How Racial Measures Affect the Estimation of Racial Inequality

Rademakers, Robbert and van Hoorn, André

SEO, Radboud University

11 May 2022

How Racial Measures Affect the Estimation of Racial Inequality

Robbert Rademakers[a] & André van Hoorn[b]

[a] *SEO Amsterdam Economics, Roetersstraat 29, 1018 WB, Amsterdam, the Netherlands. Email: R.Rademakers@seo.nl.*

[b] *Radboud University, PO Box 9108, 6500 HK, Nijmegen, the Netherlands. Tel: +31 243 611 663, Email: Andre.vanHoorn@ru.nl.*

Keywords: Racial disparities; Race measurement; Racial fluidity; Endogenous race; Discrimination; Self-identified race; Assigned race

How Racial Measures Affect the Estimation of Racial Inequality

Abstract

Although racial inequalities are much researched, studies differ on the specific measure of individuals' racial identity that they consider. This can affect the comparability of results across studies and, more importantly, the estimation of racial inequality in society. We estimate the extent of racial inequalities using four common measures of individuals' race. Analyzing the same set of individuals, results confirm that estimated racial inequalities vary greatly depending on the measure of race considered. The endogeneity of measured race with respect to socioeconomic status seems to account for part of the variation in estimated racial inequalities across the four race measures. *(JEL: J15, J71, N32, I32)*

The strict racial hierarchy that historically characterized American society may have waned, but race remains the major factor underlying socioeconomic status inequalities in the U.S. (Billings et al. 2014; Chetty et al. 2020; Collins and Margo 2011; Elder et al. 2012; Oliver and Shapiro 2010). At the same time, estimates of the extent of racial disparities reported in the literature vary widely. In the supplement we document published estimates for the income gap between Whites and People of Color (PoC), which range from a low of 3.2% to a high of 95%. (Table S1).[1] Some of this cross-study variation likely reflects measurement error and related idiosyncrasies. However, the observed extent of differences among racial inequality estimates suggests that systematic factors also matter. Hence, an investigation of potential drivers of observed cross-study variation in the estimated extent of racial status gaps in society may substantially improve our quantitative understanding of these gaps.

This paper empirically assesses the importance of the measurement of individuals' race for estimated racial disparities and thus for the comparability of different racial inequality studies. Studies of racial gaps not only differ in the way they measure a specific socioeconomic outcome but also in the way they measure race. At the same time, boundaries associated with racial categories can be blurred and racial identities can be fluid rather than fixed (Antman et al. 2016; Dahis et al. 2019; Davenport 2020; Omi and Winant 2014). Historically, the largest part of the 20th century was characterized by the one-drop rule, which states that any individual with even one Black ancestor is also Black (Humes and Hogan 2009). Things have changed since then. In 1989, for example, the Supreme Judicial Court of Massachusetts had to assert the race of twin brothers Philip and Paul Malone who

[1] We use capitals to refer to "White," "Person of Color, "Black" and other racial categories as a means to underscore that these categories are human constructs and not naturally existing.

had benefitted from affirmative action. The Court considered, among others, how the brothers had presented themselves socially and were perceived in the community (Ford 1994; Yang 2005). There is also quantitative evidence on racial fluidity deriving from longitudinal analyses of various recent censuses that shows that intra-individual changes in self-identified race are widespread, particularly among Hispanics (e.g., Liebler et al. 2017). More generally, there is a taxonomic challenge in the literature on racial disparities involving the way researchers assign individuals to mutually exclusive racial categories (Charles and Guryan 2011; Kaplan and Bennett 2003; Sen and Wasow 2016). Such a classification can be based on individuals' self-reports or on externally assigned or ascribed race. However, as indicated, these classifications need not be consistent over time, nor relative to one another (Kaplan 2014; Williams 1996). A further issue for racial inequality research is the possible endogeneity of individuals' race (Haney 1994; Rockquemore and Arend 2002; Waters 1990), particularly with respect to socioeconomic status—in addition to the known, reverse effect of race on socioeconomic status (Charles and Guryan 2011; Kaplan 2014; Penner and Saperstein 2008). If individuals' racial identity is partly a function of socioeconomic outcomes, estimates for the causal impact of racial identity on these same socioeconomic outcomes are biased (Antman et al. 2016; Saperstein and Penner 2012).[2]

The empirical evidence in this paper comes from analyzing individual panel data from the National Longitudinal Survey of Youth 1979 (NLSY79). Drawing on theoretical studies of race and racial classification, we identify four commonly used

[2] Greiner and Rubin (2011) provide a more general discussion of challenges involving racial identity as a treatment variable in observational studies. See Akerlof and Kranton (2010), Atkin et al. (2021) and Jia and Persson (2021) for further work on the endogeneity of social identities such as race, ethnicity and caste.

measures of individuals' racial identity. These four measures differ on two important dimensions.[3] The first dimension is whether they are based on self-identified race or on externally assigned race. This distinction is relevant for different reasons. Self-identified race may be more fluid or malleable than assigned race is. Similarly, self-identified race may be less affected by individuals' socioeconomic status than assigned race is. In addition, self-identified race is logically a less important driver of discrimination than externally assigned race is (Charles and Guryan 2011; Roth 2016).[4] Finally, and rather importantly, self-identified race has become the standard measure of race that is officially used by government agencies (Morning 2008; Snipp 2003). The second dimension involves the timing of measurement: the past, specifically race as a pre-adult, or current race (i.e., race when interviewed as an adult or in the present). This dimension is relevant because past/pre-adult racial classification precedes present-day socioeconomic status whereas current/adult race does not. Hence, the problem of reverse causality—socioeconomic status affecting race rather than the other way around—is less severe when using a past/pre-adult race measure than when using a current/adult race one.[5] We further consider inequalities in three areas: personal income, home ownership, and (un)employment (cf. Chetty et al. 2020; Collins and Margo 2011; Oliver and Shapiro 2010). Results confirm that racial measurement has far-reaching implications for estimated racial disparities (Figure I). Among the

[3] Table S2 in the supplement presents the four measures in a 2x2 matrix that also categorizes the studies summarized in Table S1 according to the race measure considered.

[4] This is not to say that self-identified race is unimportant and self-identified race can, in fact, influence assigned race (and vice versa).

[5] Of course, there can still be an omitted variable that affects both past/pre-adult race and current socioeconomic status.

same group of individuals, an estimated racial gap can be more than two-fifths higher, depending on the measure of race considered. Most of this cross-measure variation occurs between self-identified vs. assigned race measures. However, systematic differences between racial inequalities measured using past/pre-adult vs. current/adult race indicate that the endogeneity of race with respect to socioeconomic status also drives part of the observed cross-measure variation in estimated racial inequality.

<Insert Figure I about here>

The main contribution of this paper is that it adds a race measurement component to the large and long-standing literature on racial inequality. Recent advances in this literature include improved accuracy of measures of socioeconomic status and expansion of the range of outcomes considered, e.g., intergenerational mobility (Abramitzky et al. 2021; Chetty et al. 2020; Derenoncourt and Montialoux 2021; Elder et al. 2021; Ward 2021). Relatively less attention has been paid to the measurement of the chief independent variable, race, which is similarly essential. This paper resonates with a small literature that assesses how measurement inconsistencies between self-classifications and interviewer classifications of race affect estimated racial disparities (e.g., Bailey et al. 2013; Elam-Evans et al. 2008; Garcia et al. 2015). Our extension is that we consider a broader set of measurement inconsistencies simultaneously, including past/pre-adult vs. current/adult race, and not only inconsistencies among different race measures at a point in time. Predominantly, by distinguishing between current/adult race vs. past/pre-adult race, we are able to present novel evidence on how the endogeneity of race can affect estimated racial inequalities. By incorporating the potential endogeneity of race, we further connect the emerging literature on endogenous social identities (e.g., Akerlof and Kranton 2010; Atkin et al. 2021) to the study of race and its role in

society.

The chief conclusion we draw from the empirical evidence is that researchers should be very careful to compare racial inequalities estimated using different race measures. At the least, we should avoid the mistake of simply lumping together different race measures—e.g., assigned race and self-identified race—as some prominent studies have done. At the same time, we do not claim that there is a single correct measure of race, and that studies that have not used this particular measure are therefore invalid. Instead, we suggest that the purpose of one's study should guide the selection of a specific race measure over its alternatives. For studies of racial inequality as a result of discrimination we find that a race measure that involves external classification (i.e., assigned race) is more appropriate than a measure based on self-classification. Although assigned race is not an official race measure (Morning 2008; Snipp 2003), the way in which one is perceived by others directly affects the way in which one is treated by others, much more so than self-identification. Concern with an endogeneity bias involving race and current socioeconomic status provides a further selection criterion: the greater this concern, the less appropriate a current race measure is and the more appropriate a past race measure. In addition, the use of longitudinal data can help racial inequality researchers address the endogeneity of race which otherwise would cause an upward bias in estimated inequalities. Overall, we find that we can further our understanding of racial inequality and its anatomy by considering multiple measures of race.

The core of this paper is organized around two empirical parts. The first part documents the extent to which individuals' race is (in)consistent across different race measures. The second and main part estimates and compares estimates of racial inequality using the four measures of race, also considering the potential biasing effect of endogenous race. Below, we first present some background information on the measurement of race and on our empirical approach. We end with a

discussion and conclusion.

I. BACKGROUND: RACE AND ITS MEASUREMENT

The chief concern in this paper is that an individual's race can be measured or operationalized in a number of different ways, none of which is invalid, but these nevertheless lead to significantly different empirical estimates. Historically, race has mostly been seen as a biological phenomenon (see Smedley and Smedley 2005 for an extensive discussion). It was thought to involve different natural categories and considered an innate trait that is hereditary and fixed. In addition, race was seen as involving an unambiguous set of phenotypical characteristics, most notably skin color.

Although there are still people who adhere to such an essentialist view of race, nowadays it is mostly seen as a social construct. Individuals' racial identity is recognized to have biological associations but to be malleable (Davenport 2020; Omi and Winant 2014). This means not only that the racial categories (e.g., "Black" or "White") are themselves the result of social processes but also that individuals' placement within this imagined racial taxonomy is not a primordial given (Cornell and Hartmann 2006; Wimmer 2008). With no objective, biological criteria on which to draw, defining and measuring race can be a challenge. The consensus among social scientists is that race involves a subjective sense of belonging that individuals feel and that leads them to identify with one or more racial categories (Brubaker 2006; Weber 1921). In addition, self-identified race is the measure that is officially used by governments worldwide (Morning 2008). Still, this consensus on race as personal identification and self-categorization is relatively recent. The U.S. census, for instance, has for a long-time measured race predominantly on the basis of visual observation by enumerators that were provided with official race definitions (Bennet 2000; Snipp 2003). This practice changed most drastically with the 1960 census, which was the first that used a mail survey involving self-

enumeration. However, even for the 1970 census, Census Bureau employees still collected data in some rural areas (Levin et al. 1984). In addition, surveys such as the U.S. Census typically recognize only a relatively small set of racial categories, thus limiting the extent of possible self-identification. The U.S. Census, for example, did not include the possibility of multiracial responses until 2000 (Snipp 2003).

Even though self-identification is predominant, there are limitations to such a subjective racial categorization. One such limitation is legal, as evidenced by the above-mentioned example of the Malone brothers who self-identified as having a particular race but were overruled by a Massachusetts judge. A related but more important limitation is that it is insufficient to consider only people's feeling of belonging or their views of themselves for the purpose of understanding the role of race in society. Race is multidimensional and part of what makes race involves other people and their racial categorization and classification of the individual (Morning 2018; Roth 2016). Hence, racial self-identification—as in a survey item asking respondents to indicate their race—captures but one aspect of racial identity. Externally assigned race—as in a classification based on interviewer observation—captures another key aspect of how individuals experience their race (Campbell and Royer 2007; Harris and Sim 2002).[6]

A further challenge in the measurement of race is that racial identity itself is dynamic. Independent from genetic heritability, an individual's racial identity has a strong hereditary component deriving from one's parents and their ancestry. However, these genealogical influences appear strongest during individuals' pre-adult formative years (Helms 1990). As an adult, individuals' racial identity may

[6] The distinction between self-identified vs. assigned race goes by different names. Often used alternatives are internal vs. external race or expressed race vs. ascribed race.

change and thus differ from their identity during their pre-adult formative years. In part, this racial fluidity reflects the fact that racial categories are blurred and the boundaries between them fuzzy. Still, evidence suggests that racial fluidity can occur systematically. On the one hand, it seems that self-identified race is partly a choice between different options (Haney 1994; Harris and Sim 2002; Rockquemore and Arend 2002; Waters 1990). On the other hand, especially assigned race is partly a social outcome. An individual's socioeconomic status, in particular, seems to have a significant effect on how the individual is racially classified by others (e.g., Saperstein and Penner 2012).[7] The possibility that race is fluid over the life course has led researchers to consider individuals' race at specific points in time. Two time points are most common: race measured as an adolescent and as an adult. An individual's racial identity as an adolescent reflects the intergenerational influence of their parents and their race as well as the influence of their pre-adult social environment (French et al. 2006; Helms 1990; Sellers et al. 1998). The racial identity that an adult individual has reflects a sum of influences, both pre-adult influences and many events and changes that have happened since. Examples of major life events associated with intra-individual race change are climbing the socioeconomic ladder (Saperstein and Penner 2012) and marrying a spouse with a certain race (Rademakers and Van Hoorn 2021a). Practically, past or pre-adult race can be measured easily via a retrospective survey item that asks respondents to state the race with which they identified the most in the past (e.g., when they were a pre-adult) or to state their parents' race and their racial upbringing. Longitudinal

[7] There is also widespread critique on the main empirical evidence on the endogeneity of race with respect to socioeconomic status, notably for not considering sTable 1ndividual traits as confounders (e.g., Kramer et al. 2016). In the second empirical part of this paper, we present evidence for the effect of socioeconomic status on racial fluidity with individual fixed effects controlled for.

surveys offer data on individuals' present-day race but also on the race that they had in an earlier survey wave.

Overall, different measures of race exist and are regularly considered in the literature. Researchers tend to use these different measures interchangeably, meaning that there is an implicit assumption that each measure concerns the exact same construct. The most important motivation for this paper is that this assumption is, at best, incorrect and, at worst, misleading. Following the above discussion, we find that race measures can be categorized along two dimensions: (1) self-identified race vs. externally assigned race (e.g., Bailey et al. 2013) and (2) past (or pre-adult) vs. current (or adult) race (e.g., Rademakers and Van Hoorn 2021a) (see, also, Table S2 in the supplement). In the empirical analysis, we assess the relevance of the systematic differences between race measures captured by these two dimensions.

II. DATA AND EMPIRICAL APPROACHES

II.A. Data

II.A.1. Data Source and Sample

Data for the analysis come from the National Longitudinal Survey of Youth 1979 or NLSY79 (Bureau of Labor Statistics 2019). The NLSY79 tracks a nationally representative sample of U.S. citizens born between 1957 and 1964. Starting in 1979, respondents were first interviewed when they were between 14 and 22 years old. Because of data availability, we consider data for the years 1979-1998. For most of the main analyses, the panel comprises up to 82,154 annual/bi-annual observations for 6,670 individuals (see Table S3 in the supplement). On average, individuals are thus included more than 12 times. Because both individuals' measured race and their socioeconomic status can change over time, this longitudinal aspect of the data is a critical feature of the sample that we consider.

II.A.2. Variables and Measures

Measures of Race and Racial Fluidity

As discussed in the previous section, the empirical analysis involves four race measures that differ on two dimensions: (1) whether they refer to self-identified race or to externally assigned race, and (2) whether they refer to past race or to current race. Concerning the first dimension, we measure individuals' self-identified race using the questionnaire item that asks respondents to identify themselves as belonging to one of three race categories: "White," "Black," or "Other." Similarly, we measure individuals' assigned race using the questionnaire item that asks interviewers to classify an interviewee as "White," "Black," or "Other." Following common practice, we dichotomize answers on these race items to distinguish between Whites and People of Color (Black and Other).

Concerning the second dimension, past vs. current race, we use the fact that the NLSY79 has measured respondents' race in multiple waves. Specifically, we measure past race as the race that individuals had at the start of the survey in 1979. Respondents' average age in 1979 was about 17.9 years. Hence, we also use the term pre-adult race in addition to the term past race. Vice versa, we measure current or adult race as the race that individuals had at the end of the sample period in 1998 (at this point, respondents' average age was 36.8 years). We measure both past/pre-adult and current/adult race twice, once based on self-identified race and once based on assigned race. For each individual in the sample we therefore have four different measures of their race. Across these four measures, the percentage of individual observations classified as Person of Color varies between 30.7% (current/adult assigned race) and 38.4% (past/pre-adult self-identified race). Table I provides definitions and details for the key variables that we consider and descriptive statistics.

<Insert Table I about here>

Measures of Socioeconomic Status

The empirical analysis considers three measures of socioeconomic status as dependent variables. The first status indicator concerns individuals' personal income from wages and salary. We measure personal income using the item that asks respondents "How much did you receive from wages, salary, commissions, or tips from all jobs before deductions for taxes or anything else?" The second status indicator concerns home ownership, specifically whether a respondent owns a house (1=yes; 0=no). We measure this status indicator using the item that asks respondents: "About how much do you think your property would sell for on today's market?" This item comes with different answer options, and we classify individuals as non-owners when they explicitly declare that they do not own a house or when they declare that they own a house with a value of $0. The third status indicator concerns (un)employment, specifically whether a respondent has a paid job (1=yes; 0=no). We measure this status indicator using the item that asks respondents: "What were you doing most of last week--working, going to school , or something else?". Together, these three measures provide a comprehensive account of individuals' socioeconomic status at different time points. Data on personal income and employment status (i.e., being employed) are available for all years in the sample. Data on home ownership are available since 1988.

Control Variables

When we estimate empirical models, we always include the following variables as control variables: year/wave, age (birth year) and region fixed effects and dummies for interviewer race. These controls derive from various items included in the NLSY79. The reason for including these controls is to ensure comparability among different years, age groups, statistical regions, and interviewers with different racial backgrounds. As a robustness check, we further consider individuals' gender and the size of their family as added control variables. The reason for not including

these variables in all analyses is the risk of an included variable bias (Ayres 2005; Dobbie and Yang 2021; O'Flaherty 2015; Sen and Wasow 2016). Race is found to affect many different life outcomes, ranging from health status and non-natural death to incarceration and area of residence (e.g., Emerson et al. 2001; Laveist 2005; Pettit and Western 2004). Hence, many standard control variables would themselves partly be outcomes of race and thus "bad controls" (Angrist and Pischke 2009; Cinelli et al. 2020). Our solution to this issue is that we only include gender and family size for a robustness check.[8]

II.B. Empirical Approaches

The two empirical parts of this paper involve a different method. Below, we discuss the two empirical approaches.

II.B.1. Assessing the (In)Consistency of Measured Race Across Race Measures

The measurement of race can affect estimated racial inequalities when measures of race purporting to capture the same thing are, in fact, partly capturing different things. In the first empirical part of this paper, we assess the degree of consistency or inconsistency of measured race across the four race measures. To do so, we first dichotomize each race measure to create two dummy race variables. One of these race dummies indicates whether an individual is a Person of Color (1=yes) whereas the other race dummy indicates whether an individual has White race (1=yes). Because we construct these two race dummies for each measure of race, we have

[8] There are different reasons why these two variables may seem exogenous but are likely partly endogenous and thus bad controls. An example is that race appears to affect male life expectancy and hence the likelihood that a respondent reports that they are male or female. Another example is that race affects the likelihood of incarceration and thus individuals' presence in a household.

eight (=2x4) dummy variables in total (see also Table I).

If measured race is perfectly consistent across the four race measures, an individual with a score of 1 on any of the four Person of Color (White) dummies always has a score of 1 on the other three Person of Color (White) dummies as well. Similarly, perfect cross-measure measurement consistency implies that an individual with a score of 1 on one of the Person of Color (White) dummies should always have a score of 0 on any of the White (People of Color) dummies. In practice, however, it is possible that, at a point in time, an individual classified as Person of Color (White) according to one race measure is simultaneously classified as White (Person of Color) according to one or more other race measures.

The second step in the consistency assessment is to take an individual case with a score of 1 on a selected dummy race variable (e.g., current self-identified race is White) and consider whether this case also has a score of 1 on the seven remaining dummy race variables. We do this for all cases in the sample and calculate the percentage of cases for which the value of another race dummy is also 1. In case the selected dummy race variable indicates that an individual has White race, we are bound to observe high percentages on the remaining three White race dummies and low percentages on the four Person of Color dummies. However, we expect that there are substantial measurement inconsistencies across the four race measures. Hence, percentages can be decidedly smaller than 100% and larger than 0% respectively.

II.B.2. Assessing Racial Inequality Across Different Race Measures

The second and main empirical part of this paper compares estimates of racial inequality using the four race measures and considers race's endogeneity with respect to socioeconomic status as a driver of cross-measure differences in estimated racial inequality. The main empirical model that we estimate for this second part of the analysis is:

$$S_{it} = \beta_0 + \beta_1 W_i + \beta_2 \mathbf{I}_{it} + \beta_3 \mathbf{E}_{it} + \delta_{it} + \varepsilon_{it} \quad (1)$$

where S_{it} denotes the socioeconomic status (in terms of personal income, home ownership, or employment status) of individual i at time t. The key independent variable is W_i, which denotes a dummy variable for having White race based on one the four measures of race that we consider (past/pre-adult self-identified race, past/pre-adult assigned race, current/adult self-identified race, or current/adult assigned race). Moreover, $\mathbf{I}_{it}$ denotes interviewer's race, which we include to control for some possible sources of measurement error. The model further includes year, age and region fixed effects (δ_{it}) as controls. However, for a robustness check, we add gender and family size as further controls ($\mathbf{E}_{it}$) that can be partly endogenous with respect to race (see above). We estimate the model in Eq. 1 using robust standard errors that are clustered at the individual level. To avoid making strict assumptions about the distribution of the estimates, we bootstrap the coefficients for race (W_i).

III. EMPIRICAL RESULTS

III.A. The (In)Consistency of Measured Race

Is individuals' racial identity consistent across different race measures? Descriptive statistics showing that the percentage of individual observations classified as Person of Color can vary between about 30.7% and 38.4% depending on the specific race measure considered already provide strong evidence that there is no perfect measurement consistency across the four measures of race. Table II presents results for a systematic analysis of the (in)consistency of measured race across the four race measures. As expected from the literature on racial fluidity and the formation of race, there can be striking measurement inconsistencies.

<Insert Table II about here>

Concretely, there are many cases in which the same individual is classified as a Person of Color (White) according to one race measure but classified as White (Person of Color) according to another race measure. An example is that out of every 1000 cases where an individual currently *self-identified* as a Person of Color (Row 7 of Table II), there are more than 100 instances for which the individual was currently *assigned* to be White (Column 4 of Table II). Another example is that out of every 1000 cases where an individual *self-identified* as White in the past (Row 1), there are more than 74 instances for which the individual was *assigned* to be a Person of Color in the past (Column 6). At the same time, the measures of race considered in Table II are all thoroughly rooted in the literature. Hence, there is no ground to dismiss one or more of these measures as invalid. Nevertheless, because the specific race measure considered affects the race that an individual is deemed to have, different measures likely also lead to different estimates for the degree of racial inequality in society.

III.B. Racial Inequality Estimated Using Different Race Measures

III.B.1. Baseline Results

Does the measurement of race affect the estimated degree of racial inequality in society? Table III presents average income levels and percentages home ownership and employment for People of Color and Whites using four different race measures to measure and individual's race. These descriptive statistics reveal a significant gap in socioeconomic status between People of Color vs. Whites. This gap exists irrespective of the specific status indicator or race measure considered. People of Color have significantly lower incomes, are significantly less likely to own a house, and are significantly more likely to be unemployed. However, measured averages differ noticeably across the four measures of race, even though they of course refer

to the exact same sample of individuals. Correspondingly, the extent of measured racial disparities differs noticeably across the four measures of race as well.

<Insert Table III about here>

Moving beyond descriptives, Tables S3-S5 in the supplement present results for an analysis of the marginal effect of race on socioeconomic status (see Figure I). These regression results confirm the evidence presented in Table III. For each status indicator, it seems that racial differences in socioeconomic status are always highest when considering current/adult assigned race and always lowest when considering past/pre-adult self-identified race. More generally, estimates for racial inequality typically differ statistically significantly across race measures, as also shown in the graphical summary presented in Figure I. In fact, an estimated racial gap can be more than two-fifths higher depending on the specific race measure considered. As a robustness check, we re-estimate the models including potentially endogenous control variables (Tables S6-S8). Results are highly similar and do not change systematically.

III.B.2. Racial Fluidity and Cross-Measure Variation in Racial Inequality

What explains the observed systematic differences in racial gaps estimated using different race measures? The literature on racial fluidity suggests that an important source of cross-measure variation in racial inequality estimates can be that race is endogenous with respect to status. Because money whitens (Schwartzman 2007), a relatively high-status individual is more prone to leave the assigned Person of Color category and join the assigned White race category, which reduces the average social status among individuals that continue to be classified as Persons of Color and increases the racial gap (e.g., Saperstein and Penner 2012). This is precisely the pattern that we observe in the data. Estimated racial gaps are consistently higher

when considering current assigned race, which can be affected by socioeconomic status, than when considering past assigned race, which cannot be affected by socioeconomic status (Model S3 vs. S4 in Table S3, Model S7 vs. S8 in Table S4 & Model S11 vs. S12 in Table S5).

To dig deeper into racial fluidity as a potential explanation for systematic differences between current/adult and past/pre-adult assigned race, we first consider the relationship between individuals' socioeconomic status and changes in individuals' assigned race. We present results for two types of analyses. The analysis with individual fixed effects included (Table S9) considers how changes in an individual's status affects the likelihood that their assigned race changes to White. The analysis without individual fixed effects included considers the generic effect of an individual's socioeconomic status in a given year on the likelihood that they become seen as White in the same year (Table S10). Results indicate that the probability that a Person of Color comes to be seen as White increases with socioeconomic status, particularly with income (Models S25 and S31; see Table I for details on the measurement of racial fluidity in general and racial whitening and racial darkening in specific). We obtain comparable results when considering racial darkening instead of racial Whitening (Models S28 and S34). Here, we find that losing your house is particularly associated with becoming externally reclassified from White to Person of Color.[9]

[9] To be sure, racial fluidity can also be interpreted as measurement error instead of as a genuine phenomenon. Even in this interpretation, however, errors in measured race are not random but systematically related to socioeconomic status, thus causing biases in racial inequality estimates. We have also considered fluidity in individuals' gender. If racial fluidity is just a matter of measurement error, we would expect to find some fluidity in the survey data on individuals' gender as well. However, in the sample, we did not find any cases of individuals' gender changing

Next, we re-estimate the assigned adult race models from Tables S3-S5 but with individuals' race in the previous wave included as an additional control variable. In case of racial fluidity, individuals' assigned race in an earlier wave deviates from individuals' current assigned race. At the same time, there is no reverse causality between current socioeconomic status and assigned race in an earlier wave. Hence, this analysis provides more direct evidence that racial fluidity affects estimated racial inequalities. Table S11 presents the results, which compare to Models S4, S8 and S12 respectively. Results indicate that the marginal effect of race on socioeconomic status is lower when we control for racial fluidity using individuals' assigned race in the previous wave. It therefore seems that endogenous race, particularly racial whitening, is indeed an important factor affecting estimates of the extent of racial inequality.

IV. DISCUSSION

This paper considers whether and how the measurement of race matters for the estimated extent of racial inequality in society. Analysis of individual panel data from the NLSY79 presents strong evidence that different race measures do not consistently classify individuals as having or belonging to one specific racial category. Rather, it is quite common for an individual who is classified as a Person of Color according to one race measure to be classified as White according to another one. Most importantly, we uncover overwhelming evidence that the specific race measure considered has a major impact on estimates of racial inequality.

From the four race measures considered—past/pre-adult self-identified race, past/pre-adult assigned race, current/adult self-identified race, and current/adult assigned race—the socioeconomic status gap between Whites and People of Color

---

between waves.

is consistently highest when considering current/adult assigned race. Even though the measures of assigned race that we consider refer to race as assigned by NLSY interviewers, this outcome is as expected. Assigned race captures how an individual is perceived and socially categorized by an outside party (e.g., Harris and Sims 2002). Such perception and categorization, in turn, strongly affect how outside parties treat the individual and the nature and extent of interactions that they choose to have with the person.

Estimated racial inequality is consistently lowest when considering past/pre-adult self-identified race. Following the above argument, a partial explanation for this result is that this race measure is based on self-classification instead of on racial classification by others. A further systematic difference in estimated racial inequalities involves estimates based on measures of past race vs. estimates based on comparable measures of current race. As we elaborated in the results section, this difference can be traced back to race's endogeneity with respect to socioeconomic status. Because status-driven racial fluidity tends to reduce the average social status among individuals that continue to be classified as Persons of Color, the estimated status gap between Whites vs. People of Color is subject to an upward bias. Results indicate that estimated racial gaps can be more than two-fifths higher when considering current/adult race, which is affected by current socioeconomic status, than when considering past/pre-adult race, which is not affected by current socioeconomic status.

Overall, the evidence presented in this paper indicates that there is no single objective number for the size of the racial gap in a given socioeconomic outcome. Different race measures render different estimates, which means that there is room for selection, both unintentionally and intentionally. People may disagree on the extent of racial inequality in society because they base their assessment on different measures of race. Moreover, one could take results using current/adult assigned race to argue that racial disparities are larger than they might have appeared. In

contrast, one could take results using past/pre-adult self-identified race as a positive thing and argue that racial disparities are not as large as they might have appeared.

The validity and relevance of our analysis notwithstanding, three key limitations of this study are as follows. The first is that we are only able to study the period 1979-1998. Hence, the estimates presented in this paper need not be representative for current racial inequalities in society. We do not consider this problematic as our aim is not to provide updated estimates of racial inequalities but to examine the importance of the measurement of race for studies of racial disparities. The second is that the prevalence of racial Whitening is concentrated among specific subgroups within the broader People of Color category, particularly individuals with specific ancestries (Rademakers and Van Hoorn 2021b). For the group of People of Color as a whole, the endogeneity of race can cause an upward bias in estimated racial equality. For various subgroups, however, the upward bias will be trivial, and for other subgroups still it will be higher than suggested by the evidence presented in this paper. Hence, we think that an interesting avenue for future research is to consider subdivisions within the broad People of Color category. Using such subdivisions, we can check for which subgroups the endogeneity of race causes the biggest difference between racial gaps in current socioeconomic status estimated using past vs. current race. The third and final limitation is that we have only considered how the measurement of race matters for the study of racial disparities in socioeconomic status. Race measures, in contrast, are also a fundamental element of studies of other forms of racial segregation (Echenique and Fryer 2007; Fisman et al. 2008). Hence, we think that a further interesting avenue for future research is to consider the importance of racial measurement for the quantitative understanding of racial segregation in schools, residential areas, romantic relationships, et cetera.

V. CONCLUSION

Estimates of racial disparities in specific socioeconomic outcomes vary widely

across studies. We have sought to advance the literature on racial disparities by analyzing how and how much the measurement of race can affect the estimated extent of racial inequalities. In particular, we have considered four common measures of individuals' racial identity that vary on two key dimensions: (i) race measured in the past vs. race measured in the present (i.e., past vs. current race), and (ii) self-identified vs. externally assigned race. Empirical results reveal striking differences in the estimated extent of racial inequality across these four measures. The estimated racial gap in home ownership, for instance, is more than two-fifths higher when considering current assigned race instead of past self-identified race.

Our main conclusion is that researchers should carefully consider the measurement of race both when reporting their own inequality estimates and when evaluating racial inequality estimates from other studies. Different studies may report different degrees of racial inequality in society. Some of these differences may be genuine, reflecting, for instance, differences in the time period studied. However, different studies may also have considered disparate race measures. If so, this paper's results indicate that estimates are incomparable. The challenge of incomparability extends to attempts at creating long-running (individual) time-series by merging multiple data sets such as different censuses. The U.S. Census, in particular, has gradually changed its measurement of race from externally assigned by census enumerators (before 1960) to self-identified (1960 and onwards). Hence, any drop in racial disparities observed around this time is probably at least partly driven by the fact that racial gaps tend to be lower when estimated using self-identified race than when estimated using assigned race. Overall, researchers need to be very clear on the specific measure(s) of race that they consider. Moreover, to ensure validity, within studies, different race measures should not be considered equivalent, as unfortunately has been done by prominent research in the past.

All four race measures are strongly rooted in the literature, and we do not see

grounds to conclude that one measure or one type of measures is invalid. Similarly, we do not seek to argue that one race measure or one type of race measures is inherently superior. Instead, we conclude with some suggestions on how researchers can deal with the variety of race measures available as well as with biases caused by the endogeneity of race. Chief among these suggestions is to consider multiple measures of race simultaneously. Considering multiple race measures broadens our quantitative understanding of racial disparities in society and provides means to assess the influence of such issues as status-driven racial whitening. Moreover, people's self-identified race vs. their assigned race likely play distinct roles in shaping their lives.

A second suggestion is that researchers let the purpose of their study guide their choice among alternative race measures. Considering self-identified race has the advantage that it aligns with the official measure of race used by governments such as that of the U.S. The use of assigned race, in contrast, aligns more closely with the idea that classification by outsiders is central to how an individual is treated in society. Hence, we suggest that considering assigned race is particularly insightful for quantitative studies of racial discrimination. When it comes to choosing between past vs. current race, we see similar (dis)advantages. Current race provides a logical basis for documenting how different (self-identified) races in the U.S. are faring at this moment. This documenting is, in fact, a standard purpose of collecting (census) data on race in the first place. However, considering a measure of past race instead of current race has the advantage that current socioeconomic status cannot causally affect measured race. Hence, considering past race reduces the upward bias in estimated racial inequality that would otherwise result from reverse causality between current socioeconomic status and measured race. More generally, we find that the possibility of racial fluidity strongly suggests using longitudinal data whenever feasible. Overall, we conclude that quantitative understanding of the role of race in society can improve substantially if studies consider racial measurement

much more explicitly and in much more detail than heretofore.

REFERENCES

Abramitzky, R., Boustan, L., Jacome, E., & Perez, S. (2021). Intergenerational mobility of immigrants in the united states over two centuries. American Economic Review, 111(2), 580-608.

Addo, Fenaba R., Jason N. Houle, and Daniel Simon. "Young, Black, and (Still) in the Red: Parental Wealth, Race, and Student Loan Debt." *Race and Social Problems* 8, no. 1 (March 2016): 64–76.

Akerlof, George A., and Rachel E. Kranton. Identity economics. Princeton University Press, 2010.

Angrist, Joshua D., and Jörn-Steffen Pischke. Mostly harmless econometrics. Princeton university press, 2008.

Antman, F., Duncan, B., & Trejo, S. J. (2016). Ethnic attrition and the observed health of later-generation Mexican Americans. American Economic Review, 106(5), 467-71.

Atkin, David, Eve Colson-Sihra, and Moses Shayo. "How do we choose our identity? a revealed preference approach using food consumption." Journal of Political Economy 129.4 (2021): 1193-1251.

Ayres, Ian. Three tests for measuring unjustified disparate impacts in organ transplantation: the problem of "included variable" bias. Perspectives in biology and medicine 48.1 (2005): 68-S87.

Bailey, Stanley R., Mara Loveman, and Jeronimo O. Muniz. "Measures of "race" and the analysis of racial inequality in Brazil." Social Science Research 42.1 (2013): 106-119.

Bennett, Claudette. "Racial categories used in the decennial censuses, 1790 to the present." Government Information Quarterly 17.2 (2000): 161-180.

Billings, Stephen B., David J. Deming, and Jonah Rockoff. “School Segregation, Educational Attainment, and Crime: Evidence from the End of Busing in Charlotte-Mecklenburg.” *The Quarterly Journal of Economics* 129, no. 1 (February 1, 2014): 435–76.

Brubaker, Rogers. *Ethnicity without Groups*. 1. Harvard Univ. Press paperback ed. Cambridge, Mass.: Harvard Univ. Press, 2006.

Charles, Kerwin Kofi, and Jonathan Guryan. “Studying discrimination: Fundamental challenges and recent progress.” Annual Review of Economics 3.1 (2011): 479-511.

Chetty, Raj, Nathaniel Hendren, Maggie R Jones, and Sonya R Porter. “Race and Economic Opportunity in the United States: An Intergenerational Perspective*.” *The Quarterly Journal of Economics* 135, no. 2 (May 1, 2020): 711–83.

Cinelli, Carlos, Andrew Forney, and Judea Pearl. A crash course in good and bad controls. Available at SSRN 3689437 (2020).

Collins, W. J., & Margo, R. A. (2011). Race and Home Ownership from the End of the Civil War to the Present. American Economic Review, 101(3), 355-59.

Cornell, Stephen, and Douglas Hartmann. Ethnicity and race: Making identities in a changing world. Sage Publications, 2006.

Dahis, Ricardo, Emily Nix, and Nancy Qian. Choosing racial identity in the United States, 1880-1940. No. w26465. National Bureau of Economic Research, 2019.

Derenoncourt, Ellora, and Claire Montialoux. “Minimum Wages and Racial Inequality.” *The Quarterly Journal of Economics* 136, no. 1 (December 22, 2020): 169–228.

Dobbie, Will, and Crystal S. Yang. “The us pretrial system: Balancing individual rights and public interests.” Journal of Economic Perspectives 35.4 (2021): 49-70.

Elam-Evans, L., Jones, C. Y., Jiles, R. B., & Perry, G. S. (2008). Using “socially assigned race” to probe white advantages in health status. Ethnicity and Disease,

18, 496-504.

Elder, T. E., Figlio, D. N., Imberman, S. A., & Persico, C. L. (2021). School segregation and racial gaps in special education identification. Journal of Labor Economics, 39(S1), S151-S197.

Emerson, Michael O., Karen J. Chai, and George Yancey. "Does Race Matter in Residential Segregation? Exploring the Preferences of White Americans." American Sociological Review 66, no. 6 (December 2001): 922.

Echenique, F., and R. G. Fryer. "A Measure of Segregation Based on Social Interactions." *The Quarterly Journal of Economics* 122, no. 2 (May 1, 2007): 441–85.

Fairlie, Robert W. "Can the 'One-Drop Rule' Tell Us Anything about Racial Discrimination? New Evidence from the Multiple Race Question on the 2000 Census." *Labour Economics* 16, no. 4 (August 2009): 451–60.

Fisman, R., Iyengar, S. S., Kamenica, E., & Simonson, I. (2008). Racial preferences in dating. The Review of Economic Studies, 75(1), 117-132.

Ford, Christopher A. "Administering identity: The determination of race in race-conscious law." Cal L. Rev. 82 (1994): 1231.

French, S. E., Seidman, E., Allen, L., & Aber, J. L. (2006). The development of ethnic identity during adolescence. Developmental psychology, 42(1), 1.

Garcia, J. A., Sanchez, G. R., Sanchez-Youngman, S., Vargas, E. D., & Ybarra, V. D. (2015). Race as lived experience: the impact of multi-dimensional measures of race/ethnicity on the self-reported health status of Latinos. Du Bois review: social science research on race, 12(2), 349-373.

Goldsmith, Arthur H., Darrick Hamilton, and William Darity. "Shades of Discrimination: Skin Tone and Wages." *The American Economic Review* 96, no. 2 (2006): 242–45.

Greiner, D. J., & Rubin, D. B. (2011). Causal effects of perceived immutable characteristics. Review of Economics and Statistics, 93(3), 775-785.

Grogger, Jeffrey. “Speech Patterns and Racial Wage Inequality.” *The Journal of Human Resources* 46, no. 1 (2011): 1–25.

Harris, David R., and Jeremiah Joseph Sim. “Who is multiracial? Assessing the complexity of lived race.” American sociological review (2002): 614-627.

Helms, Janet E., ed. *Black and White Racial Identity: Theory, Research, and Practice*. Contributions in Afro-American and African Studies 129. Westport, Conn.: Praeger, 1993.

Humes, Karen, and Howard Hogan. “Measurement of Race and Ethnicity in a Changing, Multicultural America.” *Race and Social Problems* 1, no. 3 (September 2009): 111–31.

Jia, Ruixue, and Torsten Persson. Choosing ethnicity: The interplay between individual and social motives. Journal of the European Economic Association 19.2 (2021): 1203-1248.

Kaplan, Judith B. “The quality of data on “race” and “ethnicity”: Implications for health researchers, policy makers, and practitioners.” Race and Social Problems 6.3 (2014): 214-236.

Kaplan, J. B., & Bennett, T. (2003). Use of race and ethnicity in biomedical publication. Jama, 289(20), 2709-2716.

Kramer, Rory, Robert DeFina, and Lance Hannon. “Racial rigidity in the United States: comment on Saperstein and Penner.” American Journal of Sociology 122.1 (2016): 233-246.

LaVeist, T. A. “Disentangling Race and Socioeconomic Status: A Key to Understanding Health Inequalities.” Journal of Urban Health: Bulletin of the New York Academy of Medicine 82, no. 2_suppl_3 (June 1, 2005): iii26–34.

Levin, Michael J., Nampeo R. McKenney, and Paul A. Berman. “Uses and Interpretations of Racial and Ethnic Data from the US Census.” Public Law 94 (1984): 171.

Liebler, C. A., Porter, S. R., Fernandez, L. E., Noon, J. M., & Ennis, S. R. (2017).

America's churning races: Race and ethnicity response changes between census 2000 and the 2010 census. Demography, 54(1), 259-284.

Lopez, Ian F. Haney. "The social construction of race: Some observations on illusion, fabrication, and choice." Harvard civil rights-civil liberties law review. Vol. 29, no. 1 (winter 1994)

Morning, Ann. 2008. "Ethnic Classification in Global Perspective: A Cross-national Survey of the 2000 Census Round." Population Research and Policy Review 27 (2): 239–272.

Morning, Ann. "Kaleidoscope: contested identities and new forms of race membership." Ethnic and Racial Studies 41.6 (2018): 1055-1073.

O'Flaherty, Brendan. The economics of race in the United States. Harvard University Press, 2015.

Oliver, Melvin, and Thomas Shapiro. *Black Wealth / White Wealth*. Routledge, 2013.

Pettit, Becky, and Bruce Western. "Mass Imprisonment and the Life Course: Race and Class Inequality in U.S. Incarceration." American Sociological Review 69, no. 2 (April 2004): 151–69.

Rademakers, Robbert, and André van Hoorn. "Ethnic Switching: Longitudinal Evidence on Prevalence, Correlates, and Implications for Measuring Ethnic Segregation." *Journal of Development Economics*, June 2021a, 102694.

———. "Physical Appearance and Ancestry as Predictors of Racial Passing: A Research Note on Racial (Non-)Fluidity in the U.S." *SSRN Electronic Journal*, 2021b.

Rockquemore, Kerry Ann, and Patricia Arend. "Opting for white: Choice, fluidity and racial identity construction in post civil-rights America." Race and Society 5.1 (2002): 49-64.

Roth, Wendy D. "The multiple dimensions of race." Ethnic and Racial Studies 39.8 (2016): 1310-1338.

Sellers, Robert M., Mia A. Smith, J. Nicole Shelton, Stephanie A.J. Rowley, and Tabbye M. Chavous. "Multidimensional Model of Racial Identity: A Reconceptualization of African American Racial Identity." *Personality and Social Psychology Review* 2, no. 1 (February 1998): 18–39.

Sen, Maya, and Omar Wasow. "Race as a bundle of sticks: Designs that estimate effects of seemingly immutable characteristics." Annual Review of Political Science 19 (2016): 499-522.

Smedley, Audrey, and Brian D. Smedley. "Race as biology is fiction, racism as a social problem is real: Anthropological and historical perspectives on the social construction of race." American psychologist 60.1 (2005): 16.

Snipp, C. Matthew. "Racial measurement in the American census: Past practices and implications for the future." Annual Review of Sociology 29.1 (2003): 563-588.

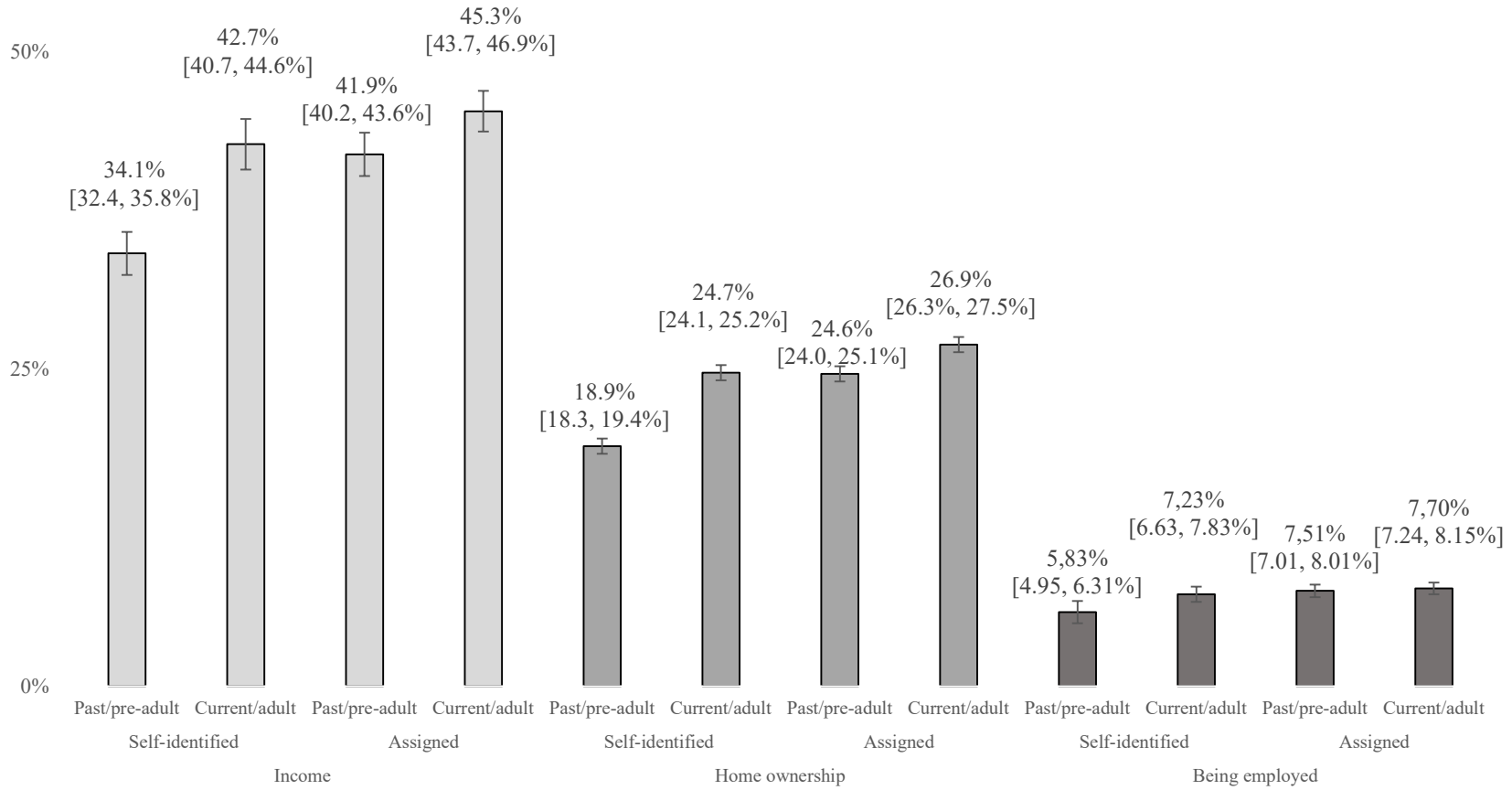
Schwartzman, Luisa Farah. "Does Money Whiten? Intergenerational Changes in Racial Classification in Brazil." *American Sociological Review* 72, no. 6 (December 2007): 940–63.

Ward, Zachary. Intergenerational mobility in American history: Accounting for race and measurement error. No. w29256. National Bureau of Economic Research, 2021.

Williams, David R. "Race/ethnicity and socioeconomic status: measurement and methodological issues." International Journal of Health Services 26.3 (1996): 483-505.

Yang, Tseming. "Choice and fraud in racial identification: The dilemma of policing race in affirmative action, the Census, and a color-blind society." Mich. J. Race & L. 11 (2005): 367.

Figure I. Cross-Measure Variation in Estimated Racial Inequalities



Notes: Figure reports the marginal effect of being White vs. being a Person of Color on an individual's socioeconomic status, as estimated in Tables S3-S5 in the supplement. For all three socioeconomic status indicators, the sample considered is the same for each of the four race measures (N=82,154 for personal income; N=65,657 for home ownership; N=73,795 for being employed). The bars indicate 95%CIs, which are also in square brackets.

Table I. Measurement of Variables and Descriptive Statistics

Variable	Definition/description	Mean, standard deviation and no. of observations
Self-identified race as adolescent is White (0/1)	Variable measured as a dummy variable that indicates whether an individual's self-identified race as adolescent is a Person of Color (0) or White (1). The underlying measure of self-identified race is based on the item asking interviewees to racially classify themselves in the survey from 1979. If the answer on the questionnaire item is "White", we consider the individual to be White. All other answers, we consider the individual to be a Person of Color.	M=60.4% SD=48.9% N=82,154
Self-identified race as adult is White (0/1)	Variable measured as a dummy variable that indicates whether an individual's self-identified race as adult is a Person of Color (0) or White (1). The underlying measure of self-identified race is based on the item asking interviewees to racially classify themselves in the survey from 1998. If the answer on the questionnaire item is "White", we consider the individual to be White. All other answers, we consider the individual to be a Person of Color.	M=65.4% SD=47.6% N=82,154
Assigned race as adolescent is White (0/1)	Variable measured as a dummy variable that indicates whether an individual's externally assigned race as adolescent is a Person of Color (0) or White (1). The underlying measure of externally assigned race is based on the item asking interviewers to racially classify interviewees in the survey from 1979. If the answer on the questionnaire item is "White", we consider the individual to be White. All other answers, we consider the individual to be a Person of Color.	M=67.0% SD=47.1% N=82,154
Assigned race as adult is White (0/1)	Variable measured as a dummy variable that indicates whether an individual's externally assigned race as adult is a Person of Color (0) or White (1). The underlying measure of externally assigned race is based on the item asking interviewers to racially classify interviewees in the survey from 1998. If the answer on the questionnaire item is "White", we consider the individual to be White. All other answers, we consider the individual to be a Person of Color.	M=67.0% SD=47.1% N=82,154
Self-identified race as adolescent is Person of Color (0/1)	Variable measured as a dummy variable that indicates whether an individual's self-identified race as adolescent is White (0) or a Person of Color (1). The underlying measure of self-identified race is based on the item asking interviewees to racially classify themselves in the survey from 1979. If the answer on the questionnaire item is "White", we consider the individual to be White. All other answers, we consider the individual to be a	M=39.6% SD=48.9% N=82,154

	Person of Color.	
Self-identified race as adult is Person of Color (0/1)	Variable measured as a dummy variable that indicates whether an individual's self-identified race as adult is White (0) or a Person of Color (1). The underlying measure of self-identified race is based on the item asking interviewees to racially classify themselves in the survey from 1998. If the answer on the questionnaire item is "White", we consider the individual to be White. All other answers, we consider the individual to be a Person of Color.	M=34.6% SD=47.6% N=82,154
Assigned race as adolescent is Person of Color (0/1)	Variable measured as a dummy variable that indicates whether an individual's externally assigned race as adolescent is White (0) or a Person of Color (1). The underlying measure of externally assigned race is based on the item asking interviewers to racially classify interviewees in the survey from 1979. If the answer on the questionnaire item is "White", we consider the individual to be White. All other answers, we consider the individual to be a Person of Color.	M=33.0% SD= SD=47.0% N=82,154
Assigned race as adult is Person of Color (0/1)	Variable measured as a dummy variable that indicates whether an individual's externally assigned race as adult is White (0) or a Person of Color (1). The underlying measure of externally assigned race is based on the item asking interviewers to racially classify interviewees in the survey from 1998. If the answer on the questionnaire item is "White", we consider the individual to be White. All other answers, we consider the individual to be a Person of Color.	M=33.0% SD=47.0% N=82,154
Racial whitening (0/1)	Variable measured as a dummy variable that indicates whether an individual's ascribed race has consistently changed from Person of Color to White (1=yes; 0=no) for two consecutive waves at t and t+1 to the individual's ascribed race in the previous wave at t-1. We consider individuals who have passed as White for two consecutive waves to reduce the risk of measuring idiosyncratic measurement errors. The underlying measure of ascribed race is based on the item asking interviewers to assess a respondent's race. We thereby build on the premise that both individuals classified as "Black" and classified as "Other" can be considered less "light" than individuals classified as "White" are.	M=5.51% SD=22.8% N=53,512
Racial darkening (0/1)	Variable measured as a dummy variable that indicates whether an individual's ascribed race has consistently changed for two consecutive waves at t and t+1 from non-Black to Black (1=yes; 0=no) compared to the individual's ascribed race in the previous wave at t-1. We consider individuals who have passed as White for two consecutive waves to reduce the risk of measuring idiosyncratic measurement errors. The underlying measure of ascribed race is based on the item asking interviewers to assess a respondent's race. We thereby build on	M=6.61% SD=24.9% N=116,306

	the premise that both individuals classified as "White" and classified as "Other" can be considered less "light" than individuals classified as "Black" are.	
Assigned race in previous wave is person of Color (0/1)	Variable measured as a dummy variable that indicates whether an individual's externally assigned race as adult is a Person of Color (1) or White (0) in the previous wave The underlying measure of externally assigned race is based on the item asking interviewers to racially classify interviewees. If the answer on the questionnaire item is "White", we consider the individual to be White. All other answers, we consider the individual to be a Person of Color.	M=32.8% SD=46.9% N=79,023
Income (ln transformed)	Chief independent variable concerning income as an important feature of individuals' socioeconomic status. The variable derives from the item asking respondents: "How much (in $) did you receive from wages, salary, commission, or tips from all jobs, before deductions for taxes or anything else?" The variable is log transformed.	M=9.40 SD=1.14 N=82,154
Income	Chief independent variable concerning income as an important feature of individuals' socioeconomic status. The variable derives from the item asking respondents: "How much (in $) did you receive from wages, salary, commission, or tips from all jobs, before deductions for taxes or anything else?" The variable is in $.	M=16,264 SD=16,297 N=82,154
House ownership (0/1)	Chief independent variable concerning home ownership as an important feature of individuals' socioeconomic status. Dummy variable indicating whether the household owns a house (1=yes; 0=no). The dummy variable derives from the item asking respondents: "About how much do you think your property would sell for on today's market"	M=34.6% SD=47.6% N=82,154
Employment status (0/1)	Chief independent variable concerning employment status as an important feature of individuals' socioeconomic status. Dummy variable indicating whether the individual is currently employed (=1) or unemployed (=0). The dummy variable derives from the item asking respondents: "What were you doing most of last week--working , going to school , or something else?". If individuals answer "Out of labor force", "Keeping house", "Going to school" and "In active forces" we consider the observation as missing data.	M=92.1% SD=26.9% N=82,154
Year/wave	Set of dummies indicating the year in which the interview was conducted.	N=82,154
Age	Set of dummies indicating the age of the respondent. Age is measured by combining the year of the survey with data from the item asking respondents: "When were you born?"	M=29.2 SD=4.73 N=82,154
Gender	Dummy variable indicating whether the respondent is female (1) or male (0). The variable derives from the item asking the interviewer: "What sex is the respondent?"	M=52.2% SD=50.0% N=82,154

Region	Set of dummies indicating the region of residence of the individual. Geolocation is truncated to the following four areas: “North East”, “North Central”, “West”, and “South.”	N=82,154
Family size	Interval variable indicating the family size of the individual. The variable derives from the item asking respondents: “Are there any new household members added to this household compared to last time?”.	M=3.19 SD=1.72 N=82,154
Interviewer race	Set of dummies indicating the racial background of the respondent’s interviewer. The dummy variables derive from the item asking interviewers: “What is your race?” Possible answers for this item are: “White”, “Black”, “Hispanic”, “Asian”, “American Indian”, and “Multicultural.”	N=82,154

Notes: Details on the wording of the various questionnaire times used can be found in the codebooks of the National Longitudinal Survey of Youth 1979.

Table II. Inconsistencies in Measured Race among Race Measures

Race according to different race dummies▶ Race according to different race dummies▼	**Column 1:** Self-identified past race is White	**Column 2:** Assigned past race is White	**Column 3:** Self-identified current race is White	**Column 4:** Assigned current race is White	**Column 5:** Self-identified past race is PoC	**Column 6:** Assigned past race is PoC	**Column 7:** Self-identified current race is PoC	**Column 8:** Assigned current race is PoC
Row 1 [N=116,190]: Self-identified past race is White	**100%**	92.5%	90.4%	91.7%	**0%**	7.49%	9.63%	8.29%
Row 2 [N=128,550]: Assigned past race is White	83.6%	**100%**	93.2%	95.0%	16.4%	**0%**	6.81%	5.00%
Row 3 [N=124,920]: Self-identified current race is White	84.1%	95.9%	**100%**	96.0%	15.9%	4.11%	**0%**	3.94%
Row 4 [N=128,040]: Assigned current race is White	83.2%	95.4%	93.7%	**100%**	16.8%	4.62%	6.28%	**0%**
Row 5 [N=86,760]: Self-identified past race is PoC	**0%**	24.3%	23.0%	24.8%	**100%**	75.7%	77.0%	75.2%
Row 6 [N=74,400]: Assigned past race is PoC	11.7%	**0%**	6.90%	7.94%	88.3%	**100%**	93.1%	92.1%
Row 7 [N=78,030]: Self-identified current race is PoC	14.3%	11.2%	**0%**	10.3%	85.7%	88.8%	**100%**	89.7%
Row 8 [N=74,910]: Assigned current race is PoC	12.9%	8.57%	6.57%	**0%**	87.1%	91.4%	93.4%	**100%**

Notes: The table reports levels of consistency between dummy variables of race as the percentage of cases where an observation is

classified as having a particular self-identified or assigned, past or current race (Rows 1-8) and simultaneously classified to have another self-identified or assigned, past or current race (Columns 1-8). Because the table considers dichotomous racial categories, either White or Person of Color (PoC), for each row, Columns 1&5, 2&6, 3&7, and 4&8 add up to 100%. Similarly, consistency scores on the diagonal are 100% because the rows and columns refer to the same dummy variables of race. The total number of cases in the sample is 202,950. Case numbers of Rows 1&5, 2&6, 3&7, and 4&8 add up to this number.

Table III. Mean Socioeconomic Status of People of Color (PoC) and Whites

Socioeconomic status indicator▼	Self-identified race				Assigned race			
	Past/pre-adult race		Current/adult race		Past/pre-adult race		Current/adult race	
	White	PoC	White	PoC	White	PoC	White	PoC
Income (in $) (N=82,154)	17,593 [17,450, 17,735]	14,231 [14,055, 14,408]	17,563 [17,427, 17,698]	13,628 [13,435, 13,821]	17,645 [17,508, 17,782]	13,655 [13,467, 13,843]	17,651 [17,516, 17,786]	13,443 [13,251, 13,636]
Home ownership (1=yes) (N=94,695)	47.2% [46.8, 47.6%]	29.2% [28.7, 29.6%]	49.0% [48.6, 49.4%]	24.4% [23.9, 24.9%]	48.5% [48.1, 48.9%]	24.0% [23.5, 24.5%]	49.3% [49.0, 49.7%]	22.7% [22.2, 23.2%]
Employed (1=yes) (N=97,213)	91.9% [91.7, 92.2%]	84.0% [83.7, 84.3%]	92.2% [92.0, 92.5%]	82.5% [82.2, 82.3%]	92.1% [91.9, 92.3%]	82.3% [81.9, 82.6%]	92.2% [91.9, 92.4%]	82.1% [81.8, 82.5%]

Notes: 95%CIs in square brackets.

SUPPLEMENT - FOR ONLINE PUBLICATION

Table S1. Cross-Study Variation in the Estimated Income Gap Between People of Color and Whites

Study	Estimated (personal) income or wage gap	Time period studied
Goldsmith et al. (2006)	3.2-15%	1992-1994
Fairlie (2009)	20-32%	2000
Grogger (2011)	8.3-17%	2004-2006
Beyer and Charles (2018)	40-95%	1940-2014
Chetty et al. (2020)	34%	1989-2015
Derenoncourt and Montialoux (2021)	25-60%	1950-2022

Table S2. Four Measures of Race on Two Dimensions

		Dimension 1: Self-identified vs. assigned race	
		Self-identified race	Assigned race
Dimension 2: Past/pre-adult vs. current/adult race	Past/pre-adult race	Fairlie (2009)	Addo et el. (2016)
	Current/adult race	Fairlie (2009) Chetty et al. (2020) Derenoncourt and Montialoux (2021) Beyer and Charles (2018)	Goldsmith et al. (2006) Grogger (2011) Beyer and Charles (2018) Derenoncourt and Montialoux (2021)

Notes: The studies in the table are the same studies as depicted in Table S1. The study by Derenoncourt and Montialoux (2021) is classified twice. The reason is that this study combines data from U.S. censuses where some early censuses contain data only on assigned race whereas later censuses contain data only on self-identified race.

Table S3. The Income Gap Between Whites and People of Color Estimated Using Four Common Race Measures

Dependent = Personal income (in ln)	Self-identified race		Assigned race	
	Model S1 Past/pre-adult race	Model S2 Current/adult race	Model S3 Past/pre-adult race	Model S4 Current/adult race
White (1=yes)	0.341 (0.009) [0.324, 0.358]	0.427 (0.010) [0.407, 0.446]	0.419 (0.008) [0.402, 0.436]	0.453 (0.008) [0.437, 0.469]
Dummies for age	Yes	Yes	Yes	Yes
Dummies for interviewer race	Yes	Yes	Yes	Yes
Dummies for region	Yes	Yes	Yes	Yes
Dummies for year/wave	Yes	Yes	Yes	Yes
Number of observations	82,154	82,154	82,154	82,154
Number of individuals	6,670	6,670	6,670	6,670
Within R^2	0.526	0.526	0.526	0.526
Between R^2	0.193	0.210	0.207	0.214
Overall R^2	0.413	0.417	0.417	0.419

Notes: Models estimate the personal income gap between Whites and People of Color using four common measures of individuals' race. Standard errors (in parentheses) are bootstrapped (50 reps) and clustered at the individual level. 95%CIs are in square brackets.

Table S4. The Home Ownership Gap Between Whites and People of Color Estimated Using Four Common Race Measures

Dependent = Home ownership (1=yes)	Self-identified race		Assigned race	
	Model S5 Past/pre-adult race	Model S6 Current/adult race	Model S7 Past/pre-adult race	Model S8 Current/adult race
White (1=yes)	0.189 (0.003) [0.183, 0.194]	0.247 (0.003) [0.241, 0.252]	0.246 (0.003) [0.240, 0.251]	0.269 (0.003) [0.263, 0.275]
Dummies for age	Yes	Yes	Yes	Yes
Dummies for interviewer race	Yes	Yes	Yes	Yes
Dummies for region	Yes	Yes	Yes	Yes
Dummies for year/wave	Yes	Yes	Yes	Yes
Number of observations	65,657	65,657	65,657	65,657
Number of individuals	6,765	6,765	6,765	6,765
Within R^2	0.148	0.149	0.148	0.148
Between R^2	0.134	0.185	0.181	0.204
Overall R^2	0.14	0.167	0.165	0.176

Notes: Table reports results for linear probability models. Models estimate the home ownership gap between Whites and People of Color using four common measures of individuals' race. Standard errors (in parentheses) are bootstrapped (50 reps) and clustered at the individual level. 95%CIs are in square brackets.

Table S5. The Employment Gap Between Whites and People of Color Estimated Using Four Common Race Measures

Dependent = Employed (1=yes)	Self-identified race		Assigned race	
	Model S9 Past/pre-adult race	Model S10 Current/adult race	Model S11 Past/pre-adult race	Model S12 Current/adult race
White (1=yes)	0.058 (0.002) [0.054, 0.063]	0.072 (0.003) [0.066, 0.078]	0.075 (0.003) [0.070, 0.080]	0.077 (0.002) [0.072, 0.081]
Dummies for age	Yes	Yes	Yes	Yes
Dummies for interviewer race	Yes	Yes	Yes	Yes
Dummies for region	Yes	Yes	Yes	Yes
Dummies for year/wave	Yes	Yes	Yes	Yes
Number of observations	73,795	73,795	73,795	73,795
Number of individuals	6,568	6,568	6,568	6,568
Within R^2	0.042	0.042	0.042	0.042
Between R^2	0.113	0.109	0.113	0.115
Overall R^2	0.051	0.050	0.051	0.051

Notes: Table reports results for linear probability models. Models estimate the employment gap between Whites and People of Color using four common measures of individuals' race. Standard errors (in parentheses) are bootstrapped (50 reps) and clustered at the individual level. 95%CIs are in square brackets.

Table S6. Robustness Check: The Income Gap Between Whites and People of Color Estimated Using Four Common Race Measures and Added Controls

Dependent = Personal income (in ln)	Self-identified race		Assigned race	
	Model S13 Past/pre-adult race	Model S14 Current/adult race	Model S15 Past/pre-adult race	Model S16 Current/adult race
White (1=yes)	0.328 (0.008) [0.311, 0.343]	0.401 (0.009) [0.383, 0.418]	0.397 (0.009) [0.379, 0.415]	0.425 (0.009) [0.407, 0.443]
Sex (1=female)	-0.526 (0.009) [-0.543, -0.509]	-0.521 (0.007) [-0.536, -0.507]	-0.527 (0.008) [-0.543, -0.511]	-0.523 (0.007) [-0.539, -0.507]
Family size	-0.048 (0.002) [-0.053, -0.044]	-0.053 (0.002) [-0.058, -0.048]	-0.048 (0.003) [-0.053, -0.043]	-0.048 (0.002) [-0.052, -0.043]
Dummies for age	Yes	Yes	Yes	Yes
Dummies for interviewer race	Yes	Yes	Yes	Yes
Dummies for region	Yes	Yes	Yes	Yes
Dummies for year/wave	Yes	Yes	Yes	Yes
Number of observations	82,154	82,154	82,154	82,154
Number of individuals	6,670	6,670	6,670	6,670
Within R^2	0.521	0.528	0.521	0.528
Between R^2	0.298	0.308	0.309	0.312
Overall R^2	0.443	0.450	0.446	0.451

Notes: Table repeats analyses from Table S3 with sex and family size as added controls. Standard errors (in parentheses) are bootstrapped (50 reps) and clustered at the individual level. 95%CIs are in square brackets.

Table S7. Robustness Check: The Home Ownership Gap Between Whites and People of Color Estimated Using Four Common Race Measures and Added Controls

Dependent = Home ownership (1=yes)	Self-identified race		Assigned race	
	Model S17 Past/pre-adult race	Model S18 Current/adult race	Model S19 Past/pre-adult race	Model S20 Current/adult race
White (1=yes)	0.180 (0.002) [0.175, 0.185]	0.255 (0.003) [0.250, 0.260]	0.253 (0.003) [0.247, 0.260]	0.278 (0.003) [0.272, 0.283]
Sex (1=female)	0.028 (0.003) [0.023, 0.033]	0.027 (0.003) [0.023, 0.0312	0.025 (0.002) [0.020, 0.030]	0.028 (0.002) [0.023, 0.33]
Family size	0.018 (0.001) [0.016, 0.020]	0.019 (0.010) [0.017, 0.021]	0.019 (0.010) [0.017, 0.021]	0.019 (0.001) [0.017, 0.021]
Dummies for age	Yes	Yes	Yes	Yes
Dummies for interviewer race	Yes	Yes	Yes	Yes
Dummies for region	Yes	Yes	Yes	Yes
Dummies for year/wave	Yes	Yes	Yes	Yes
Number of observations	65,657	65,657	65,657	65,657
Number of individuals	6,765	6,765	6,765	6,765
Within R^2	0.150	0.152	0.152	0.152
Between R^2	0.125	0.194	0.190	0.215
Overall R^2	0.137	0.173	0.171	0.183

Notes: Table repeats analyses from Table S4 with sex and family size as added controls. Standard errors (in parentheses) are bootstrapped (50 reps) and clustered at the individual level. 95%CIs are in square brackets.

Table S8. Robustness Check: The Employment Gap Between Whites and People of Color Estimated Using Four Common Race Measures and Added Controls

Dependent = Employed (1=yes)	Self-identified race		Assigned race	
	Model S21 Past/pre-adult race	Model S22 Current/adult race	Model S23 Past/pre-adult race	Model S24 Current/adult race
White (1=yes)	0.059 (0.005) [0.049, 0.069]	0.073 (0.004) [0.065, 0.081]	0.071 (0.003) [0.065, 0.078]	0.075 (0.002) [0.072, 0.079]
Sex (1=female)	-0.017 (0.003) [-0.022, -0.012]	-0.017 (0.003) [-0.022, -0.012]	-0.017 (0.002) [-0.021, -0.013]	0.070 (0.003) [-0.021, -0.012]
Family size	-0.006 (0.002) [-0.001, -0.002]	-0.006 (0.001) [-0.008, -0.003]	-0.006 (0.002) [-0.008, -0.004]	-0.006 (0.002) [-0.009, -0.003]
Dummies for age	Yes	Yes	Yes	Yes
Dummies for interviewer race	Yes	Yes	Yes	Yes
Dummies for region	Yes	Yes	Yes	Yes
Dummies for year/wave	Yes	Yes	Yes	Yes
Number of observations	73,795	73,795	73,795	73,795
Number of individuals	6,568	6,568	6,568	6,568
Within R^2	0.005	0.005	0.005	0.005
Between R^2	0.041	0.055	0.052	0.056
Overall R^2	0.016	0.020	0.019	0.020

Notes: Table repeats analyses from Table S5 with sex and family size as added controls. Standard errors (in parentheses) are bootstrapped (50 reps) and clustered at the individual level. 95%CIs are in square brackets.

Table S9. Racial Whitening as a Function of Socioeconomic Status

	Dependent = Racial whitening (1=yes)			Dependent = Racial darkening (1=yes)		
	Model S25	Model S26	Model S27	Model S28	Model S29	Model S30
Income (in ln)	0.002 (0.001) [0.000, 0.004]	-	-	-0.000 (0.001) [-0.002, 0.001]	-	-
Home ownership (1=yes)	-	0.001 (0.004) [-0.007, 0.009]	-	-	-0.005 (0.002) [-0.009, -0.001]	-
Employment (1=yes)	-	-	0.000 (0.002) [-0.005, 0.005]	-	-	-0.001 (0.002) [-0.006, 0.003]
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Sex (1=female)	-	-	-	-	-	-
Family size	0.000 (0.001) [-0.001, 0.001]	0.001 (0.001) [-0.000, 0.002]	-0.003 (0.000) [-0.001, 0.001]	-0.001 (0.001) [-0.003, 0.000]	-0.002 (0.001) [-0.003, -0.000]	-0.002 (0.001) [-0.003, -0.000]
Dummies for age	Yes	Yes	Yes	Yes	Yes	Yes
Dummies for interviewer race	Yes	Yes	Yes	Yes	Yes	Yes
Dummies for region	Yes	Yes	Yes	Yes	Yes	Yes
Dummies for year/wave	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	30,667	26,105	35,086	73,699	54,033	79,969
Number of individuals	4,540	4,421	4,683	8,866	8,277	8,995
Within R^2	0.007	0.008	0.006	0.113	0.165	0.106
Between R^2	0.052	0.082	0.052	0.063	0.095	0.067
Overall R^2	0.019	0.027	0.017	0.099	0.144	0.096

Notes: Table reports results for linear probability models. Models S25-S27 estimate the probability of racial lightening among People of Color. Models S28-S30 measure the probability of racial darkening among Whites. Standard errors (in parentheses) are clustered at the individual level. 95%CIs in square brackets. To facilitate interpretation of the estimated coefficients, we report the outcomes of the linear probability models only. However, logistic models render similar results (available on request). Table III present details on the measurement of racial whitening and racial darkening.

Table S10. The Relationship Between Racial Whitening and Socioeconomic Status Estimated without Individual Fixed Effects

	Dependent = Racial whitening (1=yes; 0=no)			Dependent = Racial darkening (1=yes; 0=no)		
	Model S31	Model S32	Model S33	Model S34	Model S35	Model S36
Income (in ln)	0.004 (0.001) [0.002, 0.006]	-	-	-0.000 (0.001) [-0.002, 0.001]	-	-
Home ownership (1=yes)	-	0.007 (0.004) [0.000, 0.016]	-	-	-0.011 (0.002) [-0.014, -0.007]	-
Employment (1=yes)	-	-	0.002 (0.002) [-0.002, 0.006]	-	-	-0.004 (0.002) [-0.009, 0.000]
Sex (1=female)	-0.013 (0.010) [-0.033, 0.008]	0.013 (0.010) [-0.007, 0.034]	-0.021 (0.010) [-0.042, -0.001]	-0.004 (0.004) [-0.012, 0.003]	-0.009 (0.004) [-0.019, -0.000]	-0.004 (0.004) [-0.012, -0.004]
Family size	0.000 (0.001) [-0.001, 0.001]	0.001 (0.001) [0.000, 0.002]	-0.000 (0.000) [-0.001, 0.001]	0.000 (0.001) [-0.001, 0.001]	0.000 (0.001) [-0.001, 0.002]	-0.000 (0.001) [-0.001, 0.001]
Dummies for age	Yes	Yes	Yes	Yes	Yes	Yes
Dummies for interviewer race	Yes	Yes	Yes	Yes	Yes	Yes
Dummies for region	Yes	Yes	Yes	Yes	Yes	Yes
Dummies for year/wave	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	30,667	26,105	14,519	73,699	54,033	79,696
Number of individuals	4,540	4,421	3,888	8,866	8,277	8,995
Within R^2	0.004	0.004	0.003	0.112	0.164	0.106
Between R^2	0.196	0.164	0.184	0.091	0.124	0.091
Overall R^2	0.090	0.074	0.083	0.115	0.161	0.110

Notes: Table repeats Table S9 but with individual fixed effects excluded. Models S31-S33 estimate the probability of racial lightening among People of Color. Models S34-S36 measure the probability of racial darkening among Whites. Standard errors (in parentheses) are clustered at the individual level. Standard errors (in parentheses) are robust standard errors that are clustered at the individual level. 95%CIs in square brackets. To facilitate interpretation of the estimated coefficients, we report the outcomes of the linear probability models only. However, logistic models render similar results (available on request).

Table S11. Racial Fluidity and the Socioeconomic Status Gap Between Whites and People of Color

	Model S37 Dependent = Personal income (in ln) (see Model S4)	Model S38 Dependent = Home ownership (1=yes) (see Model S8)	Model S39 Dependent = Employed (1=yes) (see Model S12)
Current/adult assigned race is White (1=yes)	0.426 (0.015) [0.396, 0.457]	0.226 (0.006) [0.214, 0.237]	0.046 (0.007) [0.031, 0.061]
Assigned race in previous wave			
Assigned race in previous wave is White (reference category)	0	0	0
Assigned race in previous wave is Person of Color	-0.044 (0.021) [-0.086, -0.002]	-0.032 (0.006) [-0.044, -0.020]	-0.017 (0.005) [-0.028, -0.007]
Dummies for age	Yes	Yes	Yes
Dummies for interviewer race	Yes	Yes	Yes
Dummies for region	Yes	Yes	Yes
Dummies for year/wave	Yes	Yes	Yes
Number of observations	79,023	78,512	71,461
Number of individuals	6,663	6,762	6,555
Within R^2	0.463	0.150	0.526
Between R^2	0.186	0.208	0.207
Overall R^2	0.354	0.179	0.417

Notes: Table repeats analyses from Models S4, S8 and S12 from Tables S3-S5with racial fluidity controlled for. Table reports estimated linear effects. Standard errors (in parentheses) are bootstrapped (50 reps) and clustered at the individual level. 95%CIs are in square brackets. The negative coefficients for being seen as a Person of Color in the previous wave indicate that individuals that were not seen as White in the past do not have the same level of status as individuals that have always been seen as White. At the same time, the negative effect of being seen as a Person of Color in the previous wave is not large enough to eliminate the strong positive effect of currently being seen as White (top row). Hence, these results also illustrate selective, status-driven churning from the People of Color category to the White race category.