuters

Table O. Selected Characteristics of Commuters by Distance to Work

(For the United States: 1975. Workers 14 years old and over. For explanation of symbols, see text)

Characteristics	Total[1] (thousands)	Percentage distribution by distance to work (miles)									Mean
		Total	Less than 1 mile	1 to 2 miles	3 to 4 miles	5 to 9 miles	10 to 14 miles	15 to 24 miles	25 to 49 miles	50 miles or more	
All workers	70,816	100.0	12.3	16.0	17.2	21.6	13.5	12.3	6.1	0.9	8.5
SEX											
Male	42,031	100.0	10.8	14.1	16.4	21.0	14.2	14.1	8.0	1.4	9.7
Female	28,785	100.0	14.6	18.7	18.3	22.5	12.4	9.7	3.4	0.3	6.7
RACE											
White and other	64,070	100.0	12.4	16.1	17.0	21.5	13.4	12.3	6.3	1.0	9.2
Black	6,746	100.0	11.5	15.5	18.9	22.4	14.0	12.2	4.8	0.8	8.1
HOUSEHOLD RELATIONSHIP											
Head	42,436	100.0	10.8	14.3	17.1	21.0	14.1	13.7	7.7	1.3	9.5
Male	35,706	100.0	10.0	13.4	16.3	21.0	14.6	14.6	8.6	1.5	10.8
Female	6,730	100.0	15.4	18.7	21.1	21.2	11.8	8.7	2.9	0.2	6.9
Wife of head	17,036	100.0	13.8	18.5	17.5	23.0	13.0	10.2	3.6	0.3	7.0
Other member	11,344	100.0	15.7	18.8	16.8	21.7	11.8	10.3	4.2	0.6	7.1
EARNINGS											
Without earnings or not reported	4,604	100.0	22.2	18.5	16.7	19.4	10.3	8.2	4.0	0.7	6.5
With earnings	66,212	100.0	11.6	15.8	17.2	21.8	13.7	12.6	6.3	1.0	9.3
$1 to $1,999	8,058	100.0	21.0	21.3	18.0	19.5	9.6	7.5	2.7	0.4	5.7
$2,000 to $3,999	7,135	100.0	17.0	19.9	18.5	20.5	10.9	9.2	3.6	0.4	6.5
$4,000 to $5,999	8,376	100.0	13.7	18.8	18.4	21.6	12.7	10.1	4.0	0.7	7.2
$6,000 to $7,999	8,791	100.0	11.5	16.5	18.2	22.6	13.9	11.5	4.9	0.8	8.0
$8,000 to $9,999	7,475	100.0	11.1	14.6	17.8	22.6	13.9	12.7	6.5	0.9	8.8
$10,000 to $11,999	7,265	100.0	8.5	13.0	16.2	22.6	15.9	14.9	7.7	1.2	9.9
$12,000 to $14,999	8,376	100.0	7.3	13.4	16.2	22.6	15.0	15.6	8.6	1.2	10.3
$15,000 to $19,999	6,329	100.0	5.8	11.6	15.3	22.2	16.1	17.1	9.8	2.0	11.5
$20,000 to $24,999	2,342	100.0	4.6	10.1	14.5	20.6	19.3	17.8	11.2	2.0	12.3
$25,000 or more	2,065	100.0	4.9	8.9	14.2	22.9	16.2	18.7	12.7	1.5	12.3
Median	$8,200	...	$5,650	$6,724	$7,719	$8,445	$9,370	$10,185	$11,246	$11,671	...
Mean	$9,130	...	$6,514	$7,654	$8,624	$9,519	$10,094	$10,761	$11,937	$11,810	...

[1]Excludes workers with no fixed place of work and workers who worked at home.

Table P. Place of Residence by Place of Work, by Means of Transportation and Race

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census. For explanation of symbols, see text)

Means of transportation by race	Living in SMSA central cities				
		Working --			
		In SMSA of residence			
	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area
All workers	22,760	16,338	3,724	506	278
Percent White and other races	81.3	81.3	80.6	83.2	89.2
Percent Black	18.7	18.7	19.4	16.8	10.8
Drive alone	13,622	9,152	2,684	316	170
Percent White and other races	84.1	83.8	83.9	84.2	91.8
Percent Black	15.9	16.2	16.1	15.8	8.2
Carpool	3,935	2,671	780	123	84
Percent White and other races	79.7	81.2	75.0	82.9	81.0
Percent Black	20.3	18.8	25.0	17.1	19.0
Public transportation	3,188	2,674	209	54	10
Percent White and other races	68.8	69.9	57.9	74.1	100.0
Percent Black	31.2	30.1	42.1	25.9	-
Other means[2]	2,015	1,842	51	13	14
Percent White and other races	85.7	85.7	86.3	100.0	100.0
Percent Black	14.3	14.3	13.7	-	-

Means of transportation by race	Living in SMSA's, outside central cities				
		Working --			
		In SMSA of residence			
	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area
All workers	32,658	8,932	18,001	1,919	727
Percent White and other races	95.2	93.8	95.5	96.2	94.9
Percent Black	4.8	6.2	4.5	3.8	5.1
Drive alone	22,756	5,965	12,523	1,266	495
Percent White and other races	95.9	93.8	96.3	97.0	96.6
Percent Black	4.1	6.2	3.7	3.0	3.4
Carpool	6,185	2,007	3,197	416	177
Percent White and other races	93.5	93.7	93.0	96.6	90.4
Percent Black	6.5	6.3	7.0	3.4	9.6
Public transportation	1,437	862	318	185	5
Percent White and other races	89.8	92.9	83.0	90.8	80.0
Percent Black	10.2	7.1	17.0	9.2	20.0
Other means[2]	2,280	97	1,963	53	49
Percent White and other races	96.1	94.8	96.0	92.5	98.0
Percent Black	3.9	5.2	4.0	7.5	2.0

Means of transportation by race	Living in nonmetropolitan area			
		Working --		
		In SMSA's		
	Total[1]	Inside central cities	Outside central cities	In nonmetropolitan area
All workers	24,707	997	1,090	20,221
Percent White and other races	93.8	96.6	94.6	93.7
Percent Black	6.2	3.4	5.4	6.3
Drive alone	15,916	559	659	12,928
Percent White and other races	95.7	98.0	95.4	95.6
Percent Black	4.3	2.0	4.6	4.4
Carpool	5,455	385	400	4,155
Percent White and other races	88.4	94.5	94.5	87.7
Percent Black	11.6	5.5	5.5	12.3
Public transportation	201	37	10	140
Percent White and other races	81.6	94.6	80.0	77.9
Percent Black	18.4	5.4	20.0	22.1
Other means[2]	3,134	16	22	2,997
Percent White and other races	94.3	100.0	77.3	94.5
Percent Black	5.7	-	22.7	5.5

[1] Includes workers with no fixed place of work and workers who did not report a place of work not shown separately.
[2] Includes workers using bicycles or motorcycles, workers who walked to work or worked at home, and workers using other means not listed.

where Blacks were somewhat underrepresented. The commuting flows with the largest proportion of Black workers—workers living and working within central cities and those living in central cities and working in the suburbs—did not evidence a disproportionate number of either racial group.

When the means of tranportation to work is taken into account, Blacks were significantly overrepresented among the public transportation users living in each geographic sector and in most major commuting flows in 1975. This disparity is most noticeable among workers who lived in central cities but commuted out to suburban jobs. Whereas Blacks represented about 19 percent of all workers who lived in central cities and worked in the suburbs, they made up 42 percent of the workers in that flow who depended upon public transportation to get to work. This level of dependency, along with the increasing importance of suburban employment shown earlier in the report, would seem to point up the problem of central city Blacks in getting access to job opportunities in areas to which regular public transportation service may not be readily available.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during October through December 1975, as part of the enumeration for the Annual Housing Survey national sample. In all, the occupants of about 65,700 sample households were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The interviews resulted in 136,800 respondents. A facsimile of the Supplement can be found in appendix B.

Data were collected for sample households located in the counties and independent cities comprising the 461 sample areas used in current surveys of the Census Bureau. A sample of housing units was selected in these areas from the 1970 census and updated to take into account new construction and demolitions or conversions which had occurred since 1970. A more detailed description of the survey design and sampling procedures can be found in appendix A.

The Travel-to-Work Supplement was also included for the 1975-76, 1976-77, and 1977-78 Annual Housing Survey SMSA samples, each of which contained about 140,000 households spread over 20 SMSA's (for operational reasons, the 1975-76 enumeration covered 21 areas). The 3-year cycle of surveys thus resulted in enumeration of about 420,000 metropolitan households in 60 SMSA's in a 3-year period. Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. The remaining SMSA's each contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. Below is a list of SMSA's in each group and the period in which they were surveyed for the Travel-to-Work Supplement:

SURVEY GROUP I (1977 to 1978)

Albany-Schenectady-Troy, N.Y.
Anaheim-Santa Ana-Garden Grove, Calif.
Boston, Mass.*
Dallas, Tex.
Detroit, Mich.*
Fort Worth, Tex.
Los Angeles-Long Beach, Calif.*
Madison, Wis.†
Memphis, Tenn.-Ark.
Minneapolis-St. Paul, Minn.
Newark, N.J.
Orlando, Fla.
Phoenix, Ariz.
Pittsburgh, Pa.
Saginaw, Mich.
Salt Lake City, Utah
Spokane, Wash.
Tacoma, Wash.
Washington, D.C.-Md.-Va.*
Wichita, Kans.

SURVEY GROUP II (1975 to 1976)

Atlanta, Ga.*
Chicago, Ill.*
Cincinnati, Ohio-Ky.-Ind.
Colorado Springs, Colo.
Columbus, Ohio
Hartford, Conn.
Kansas City, Mo.-Kans.
Miami, Fla.
Milwaukee, Wis.
New Orleans, La.
Newport News-Hampton, Va.
Paterson-Clifton-Passaic, N.J.
Philadelphia, Pa.-N.J.*
Portland, Oreg.-Wash.
Rochester, N.Y.
San Antonio, Tex.
San Bernardino-Riverside-Ontario, Calif.
San Diego, Calif.
San Francisco-Oakland, Calif.*
Springfield-Chicopee-Holyoke, Mass.-Conn.

SURVEY GROUP III (1976 to 1977)

Allentown-Bethlehem-Easton, Pa.-N.J.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N.Y.
Cleveland, Ohio
Denver, Colo.
Grand Rapids, Mich.
Honolulu, Hawaii
Houston, Tex.*
Indianapolis, Ind.
Las Vegas, Nev.
Louisville, Ky.-Ind.
New York, N.Y.*
Oklahoma City, Okla.
Omaha, Nebr.-Iowa
Providence-Pawtucket-Warwick, R.I.-Mass.
Raleigh, N.C.
Sacramento, Calif.
St. Louis, Mo.-Ill.*
Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.
† Included with Group II for the first (1975-76) enumeration.

Related travel-to-work data. In addition to this report, data from the Travel-to-Work Supplement will also be available in the form of unpublished tables and a microdata tape. The unpublished tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and income. Some tables also provide breakdowns by census region and division. Information on these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

The microdata tape will provide records for unidentified individuals in geographical aggregates with a resident population of at least 250,000. Information on the tape will include the transportation-related items from the Travel-to-Work Supplement and selected demographic and household characteristics from the Annual Housing Survey. It may be obtained by writing to the Chief, Customer Services Branch, Data User Services Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Several data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement as well. They include published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each SMSA. Data for the SMSA's in Survey Group II are currently available in **Current Population Reports,** Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975," and in the other forms listed above. Data for the SMSA's in Survey Group III are only available in **Current Population Reports,** Series P-23, No. 72 "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976" at this time. No data for the SMSA's in Survey Group I have yet been released.

Comparison of Travel-to-Work Supplement data with data from the 1970 census. Data from the Travel-to-Work Supplement to the 1975 Annual Housing Survey pertain to workers, 14 years old and over, who were living in households. Workers living in group quarters in 1975 were thus excluded from the universe.

In contrast to the survey, journey-to-work data from the 1970 census pertain to all workers 14 years old and over, regardless of whether they live in households or group quarters. Consequently, the universes of the two sets of data are not exactly comparable. Creation of a comparable 1970 data set would require an extensive special tabulation of census data, based exclusively on workers living in housing units in 1970.

As an alternative to such a special tabulation, the 1970 census data used in this report are taken from table 26, "Place of Work of Civilian Persons 16 Years Old and Over at Work During Census Week by Poverty Status in 1969, Family Status, Other Selected Characteristics, and Race: 1970," published in U.S. Bureau of the Census, Census of Population: 1970 **Subject Reports,** Final Report PC(2)-9A, "Low Income Population," U.S. Government Printing Office, Washington, D.C., 1973. This published tabulation excludes workers who were inmates of institutions, members of the Armed Forces living in barracks, and college students living in dormitories—persons that made up the large majority of workers living in group quarters in 1970. However, it includes workers living in rooming houses, boarding houses, or other group quarters not specifically excluded, and its universe is workers 16 years old and over.

Given the limitations on comparability between the survey data and 1970 census data described above, comparisons made in this report between travel-to-work characteristics in 1970 and 1975 are made only between the relative proportion of workers evidencing the characteristic in the two periods. Changes which have occurred between 1970 and 1975 are thus measured in "percentage point differences" (e.g. the difference between the percent of workers who used public transportation in 1970 and the percent who used public transportation in 1975), rather than the customary "percent change."

Table 1. Place of Residence by Place of Work, by Means of Transportation and Travel Distance to Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census. For explanation of symbols, see text)

Means of transportation by distance to work	Living in SMSA central cities					Living in SMSA's, outside central cities					Living in nonmetropolitan area			
		Working --					Working --					Working --		
		In SMSA of residence					In SMSA of residence							
	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area	Total[1]	In SMSA central cities	In SMSA's outside central cities	In nonmetropolitan area
All workers[2]	19,375	14,704	3,700	498	267	28,063	8,909	16,315	1,892	687	19,733	987	1,079	17,493
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile	5.5	6.7	1.7	0.4	0.7	6.0	0.9	9.4	2.5	2.9	13.4	0.8	0.5	15.0
1 to 2 miles	17.3	20.8	6.9	2.8	3.4	12.9	4.3	18.8	5.5	5.5	20.6	1.2	1.9	23.0
3 to 4 miles	23.4	26.2	16.4	4.4	5.6	16.0	12.0	19.5	6.7	9.5	15.9	0.8	3.8	17.5
5 to 9 miles	26.2	25.8	29.3	17.5	16.1	23.7	27.4	22.9	13.7	15.0	18.2	3.9	10.8	19.0
10 to 14 miles	14.2	12.4	21.1	16.1	13.9	16.7	23.5	13.1	15.7	18.5	10.7	7.6	12.0	10.8
15 to 24 miles	9.8	7.0	18.1	25.3	21.3	16.5	22.7	11.9	24.6	24.0	11.0	24.0	26.0	9.5
25 miles or more	3.5	1.0	6.5	34.1	38.6	8.3	9.2	4.4	31.3	24.6	10.3	61.6	44.9	5.3
Mean	7.3	5.8	10.3	20.8	23.4	9.9	11.9	7.5	19.2	18.1	9.2	30.1	25.3	7.0
Drives alone	12,438	9,152	2,684	316	170	20,457	5,965	12,523	1,266	495	14,292	559	659	12,928
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile	6.1	7.6	2.1	0.6	1.2	6.1	1.1	9.1	2.6	3.8	14.7	0.5	0.6	16.2
1 to 2 miles	17.6	21.7	6.5	1.9	2.9	13.2	4.1	18.7	5.8	6.1	21.6	1.1	1.7	23.7
3 to 4 miles	23.7	26.7	16.8	3.8	7.1	17.1	13.4	20.1	8.1	10.3	17.1	1.3	5.0	18.5
5 to 9 miles	26.7	26.1	30.0	15.5	16.5	24.7	29.1	23.6	14.8	16.0	19.1	3.9	13.1	19.4
10 to 14 miles	13.5	10.8	21.8	17.4	15.3	16.5	23.6	13.3	16.0	17.6	10.3	9.7	14.4	10.2
15 to 24 miles	9.3	6.3	16.7	27.2	25.3	15.5	21.3	11.4	25.7	25.5	9.7	27.5	28.2	8.1
25 miles or more	3.2	0.8	6.1	33.2	31.2	6.8	7.6	3.8	27.1	20.6	7.4	56.0	37.2	3.8
Mean	7.1	5.5	9.9	20.9	20.9	9.4	11.3	7.3	18.1	17.0	7.9	28.2	22.6	6.3
Carpool	3,683	2,671	780	123	84	5,824	2,007	3,197	416	177	4,962	385	400	4,155
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile	4.3	5.7	0.6	-	-	5.2	0.5	8.8	1.7	0.6	8.4	0.8	-	9.9
1 to 2 miles	16.6	20.2	7.7	3.3	-	11.2	4.6	16.8	4.1	2.8	16.5	1.0	1.0	19.5
3 to 4 miles	21.8	25.8	14.1	1.6	-	12.9	9.1	16.7	4.6	7.3	12.3	0.3	1.8	14.4
5 to 9 miles	25.7	26.4	26.2	13.0	13.1	21.6	24.9	21.2	12.7	11.3	16.0	2.9	6.5	18.1
10 to 14 miles	14.0	12.6	18.7	13.8	10.7	18.0	24.1	14.0	18.3	21.5	12.2	4.7	8.3	13.3
15 to 24 miles	12.0	7.6	24.2	26.8	16.7	18.9	24.6	15.0	19.7	20.3	15.7	21.3	23.0	14.5
25 miles or more	5.5	1.6	8.6	41.5	51.2	12.2	12.2	7.4	38.7	36.2	18.9	68.8	59.3	10.3
Mean	8.5	6.1	11.9	23.1	29.2	11.6	13.1	8.9	21.0	21.9	13.3	32.9	30.2	9.9
Public transportation	3,007	2,674	209	54	10	1,391	862	318	185	5	189	37	10	140
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile	3.1	3.3	1.0	-	-	1.4	-	6.0	-	-	9.5	-	-	12.9
1 to 2 miles	15.9	17.0	7.2	3.7	-	9.1	3.8	27.0	3.2	-	28.0	2.7	10.0	36.4
3 to 4 miles	25.2	26.1	19.1	14.8	-	13.7	9.5	31.4	3.2	-	15.9	2.7	10.0	18.6
5 to 9 miles	26.2	25.4	33.0	33.3	40.0	20.3	22.0	22.3	9.7	40.0	18.5	10.8	30.0	20.0
10 to 14 miles	17.8	17.7	20.1	13.0	-	16.8	21.5	7.2	8.1	40.0	3.7	2.7	-	5.0
15 to 24 miles	9.6	9.1	14.8	11.1	-	23.3	29.0	5.0	29.7	20.0	3.7	-	20.0	3.6
25 miles or more	2.3	1.4	4.8	22.2	60.0	15.5	14.2	1.3	45.4	20.0	20.1	81.1	30.0	4.3
Mean	7.2	6.8	8.0	16.3	21.7	13.0	13.8	3.6	23.5	14.6	10.9	32.7	18.5	4.8
Other means[3]	247	208	27	6	3	391	75	277	26	9	290	7	10	269
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile	24.3	28.4	3.7	-	-	27.4	8.0	33.9	26.9	-	34.8	28.6	10.0	36.4
1 to 2 miles	36.0	36.5	29.6	33.3	66.7	31.2	17.3	34.3	26.9	44.4	33.4	28.6	40.0	33.5
3 to 4 miles	11.7	11.5	14.8	-	-	11.0	9.3	13.0	-	-	12.8	-	-	13.8
5 to 9 miles	12.1	9.1	22.2	50.0	-	13.0	32.0	9.4	3.8	11.1	11.0	-	10.0	10.4
10 to 14 miles	10.5	8.7	22.2	-	66.7	8.4	21.3	4.7	11.5	11.1	4.8	14.3	10.0	4.1
15 to 24 miles	4.9	5.3	7.4	-	-	6.4	12.0	4.0	11.5	22.2	2.4	14.3	10.0	1.5
25 miles or more	0.8	-	-	33.3	-	2.6	2.7	0.4	19.2	11.1	0.7	14.3	10.0	0.4
Mean	4.0	3.3	6.5	11.6	8.0	4.4	7.6	2.9	10.0	11.4	2.9	9.7	8.0	2.5

[1]Includes workers with place of work not reported not shown separately.
[2]Excludes workers with no fixed place of work, and workers who walked to work or worked at home.
[3]Includes workers using bicycles, motorcycles, and all other means not listed.

Table 2. Place of Residence by Place of Work, by Means of Transportation and Travel Time to Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census. For explanation of symbols, see text)

Means of transportation by travel time to work	Living in SMSA central cities					Living in SMSA's, outside central cities					Living in nonmetropolitan area			
		Working --					Working --					Working --		
		In SMSA of residence					In SMSA of residence							
	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area	Total[1]	Inside central cities	Outside central cities	In another SMSA	In nonmetropolitan area	Total[1]	In SMSA central cities	In SMSA's outside central cities	In nonmetropolitan area
All workers[2]	19,375	14,704	3,700	498	267	28,063	8,909	16,315	1,892	687	19,733	987	1,079	17,493
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes	13.7	16.1	7.0	1.8	1.9	17.2	4.2	26.0	7.1	8.9	28.3	0.9	2.5	31.7
10 to 14 minutes	18.6	20.9	12.5	5.0	8.2	16.1	10.2	20.5	8.4	10.8	20.6	1.4	4.3	22.8
15 to 24 minutes	35.5	35.1	38.7	22.3	27.3	31.4	35.4	29.9	21.3	30.1	27.0	9.9	21.8	27.7
25 to 29 minutes	5.0	4.0	8.5	7.0	5.6	5.6	7.7	4.7	4.1	5.4	3.5	6.2	8.0	3.1
30 to 34 minutes	12.5	11.2	16.3	17.5	15.7	13.9	19.4	10.5	16.9	15.1	9.0	18.0	18.3	8.0
35 to 49 minutes	8.8	7.6	11.2	22.5	14.2	10.2	15.1	6.2	19.6	15.7	6.7	31.9	21.2	4.4
50 minutes or more	6.0	5.0	5.8	24.1	26.6	5.7	7.9	2.1	22.7	14.0	4.9	31.6	24.0	2.3
Mean	21.4	19.7	24.0	38.0	38.5	21.6	26.8	16.7	35.8	29.8	17.9	45.8	37.6	15.2
Drives alone	12,438	9,152	2,684	316	170	20,457	5,965	12,523	1,266	495	14,292	559	659	12,928
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes	17.1	20.6	8.3	1.9	1.2	18.9	5.1	27.2	8.4	10.7	31.8	0.7	3.2	34.9
10 to 14 minutes	21.8	25.1	13.5	5.1	9.4	17.3	12.1	21.1	9.4	11.3	21.9	2.1	5.5	23.8
15 to 24 minutes	38.6	37.9	41.8	27.8	28.8	33.2	39.5	30.6	24.6	31.9	27.3	12.2	25.8	27.4
25 to 29 minutes	5.1	4.0	8.4	7.9	8.8	5.8	8.3	4.7	4.9	5.3	3.2	7.3	8.3	2.8
30 to 34 minutes	10.1	8.0	15.8	16.5	17.6	13.2	19.7	9.6	17.8	15.6	7.7	20.6	18.4	6.6
35 to 49 minutes	5.3	3.4	9.1	24.1	15.3	8.4	11.5	5.4	20.9	14.5	5.1	32.2	20.6	3.2
50 minutes or more	2.1	0.9	3.1	16.5	18.8	3.1	3.7	1.4	14.0	10.5	3.1	24.9	18.1	1.4
Mean	17.6	15.5	21.6	33.8	34.1	19.4	23.6	15.9	31.1	27.4	15.8	42.4	34.0	13.6
Carpool	3,683	2,671	780	123	84	5,824	2,007	3,197	416	177	4,962	385	400	4,155
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes	11.1	13.9	4.0	0.8	3.6	13.2	3.1	21.2	5.3	3.4	18.6	1.0	1.0	22.0
10 to 14 minutes	18.4	21.5	11.8	2.4	6.0	14.4	8.6	19.1	6.7	10.2	16.8	0.3	2.3	19.8
15 to 24 minutes	38.4	40.7	34.2	18.7	27.4	29.3	33.3	28.2	20.7	24.9	26.2	7.0	14.8	28.9
25 to 29 minutes	5.1	3.9	9.4	7.3	-	6.1	8.3	5.1	3.6	5.1	4.4	4.9	7.5	4.1
30 to 34 minutes	13.4	11.4	19.1	21.1	10.7	16.6	20.4	14.0	19.2	13.6	13.1	15.6	18.5	12.4
35 to 49 minutes	8.8	6.5	15.1	14.6	14.3	13.6	19.2	8.9	20.2	18.6	11.4	34.5	22.5	8.2
50 minutes or more	4.9	2.2	6.3	34.1	36.9	6.9	7.0	3.5	24.5	24.3	9.4	36.4	33.8	4.5
Mean	21.4	18.3	26.3	41.0	43.0	24.0	27.9	19.2	36.5	36.8	23.6	47.3	43.3	19.6
Public transportation	3,007	2,674	209	54	10	1,391	862	318	185	5	189	37	10	140
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes	1.9	1.9	2.4	3.7	-	4.0	1.0	13.8	1.6	-	11.6	2.7	10.0	15.0
10 to 14 minutes	5.8	5.9	1.4	9.3	10.0	4.0	0.7	13.8	2.7	-	14.3	-	-	19.3
15 to 24 minutes	19.7	20.5	15.3	-	-	13.4	11.8	24.5	1.6	40.0	23.3	2.7	10.0	29.3
25 to 29 minutes	4.0	4.2	5.3	-	-	2.6	2.7	3.5	1.1	-	1.1	-	-	1.4
30 to 34 minutes	22.0	22.6	12.4	13.0	30.0	13.7	14.6	15.1	4.9	40.0	12.2	8.1	-	14.3
35 to 49 minutes	23.4	23.5	24.4	29.6	-	23.5	31.1	12.6	9.2	20.0	10.1	2.7	30.0	10.7
50 minutes or more	23.2	21.5	38.8	44.4	60.0	38.7	37.9	17.0	79.5	20.0	27.0	86.5	50.0	10.7
Mean	37.1	35.9	46.5	55.8	70.8	44.7	46.0	29.0	66.5	35.6	37.9	85.5	60.3	24.2
Other means[3]	247	208	27	6	3	391	75	277	26	9	290	7	10	269
Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes	25.9	30.8	-	-	-	31.7	1.3	42.2	15.4	22.2	35.9	-	10.0	38.3
10 to 14 minutes	21.1	21.2	22.2	33.3	-	17.4	13.3	18.4	23.1	-	20.7	14.3	10.0	21.9
15 to 24 minutes	29.1	28.4	40.7	-	66.7	29.2	38.7	27.8	11.5	44.4	29.3	42.9	40.0	27.5
25 to 29 minutes	5.3	3.8	22.2	-	-	1.5	2.7	0.7	-	11.1	2.1	14.3	10.0	1.5
30 to 34 minutes	5.7	4.3	11.1	33.3	-	10.0	21.3	6.5	15.4	11.1	3.8	14.3	10.0	3.3
35 to 49 minutes	5.7	4.3	3.7	33.3	-	5.4	9.3	2.5	19.2	22.2	2.8	14.3	-	2.2
50 minutes or more	7.3	7.2	-	16.7	66.7	4.9	14.7	1.4	15.4	-	5.5	14.3	10.0	5.2
Mean	19.6	18.4	20.1	38.8	52.7	17.0	27.6	12.5	32.0	23.6	15.5	31.2	21.3	14.9

[1]Includes workers with place of work not reported not shown separately.
[2]Excludes workers with no fixed place of work, and workers who walked to work or worked at home.
[3]Includes workers using bicycles, motorcycles, and all other means not listed.

Appendix A

DEFINITIONS AND EXPLANATIONS

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items in appendix B. An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household, 14 years old or over, who had a regular part-time or regular full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. The actual geographic location at which the worker **usually** carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time, then changed work locations (e.g., a temporary office worker), were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported in to begin work each day. Persons who neither worked at the same location, nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report in to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of one-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person usually traveled from home to work during the week prior to interview.

Travel time to work. The total elapsed time in minutes that it usually took the person to get from home to work during the week prior to interview. The elapsed time includes time spent waiting for public transportation, picking up members of carpools, etc.

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, for purposes of the 1970 census and the Annual Housing Survey, a standard metropolitan statistical area was defined essentially as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000, and contiguous counties if, according to certain criteria, these were socially and economically integrated with the central county. In the New England States, SMSA's consist of towns and cities instead of counties. Each 1970 census SMSA included at least one central city, and the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
   a. The additional city or cities have at least 250,000 inhabitants.
   b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience, since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Nonmetropolitan area or territory. The territory outside metropolitan areas.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation of the enumerator, or on inquiry.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room, is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons such as lodgers, foster children, wards, or employees who share the housing unit. A person living alone in a housing unit, or a group of unrelated persons sharing a housing unit as partners, is also counted as a household.

Head of household. In the 1975 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. Married women were not classified thus, if their husbands were living with them at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. The total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "—" means "rounds to or represents zero." Three dots "..." means "not applicable."

SOURCE AND RELIABILITY OF THE ESTIMATES

Sample Design

1975 DOT Travel-to-Work Supplement to the Annual Housing Survey-National. The 1975 estimates are based on data collected in October through December 1975 for the Annual Housing Survey (AHS)-National, conducted by the Bureau of the Census, acting as collection agent for the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-National questionnaire included a supplementary group of questions pertaining to travel to work. The sample for this survey was spread over 461 sample areas (called primary sampling units), comprising 923 counties and independent cities with coverage in each of the 50 States and the District of Columbia.

Approximately 72,600 sample housing units (both occupied and vacant) were eligible for interview in the 1975 Annual Housing Survey-National. Of this number approximately 65,700 housing units were occupied, thus making their occupants eligible for the DOT Travel-to-Work Supplement. However, interviews were not obtained at 3,600 households because the occupants refused to be interviewed, were not found at home after repeated visits or were unavailable for some other reason. In the interviewed AHS households, there were 137,300 persons 14 years or older who were eligible for the DOT Supplement. However, 500 of these 137,300 did not respond to the travel-to-work portion of the questionnaire.

Selection of sample areas. The United States was divided into areas made up of counties and independent cities referred to as primary sampling units (PSU's). These PSU's were then grouped into 376 strata, 156 of which consisted of only one PSU which was in sample with certainty. These 156 strata were mostly the larger SMSA's and were called self-representing (SR) since the sample from the sample area represented just that PSU. Each of the other 220 strata consisted of a group of PSU's and was referred to as non-self-representing (NSR), since the sample of housing units from the sample PSU in a stratum represented the other PSU's in the stratum as well.

One PSU was selected from each NSR stratum with probability proportionate to the 1970 census population of the PSU. (This resulted in 220 NSR sample PSU's). In addition, the NSR strata were grouped into 110 pairs and one stratum was picked at random from each pair. From this stratum, an additional PSU was selected independent of the other PSU selected from this stratum. Since the two PSU's were independently selected, it was possible for the same

PSU to be selected twice. This occurred in 25 instances, producing an additional 85 NSR sample PSU's, thus giving a grand total of 461 PSU's.

Designation of sample housing units for the 1975 AHS enumeration. The sample housing units designated to be interviewed in the 1975 AHS enumeration consisted of the following categories, which are described in detail in succeeding sections.

1. All sample housing units that were interviewed in the 1974 enumeration.
2. All sample housing units that were either type A noninterviews (i.e., units eligible to be interviewed) or type B noninterviews (i.e., units were not eligible for interview at the time of enumeration but which could become eligible in the future) in the 1974 enumeration.
3. All sample housing units that were selected from the list of building permits issued since the 1974 enumeration. (This sample represents the housing units built in permit-issuing areas, since the 1974 enumeration.)
4. Units added as the result of the updated listings in selected areas which do not issue building permits.

Selection of the 1973 sample housing units. The overall sampling rate used to select the sample for the 1973 AHS was about 1 in 1,366. The within-PSU sampling rate for AHS was determined so that the overall probability of selection for each sample housing unit was the same (e.g., if the probability of selecting a NSR PSU was 1 in 10, then the within-PSU sampling rate would be 1 in 136.6).

Within the sample PSU's, a sample of the housing units enumerated in the 1970 Census of Population and Housing was selected for AHS. In addition, a sample of new construction building permits was also selected to represent the units constructed since the 1970 census. These samples were selected at about twice the rate mentioned previously (i.e., at 2 in 1,366), thereby producing a sample twice as large as needed. This sample was split into two equal-sized samples—one to be used for AHS, and one to be held in reserve for possible future use for AHS. The procedure used to split this sample into equal-sized samples is described in the next section.

The sample of 1970 census units was selected in several stages of a sampling. Within the sample PSU's, the first step was the selection of a sample of census enumeration districts (ED's), administrative units used in the 1970 census. The probability of selection for an ED was proportional to the following 1970 census counts of housing units (HU's) and persons in group quarters, combined in the following formula:

$$\frac{\text{Number of HU's in the ED} + \dfrac{\text{Number of Group Quarters Persons in the ED}}{3}}{4}$$

The next step was to select an expected cluster of about four neighboring housing units within each sample ED. For most of the ED's, the selection was accomplished using the list of addresses for the ED as compiled in the 1970 census. However, in those ED's where addresses were incomplete or inadequate (mostly rural areas), the selection process was accomplished using area sampling methods. These ED's were divided into segments, i.e., small land areas with well-defined boundaries, having an expected size of four or a multiple of four, housing units. Those segments with an expected size which was a multiple of four were further subsampled at the time of enumeration so that an expected four housing units were chosen for interview.

The sample of new construction units was selected from building permits issued since January 1970. Within each sample PSU, the building permits were chronologically ordered by month issued, and compact clusters of approximately four housing units were created. These clusters were then sampled for inclusion in the AHS at the sampling rate of 2 in 1,366. Housing units constructed since the 1970 census in areas which do not issue building permits were brought into the sample as a result of the area sample described above.

Splitting of the sample. The sample selection procedure as described above produced clusters (segments) of size-four housing units for the sample taken from the census address frame, the new construction frame and the area sampling frame (mainly rural areas). Clusters of this size should result in a minimum loss in precision for estimates of housing characteristics in rural areas because of the heterogeneity of neighboring units. However, clusters of size-two were considered to be more optimal within those areas where the housing characteristics of neighboring units tended to be very similar (e.g., urban areas and new construction units). A splitting operation was then carried out for segments selected from the census address and new construction frames. This consisted of halving each sample cluster from these frames. Thus, two housing units from each cluster were to be included in the survey and two housing units were held in reserve. No splitting operation was carried out within the clusters selected from the area sampling frame; instead every other area sample cluster of four housing units was used for the survey and the remaining clusters were assigned to the reserve sample.

Selection of supplemental sample housing units in rural areas. In 1974, it was decided to increase the reliability of the AHS estimates of rural housing characteristics, by doubling the number of sample housing units from rural areas. This was accomplished by reactiviating the reserve sample, selected in the original sampling operations in 1973, from rural areas only. For the reserve sample selected in census address and new construction frames, this meant that the other half of each rural cluster (an expected two housing units) was reactivated in 1974. Similarly for the area sample frames, this meant the entire reserve cluster (an expected four housing units) was reactivated in 1974 if the cluster was rural. This supplementation increased the overall probability of selection for sample housing units in rural areas to about 2 in 1,366; whereas, the overall probability of selection for sample housing units in urban areas remained at 1 in 1,366.

1970 Census of Population and Housing. The estimates pertaining to the 1970 population (i.e., the population that existed at the time of the 1970 census) are based on either 20-percent, 15-percent, or 5-percent sample data collected in April 1970 for the Decennial Census of Populstion and Housing. A detailed description of the sample design can be obtained in the 1970 census report, PC(1)-D1, **Detailed Characteristics, United States Summary.**

Estimation

1975 DOT Travel-to-Work Supplement. The 1975 DOT Travel-to-Work Supplement employed a two-stage ratio estimation procedure. However, prior to the implementation of the procedure, the basic weight (i.e., the inverse of the probability of selection) was adjusted first to account for the type A noninterview housing units encountered in AHS and second to account for the persons in households that were interviewed for AHS-National who did not respond to the travel-to-work section of the questionnaire. The noninterview adjustment for type A housing units was done separately for different categories of occupied housing units. This noninterview adjustment was equal to the following ratio:

$$\frac{\text{Interviewed housing units + Noninterviewed housing units}}{\text{Interviewed housing units}}$$

The noninterview adjustment for the DOT Travel-to-Work Supplement interviews that were not obtained in households interviewed for AHS was done separately for different residence-age-sex-marital status categories. This noninterview adjustment was equal to the following ratio:

$$\frac{\text{Persons who were interviewed for the DOT Travel-to-work Supplement in households that were interviewed for AHS-National} + \text{Persons who were not interviewed for the DOT Travel-to-Work Supplement in households that were interviewed for AHS-National}}{\text{Persons who were interviewed for the DOT Travel-to-work Supplement in households that were interviewed for AHS-National}}$$

The estimates used in both the numerator and the denominator were weighted sample estimates of persons after the adjustment for type A noninterview housing units had been applied.

The first-stage ratio estimation procedure was employed for sample persons from non-self-representing (NSR) PSU's only. The procedure was designed to reduce the contribution to the variation arising from the sampling of NSR PSU's. The first-stage ratio estimation procedure takes into account the differences that existed at the time of the 1970 census in the distribution by race and residence of the population estimated from the sample NSR PSU's and that of the NSR population in each of the four census regions of the country.

The first-stage ratio estimation factor for each specified category was as follows:

$$\frac{\text{The 1970 census population in the residence-race category for all NSR strata in a census region}}{\text{Estimate of the population category using 1970 census population counts for sample NSR PSU's in a census region}}$$

The numerators of the ratios were calculated by obtaining the 1970 census population counts for each of the residence-race categories for each NSR stratum and summing these counts across the NSR strata in each census region. The denominators were calculated by obtaining the 1970 census population counts for each of the residence-race categories for each NSR sample PSU, weighting these counts by the inverse of the probability of selecting that PSU and summing these weighted counts across the NSR PSU's in each census region. The computed first-stage ratio estimation factor was then applied to the existing weight for each NSR sample person in each first-stage ratio estimation category.

The second-stage ratio estimation procedure was employed for all sample persons 14 years or older, both civilian and military. This procedure was designed to adjust the DOT Travel-to-Work Supplement estimates of the population 14 years or older in households, (i.e., the estimates employing the two noninterview adjustments and the first-stage adjustment) to independently derived current estimates for 68 race-sex-age categories to correct for deficiencies known to exist in the AHS sample.

The second-stage ratio estimation factor for each specific category was as follows:

$$\frac{\text{Current independent estimate of household population in the race-sex-age category}}{\text{DOT Supplement sample estimate of household population in the category}}$$

The numerators of the ratios were derived from data based on the 1970 Census of Population and Housing, birth and death rates, immigration and emigration rates and the 1975 and 1976 March supplement of military personnel for the Current Population Survey (CPS), a sample household survey conducted monthly by the Bureau of the Census. The denominators of the ratios were the weighted estimates for the DOT Travel-to-Work Supplement sample persons, using the existing weight after the first-stage ratio estimation procedure. The computed second-stage ratio estimation factor was then applied to the existing weight for each sample person in each second-stage ratio estimation category.

The effect of the second-stage ratio estimation procedure, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. The distribution of the household population 14 years or older selected for the sample differed somewhat, by chance, from that of the nation as a whole in such basic characteristics as race, sex, and age. These characteristics are probably correlated with other characteristics measured for the DOT Travel-to-Work Supplement. Therefore, through the use of the two-stage ratio estimation procedure one can expect the sample estimates to be improved substantially when the sample counts of persons 14 years and older is brought into close agreement with a known distribution of the entire population 14 years or older with respect to these basic characteristics.

Ratio Estimation Procedure of the 1970 Census of Population and Housing. This report presents data on the population characteristics of the 1970 Census of Population and Housing. The statistics based on 1970 census sample data employed a ratio estimation procedure which was applied separately for each of the three census samples, a detailed description of the ratio estimation procedure employed for the 1970 census can be obtained in the 1970 census report, PC(1)-D1, **Detailed Characteristics, United States Summary.**

Reliability of the Estimates

There are two types of possible errors associated with estimates based on data from sample surveys, sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement and of the nonsampling errors associated with the 1970 census estimates. A description of the sampling errors associated with the sample estimates from the 1970 census appears in the 1970 census report, PC(1)-D1, **Detailed Characteristics, United States Summary.** The sampling errors for 1970 census data are much smaller than those for DOT Supplement data. Therefore, in making comparisons between the two data sources, it can be safely assumed that the census data are subject to zero sampling errors.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error, as calculated for this report, also partially reflects the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and nonsampling errors, measured by the standard error, and biases and some additional nonsampling errors not measured by the standard error.

The procedure, as illustrated below, provides a method to construct interval estimates such that a known proportion of the intervals would contain the average of all possible samples. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All statements of comparison appearing in this report are significant at the 1.6 standard error level or higher, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by the use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates shown in this report. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than the precise standard error for any specific item.

Table A-1. presents the standard errors applicable to the 1975 worker (14 years or older) estimates in this report. Linear interpolation should be used to determine standard errors for levels of estimates not specifically shown in table A-1.

The reliability of an estimated percentage, computed by using sample data for both numerator and denominator depends upon both the size of the percentage and the size of the total upon which the percentage is based. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentages, particularly if the percentages are 50 percent or more.

Table A-2. presents the standard errors of estimated percentages of 1975 workers. Two-way linear interpolation should be used to determine standard errors for estimated percentages not specifically shown in table A-2.

Included in tables A-1. and A-2. are estimates of standard errors for estimates of zero and zero percent. These estimates of standard errors are considered to be overestimates of the true standard errors.

For ratios, 100(x/y), where x is not a subclass of y, the above table A-2. underestimates the standard error of the ratio when there is little or no correlation between x and y. For this type of ratio, a better approximation of the standard

Table A-1. Standard Errors of Estimated Number of Workers: 1975

(In thousands. 68 chances out of 100)

Size of estimate	Standard error		Size of estimate	Standard error	
	Total or White	Black		Total or White	Black
0	2	2	2,500	64	60
5	3	3	5,000	90	79
10	4	4	10,000	125	88
25	7	7	25,000	185	
50	9	9	50,000	227	
100	13	13	75,000	229	
250	20	20	100,000	192	
500	29	29			
1,000	41	40			

error may be obtained by letting the standard error of the ratio be approximately equal to:

$$(100)\,(x/y)\sqrt{\left(\frac{\sigma_x}{x}\right)^2 + \left(\frac{\sigma_y}{y}\right)^2}$$

where: x = the numerator of the ratio
y = the denominator of the ratio
σ_x = the standard error of the numerator
σ_y = the standard error of the denominator

Illustration of the use of the standard error tables. Table A of this report shows 20,846,000 workers living inside central cities and reporting a fixed place of work. Interpolation in table A-1 of this appendix shows that the standard error of an estimate of this size is approximately 168,000. The following procedure was used in interpolating.

The information presented in the table below was extracted from table A-1. The entry for "x" is the one sought.

Size of Estimate (thousands)	Standard Error (thousands)
10,000	125
20,846	x
25,000	185

By vertically interpolating between 125 and 185, the entry for "x" is determined to be 168.

$$20{,}846 - 10{,}000 = 10{,}846$$
$$25{,}000 - 10{,}000 = 15{,}000$$

$$125 + \frac{10{,}846}{15{,}000}(185 - 125) = 168$$

Consequently, the 68-percent confidence interval, as shown by these data, is from 20,678,000 to 21,014,000. Therefore, a conclusion that the average estimate, derived from all possible samples, of workers living inside central cities lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 20,577,000 to 21,115,000 with 90-percent confidence; and that the average estimate lies within the interval from 20,510,000 to 21,182,000 with 95-percent confidence.

Table B shows that of the 20,846,000 workers living inside central cities and reporting a fixed place of work, 79.3 percent are working inside central cities. Interpolation in table A-2. (i.e., interpolation on both the base and percent) of this appendix shows that the standard error of the above percentage is approximately 0.5 percentage points. The following procedure was used in interpolating.

The information presented in the table below was extracted from table A-2. The entry for "p" is the one sought.

Base of percentage (thousands)	Estimated percentage		
	25 or 75	79.3	15 or 85
10,000	0.6	a	0.5
20,846	...	p	...
25,000	0.4	b	0.3

1. By horizontal interpolation between 0.6 and 0.5, the entry for cell "a" is determined to be 0.6.

$$79.3 - 75.0 = 4.3$$
$$85.0 - 75.0 = 10.0$$

$$0.6 + \frac{4.3}{10.0}(0.5 - 0.6) = 0.6$$

2. By horizontal interpolation between 0.4 and 0.3, the entry for cell "b" is determined to be 0.4.

$$0.4 + \frac{4.3}{10.0}(0.3 - 0.4) = 0.4$$

3. By vertical interpolation between 0.6 and 0.4, the entry for "p" is determined to be 0.5.

$$20{,}846 - 10{,}000 = 10{,}846$$
$$25{,}000 - 10{,}000 = 15{,}000$$

$$0.6 + \frac{10{,}846}{15{,}000}(0.4 - 0.6) = 0.5$$

Consequently, the 68-percent confidence interval, as shown by these data, is from 78.8 to 79.8 percent; the 90-percent confidence interval is from 78.5 to 80.1 percent; and the 95-percent confidence interval is from 78.3 to 80.3 percent.

Differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard errors of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. If, however, there is a high positive correlation between the two characteristics, the formula will overestimate the true error. Also, if there is a high negative correlation between the two characteristics, the formula will underestimate the true standard error.

Illustration of the computation of the standard error of a difference. Table E of this report shows that 52,294,000 workers drive alone to work and 15,575,000 carpool to work. Thus, the apparent difference between the number of workers driving alone and carpooling is 36,719,000. Table A-1. of the appendix shows that the standard error of 52,294,000 is approximately 227,000 and that the standard error of 15,575,000 is approximately 147,000. Therefore, the standard error of the estimated difference of 36,719,000 is about

$$270{,}000 = \sqrt{(227{,}000)^2 + (147{,}000)^2}$$

Consequently, the 68-percent confidence interval for the 36,719,000 difference is from 36,449,000 to 36,989,000. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 36,287,000 to 37,151,000, and the 95-percent confidence interval is from 36,179,000 to 37,259,000. Thus, we can conclude with 95-percent confidence that the number of workers driving alone is greater than the number of workers who carpool since the 95-percent confidence interval of this difference does not include zero or negative values.

Medians. For the medians presented in certain tables, the sampling error depends on the size of the base and on the distribution upon which the median is based. An approximate method for measuring the reliability of the estimated median is to determine an interval about the estimated median such that there is a stated degree of confidence that the average median from all possible samples lies within the interval. The following procedure may be used to estimate confidence limits of a median based on sample data:

1. From table A-2, determine the standard error of a 50-percent characteristic on the base of the median;
2. Add to and subtract from 50 percent the standard error determined in step 1; and
3. Using the distribution of the characteristic, read off the confidence interval corresponding to the two points established in step 2.

Table A-2. Standard Errors of Estimated Percentages of Workers: 1975

(68 chances out of 100)

Base of percentage (thousands)	Estimated percentage							
	0 or 100	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
5	25.3	25.3	25.3	25.3	25.3	25.3	25.3	29.1
10	14.5	14.5	14.5	14.5	14.5	14.7	17.8	20.6
25	6.3	6.3	6.3	6.3	7.8	9.3	11.3	13.0
50	3.5	3.5	3.5	4.0	5.5	6.6	8.0	9.2
100	1.7	1.7	1.8	2.8	3.9	4.6	5.6	6.5
250	0.7	0.8	1.2	1.8	2.5	2.9	3.6	4.1
500	0.3	0.6	0.8	1.3	1.7	2.1	2.5	2.9
1,000	0.2	0.4	0.6	0.9	1.2	1.5	1.8	2.1
2,500	0.07	0.3	0.4	0.6	0.8	0.9	1.1	1.3
5,000	0.03	0.2	0.3	0.4	0.6	0.7	0.8	0.9
10,000	0.02	0.13	0.2	0.3	0.4	0.5	0.6	0.7
25,000	0.01	0.08	0.12	0.2	0.2	0.3	0.4	0.4
50,000	-	0.06	0.08	0.13	0.2	0.2	0.3	0.3
75,000	-	0.05	0.07	0.10	0.14	0.2	0.2	0.2
100,000	-	0.04	0.06	0.09	0.12	0.15	0.2	0.2

For about 68 out of 100 possible samples, the average median from all possible samples would lie between these two values.

A two-standard error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1. For about 95 out of 100 possible samples, the average median from all possible samples would lie between these two values.

Illustration of the computation of the 95-percent confidence interval for a median. Table 0 of this report shows the median earnings of workers with earnings was $8,200. The base of the distribution from which this median was determined is 66,212,000.

1. From table A-2., the standard error of a 50-percent characteristic on the base of 66,212,000 is 0.2 percentage points.
2. To obtain a two-standard error confidence interval on the estimated median, add to and subtract from 50 percent twice the standard error determined in step 1. This yields percentage limits of 49.6 and 50.4.
3. From table 0, it can be seen by cumulating the frequencies for the first four categories that 32,360,000, or 48.9 percent had earnings less than $8,000 and that an additional 7,475,000, or 11.3 percent had earnings from $8,000 to $9,999. By linear interpolation, the lower limit of the 95-percent confidence interval is found to be about $8,124.

$$\$8{,}000 + (\$10{,}000 - \$8{,}000)\left(\frac{49.6 - 48.9}{11.3}\right) = \$8{,}124$$

Similarly, the upper limit of the 95-percent confidence interval is found to be about $8,265.

$$\$8{,}000 + (\$10{,}000 - \$8{,}000)\left(\frac{50.4 - 48.9}{11.3}\right) = \$8{,}265$$

Thus, the 95-percent confidence interval ranges from $8,124 to $8,265.

Means. For the means presented in certain tables, the sampling error depends on the sample size, design of the sample, and the estimation procedure, as well as on the size of the base and on the distribution upon which the mean is based. To get an approximation of the standard error of a mean, the following formula can be used:

$$\sigma_{\bar{X}} = 41\sqrt{\frac{\left(\sum_{i=1}^{c} P_i X_i^2\right) - \left(\sum_{i=1}^{c} P_i X_i\right)^2}{Y}}$$

where c is the total number of classes,

P_i is the proportion of total cases in the ith class,

X_i is the midpoint of the ith class, with the midpoint of the upper open-ended class taken to be 3/2 times its lower limit,

$\bar{X}$ is the mean,

Y is the base of the distribution,

and 41 is a constant which depends on the sample size, the sample design, and the estimation procedure.

Illustration of the computation of the standard error of a mean. Table 2 shows a distribution of travel time to work of all workers living in central city of an SMSA and working in the SMSA of residence but outside the central city. The mean travel time to work as shown in this table is 24.0 minutes. From this distribution, we can calculate

$$\left(\sum_{i=1}^{c} P_i X_i^2\right) - \left(\sum_{i=1}^{c} P_i X_i\right)^2$$

to be approximately 244.3. The base of the distribution is 3,700,000. Therefore, the standard error of the mean 24.0 is approximately 0.3 minutes. Consequently, the 68-percent confidence interval of 24.0 minutes is from 23.7 to 24.3 minutes; the 90-percent confidence interval is from 23.5 to 24.5 minutes; and the 95-percent confidence interval is from 23.4 to 24.6 minutes.

Nonsampling Errors. In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data. As can be seen from the above list, nonsampling errors are not unique to sample surveys since they can, and do, occur in complete censuses as well.

Also, many of the DOT Travel-to-Work Supplement interviews were conducted by proxy. That is, the responses for a particular worker were given by someone else who perhaps is not as knowledgeable as the worker would be. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Hence, it is possible that biases due to proxy interviewing are present in the data. However, the magnitude of these biases, as well as other nonsampling errors, for the DOT Travel-to-Work Supplement are unknown.

Obtaining a measurement of the total nonsampling error associated with the estimates from a survey is very difficult, considering the number of possible sources of errors. However, an attempt was made to measure some of the nonsampling errors associated with the estimates for both the 1970 Census of Population and Housing and the 1975 AHS-National.

1970 Census. A number of studies were conducted to measure two types of general errors associated with 1970 census estimates: "Coverage" and "Content" errors. The

"coverage" errors determined how completely housing units and people were counted in the census. The "content" errors measured the accuracy of the data collected for enumerated housing units and people. These errors were measured by reinterviews, record checks, and other surveys.

The detailed results of these studies on coverage and content errors, as well as the methodology employed, can be found in the 1970 Census of Population and Housing Evaluation and Research Program reports PHC(E)-5, **The Coverage of Housing in the 1970 Census;** PHC(E)-10, **Accuracy of Data for Selected Housing Characteristics as Measured by Reinterviews;** PHC(E)-4, **Estimates of Coverage of Population by Sex, Race, and Age: Demographic Analysis;** and PHC(E)-9, **Accuracy of Data for Selected Population Characteristics as Measured by Reinterviews.**

Reinterview Program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the AHS-National sample, a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-National data. A reinterview program was conducted for a subsample of the AHS households. These households were revisited and answers to some of the questions on the AHS questionnaire were obtained again. The original interview and the reinterview were assumed to be two independent readings and thus were the basis for the measurement of the "content" error of these AHS estimates. As part of the reinterview, an additional check was carried out for interviewer evaluation and quality control. A check was made at each of these households to determine if the following was done during the original interview:

1. The correct unit was visited.
2. The correct number of housing units were interviewed at that address.
3. The correct information on "Year Built" was obtained.
4. The correct information on "Tenure" was obtained.
5. The correct information on "Household Composition" was obtained.
6. The correct information on "Type of Housing Unit" was obtained.
7. The correct information on "Occupancy Status" was obtained.

The results of the reinterview study are presented in the following Census Bureau memorandum: "Response Error in the Annual Housing Survey Data — Year III, National Sample." Some of these results are:

1. Approximately 75 percent of the nonattitudinal items showed low levels of inconsistency in response.
2. For the attitudinal items, most of the indices showed moderate levels of inconsistency for the reinterview sample in which reconciliation was done, i.e., after the question is answered in the reinterview, the enumerator presents the previous responses and then asks the respondent to decide upon the best answer. However, approximately one-half of the items showed high levels of inconsistency for the reinterview sample in which no reconciliation was done. Moderate levels of inconsistency in response indicate that there is some problem with inconsistent reporting; whereas, high levels indicate that improvements are needed in the method used to collect these data or that the category concepts themselves are ambiguous.
3. Reinterview results indicated that biases exist in some of the original survey distributions, most of which occurred in the attitudinal items concerning neighborhood conditions and assessing the adequacy of neighborhood services.

The 1970 census reinterview results provide illustration of possible nonsampling errors for some of the items which also appear in the AHS. For example, median value of homes was consistently underestimated by about 5 percent, and the average monthly costs of electricity and utility gas were consistently overestimated although the net effect on average gross rent was fairly small.

A possible explanation for the results of the AHS and census reinterview studies, as well as the surveys themselves, is that the data are based on the answers given by the respondent, who may lack precise information. Also, the results of the reinterview studies are derived from sample surveys so there is sampling error associated with these estimates of nonsampling error. Therefore, the possibility of such errors should be taken into account when considering the results of these studies.

Coverage Errors. With respect to errors of coverage and estimation for missing data, it is known that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction in permit-issuing areas and new construction mobile homes. During the sampling of building permits, only those issued January 1, 1970 or later were eligible to be sampled to represent conventional new construction in permit-issuing areas. It had been assumed that units with permits issued prior to 1970 would have been completed by the time of the 1970 census (i.e., April 1970), and therefore would have been represented in the sample selected from 1970 census units. However, it has been estimated that the 1975 AHS sample misses about 6 percent (i.e., about 600,000 units) of all conventional new construction (i.e., all conventional housing units built after April 1970, in both permit-issuing and nonpermit-issuing areas) because the permits for these units, which were built after April 1970, were issued before January 1970.

Also, during the sampling of building permits, only those issued more than 5 months prior to the survey were eligible to be sampled to represent conventional new construction. Due to time constraints, it is not possible to select units whose permits are issued less than 5 months in advance of the survey. It has been estimated that the 1975 AHS sample misses about 2 percent (i.e., about 200,000 units) of all conventional new construction (i.e., all conventional housing units built after April 1970) because the permits for these units, which were built before October 1975, were issued less than 5 months in advance of the survey.

In addition, unlike the procedure for conventional new construction, there was no sampling procedure specifically for new construction mobile homes. However, new mobile homes located in ED's where area sampling methods were used are represented in the AHS sample. In addition, new mobile homes located in mobile home parks sampled from the 1970 census address frames also are represented. However, new mobile homes located in mobile home parks not in existence at the time of the 1970 census have no chance of representation in the AHS sample. It has been estimated that the 1975 AHS sample misses about 15 percent of all new mobile homes (i.e., about 300,000 units).

Finally, it is felt that deficiencies also exist in ED's where area sampling methods are used. As before, it had been assumed that all units located inside these ED's would be represented in the sample. But the 1975 AHS sample has been estimated to miss as much as 2 percent (i.e., as much as 400,000 units) of all housing units in ED's where area sampling methods are used because these units are not listed during the canvassing.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators have no chance for enumeration in the DOT Travel-to-Work Supplement. The second stage of ratio estimation corrects for these deficiencies as far as the count of persons in the age-race-sex cells are concerned. However, biases associated with estimated characteristics of these age-race-sex categories may still remain.

Rounding Errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages, median distance, median speed, and median amount of time when these figures are derived from relatively large bases. This means that confidence intervals formed from the standard errors given may be distorted and this should be taken into account when considering the results of the survey.

Appendix B. Facsimile of the Travel-to-Work Supplement

↓ ~ PGM 5

Line number of person (388) | Line number of respondent (389)

If last worker in this household, mark this box → ☐

3a. What is . . . 's principal means of transportation to work?

(390) 1 ☐ Truck . . . . .
2 ☐ Car or carpool

(391)
1 ☐ Drives alone – *Skip to 4a*
2 ☐ Shares driving . . . . . .
3 ☐ Drives others . . . . . .
4 ☐ Rides with someone else
} *Skip to 3c*
5 ☐ Walks only – *Skip to 4a*
6 ☐ Works at home – *Skip to 8a*
7 ☐ Railroad
8 ☐ Subway or elevated
9 ☐ Bus or streetcar
10 ☐ Taxicab
11 ☐ Motorcycle
13 ☐ Bicycle
12 ☐ Other means – *Specify* _____

b. Does . . . usually ALSO use a car for part of the trip to work?

(392) 1 ☐ Yes 2 ☐ No – *Skip to 4a*

c. How many people, including . . . , usually ride in the car to work?

(393) _____ Number

4a. Does . . . usually WORK at the same location each day?

(394) 1 ☐ Yes – *Skip to 4c* 2 ☐ No

b. Does . . . usually REPORT to the same location to begin work each day?

(395) 3 ☐ Yes 4 ☐ No – *Skip to 8a*

c. Where is . . . 's usual place of work?

(1) Company or business establishment name

(2) Address *(Number and street)*
Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description.

(3) Names of nearest intersecting streets

(4) Name of city, town, village, borough, etc.

Place type →

(5) County

State | ZIP code

4d. Is . . . 's place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 4c(4))?

(396) 1 ☐ Yes 2 ☐ No 3 ☐ Don't know

5. What time does . . . usually leave for work?

(397) _____ Time

(398) 1 ☐ a.m.
2 ☐ p.m.

6. How long does it usually take . . . to get from home to work?

(399) _____ Minutes

7. What is . . . 's ONE-WAY distance from home to work?

(400) _____ Miles **OR** 0 ☐ Less than 1 mile

8a. In the last year, has . . . changed his principal means of transportation to work?

(401) 1 ☐ Yes 2 ☐ No – *Skip to 9*

b. What was . . . 's principal means of transportation to work (prior to the change)?

(402) 1 ☐ Truck . . . . .
2 ☐ Car or carpool

(403)
1 ☐ Drove alone
2 ☐ Shared driving
3 ☐ Drove others
4 ☐ Rode with someone else
5 ☐ Walked only
6 ☐ Worked at home
7 ☐ Railroad
8 ☐ Subway or elevated
9 ☐ Bus or streetcar
10 ☐ Taxicab
11 ☐ Motorcycle
13 ☐ Bicycle
12 ☐ Other means – *Specify* _____

9. If "Yes" marked in 8a – *ASK* **Compared to . . . 's previous means of transportation to work** (Given in 8b), **how satisfied is . . . with his present means of transportation to work – much more, more, about the same, less or much less satisfied?**

If "No" marked in 8a – *ASK* **Compared to a year ago, how satisfied is . . . now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied?**

(404) 1 ☐ Much more satisfied
2 ☐ More satisfied
3 ☐ About the same satisfaction
4 ☐ Less satisfied
5 ☐ Much less satisfied
6 ☐ Don't know
7 ☐ Did not work last year

INTERVIEWER Be sure to transcribe items 2c, 3a, 3b, 6 and 7 for head of household to items 82a–e on page 13 of AHS-2 questionnaire.

Ask Question 10, page 39, for the HEAD

FORM AHS-2 (4-17-75)

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