

Commuting Constraints on Black Women: Evidence from Detroit, Michigan

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In general, the commuting literature associates the use of a private automobile, working in a low-wage job, or being a working mother with a shorter commute time. There is growing evidence, however, that this general pattern does not hold for minority women. This paper reports findings from a study that focuses on the journey to work of black women. The study is based on Public Use Microdata Samples (PUMS) for metropolitan Detroit. The analysis controls for automobile use, occupation, income, parental status, and workplace location. First, the findings show that over the years, as more black women have more access to automobiles, there is reduced racial disparity in the duration of the journey to work. The study then examined (a) opposite direction commuters and (b) residents of Detroit central city. Compared to black reverse commuters, the long commutes of suburban white women with central city work locations are less constrained. Multiple analysis of variance revealed that traveling to suburban destinations in the Detroit metropolitan area imposed more commuting time constraints on black service workers than on white counterparts.

Keywords: commuting, spatial mismatch, race, African-American women

The early works of McLafferty and Preston (1991, 1992) and Preston et al. (1993) found significant racial and ethnic differences in commuting behavior among African-American, Latina and European American women in the Greater New York area and alerted geographers of the importance of recognizing the diversity of women's spatial behavior. There are now several studies on the commuting behavior of different groups of women, but the commuting behavior of minority women in particular is still understudied.

In one of the first studies to examine racial differences in women's commuting for both 1980 and 1990, Johnston-Anumonwo (1995) analyzed census data for Buffalo, NY and found that suburban employment imposes longer commute times on African-American women than on European-American women. Those results are consistent with the spatial mismatch hypothesis which emphasizes the adverse effects of job suburbanization on African-Americans. One main contribution of the Buffalo study is that analysis of data on work location provides a clear assessment of the existence and nature of commuting difficulties that African-American women face when they work in suburbs. It is possible that the results for Buffalo could inform analysts about racial differences

in commuting among women in cities with equally high and persistent levels of segregation.

There is still a dearth of studies focusing on racial differences among women in U.S. cities. Can the findings for New York City and Buffalo be replicated in other contexts that are not in metropolitan areas of New York State, especially not in the Northeast? The purpose of the present study is to replicate the Buffalo analysis for Detroit, a metropolitan area that ranks high in many aspects of racial polarization, especially racial residential segregation. Following a review of the background literature and a description of the study's data and methods, the findings are presented. The study's findings highlight the commuting difficulties of African-American women relative to those of European-American women in Detroit.

Background and Rationale

Inquiries about racial disparities in employment accessibility are pertinent to the spatial mismatch hypothesis (Kain 1968; see also Holzer 1991 for a review). According to the hypothesis, the rapid increase in suburban employment and the continuing segregation of African-Americans in inner cities

contribute to a spatial mismatch such that black inner city residents face difficulties in reaching the growing employment opportunities in suburban centers. There has been little change in the residential segregation of blacks between the 1960s and the present (Darden 1990; Denton 1994; Massey and Hajnal 1995).

Although early research on the effects of decentralized employment on the job accessibility of African-Americans rarely included female workers, in the past decade, research on female workers generally showed that black women commute longer than white women (e.g., Madden and Chen Chiu 1990, McLafferty and Preston 1991, 1992, 1996, 1997; Preston et al. 1993; Johnston-Anumonwo 1995 and 1997). The research finding that being black is associated with longer work-trip times may be explained by racial differences not only in automobile availability but also in socioeconomic and locational variables known to affect journey-to-work time.

According to the literature on commuting, workers who use public transportation and those employed in male-dominated high-income occupations such as professional and managerial jobs have longer work-trip times than those who use a private car or those who work in service or low income jobs (e.g., U.S. Department of Commerce 1982; Hanson and Johnston 1985; Pisarski 1987; Gordon et al. 1989; Dubin 1991; Cooke and Shumway 1991; Ihlanfeldt 1992; Wyly 1996; McLafferty and Preston 1997). Empirical evidence about the role of domestic responsibility on travel time is mixed, but in a study on women's travel time across racial groups, Preston et al. (1993) found that black mothers had longer travel times than did white mothers irrespective of central city or suburban residence.

While differences in the residential, occupational, income and household characteristics of black and white women are well documented, we still do not know much about the ways in which the commute lengths of black and white¹ women vary as a result of suburban versus central city work location because only a handful of studies have examined the influence of workplace location (e.g., Zax 1990, Johnston-Anumonwo 1995, 1997). And even though the spatial mismatch hypothesis emphasized access to suburban employment, there are still very few empirical analyses

of the role of suburban workplace location on the commuting behavior of black women.

Zax's (1990) study of commuting in Detroit does examine workplace location. Based on 1980 data, he found that blacks who worked in the CBD worked closer to home than whites, but for suburban destinations blacks commuted longer than whites. He interpreted this difference in commuting patterns as evidence that racial residential segregation restricts black suburbanization and contributes to longer commutes for blacks who have to work in suburban Detroit. The present study investigates whether black working women in Detroit metropolitan area experience greater commuting difficulties than white women while taking into consideration racial differences in key factors that affect work-trip time, namely, automobile use, occupation, income and child status as well as workplace and residential location. With the exception of Wyly's (1996) study of Minneapolis-St Paul, recent empirical studies of the racial disparity in women's commuting length have examined cities in the Northeast. This study shifts the focus to a Midwestern city with a relatively large percentage of blacks by examining 1990 and 1980 data for Detroit, Michigan.

In the Detroit metropolitan area, the black population constitute 21.5 percent of the population, but 75.7 percent of those who live in the Detroit central city are blacks (U.S. Dept. of Commerce 1993). The majority of blacks continue to live in segregated neighborhoods in Detroit (Darden et al. 1987; Darden 1994). The level of racial residential segregation in Detroit has consistently been one of the highest among U.S. cities, a situation that continues through the 1990s. Some researchers have cited Detroit as the most segregated urban area in the country (Farley et al. 1994; USA Today 1991). Detroit is also a classic example of a United States city that experienced massive de-industrialization when manufacturing employment declined in the urban economy, moving out of the central city to the suburbs. As manufacturing jobs decreased, service jobs increased. In general, all jobs decentralized. Therefore, one can expect to find evidence of journey-to-work constraints for blacks in Detroit. The results for Detroit could illustrate job access constraints that black women face in the context of acute residential segregation.

The research questions examined in the study are similar to those for the Buffalo study: do black women in Detroit spend a longer time commuting than white women? Does unequal access to an automobile lead to differences in the journey-to-work time of black and white women? If so, when auto use is held constant there should be no difference in the work-trip times of black and white workers. Are there continuing racial differences in commute times among women with similar socioeconomic backgrounds? And, is location of the workplace responsible for any racial differences in commuting?

Data and Methods

The data examined are the 1990 five percent and 1980 one percent Public Use Microdata Samples (PUMS) for Detroit MSA. The PUMS is a disaggregate database with information on individuals' socioeconomic characteristics and their locational and work-trip attributes. Much of the discussion in this paper focuses on the 1990 results because the larger sample sizes enable more accurate conclusions. In 1980 there was no five percent PUMS sample for the Detroit MSA; only the one percent PUMS sample covered the metropolitan area. Furthermore, in 1980 due to budget cut backs, the Census Bureau processed only half of the responses about the journey to work, so the sample sizes for 1980 are much smaller than for 1990.

While socioeconomic and demographic information provided in the PUMS is quite detailed, details about geographic information are not provided for public use in order to protect the confidentiality of respondents. Only two geographic categories are used for this study: central city location and non-central city location (i.e., suburb). Work-trip length is available in the PUMS dataset as travel time, the actual number of minutes spent from home to work as reported by the respondent. The travel modes examined are public transportation or private automobile. Workers are classified into four standard census occupation groups (agricultural workers not included). The measure for income is the worker's annual salary. The Census Bureau specifies 'race' as white or black based on respondents' self-classification (U.S. Department of Commerce 1992).

Only white and black employed females sixteen years old and older were selected for the study. There are

25,150 white women and 5,411 black women represented for 1990; but because of the data limitations noted above for 1980, there are only 2,802 white and 641 black women represented in the 1980 analysis. Racial differences in travel time are assessed using t-test statistics (two-tailed), while the influences of the various factors on women's travel time are examined through a multiple analysis of variance. The results are presented in the next section, starting with racial differences in the mode of transportation used for the work trip.

Results

Racial Differences in Women's Transportation Mode and Travel Time

Black female workers in Detroit were not as dependent on public transportation in 1990 as they were in 1980, but a much higher proportion of black women than white women still use public transit for their work trip (Figure 1). In 1990, 10.9 percent of black women used public transit compared to 0.8 percent of white women (versus 16.7 percent and 1.9 percent respectively in 1980).

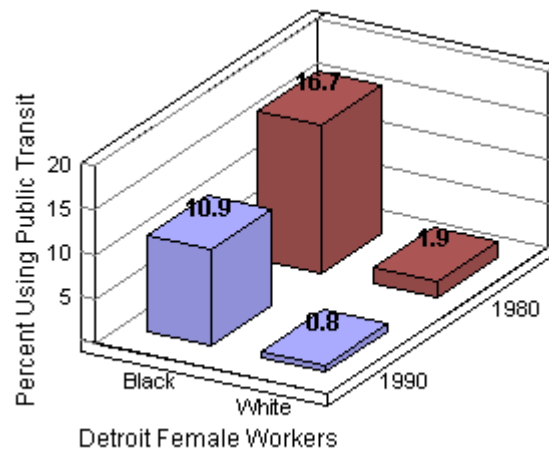


Figure 1: Women's public transit use in Detroit, 1980 and 1990

The results for the time spent traveling to work show that black women in metropolitan Detroit spent longer times than white women. The mean travel times are shown in Table 1. Black women spent 23.9 minutes

versus 21.1 minutes for white women in 1990 (t-values are significant at $p < 0.05$). This racial gap is smaller than in 1980 when there was a six-minute disparity (25.5 versus 19.2 minutes).

Since more black women use public transit, and since research shows the pronounced lengthening effect of public transit on workers' commute times (e.g., Taylor and Ong 1995; McLafferty and Preston 1992 and 1997), I control for travel mode and examine only auto users. All subsequent comparisons in the study about racial differences in travel time are restricted to respondents who used a car. When the travel times of auto users are compared, the racial difference reduced to only one minute although this difference is still statistically significant (22.3 minutes and 21.2 minutes in Table 1).

Table 1 Racial Differences in Detroit Women's Commuting (1990 PUMS 5%)

	Black Women	White Women
Full Sample (N)	5411	25150
% who use transit	10.9	0.8
Total travel time (minutes)	23.9	21.1 ^{a,b}
Travel time of auto users	22.3	21.2 ^{a,b}

^asignificant at $p < 0.05$; ^b also significant in 1980

The disproportionate use of public transit by black women therefore partly accounts for their relatively longer commutes. Greater dependence on public transit does not, however, offer complete explanation for continuing differences in women's work trips because, when the sample of workers is broken down by socioeconomic status or by workplace location, significant racial differences persist in the commuting time of many women auto users. The continuing racial differences in travel time among women with similar socioeconomic and locational profiles are reported below.

Racial Differences in Travel Time after Controlling for Socioeconomic factors

The socioeconomic factors examined are occupation, income, and the presence of children in the household. First, I examined racial disparities in work trip length of women across different occupation groups. In 1990,

there are no significant differences between black women and white women who are craft workers, who are in clerical, sales and technical occupations, or who are professionals and managers (i.e., non significant differences in Table 2). There are however, large and significant racial differences among women who are service and industrial workers. Black female service and industrial workers in Detroit spend over four minutes longer than white female service and industrial workers (the racial gap was over seven minutes for the 1980 sample).

Also, as shown in Table 2, black low income female workers spend a longer time for their work trip than white low income workers (20.7 minutes versus 17.8 minutes in 1990); and black mothers spend a longer time than white mothers (significant differences in Table 2). These significant results contradict the usual expectation that low-income workers or workers with household responsibilities for children will have shorter commutes. Instead, in both years, in spite of the constraints, low-income black women and those with children endure longer commutes than their white counterparts. We now look at women with the same workplace location.

Table 2 Mean Travel Time (minutes) controlling for socioeconomic variables (auto users only)

	Black Women	White Women	
Professionals/Managers	22.7	23.3	ns
Sales/clerical/technical	21.8	21.2	ns
Service workers	21.5	17	a, b
Craft workers	22.8	22.9	ns
Industrial workers	24.5	20.3	a, b
Low-income workers	20.7	20.3	a, b
Mothers	23	20.8	a, b

a - significant at $p < 0.05$; b - also significant in 1980; ns - not significant

Racial Differences in Travel Time after Controlling for Workplace Location

Work trips that originate and terminate in the same general area are likely to take a shorter time than those that start in one area and end in another area. For instance, trips that start in the suburbs and end in the

central city may take longer than those that originated and terminated in the suburbs. In other words, opposite direction trips generally take a longer time than intra-area trips (Hanson and Johnston 1985; Johnston-Anumonwo 1995). Thus, racial differences in geographic location of the workplace *vis a vis* the home are likely to contribute to racial gaps in commute times. It is necessary then to control for location.

When workplace location is controlled, significant racial disparities in travel time are observed among the working women in Detroit. In 1990, among those with work trips to central city destinations, white women auto users spent over seven minutes longer than black women, 28.5 versus 21.3 minutes (Table 3). In 1980, the trip time of white women with central city destinations was not different from that of black women. For work trips with suburban destinations, black women spent about three minutes longer than white counterparts in 1990 (Table 3). In 1980, they spent over five minutes longer than white counterparts.

Table 3 Mean Travel Time (minutes) Controlling for Workplace and Residential Location (auto users only)

	Black Women	White Women	
Central city workplace	21.3	28.5	a
suburban workplace	23.4	20.3	a, b
Central city residents	22.5	21.6	ns
Reverse commuters	25.4	23.5	a, b

a - significant at $p < 0.05$; b - also significant in 1980; ns - not significant

These findings as displayed in Figure 2 simply show that: (a) white women with central city work locations have much longer commutes than the black women, and (b) black women with suburban work locations have longer commutes than the white women. Note that among all auto users, white women with Detroit central city workplaces are the group with the longest average commute time in the study (this point is examined further later on in the paper).

Precisely because the spatial mismatch hypothesis is concerned with the situation of inner city workers who are posited to suffer from distant suburban employment, I restricted the remaining comparisons on location effects to respondents with central city

residence. There were no significant differences in the travel time of black and white women who resided in Detroit central city (shown in Table 3). When the focus is on those workers who reverse commute, however, it is revealed that in both years, black central city residents who traveled to suburban work locations (reverse commuters) spent a longer time than white women. In 1990, black women spent about two minutes longer than white reverse commuters – 25.4 minutes versus 23.5 minutes (Table 3). (The disparity was 4.7 minutes in 1980).

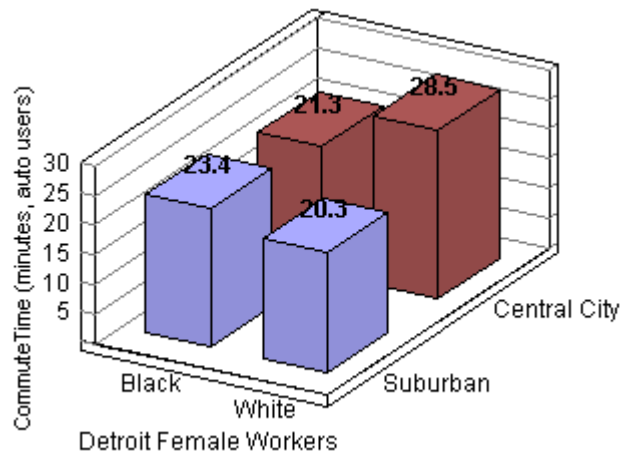


Figure 2: Mean commute time for auto users controlling for workplace location (1990)

To summarize, the results show that for the full sample of auto users, black women with work locations in central city Detroit did not spend a longer time commuting than white women with work locations in central city Detroit; but black women with work locations outside the central city of Detroit commuted longer than white women with work locations outside the central city of Detroit. The converse situation applied for whites. The lengthening effect of opposite direction commute can be inferred from these results.

In fact, since the average travel time of white women with central city destinations was five minutes longer than the average travel time of the black women with suburban destinations (28.5 minutes versus 23.4 minutes – Table 3 and Figure 2), the key question becomes: are the white women with central-city work destinations more "disadvantaged" by their long work trips in 1990? To answer this question, I concentrated on opposite direction commuters. I singled out white

women who lived in the suburbs but worked in the central city (n=2173) and black women who lived in the central city but worked in the suburbs (n=1389) and looked for racial differences.

Racial Differences in Socio-demographic Characteristics of Opposite Direction Commuters

Since the overall average travel time for Detroit workers in 1990 was under 24 minutes (U.S. Department of Commerce, 1993) then relatively speaking, the white women who commute from the suburbs to the central city (average commute of 30.6 minutes in 1990) and the black women who commute from the central city to suburban jobs (average commute of 25.4 minutes in 1990) are two groups with long commutes. The characteristics of these two groups of opposite direction commuters showed major contrasts in occupations, income and child status. For example, 41.9 percent of white women with the long suburb-to-city commutes are in managerial jobs, and only 7.5 percent are in service occupations compared to 16.8 and 17.8 percent respectively of black women in both occupations (Table 4). The average annual salary of black women who work full time (35 hours or more a week) is also lower than for white women (\$21,770 versus \$26,967). Lastly, regarding child status, which distinguishes between non-mothers and mothers, white women with long commutes are less likely to be mothers compared to black women who reverse commute.

Table 4 Characteristics of Opposite Direction Commuters (auto users only)

	Black Women City-suburb	White Women Suburb-city
Total	1389	2173
Travel Time (minutes)	25.4	30.6
Managerial/Professional (%)	16.8	41.9
Service workers (%)	17.4	7.5
Mothers (%)	41.5	29.3
Full time income (US\$)	21770	26967

These results constitute important qualitative differences between white and black working women. Aside from their longer average travel time, the white suburb-to-city commuters (whose relative proportion is small) are comparatively well placed by their higher socioeconomic status and fewer dependent children. Since black women reverse commuters earn much less and appeared to have greater child care responsibilities, they can be considered to be more disadvantaged. Certainly the long commutes of white women cannot be considered more inconvenient than the long commutes of the black women.

The final set of comparisons focused on white and black women who live in the central city. This multi-variate analysis shed light on which specific groups of workers suffer constrained work trips due to reverse commuting.

Racial Differences in the Travel Time of Reverse Commuters

The separate and combined effects of race, workplace location, occupation and income on the commuting time of central city residents in 1990 are examined through a multiple Analysis of Variance (ANOVA). As before, only auto users are included and agricultural workers are excluded. Income is a co-variate. F-ratios are reported for the main and interaction effects of the other factors. In order to avoid wrongly identifying differences as significant, I conducted Scheffe tests to help interpret pairs of groups whose mean times are significantly different at $p=0.05$.

As shown in Table 5, travel time is positively associated with income, while race, occupation, and place of work all have significant effects on Detroit women's travel time (with place of work having the most significant effect). Women with suburban workplaces spend a longer time than those who work in the central city; black women spend a longer time than white women; and professional women spend a longer time than women in service jobs. There is an interaction effect between race and occupation whereby white service workers spend a significantly shorter time than white in all the other occupational categories; however, the travel times of black women in the different occupation groups are not significantly different. There is also an interaction effect between occupation and place of work.

Therefore, although Figure 2 suggests that central city employment generated less travel time for black women while suburban employment generated more travel time expenditure for black women when compared to white counterparts, the more exacting inquiry of the multivariate analysis has isolated the precise character of the commuting constraint faced by Detroit inner city black women in 1990. The results show that the longer travel times of black female service workers reported earlier in Table 2 arose from trips to suburban destinations.

Table 5 Multiple ANOVA: F-Statistics for Women's Travel Time Controlling for Race, Occupation and Workplace Location

N ^a	4460
Covariate	
Income	22.2 ^b
Main Effects	
Race	13.6 ^b
Occupation	2.6 ^b
Place of work	132.5 ^b
Interaction Effects	
Race * Occupation	4.5 ^b
Occupation * Place of work	5.5 ^b
Race * Place of work	0.5 ^c
Race * Occupation * Place of work	0.8 ^c

^a auto users only. Only respondents with data on income are included; ^b significant at p<0.05; ^c not significant

Indeed, one question that was examined in the Buffalo study was whether black female workers in particular occupations experienced the constraint of employment suburbanization more than white counterparts. A particularly striking finding of the multiple analysis of variance for Detroit is summarized in Table 6. It shows that in 1990, black sales, clerical and technical workers who reverse commute do not spend a longer time than white sales, clerical and technical workers (23.6 and 23.9 minutes); but black service workers who reverse commute spend almost six minutes longer getting to work than white service workers (25.7 and 20 minutes).

Since these comparisons are conducted only for auto users, the findings show that even when access to an automobile is not a hindrance, black female service workers in Detroit city still bore a bigger time "cost" than white counterparts when they have to work in suburban destinations. Also, since these are employed women, the results counter the welfare queen stereotype of black women. Lastly, these findings parallel the conclusions for Buffalo that although there is a reduced racial gap between 1980 and 1990, the time cost for black women service workers is not trivial. For instance the cumulative time of a two-way trip is quite considerable, and it amounts to time lost from other work or non-work tasks.

Table 6 Interaction Effect of Occupation and Race: Mean Travel Time (minutes) of Reverse Commuters by Occupation (auto users only)

	Black Women	White Women
Travel time of:		
• sales/clerical/technical workers	23.6	23.9
• service workers	25.7	20.0

Discussion and Conclusions

The findings of this study show that over the years, as more black women have access to automobiles there is reduced racial disparity in the duration of the journey to work (see also Taylor and Ong 1995). Indeed by 1990, among women who use private vehicles in Detroit, black women overall spent only one minute longer travelling than white women. When the geographic location of the workplace is considered, however, it is the white women who commute from suburban homes to central city work locations who have the longest travel times. Not only are these suburban white women proportionately fewer in number, their long commutes are to disproportionately high status managerial and professional jobs located in the Detroit central city. These commutes are therefore relatively less constrained than the long commutes of inner city black women.

These findings from Detroit 1990 and 1980 data about racial differences in women's commuting

behavior are very close to the findings of McLafferty and Preston (1991, 1992, 1996, 1997) for metropolitan New York and those by Johnston-Anumonwo (1995 and 1997) for Buffalo. In those metropolitan areas as well as in Detroit, black female workers in service occupations are found to have significantly longer commute times than white counterparts. Also, a central line of inquiry in this study was the specific impact of suburban employment on women's commuting. As in the case of working women in Buffalo, commuting to suburban destinations of Detroit metropolitan area places more time constraints on black women than on white women. Especially among Detroit central city residents, the findings about the longer commutes of black service workers who reverse commute in 1990 underscore the notion that if employment opportunities in service occupations continue to expand in suburban locations and not in central city locations, black women (even those who use a car) suffer the inconvenience of longer commutes to suburban workplaces than do white women.

By ignoring the impact of workplace location on the travel behavior of female workers in specific occupation groups, many previous studies understate racial disparities in women's locational access to jobs. It is important to stress that, like all studies that use commuting data, this study excludes the unemployed, thereby understating employment accessibility constraints. The use of journey-to-work data, however, puts the emphasis on locational access to jobs. Admittedly, the geographical resolution of the available residential and workplace information used for this study is not detailed enough to examine the extent to which black women and white women live and/or work in different sub-areas across Detroit. Future research using more detailed geographic units may uncover racial differences in workplace destinations, especially within suburban areas. In fact, a recent qualitative study of employer hiring practices in suburban Detroit provides stark evidence of racial discrimination (Turner 1997). The study linked findings about spatial mismatch with findings about the negative treatment and harassment of blacks in Detroit suburbs by the police and by white residents to emphasize the multiple barriers facing blacks in gaining access to employment opportunities in suburban Detroit.

In conclusion, this empirical analysis of work trips in Detroit shows reduced racial disparities in access to private automobiles and overall average journey to work time; but it also shows the continued relevance of transportation, race, occupation, and suburban work location in the job access constraints of inner city black women. The study has shed additional light on analyses about racial differences in women's commuting. Geographers are increasingly paying attention to the diversity of women's urban experiences (Gilbert 1997), and moving away from prior generalizations that often lumped all women together. Not all black women face the constraints of long journeys to low-paying jobs. But the evidence from Detroit, matching those of Buffalo and New York metropolitan areas, reinforces the conclusions of McLafferty and Preston (1991) that many black women still experience a very insidious form of spatial entrapment and continue to face significant spatial barriers in traveling to work. The same has been observed for Buffalo (Johnston-Anumonwo 1997). On the basis of long travel times and low incomes, I interpreted the commutes of inner city black female service workers in Detroit as constrained work trips.

Notes

1. This research uses the Public Use Microdata Samples (PUMS) for metropolitan Detroit. In this data set, 'race' refers to respondents' self-identification as a member of racial category. For this study, female respondents in the data set who identified themselves as being either 'black' or 'white' are selected. While it may be likely that most women identifying themselves as 'black' are African-American, and that most identifying themselves as 'white' are European-American, the terms black and white are used in the remainder of the paper, in accordance with the parameters of the data set.

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