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Alan Benson, Louis-Pierre Lepage

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Authors

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RFBerlin
ROCKWOOL Foundation Berlin –
Institute for the Economy
and the Future of Work

Gormannstrasse 22, 10119 Berlin
Tel: +49 (0) 151 143 444 67
E-mail: info@rfberlin.com
Web: www.rfberlin.com

Learning to Discriminate on the Job

Alan Benson
University of Minnesota

Louis-Pierre Lepage
Stockholm University

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Abstract

Using administrative records from a large national US retailer, we find that managers learn to discriminate "on the job" as they hire workers of different races. We find that idiosyncratic negative and positive experiences of managers influence the race of their future hires. Early negative experiences hiring black workers yield particularly substantial and persistent declines in the manager's subsequent black hiring. Our results highlight that individual labor market experiences of employers with minority workers systematically give rise to hiring discrimination, consistent with past experiences dynamically shaping employer perceptions of worker groups.

JEL Classifications: J71 (Discrimination); M50 (Personnel economics); D83 (Search, learning, information and knowledge, communication, belief, unawareness); J24 (Human capital, skills, occupational choice, labor productivity)

Keywords: Labor market discrimination, managers, experience effects, racial inequality

Benson: bensona@umn.edu. Lepage: louis-pierre.lepage@sofi.su.se. We thank Martha Bailey, John Bound, Charlie Brown, David Card, Pierre Deschamps, Steve Lehrer, Matthew Lindquist, Erik Lindqvist, Conrad Miller, David Miller, Jose Montalban Castilla, Rosina Rodriguez Olivera, Dan-Olof Rooth, Jeff Smith, Aaron Sojourner, and Evan Starr for helpful discussions and feedback as well as seminar participants at the 2022 NBER Summer Institute, Stanford University, Bocconi, ASSA, CMU, EEA, SOLE, CIREQ, EALE, CEA, RES, AFSE, ESPE, SEC, the University of Michigan, the Stockholm School of Economics, SOFI at Stockholm University, the Nordic Summer Institute, the Discrimination and Diversity Workshop, and the Online Seminar on the Economics of Discrimination and Disparities for their comments. A previous draft of this paper was circulated under the title "The Emergence of Hiring Discrimination."

Extensive and persistent racial disparities pervade the labor market, with black-white earnings and unemployment gaps having moved little for decades (Lang and Lehmann, 2012). Studies that have sought to unpack the root causes of discrimination have largely echoed a common refrain: evaluators, judges, physicians, and other influential decision makers frequently hold individual-level biases or stereotypes about certain groups (Reuben et al., 2014; Arnold et al., 2018; Bohren et al., 2019; Bordalo et al., 2019; Sarsons, 2019). The cumulative effects of everyday decisions informed by these biases could provide a foundation for understanding systemic discrimination and its consequences for social and economic inequality (Darity and Mason, 1998; Bohren et al., 2022). Yet, we know little about where individual-level biases come from and how they evolve over time.[1]

We investigate whether individual-level hiring discrimination emerges and evolves based on a decision-maker's personal experiences on the job. In particular, we study whether and how managers' experiences hiring workers of different races affects the race of their subsequent hires. We use administrative data from one of the largest employers in the US, with around 1 million workers in permanent positions working for over 27,000 managers across over 4,000 stores between 2009 and 2016. The setting is well suited to study the evolution of individual-level hiring decisions: hiring is highly decentralized and at the discretion of department managers, who are free to draw upon their past experience to make decisions. Because department managers hire for their department nested within a store and we observe when managers arrive or leave a department, we can isolate the effect of a manager's hiring experiences from the effects of the job or store location, such as differences in applicant pools, shares of minority workers in the area, or local labor markets conditions. Because workers are hired to perform similar tasks within a single firm, we can also separate the effect of a manager's experiences from other factors that affect the racial composition of hires. The data allow us to study hiring across a large set of managers in a broadly representative labor market setting; about half a percent of the stock of the US labor force was hired by the firm in this period. Workers in the retail trade sector constitute about 10% of the US labor force and share similar barriers to economic mobility as other working-class occupations (Bureau of Labor Statistics, 2021).

Our main empirical analysis examines whether manager-level variation in hiring within a store reflects past experiences "on the job" with workers from different races. Specifically, we study within-manager variation in the race of hires over time, conditional on whether their

[1]Data limitations have stymied efforts to study individual discriminatory behavior, for example since Census and audit study data typically lack information on individual recruiters or managers (Charles and Guryan, 2011; Guryan and Charles, 2013).

previous experiences hiring workers from different racial groups were positive or negative. To operationalize negative and positive experiences, we use variation in the realized tenure and the turnover reasons of a manager's previous hires, net of store, department, and local market-level factors.[2] Turnover at this firm (and in retail generally) is very high, as are the costs of recruiting and training new workers, so reducing turnover is a key aspect of managers' jobs. Tenure is correlated with greater objective sales performance (where this metric is available) and a greater likelihood of leaving for voluntary reasons rather than being dismissed for poor performance. As a result, new hires with short tenures generally represent a bad hiring outcome for the manager. In contrast, a new hire who remains in their position for a particularly long time represents a good hiring outcome, both because of reduced turnover costs and increased average productivity.

We have two main findings: (1) a manager's past hiring experiences, particularly with black workers, affect their probability of hiring from that group in the future, and (2) negative experiences with black workers, especially early in a manager's career, have particularly persistent effects. Our estimates suggest that managers' first experiences alone reduce subsequent black hiring by 7.3%, corresponding to 1,000 fewer black hires at the firm each year. We document these findings across several different experience measures, including using managers' exposure to incumbent workers when they join their department rather than their own hires. We also document these findings even though the distribution of negative and positive experiences with black and white hires is similar at the firm.

We then present additional evidence to help interpret our main findings. First, we find that negative experiences of a manager with black workers in the past predict a lower likelihood of having a negative experience with current black hires. This is consistent with the possibility that managers who have a bad experience hiring a black worker in the past adopt a higher threshold for hiring a black worker in the future, such that black applicants who overcome this higher threshold are positively selected. Second, the effect of previous experiences on hiring is greatest for less experienced managers. Third, the impact of managers' negative experiences with black workers is stronger in areas with lower shares of black population. Fourth, managers do not seem to respond to the experiences of other managers in the same store, only their own.

We interpret our findings as evidence of experience effects and find that they appear

[2]The tenure of minority hires could be influenced by pre-existing bias of managers, although we show below that average tenure of black and white workers is quite similar at the firm, as are objective performance measures that we observe for a subset of workers. Nevertheless, we return to the distinction between pre-existing bias and bias from experience in detail when interpreting our results below.

driven by demand-side responses (e.g., managers avoid hiring from a group following a bad experience) rather than supply-side responses (e.g., black workers apply based on the manager's hiring history). We present additional results showing that time, manager, local labor shocks, and team composition placebos fail to predict the effects we document, whereas the individual hiring experiences of the "true" manager add substantially to our ability to predict their hiring. These analyses require alternative explanations to be manager-specific, such as negative experiences reflecting or being influenced by a manager's preexisting bias or taste-based discrimination. However, these alternatives are not consistent with several of our findings and additional tests. For example, we would expect biased managers to take longer than expected to hire their first black worker relative to other managers at their store, and if bias also affects turnover, then we would expect these managers to have higher initial turnover rates with their black hire(s). In addition, if managers had a preexisting bias that increased turnover for black workers, then we would expect bad experiences to be positively serially correlated within managers. We find that neither pattern is consistent with the data and present additional evidence supporting our interpretation after establishing our main findings.[3]

Lastly, we present a simple theoretical framework that rationalizes our results through experience effects: (1) a manager's perception of a worker group affects their hiring of the group, and (2) their perception of a group is at least in part shaped by their experiences with its workers. Moreover, we show that experience effects can disproportionately affect minority hiring under a set of conditions, including the possibility that managers have less initial information about minority groups and so update their perception more strongly following an experience with them, or behavioral biases like stereotyping. While these conditions appear intuitive and the framework yields novel testable predictions in line with our empirical findings, the role of personal experience in shaping discrimination has received relatively little attention in prior work.[4]

We contribute to a large literature on racial discrimination and inequality in the labor market, presenting novel evidence that individual biases arise from experience and create

[3]These results do not speak to whether preexisting biases exist or affect hiring at the firm. Rather, they indicate that, whatever initial biases may exist, they are not driving our results by creating selection in the managers who have positive or negative experiences with black workers.

[4]In classical models of statistical discrimination, employers, at least in equilibrium, typically act on the true, known distribution of outcomes across groups (Phelps, 1972; Arrow, 1973; Aigner and Cain, 1977; Coate and Loury, 1993). In taste-based discrimination, preferences are typically implicitly presumed to not evolve based on market interactions (Becker, 1957). As a result, group perceptions and prejudices are static over time, leaving limited scope for discrimination to arise from experience.

systematic racial discrimination in hiring. We study one of the largest employers of low-skill workers in the US, jobs for which racial discrimination is often posited to be largest and could differ importantly from gender discrimination or discrimination against high-skill workers (Lang and Lehmann, 2012). Recent evidence from correspondence studies indicates hiring discrimination at several large US employers (Kline et al., 2022). We take a complementary approach by documenting a specific source of racial discrimination at one such large employer and showing that accounting for experience effects substantively helps predict hiring discrimination. Such jobs are also often a first rung in a career ladder, with important implications for future outcomes (Oreopoulos et al., 2012).

Experience effects could arise across a number of hiring settings, especially when hiring is decentralized or at smaller firms. Hiring decisions are often relatively infrequent and managers making such decisions, especially early in their career, may have comparatively little information to inform their decision. As a result, their previous hiring outcomes, even if few, could sway hiring decisions. This is consistent with employer surveys (Pager and Karafin, 2009) as well as a growing literature on experience effects and the dynamic trade-offs that agents face between exploration and extraction, documented both within (Leung, 2018; Li et al., 2020; Lepage, 2024) and outside labor market settings (De Quidt and Haushofer, 2016; Malmendier, 2021a,b; Sarsons, 2019).[5] More generally, our findings contribute evidence that giving managers discretion in hiring leaves room for individual biases to arise and contribute to economic inequality (Hoffman et al., 2018).

Notwithstanding evidence that people generally learn and update beliefs with personal experience, the type of discrimination we document is unusual for the discrimination literature in that differences across managers may not only be due to some inherent trait (e.g. taste-based discrimination) or job- and market-level factors (e.g. statistical discrimination), but also market interactions with workers.[6] Rather, our results suggest that the initial "seeding" of hiring experiences with minorities can have substantial, persistent effects on hiring discrimination, causing a spillover effect whereby experiences with earlier minority hires affect a manager's treatment of other minority workers in the future. Furthermore, to the extent

[5]The trade off between repeating a successful experience and exploring a less well-known alternative has long been recognized as fundamental to organizational design (March, 1991; Denrell and March, 2001), relating to the economics literature on bandit problems (Bergemann and Valimaki, 2006).

[6]Previous work on managers has primarily focused on static hiring differences across managers, while we focus on the dynamic effects of their own market interactions with workers (Giuliano et al., 2009; Giuliano and Ransom, 2013; Åslund et al., 2014; Hjort, 2014; Benson et al., 2024; Bartanen and Grissom, 2023; Glover et al., 2017; Cowgill and Perkowski, 2024). The statistical discrimination literature has devoted some attention to the dynamics of discrimination, but typically focusing on how perceptions of individual workers, rather than worker *groups*, evolve with additional information (Altonji and Pierret, 2001; Bohren et al., 2019).

that experience is a product of a decision maker's own decisions, then avoidance of a group following negative experiences could insulate the decision maker from new experiences that could correct their negative perceptions. This provides one explanation for the emergence and persistence of inaccurate group perceptions, which are at the center of a growing strand of the discrimination literature (Bohren et al., 2021; Lepage, 2024). We also provide evidence on a specific process through which the nature of contact between employers and workers may shape employer attitudes, consistent with a broader literature on the contact hypothesis reviewed in (Paluck et al., 2019).

Identifying the causes and consequences of individual biases is crucial to understand economic inequality and help organizations as well as policymakers design effective remedies. Our results give cause for both pessimism and optimism for efforts to combat discrimination. On one hand, black workers are inherently disadvantaged because manager responses are particularly strong following negative experiences with them, which as we discuss below can arise even without invoking behavioral biases, biased priors, productivity differentials, or prejudice. On the other, an important driver of discrimination appears to be that managers rely on a limited, potentially selected set of experiences to inform their hiring decisions. This suggests increased scope for organizational practices like hiring algorithms that build on the experience of many different managers, or policies like affirmative action that foment greater contact with minority groups (Miller, 2017; Li et al., 2020).

1 Empirical framework and institutional setting

Our central hypothesis regards whether managers' positive and negative hiring experiences with black and white workers predict their future hiring from these groups. To operationalize this hypothesis, we may consider whether the share of black hires by manager m in location l (each with multiple managers) and at time t can be explained by measures of whether past experiences of the manager with black and white workers were positive or negative. For estimation purposes, we consider the form

$$B_{mlt} = \beta_1 EXP_{B,t} + \beta_2 EXP_{W,t} + X_{mlt}\zeta + \theta_t + \lambda_l + \gamma_m + \zeta_{mlt} \tag{1}$$

where $EXP_{B,t}$ and $EXP_{W,t}$ capture whether a manager's experiences with black and white workers were more negative or positive.

Without measures of previous experiences, Equation (1) corresponds to a standard

specification used to investigate differences in minority hiring across employers.[7] Our key proposition is that, by augmenting Equation (1) with measures of whether past experiences with workers were negative or positive, we can better understand hiring patterns across managers and establish the role of experience effects in hiring. Intuitively, if $EXP_{B,t}$ denotes a positive past experience, then a positive sign signifies that positive experiences hiring black workers are associated with more black hiring in the current period, net of job and other worker characteristics (X_{emlt}) as well as location (λ_l), time (θ_t), and potentially manager fixed effects (γ_m). In contrast, near-zero estimates on $EXP_{B,t}$ and $EXP_{W,t}$ would suggest that heterogeneity in the race of managers' hires can be explained by factors relating to the store or hiring context.

In this specification, $EXP_{B,t}$ and $EXP_{W,t}$ may be correlated with current hiring through a few potential channels. Section 3 scrutinizes whether our estimates are truly driven by managers' experiences, rather than other characteristics correlated with the manager. The fixed effects in Equation (1) isolate within-store variation over time. To assess within-department factors or dynamic effects such as referrals and labor market shocks, we present additional analyses, including placebo tests using the timing of managers' arrival. These results make clear that our results truly reflect manager-level effects. We then consider the possibility that positive and negative experiences depend on a manager's pre-existing bias. For example, taste-based discrimination could affect the rate at which a manager hires minority workers as well as whether their experiences with those hires are negative. Our strategy for investigating these factors is to present balancing tests and additional evidence on the precise timing of the relationship between a manager's propensity to hire minority workers and their propensity to have negative experiences with them. These analyses do not rule out that static, pre-existing biases influence hiring at the firm, but they do plausibly rule out that these factors are driving the specific hiring patterns we document.

Having plausibly isolated experience effects, their interpretation as hiring discrimination follows from two conditions: managers make hiring decisions based on their perception of different worker groups, and these perceptions are shaped by their prior hiring experiences.

[7] For instance, Bartanen and Grissom (2023), Bates (1994), Carrington and Troske (1998), and Stoll et al. (2004) find heterogeneity in the probability that a black worker is hired based upon the race of the manager and location. Cowgill and Perkowski (2024) finds variation across hiring managers and intermediary applicant screeners. Moreover, Benson et al. (2024), Giuliano et al. (2009), and Giuliano and Ransom (2013) find that the race of managers is correlated with the race of hires even within locations. Miller and Schmutte (2021) finds location-specific effects from founder race and social network effects, and Kline et al. (2022) find firm-specific effects in a correspondence study of large employers. Couch and Fairlie (2010) and Cajner et al. (2017) find that labor markets for black and white workers respond differently to business cycles.

1.1 Setting

Our data consist of monthly longitudinal administrative records on workers and managers from the US operations of a large national retailer between February 2009 and October 2016. Each store is led by one store manager and a set of department managers who hire for their respective department (on average 4-5 managers per store). Crucially, the setting and data allow us to analyze the sequence of hiring decisions within a manager, and condition future hiring decisions on the manager's own past hiring outcomes. We restrict our sample to new hires into permanent non-managerial retail positions (83% of new hires and 97% of worker-month observations), as these are presumably the most consequential for the manager and positions for which tenure can be used as a measure of the worker's performance (Autor and Scarborough, 2008). Excluding transfers and returning workers allows us to concentrate on hires who were chosen by the manager and may therefore be more salient. Section 2.4.4 considers other potential sources of updating, particularly: (1) other managers at the same store location, (2) incumbent workers who the manager inherits when joining the department, and (3) the manager's hires prior to joining the focal department. However, our main analysis focuses on the manager's own initial hires within that same department, under the supposition that these will be most salient.

Our main analysis makes two additional sample restrictions. First, we focus on white and black workers because they are the two largest racial categories in our data, making it more feasible to estimate the evolving hiring behavior of managers.[8] Second, to study the entire hiring sequence of each manager, we restrict our sample to new department managers who begin hiring for the first time at the firm during our sample period. Although we cannot observe whether these managers hired workers at other firms in the past, they have to adapt to a new hiring context when they arrive at the firm, likely making their initial hiring experiences particularly relevant.

Table 1 presents summary statistics on workers and managers. Black and white workers account for over 84% of workers and once restricting the sample to these two groups, white workers account for approximately two thirds of hires. More than half of hires are female. Managers on average hire approximately 18 workers (including both black and white hires), with a median of 7. While black workers make up nearly a third of entry-level hires, they are less likely to be employed as managers, so we pool both black and white managers in our

[8]Hispanics are the third largest category. They are treated as a separate category in the data and the firm does not distinguish between race and ethnicity. Still, corresponding analyses are presented in Appendix E.

Table 1: Summary statistics and performance measures for new managers and their hires

	Workers		Managers	
	Mean	Std. dev.	Mean	Std. dev.
Age	28.02	(12.32)	42.13	(11.31)
Female	0.54	(0.50)	0.30	(0.46)
White	0.67	(0.47)	0.88	(0.32)
Black	0.33	(0.47)	0.12	(0.32)
Full time	0.10	(0.29)	0.99	(0.07)
Tenure at the firm (months)	3.13	(2.75)	86.61	(98.27)
Tenure as hiring manager (months)			15.53	(14.29)
Total # of hires			18.16	(36.36)
Number persons	138,323		7,615	
Number person-months	703,372		117,154	

NOTE. The sample is restricted to managers who hired their first worker during our sample period (2009-2016) and the black and white workers hired by those managers into permanent positions, excluding transfers and rehires. Performance measures are calculated at the individual hire level. Total hires corresponds to the total number of workers hired by a manager over our sample period.

analysis.[9]

To study the relationship between manager experiences and their current hiring, we use a manager-level panel in which one observation corresponds to a month in which a manager hires at least one black or white worker, which we refer to as a hiring event. On average, managers hire workers approximately every 2-2.5 months. We observe 60,096 hiring events (46% of all manager-months) with an average of 2.3 workers per hiring event (0.75 black, 1.55 white). One motivation for organizing the data by hiring event is to focus on effects from managers' own hiring experiences, which are concentrated in the irregular periods that managers hire workers.[10] Since more white workers are typically hired in a given event, experience measures calculated at the event level have lower variance for white workers. To account for this, we interpret our effects for a one standard deviation change in experience

[9]Performing the analysis restricted to white managers yields similar results, since they account for the vast majority of managers. Performing the analysis restricted to black managers yields some evidence that they also respond to their hiring experiences, but the estimates are too noisy to conclude whether they behave differently from white managers. Results are available upon request.

[10]In these specifications, controlling for the number of hires in a given hiring event and the time between hiring events has little impact on the results. Results shown below indicate similar results when considering a time panel instead of an event panel (Appendix Table D1).

measures with white or black hires, but still present the unscaled coefficients in the tables and figures, making clear that the main takeaways of our analysis do not depent on this interpretation point.

Staffing levels for permanent positions in each store are determined by forecasts made by the firm's headquarters. When a manager is tasked with filling a vacancy, the manager would typically begin by requesting a shortlist of candidates from the location's HR representative. That is, most entry-level positions are filled from evergreen requisitions: candidates provide a generic application that asks for formal qualifications, job, and geographic preferences, and then an HR manager provides a shortlist of qualified, available applicants to the hiring manager from this common pool of applicants in the event of a vacancy. As such, candidates are not applying to any specific manager, store location, job, or position. The manager then interviews candidates and makes offers; they have complete authority to select the final candidate, pending a background check. Workers in most entry-level jobs (e.g. cashiers, sales associates, and material handlers) are provided about one week of formal online skills training and one week of job shadowing before moving to regular status. In principle, it is possible that managers could have pre-existing contact or private familiarity with a candidate, but interviews with managers suggest this is very rare. Nevertheless, we return to a discussion of applicant pool endogeneity, sorting between workers and managers, and referral hiring as potential explanations for our findings in Section 3.

There is large variation in black hiring across managers at the firm. The mean share of black hires is 20% with the first, second, and third quartiles corresponding to 0%, 9%, and 33%. Appendix C presents evidence that variation in the share of black hires persists after controlling for store fixed effects. A substantial share of residual variation is explained by manager fixed effects, implying that individual manager factors play a role in determining the race of hires. Our main analysis tests whether these effects are in fact partially driven by experiences on the job. To this end, we restrict our sample to managers who hired at least twice in total. In particular, analyzing the effects of a previous experience with black workers evidently requires the manager having hired black workers at least once in the past. Appendix also C presents evidence that our sample of managers appears representative of managers at the firm and that instances of managers hiring no black workers appear to largely arise from differences in hiring contexts. Still, to the extent that our analysis was to exclude some managers who hire no black workers because they are particularly biased, then it would make the evidence of hiring discrimination we document below more striking.

When a worker separates, the manager reports a general reason (voluntary or involuntary)

and a detailed subreason, which is then approved by HR. Nominally, managers report that workers most often quit for better pay, hours, or career advancement, whereas they are usually dismissed for performance, absenteeism, or integrity violations (e.g. theft). Substantively, most separations are voluntary, and dismissed workers are generally not rehirable.

1.2 Tenure and experience measures

Turnover at the firm is high, in line with the broader retail sector which has 50% greater turnover than the US average.[11] High turnover provides valuable variation in hiring of workers within managers even over a limited time horizon, allowing us to better study manager responses following their experiences.

Turnover is also costly. Workers must be hired, trained, and provided time to develop skills and a familiarity with the store's protocols and products. Workers hired into permanent positions and who depart after short tenures also impose an opportunity cost: they filled a position that could have otherwise been filled by a successful hire. Survey evidence indicates that the average cost of hiring and training a replacement retail worker is around 10 weeks of worker salary (Boushey and Glynn, 2012). Hiring and retaining quality workers into permanent positions is thus one of the most important aspects of department managers' jobs.

Figure 1 provides an overview of tenure and separation at the firm, showing that over 85% of workers no longer work in the position for which they were hired at a given store after one year. Most turnover reflects dismissals and quits, particularly in the first three months of employment, during which these two sources of turnover account for 70% of turnover. After three months, around 50% of position separations are for reasons other than dismissals and quits, including transitions to other departments, layoffs, promotions, disability, and death. After the first year of employment, turnover declines substantially and remains below 2% per month, suggesting a successful hire and sufficiently good match between the worker and the position for the employment relationship to persist.

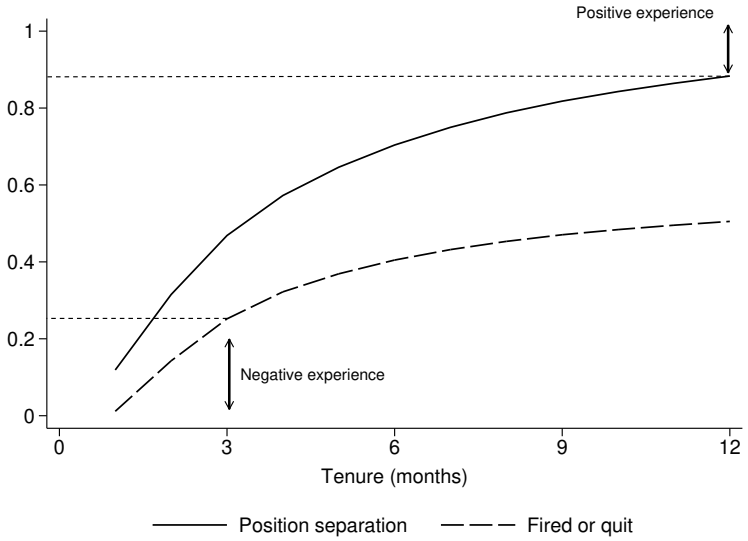
These patterns motivate our use of tenure cutoffs and turnover reasons to capture positive and negative experiences of managers with workers.[12] Following Figure 1, we define a negative experience as the share of new hires of a race who are fired or quit in the first 3 months of employment. We define a positive experience as the share of new hires of a race who achieve at least 12 months of tenure in the position for which they are hired. We use tenure to define

[11] https://www.bls.gov/news.release/jolts.t18.htm.

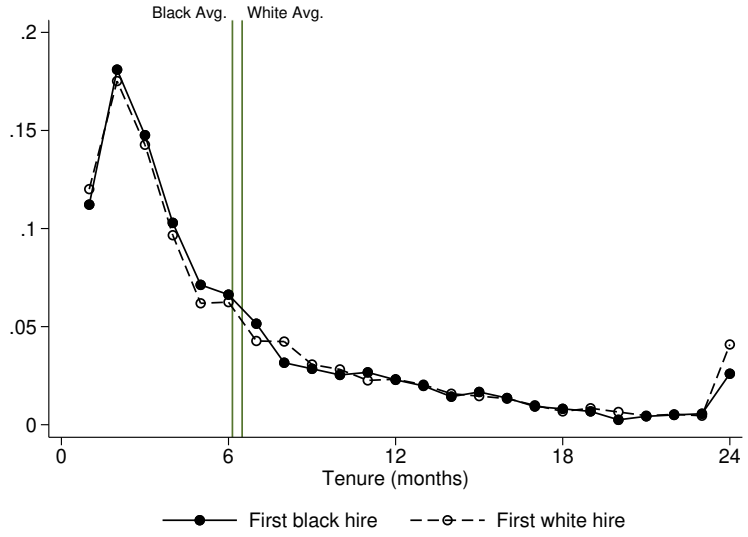
[12] We would ideally contrast performance measures to a manager's expectation, but because we don't observe expectations, we use performance measures relative to other new hires at the firm, which should inform manager expectations.

Figure 1: Tenure at the firm

(a) Cumulative turnover by tenure



(b) Tenure among managers' first hires, by worker race



NOTE. Panel A: "Position separation" refers to the worker no longer working in the position for which they were hired, including dismissals and quits but also department or store transfers, layoffs, promotions, and retirement/disability/death. The sample is restricted to workers hired at least one year before the end of our sample period. Panel B: Workers hired in the last two years of our sample are excluded since they cannot achieve the maximum tenure censored at 24 months. Hiring events are restricted to those with at most one worker hired from each racial group.

positive experiences because it reflects a stronger measure of performance than using the share of workers that has not quit or been fired after 12 months, since poorer hires could also be transferred or laid off. This classification yields positive and negative experience measures which are not necessarily symmetric, but we show below that this distinction is inconsequential for our main results.

Managers presumably observe a positive or negative signal of quality for their hires within the first few weeks of employment. For instance, workers who will eventually achieve tenure above one year have higher sales performance within the first three months than workers who will quit or be fired within these three months (Appendix B).[13] As such, we do not posit that positive experiences are only revealed to managers after one year. The 3-month and one-year cutoffs are only a way for us to ex-post characterize hires who were more or less successful, in the absence of direct shorter-term performance information. Furthermore, Section 3.3 presents evidence that the discrepancy in timing between our positive and negative measures is not driving our results. Lastly, using these two measures requires that we exclude workers hired in the last 3 months (1 year) of our sample period for negative (positive) experiences in order to compute experience measures for all hires.

Experience measures with white and black hires are similar. In particular, black hires in a given event have only a slightly higher 3-month quit or dismissal rate (21% vs 19%) and slightly lower 12-month retention rate (9% vs 11%). Most variation in tenure is clearly not explained by race, but by idiosyncratic differences across individuals within race. For instance, there's a 48% probability that a given black hire meets or exceeds the average tenure of a white hire. Black and white workers have similar median (4 versus 4.5 months) and average tenure (5.6 versus 6.1 months). Moreover, conditional on being fired or quitting within 3 months, both black and white workers achieve an average tenure of 2.4 months, so there is little difference in tenure across race conditional on an experience being classified as negative. Panel B of Figure 1 similarly shows that, while the distribution of realized tenure among managers' first hires varies widely *within* race, it largely overlaps *across* race.

In principle, identifying experience effects – how managers dynamically adjust hiring based on their group-specific experiences – does not require that the performance of black and white workers is the same or even similar, as also made clear in our theoretical framework below. Still, it simplifies interpretation to think of managers drawing from two similar tenure distributions, but responding more strongly to draws they observe from the Black distribution.

[13] Appendix B also provides evidence that workers who achieve longer tenure are more productive in general and less likely to leave due to involuntarily termination.

A priori, differences in tenure across race could have been explained by differences in performance, but also by other factors including manager bias. Because differences in tenure and in the rate at which managers have positive and negative experiences across race are quite modest, it seems unlikely that manager bias plays a large role in explaining worker turnover at the firm.[14] We also provide additional evidence below that static or pre-existing bias, without involving experience effects, provides a poor alternative explanation for our findings.

2 Evidence on experience effects

We begin with the simplest empirical specification to test for experience effects: the impact of a manager's first experience hiring black and white workers at the firm. After establishing that initial experiences with black workers impact a manager's subsequent hiring, we test the impact of experiences beyond the first, perform robustness checks using alternative experience measures, and provide additional evidence to better understand how experience effects operate.

2.1 The impact of a manager's first experience

To test how a manager's initial experience affects their subsequent hiring, we estimate Equation (1) only for initial hires:

$$FB_{emlt} = \beta_1 EXP_{B,1} + \beta_2 EXP_{W,1} + X_{emlt}\zeta + \theta_t + \lambda_l + \zeta_{emlt} \tag{2}$$

where the dependent variable is the fraction of black workers hired in event e by manager m in location l at time t. $EXP_{B,1}$ and $EXP_{W,1}$ respectively indicate the share of black and white workers for whom the initial hiring experience was negative or positive.[15] We consider two sources of exposure: the manager's first hires after joining a department and, in Section 2.4.4, workers who were already present in the department when the manager joined. X_{emlt} potentially includes the fraction of full-time workers, fraction female, average age, total

[14] Though our focus is on the evolution of hiring based on experiences, we also find small, statistically non-significant differences in black turnover in states with above versus below-median racial prejudice (as measured by Stephens-Davidowitz, 2014) (Appendix Table D2). We thus find little evidence that geographic variation in prejudice drives racial differences in turnover rates.

[15] We do not require that a manager's first experience with black and white workers be in the same initial hiring event.

number of hires in the event, number of previous hiring events, time since last hiring event, yearly state unemployment, and yearly state college attainment (we do not have information on individual workers' education level).[16] In particular, controlling for the total number of hires accounts for the fact that managers may respond differently based on the number of good of bad signals they observe from their first hiring event, e.g. 5 negative experiences out of 5 versus 2 negative experiences out of 2. θ_t and λ_l represent month and year as well as store fixed effects. Standard errors are clustered at the store level. Unless otherwise specified, all of our tests refer to a statistical significance level of 5%. The identification assumption we rely on for estimates of Equation (2) to represent experience effects of a first experience on subsequent hiring is that the tenure of a manager's first black and white hires is randomly assigned conditional on store and time fixed effects as well as other controls. We show several robustness analyses consistent with this interpretation after showing our main results.

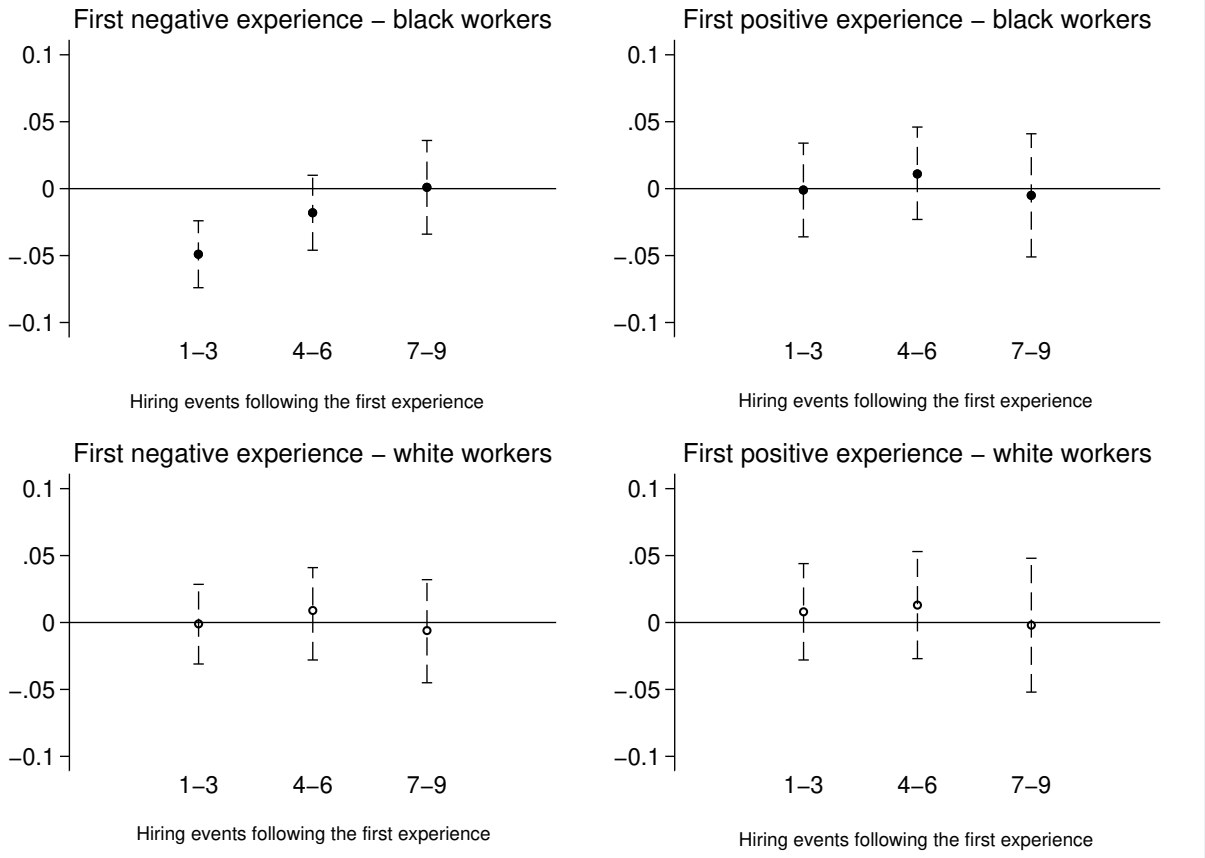
Figure 2 estimates Equation (2) for hiring events following a manager's first experience with their black and white hires. Recall that the sample is restricted to black and white workers, so estimates for the fraction of white hires have the same magnitude but with the opposite sign. As shown in the top left panel, when a manager's first black hires quit or are fired within three months, the manager hires fewer black workers for up to the next six hiring events, corresponding to around 12-15 months on average.[17] The decrease is strongest immediately following the negative experience, corresponding to a reduction of around 14% for events 1-3 and 5% for events 4-6. The magnitude and persistence of this effect is unique to negative experiences with black workers, rather than white workers or positive experiences. If positive experiences have any temporary impact on hiring, as we investigate in greater detail below, it appears that the impact has dissipated within the following three hiring events.

Figure 3 shows that a first negative experience with black hires sets managers on a path of persistently lower rates of black hiring. The fraction of managers who hire at least one black worker in the hiring event following their first experience is about 15 percentage points lower at around 33% for managers whose first experience was negative. The hiring gap subsides

[16] Black hires at the firm are younger (35 versus 40 years on average) and more likely to be female (59 versus 54%), so controlling for hires' age and gender helps isolate experience effects relating to race in particular.

[17] We assess two potential concerns with the estimates from Figure 2. First, because managers vary in the number of hiring events they have, estimates among managers with more observed hires may not be due to experience effects, but selection among managers who ultimately have more hiring events. Restricting the sample to managers who ultimately have at least six hiring events when estimating Equation (2) has little impact on the results. Second, there could be selection into the set of managers who never hire a black worker vs those who never hire a white worker. Restricting the sample to managers predicted to hire at least one black and one white worker (based on location and managerial tenure) has little impact on results (Appendix Table D3).

Figure 2: Impact of a manager's first hiring experience with black and white workers on their subsequent black hiring share

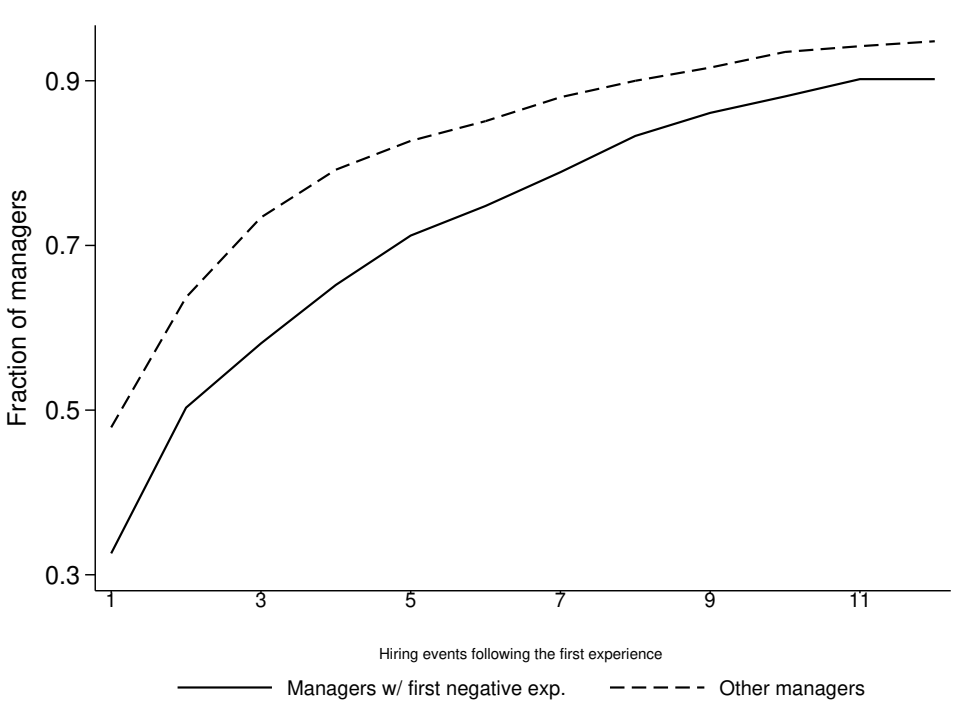


NOTE. The figure shows estimates from Equation (2) where the dependent variable is the fraction of black hires in a given hiring event and the independent variables are whether a manager's first experience with black or white hires was positive or negative. Hiring events following a manager's first experience are grouped into bins of 3 up to the 9th event following the first experience. We exclude workers hired in the last 3 months (1 year) of our sample period for negative (positive) experiences so we can compute experience measures for all hires. Controls include the fraction of full-time and female hires, average age of hires, total number of workers hired in the event, number of previous hiring events, time since the last hiring event, manager tenure, yearly unemployment and college attainment rates in the state, as well as store and hiring month and year fixed effects. Dashed lines represent 95% confidence intervals from clustered standard errors at the store level.

over time as managers hire more workers, but there remains a 5 percentage point difference in the fraction of managers who have hired *any* black workers since their first experience, even after 12 hiring events or around 2.5 years.

Similar results are shown in Table 2, which tests the impact of a first experience on hiring in the current event. Estimates from the first three columns indicate a statistically significant decrease of 2% in black hiring for a one standard deviation increase in the fraction

Figure 3: Share of managers who have hired at least one black worker following their first experience with black workers



NOTE. The figure presents the share of managers who hired black workers at least one more time, following a first negative/non-negative experience hiring a black worker.

of the first black hires who were fired or quit within 3 months. These results indicate that early negative experiences of a manager with black workers persistently impact hiring over subsequent hiring events. Columns 4-6 show smaller statistically non-significant impacts for early positive experiences, suggesting that any impact they may have does not persist, consistent with Figure 2. The impact of a first negative experience with white workers is smaller and statistically non-significant, and we can reject that the coefficient is of the same magnitude but opposite sign to that of a first negative experience with black workers.

To put the magnitude of these effects into context, we estimate the impact of a first negative experience on future black hiring compared to a counterfactual scenario in which managers always hire black workers at the rate they do in their first event (25%, when not restricting to only black and white workers). Specifically, we compute the sum of the four coefficients in columns 3 and 6 of Table 2 weighted by the frequency of negative and positive experiences with each worker race across 9,999 bootstrap samples. On average, given that managers respond particularly strongly to negative experiences with black workers, we

Table 2: Impact of a manager's first experience with black and white workers on current black hiring

Black fraction hired	(1)	(2)	(3)	(4)	(5)	(6)
Black fraction quit/fired $\leq$ 3 months	-0.024	-0.021	-0.019			
	(0.007)	(0.007)	(0.007)			
White fraction quit/fired $\leq$ 3 months			-0.009			
			(0.008)			
Black fraction tenure $\geq$ 12 months				-0.010	-0.007	-0.010
				(0.010)	(0.010)	(0.011)
White fraction tenure $\geq$ 12 months						-0.003
						(0.011)
Worker and event controls		Y	Y		Y	Y
Store FE	Y	Y	Y	Y	Y	Y
Hiring month and year FE	Y	Y	Y	Y	Y	Y
Outcome mean	0.410	0.387	0.367	0.411	0.387	0.366
Standard deviation black	0.405	0.405	0.405	0.327	0.327	0.327
Standard deviation white			0.348			0.342
P-Value: B = -1 * W			0.006			0.375
Observations	39,143	36,816	35,613	32,969	30,908	29,869

NOTE. The table shows OLS estimates from Equation (2) where the dependent variable is the fraction of black hires in a given hiring event and the independent variables are whether a manager's first experience with black or white hires was positive or negative. One observation corresponds to a hiring event, meaning a manager-month in which at least one worker was hired. All hiring events following a manager's first experience are included in the analysis sample, but we exclude workers hired in the last 3 months (12 months) of our sample period for negative (positive) experiences so we can compute experience measures for all hires. Black (white) fraction quit/fired $\leq$ 3 months corresponds to the share of a manager's hires in their first hiring event with a black (white) workers that was fired or quit in the first 3 months of employment. Black (white) fraction tenure $\geq$ 12 months corresponds to the share of a manager's hires in their first hiring event with black (white) workers that achieved tenure of at least one year in their position. The "baseline controls" referred to in subsequent analyses include "worker and event controls," which are the fraction of full-time and female hires, average age of hires, total number of workers hired in the event, number of previous hiring events, time since the last hiring event, manager tenure, and yearly unemployment and college attainment rates in the state. Baseline controls also include store, hiring month, and hiring year FEs. P-Value: B = -1 * W corresponds to the p-value from a test of whether the coefficient for black workers is equal but opposite sign to the one for white workers. Clustered standard errors at the manager level are presented in parentheses.

estimate that a manager's first experience reduces their subsequent black hiring by 7.3% (standard deviation of 0.057, less than 10% of estimates above 0). Differently put, without these first-experience effects, we estimate that black workers would compose 25% of the firm's total new hires rather than the observed 23.3%, corresponding to an additional 1,000 new black hires each year. While this exercise relies on some approximations and simplifications, it suggests that experience effects are quantitatively important, particularly given that restricting to the impact of first experiences underestimates any cumulative impacts of later experiences.

2.2 The impact of a manager's experiences beyond the first

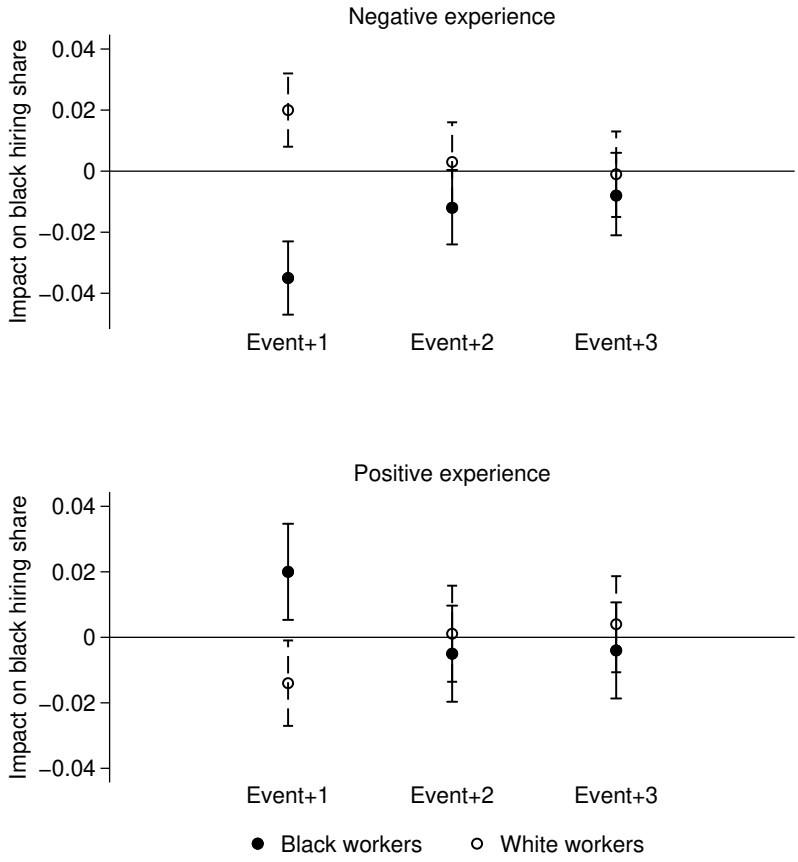
We next generalize Equation (2) to any past experience of a manager with black and white workers, adding manager fixed effects and clustering standard errors at the manager level (results are similar when clustering at the store level). Manager fixed effects account for time-invariant differences in managers' willingness or ability to hire workers of different races. For example, if some managers are biased against black workers, regardless of their experience, and hire fewer of them as a result, the fixed effects separate these effects from within-manager changes in hiring over time based on their experiences.

Figure 4 shows the impact of a positive or negative experience on hiring over the next three events. We find decreases (increases) in the share of black hires of 3.5 (2) percentage points in the next hiring event following a negative experience with black (white) hires (4.2% (1.9%) for a one standard deviation increase in our measures of negative experience). Positive experiences also affect hiring in the next event, with a 2 (1.5) percentage point increase (decrease) in black hiring following a positive experience with black (white) workers. As such, managers appear to respond more strongly to their experiences with black workers, whether they are positive or negative.[18] Compared to Figure 1, impacts subside more rapidly, are only marginally statistically significant for the second event following a negative experience with black hires, and have mostly dissipated after three events or around 7.5 months on average. The impacts of negative experiences with white workers or positive experiences appear to have almost entirely subsided by the second event following the experience. A related consideration is whether the recency of the latest experience matters for predicting how managers respond when they have to hire workers again. Table D13 splits the response to a negative experience with black workers in the next hiring event with black workers by whether it happened three months or less versus more than three months ago and shows that effects appear largely driven by the former.

Our last specification investigates how the cumulative share of positive and negative experiences up to event $e-1$ affect the black hiring in the current event, providing an intuitive way to quantify how an employer's entire history affects their current hiring. Table 3 documents that managers statistically significantly decrease black hiring by 6% in column 3 for a one standard deviation increase in the fraction of previous negative experiences. Impacts for experiences with white workers indicate a substantially smaller but still statistically

[18] This suggests that our results are not necessarily inconsistent with Bayesian updating by managers over their own experiences. In contrast, Sarsons (2019) documents that female surgeons receive fewer referrals from a doctor after the doctor has had a negative experience with a female surgeon, but that the converse is not true following a positive experience, suggesting an updating bias.

Figure 4: Impact of a manager's latest hiring experience with black and white workers on their subsequent black hiring



NOTE. The figure shows estimates from a generalized version of Equation (2) where the dependent variable is the fraction of black hires in a given hiring event and the independent variables are whether a manager's experience with their latest black or white hires was positive or negative. The model includes the baseline controls from Table 2 along with manager fixed effects. 95% confidence intervals from clustered standard errors at the manager level are presented using dashed lines.

significant increase of approximately 3% in black hiring. Managers statistically significantly increase black hiring by 4% in column 6 for a one standard deviation increase in the fraction of previous positive experiences with black hires, while impacts for white hires are small and not statistically significant.

The adjusted R-squared from Column 3 of Table 3 is 0.414, whereas that of a specification excluding manager fixed effects but keeping experience measures is 0.413 and that of a

Table 3: Cumulative impact of previous experiences with black and white workers on current black hiring

Black fraction hired	(1)	(2)	(3)	(4)	(5)	(6)
Black fraction quit/fired $\leq$ 3 months	-0.053	-0.073	-0.072			
	(0.009)	(0.016)	(0.017)			
White fraction quit/fired $\leq$ 3 months			0.044			
			(0.022)			
Black fraction tenure $\geq$ 12 months				0.029	0.057	0.058
				(0.014)	(0.022)	(0.024)
White fraction tenure $\geq$ 12 months						-0.001
						(0.027)
Manager FE		Y	Y		Y	Y
Baseline controls (see notes)		Y	Y		Y	Y
Outcome mean	0.367	0.367	0.348	0.366	0.366	0.347
Standard deviation black	0.295	0.294	0.294	0.229	0.229	0.229
Standard deviation white			0.188			0.205
P-Value: B = -1 * W			0.044			0.067
Observations	34,496	33,971	31,911	28,879	28,456	26,655

NOTE. The table shows OLS estimates from a generalized version of Equation (2) where the dependent variable is the fraction of black hires in a given hiring event and the independent variables are the cumulative fraction of a manager's past experiences with their black or white hires which were positive or negative. The model includes the baseline controls from Table 2 along with manager fixed effects. For details regarding samples and definitions, see the notes for Table 2. Clustered standard errors at the manager level are presented in parentheses.

specification excluding experience measures but keeping manager fixed effects is 0.389. This suggests that experience measures explain roughly 6% of the variation in black hiring – a substantially larger share than manager fixed effects do – and that experience effects may be cumulative.[19] Still, we do not emphasize results conditioning on more than the initial experience, because there could be selection in the decision to continue hiring from a group in spite of previous experiences. For example, the quality of new hires may become endogenous to the quality of previous experiences, as we investigate in Section 2.4.1.

Across specifications, estimated coefficients on negative experiences with black hires are statistically significant and larger than those with white hires. Those on positive experiences with black hires are larger or similar to those with white hires. Statistical tests across specifications reject the null hypothesis that impacts of experiences with black and white workers, in particular negative ones, are equal but of opposite sign at the 5 or 10% level, as shown by the p-values presented in Table 2 and Table 3. Overall, evidence of experience effects is weaker for white workers, though coefficients are generally of the expected sign.

[19]Examining the first three hiring experiences of managers rather than only their first in Appendix Table D4 also suggests that more negative experiences with black workers cumulate into larger negative impacts.

2.3 Robustness to alternative measures and specifications

For simplicity, our specifications adopt a number of design choices: updating occurs after each hiring event, we discretize positive and negative experiences, we use measures of negative and positive experiences which are not symmetric, we estimate effects of positive and negative experiences separately, and we treat reasons for short-term quits and terminations as equivalently negative. Our main results are not sensitive to these decisions.

In one analysis, we re-organize the data into a monthly time panel with observations at the manager-month rather than the manager-hiring event level and compute a continuous measure of previous experience comparing tenure achieved by a manager's hires to expected tenure at the firm. Specifically, using a hazard rate approach, we compute deviations in turnover rates by race and months of tenure at the level of the manager's subordinates from average turnover rates at the firm, cumulatively for every month leading to a given hiring event.[20] The cumulative average of these deviations indicates how a manager's previous hires from each racial group were more or less likely to achieve a given level of tenure than expected. The results, shown in Appendix Table D1, indicate that a manager's previous black hires achieving higher-than-expected tenure on average is associated with more black hiring. In contrast, deviations from expected tenure for previous white hires have a much smaller, though still marginally statistically significant, impact on hiring.

Another analysis defines positive (negative) experiences as the previous hires of a manager being in the top (bottom) quartile of deviations from expected tenure at the firm. This differs from our baseline experience measures in three meaningful ways. First, using quartiles of deviations from expected tenure yields an equal fraction of positive and negative experiences across managers, while negative experiences were more frequent than positive ones using our baseline measures. Second, while our baseline measures calculate positive and negative experiences over different time horizons, the quartile measure calculates both based on total realized tenure. Third, our baseline negative experience measure considers only terminations or quits, while our baseline positive experience measure considers any reason for turnover. In contrast, the quartile measure considers any reason for turnover for both positive and negative experiences. Ultimately, the experience effects we document are not sensitive to these considerations, as shown in Appendix Table D5. Still, there could remain differences between positive and negative experiences, for example if quick turnover is a stronger performance signal than avoiding turnover for an extended period of time, so we emphasize differences in

[20] The results are similar whether comparing to race-specific or average turnover rates across race, since turnover rates at the firm are similar across race.

the persistence of the impacts of positive versus negative experiences and in the magnitude of impacts across worker race, rather than within-race differences in magnitude between positive and negative experiences.

Table D12 estimates the impact of a more positive and more negative first experience in the same regression. In our main specification, it is possible that a manager has both some positive and some negative experiences with their first group of hires of a given group, which may lead to a different response than if all experiences are negative or neutral. By including both measures in the same regression, we hold constant the share of good experiences with first hires from a group constant when testing the impact of a higher share of bad experiences, and vice versa. The main takeaways remain unchanged with the impact of a more negative first experience with black workers estimated to have an even larger negative impact on subsequent black hiring, although a more negative first experience with white workers is also estimated to have a small positive, marginally statistically significant impact on subsequent black hiring.

A last set of analyses distinguishes among different types of negative experiences. Results are reported in Appendix Table D6. First, we separate negative experiences by whether the firm classified them as a termination or quit. Both yield decreased black hiring, with a larger effect for terminations than quits. This result is inconsistent with the possibility that differences in the impact of negative experiences across race are driven by black or white workers being relatively more likely to be fired rather than quitting. They also appear inconsistent with our results being driven by potential differences in firing costs across worker race. Second, we redefine our experience measures with black workers as relative to white workers or relative to the local labor market.[21] The distinction has little impact on the results. Finally, looking at more detailed reasons for turnover, we distinguish those more likely to be impacted by a manager's behavior from those out of their control, including dissatisfaction with pay, compensation, or benefits. Negative experiences that are less likely to be influenced by a manager's on-the-job behavior appear to have a smaller impact on subsequent black hiring, although still substantial and statistically significant, supporting the notion that our results are not driven by biased manager behavior.[22]

[21] These are, respectively, the excess fraction of black hires who are fired or quit compared to the average share among white hires, and the excess fraction of black hires who are fired or quit compared to the average share among hires in the same CBSA.

[22] Manager fixed effects explain relatively little variation in whether a termination is reported as involuntary after conditioning on time, store, and department fixed effects (adjusted R-squared of 0.056 with manager fixed effects versus 0.046 without). Moreover, the variation explained by manager fixed effects is almost identical for terminations of black and white workers (less than a 0.3% difference in adjusted R-squared

2.4 Exploring the impact of negative experiences

Our main results establish that managers' experiences, especially with black workers, impact their subsequent hiring decisions. This section delves deeper into experience effects with black workers by presenting additional analyses.

2.4.1 How do past experiences affect the quality of future hires?

Negative experiences of a manager may not only lead them to subsequently hire fewer black workers, but also yield positive selection in future black hires if they have to overcome a higher bar to be hired. In that case, negative hiring experiences in the past should lead to more positive experiences in the present.

Table 4 tests this hypothesis using different specifications. We find a negative correlation between previous negative experiences with black workers (either measured cumulatively or in the latest event) and the probability of a negative experience with current black hires. In contrast, we find smaller, statistically nonsignificant impacts of previous positive experiences with black workers on the probability of a positive experience with black workers in the current event (Columns 3 and 4). These results suggest that managers may increase the hiring bar for black workers following negative experiences, but not necessarily decrease it following positive experiences. It also makes clear that these findings are unlikely to simply reflect mean reversion. Otherwise we would expect a stronger, rather than weaker, pattern following positive experiences with black workers since they arise relatively more rarely given our experience measures. The quality of a current hire should be independent of the quality of previous hires, even conditioning on having had negative experiences with previous hires, in the absence of a mechanism operating at the manager or department level, also suggesting that these results capture a response by managers.

We see these results as important in part to further understand the mechanisms driving experience effects and in part to confirm that our results reflect experience effects rather than alternative mechanisms. Indeed, they contrast with patterns expected from worker referrals, taste-based discrimination, or other mechanisms through which positive experiences in the past should predict positive experiences in the future. In particular, while stationary taste-based discrimination may also lead managers to set a higher hiring bar for black workers, this would not result from previous negative experiences in particular. We return to these results in Section 4 when discussing alternative explanations.

gain). This is inconsistent with the notion that the rate of involuntary terminations or categorizations of

Table 4: How past negative and positive experiences predict current ones

	Black fraction quit/fired $\leq$ 3 months		Black fraction tenure $\geq$ 12 months	
	(1)	(2)	(3)	(4)
Black fraction quit/fired $\leq$ 3 months, cumulative	-0.090			
	(0.016)			
Black fraction quit/fired $\leq$ 3 months, latest event		-0.058		
		(0.008)		
Black fraction tenure $\geq$ 12 months, cumulative			-0.031	
			(0.020)	
Black fraction tenure $\geq$ 12 months, latest event				0.003
				(0.11)
Baseline controls (see notes)	Y	Y	Y	Y
Outcome mean	0.221	0.221	0.109	0.109
Standard deviation	0.234	0.367	0.203	0.293
Observations	17,000	17,000	14,337	14,337

NOTE. The table shows estimates of OLS regressions where the dependent variable is the share of a manager's black hires in a given event who were fired or quit within 3 months of being hired and the independent variables are the shares of a manager's black hires in their latest event, or cumulatively over all previous events, who were fired or quit within 3 months of being hired. For details regarding controls, samples, and definitions, see the notes for Table 2. Clustered standard errors at the manager level are presented in parentheses.

2.4.2 Are experience effects more important early in a manager's career?

We now present evidence on whether experience effects diminish with tenure and hiring experience, in line with belief updating and learning. While some previous work has documented that decision makers discriminate less with experience, this could differ importantly between cases where experience with a group is endogenous as in hiring versus exogenous as in the criminal justice system (Emeriau, 2023).

The results are shown in Table 5. First, we test whether experience effects are stronger for a manager's first experience hiring black workers at the firm versus a "placebo first experience" which corresponds to a manager's first experience during our sample period, but for more experienced managers who started hiring at the firm before 2009 (as a reminder, these managers were excluded from our previous analyses). The first column of Panel A reproduces our results from Column 2 of Table 2 for convenience, showing that a first negative

terminations as involuntary are themselves influenced by manager behvior.

experience with black workers has persistent impacts on black hiring when it is a manager's first experience at the firm. In contrast, Column 2 highlights that impacts are much smaller and statistically non-significant for managers who have had spells hiring workers at the firm before the start of our sample period. The difference between the two estimates is statistically significant at the 10% level, as shown at the bottom of Panel A. Second, going back to an analysis of new managers in Panel B, we find that decreases in black hiring following a negative experience with black workers are larger when managers have fewer months of tenure or have hired workers fewer times. Again, these differences are statistically significant at the 10% level.

Overall, the evidence is thus consistent with the impact of negative hiring experiences with black workers being stronger early in a manager's career. We may wonder whether these effects partly reflect selection. Managers who respond strongly to their early negative experiences may be less likely to achieve longer tenure or accumulate as much hiring experience. Appendix Table D7 shows that this does not appear to be the case – early negative experiences with black workers do not impact the total number of events that managers hire for over our sample period, suggesting a lack of penalty for these managers.

2.4.3 Do experience effects vary with the share of black population?

Decreases in black hiring following negative experiences could also relate to the relative size of the local black workforce. In particular, managers may have had more previous experience with black workers (including as coworkers) and may have higher incentives to learn/less opportunity to avoid black workers in areas with a higher black population. To test this, we match stores to data on racial composition by ZIP Code from the American Community Survey and estimate Equation (2) separately for stores located in areas with above and below-median black-to-white population ratios. Negative experiences lead to much larger, more persistent declines in black hiring in areas with smaller black populations. The likelihood of hiring a black worker over the three events following a first negative experience declines by 46% (s.e. 17%) in areas with low black populations versus 13% (s.e. 8%) in those with high black populations. The decrease in areas with low black population remains large at 42% (s.e. 19%) for the next three events and 23% (s.e. 25%) for events 7-9, while it has mostly dissipated by events 4-6 in other areas (Figure 5). Although individual coefficients are quite noisy and not statistically significantly different across areas, the joint test that coefficients are equal in both areas across events 1-9 rejects the null at the 10% threshold

Table 5: Impact of negative experiences on black hiring across manager tenure and experience

Panel A) First experience	New managers	Managers with previous hiring experience
Black fraction hired	(1)	(2)
Black fraction quit/fired	-0.021	-0.008
$\leq$ 3 months	(0.007)	(0.006)
Baseline controls (see notes)	Y	Y
Outcome mean	0.387	0.356
Observations	36,816	37,886
P-value	0.086	

Panel B) Latest experience	Manager tenure (months)		Manager number of previous hiring events	
	$\leq$ 36	$>$ 36	$\leq$ 5	$>$ 5
Black fraction hired	(1)	(2)	(3)	(4)
Black fraction quit/fired	-0.047	-0.025	-0.060	-0.028
$\leq$ 3 months	(0.007)	(0.014)	(0.016)	(0.017)
Baseline controls (see notes)	Y	Y	Y	Y
Manager FE	Y	Y	Y	Y
Outcome mean	0.374	0.342	0.422	0.349
Observations	26,054	7,645	8,184	24,039
P-value	0.055		0.062	

NOTE. The table shows OLS regression estimates where the dependent variable is the fraction of black hires in a given hiring event and the independent variables are the shares of a manager's black hires in their first or latest hiring events who were fired or quit within 3 months of being hired. Column 1 of Panel A and Panel B restrict to managers who never hired at the firm before the start of our sample period, as in our main analysis. Column 2 of Panel A restricts to managers who had a previous hiring spell at the firm before the start of our sample period. For details regarding controls, samples, and definitions, see the notes for Table 2. Clustered standard errors at the manager level are presented in parentheses.

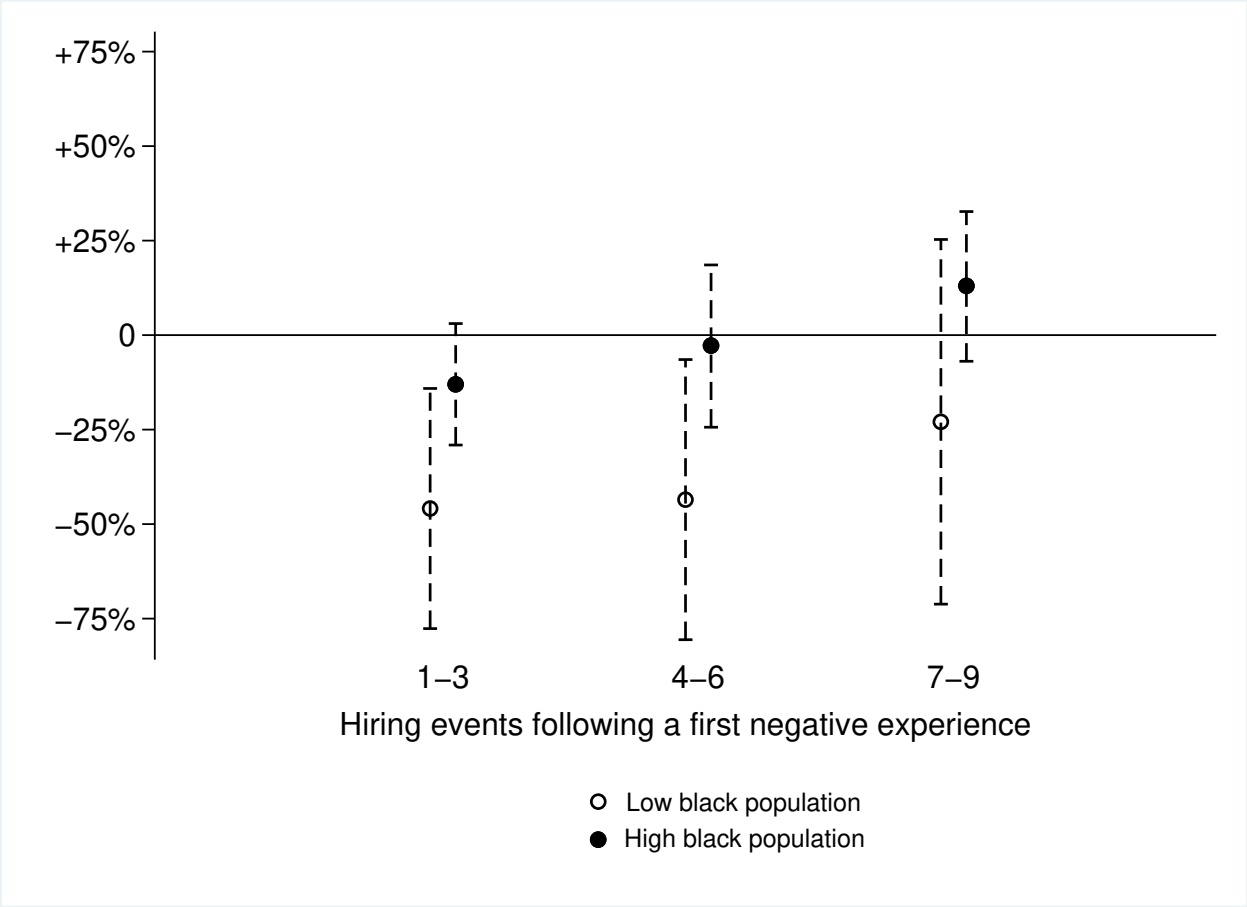
(p-value=0.097).

2.4.4 Are managers swayed by other sources of exposure?

Our main analysis considers the manager's initial hiring experience as the kernel that potentially affects the race of future hires. We can scrutinize the effect of other on-the-job exposures on future hires.

First, managers may learn from the positive and negative experiences of other department managers within their same location, consistent with theories of experiential learning in social networks (e.g. Golub and Jackson, 2010). To evaluate this possibility, we add measures of first or cumulative negative experiences for other same-establishment managers to our

Figure 5: Impact of a first negative experience with black workers on the subsequent black hiring share, by local black population



NOTE. See Figure 2 for estimation details. Local black population data come from U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates.

estimating equation (Table 6, columns 1 and 2). The estimated impacts of a manager's own negative experiences with black workers remain largely unchanged, while estimated coefficients on experiences of other managers within the store are small and statistically insignificant. Therefore, even in a setting where same-store managers' experiences may be reasonably easy to observe, they appear to have little impact on a manager's hiring after accounting for their own experiences. Managers' experiences appear not to transmit to other managers, or other managers do not interpret other managers' experiences as informative.

Second, incoming managers may learn from incumbent workers in their assigned department. To test this channel, we examine the share of incumbent black and white workers who quit or are fired between the moment the incoming manager enters and their first hiring event. If, for instance, an incoming manager inherits several black workers who quit or

are fired by the manager shortly after the manager comes in, then the incoming manager may be less likely to hire black workers in the future.[23] Our results, presented in Table 6, column 3, corroborate this channel and are similar to our main estimates that use the manager's own hires. We interpret this as evidence that experience effects do not arise purely through the hiring process and do not appear solely driven by the manager's selection of workers.

Third, managers may import their previous hiring experiences within the same employer, but in a different location. We thus examine whether experience effects persist after managers change stores, restricting the analysis to 977 hiring events of managers joining a new store for whom we observe hiring outcomes at both the origin and destination stores. Fewer than 30% of managers from our main analysis have such an event, placing considerable demands on the data. We find similar point estimates as our main analysis, though errors are outside conventional testing thresholds (Table 6, column 4). This suggests our effects being driven by individual managers rather than by department or store-level factors, in which case we would not expect a manager's hiring behavior to still be influenced by their previous experience after they change stores.

3 Interpretation as experience effects

In this section, we discuss potential alternatives to the interpretation that our results arise from individual experiences of managers on the job. We evaluate these alternatives based on our prior findings as well as additional robustness checks and falsification tests to provide evidence that each explanation is unlikely to play a substantive role in explaining our results. We conclude that the effects we identify are specific to department managers within stores and the precise timing and quality of hires within their tenure in the department.

3.1 Could the effects we document reflect worker rather than manager responses?

If black workers are aware that a manager hires fewer of them and/or has high turnover with their black hires, they could be less likely to apply and/or accept a position under the manager. A few results suggest that worker-side effects are not driving the patterns we document. Namely, it is unclear why experience effects would diminish over a manager's tenure and their number of hiring experiences if black workers were responding to a manager's

[23] This analysis excludes managers who join departments that consist entirely of newcomers, such as newly-created departments.

Table 6: Impact of previous experiences with black workers on current black hiring, other sources of updating

Black fraction hired	Own experiences versus other managers		Incumbent workers	Store change
	First	Cumulative		
	(1)	(2)	(3)	(4)
Black fraction quit/fired $\leq$ 3 months	-0.025	-0.079	-0.044	-0.067
	(0.012)	(0.022)	(0.027)	(0.045)
Black fraction quit/fired $\leq$ 3 months	0.010	0.003		
(other managers at the store)	(0.013)	(0.024)		
Baseline controls (see notes)	Y	Y	Y	Y
Manager FE		Y		
Outcome mean	0.477	0.372	0.328	0.356
Observations	9,139	33,155	10,911	977

NOTE. The table shows estimates of OLS regressions where the dependent variable is the share of black hires in a given event and the independent variables are the shares of a manager's black hires in their first, latest, or all previous events who were fired or quit within 3 months of being hired. For details regarding controls, samples, and definitions, see the notes for Table 2. Columns 1 and 2 include a term for a manager's own negative experiences with black workers as well as terms for the negative experiences of other managers at the same store, their first experience in Column 1 and their cumulative experiences in Column 2. Column 3 calculates a manager's negative experience with workers already in the department at the manager's arrival. Column 4 restricts to managers who changed store between their latest negative experience with black workers and their current hiring event. Columns 1-3 cluster standard errors at the manager level, and column 4 clusters at the store level.

"reputation" hiring and managing black workers. In that case, experience effects should presumably be weaker for first experiences and amplify as a manager's reputation becomes more established.

More importantly, given our institutional context, there is little scope for such worker responses. Recall that candidates do not apply for a position under a particular manager. When they have a vacancy, department managers are provided a list of qualified applicants from the firm's centralized HR department. As such, they do not typically select their pool of applicants, though they could decide to seek or consider additional applicants if they wish. Given the firm's data infrastructure, it is also implausible that HR representatives would take into account information about a manager's history of hiring or managing workers when sending a list of candidates.[24] Given this process and consistent with interviews we conducted with managers, it would be rare for a worker to have information on a manager's history before being hired, especially since we exclude transfers and rehires.

[24]If this was driving our results, we may also expect experiences of other managers within a store to predict a given manager's hiring by shaping their applicant pool, but they do not (Table 6).

Accordingly, we can think of our setting as one in which managers largely face common, exogenously-defined applicant pools within a store or region.

3.2 Could the effects we document reflect differences across stores, departments, applicant pools, customers, or coworkers?

Our analyses include store fixed effects to isolate within-store variation across department managers. As a result, any difference between stores or locations not correlated with the specific nature of a department manager's experiences cannot explain our results. This rules out several explanations, namely relating to the share of black or white workers in an area or their productivity, relative labor market conditions, or customer differences. Recall also that store-level experience measures of other department managers do not predict a department manager's hiring; their own hiring experiences do (Table 6).

To further scrutinize whether the results depend on the identity of specific department managers and their experiences, we conduct a series of placebos. First, the performance of black workers in a given department *before* a new manager arrives has no impact on the race of that manager's initial hires (Appendix Table D8, column 1). Similarly, whether a higher or lower fraction of black workers were hired in the department before a new manager arrives has no impact on the manager's initial experience with their black hires (Appendix Table D8, column 2). Because we cannot predict a manager's hiring and hiring outcomes from departmental conditions before their arrival, but we can predict them using departmental hiring determined by the manager themselves after their arrival, this implies manager-level effects. Our results regarding decreasing impacts with manager tenure and hiring experience are also analogous to a time placebo; it is the timing and performance of hires specifically within a manager's tenure in a department that matters (Table 5).

A related concern is that applicant pools for a store or department take time to replenish themselves, especially for minority workers, such that following negative experiences, there may be fewer black workers remaining in a manager's hiring pool, leading to decreases in black hiring. This appears inconsistent with several of our results, including documenting negative experience effects with incumbent workers not hired by the manager. Moreover, if managers first hire the best workers available in their pool, then more negative experiences in the past would lead to a higher likelihood of negative experiences in the future, not less. Experiences would also transfer across managers (but not transfer across stores for a given manager) rather than being manager-specific and evolving with their level of hiring experience, inconsistent with our placebo and heterogeneity results.

Explanations relating to departments, stores, or customers, along with coworker discrimination or same-race productive complementarities, are thus unlikely to be driving our results.

3.3 Could the effects we document reflect worker referrals?

If high (low) productivity workers tend to refer other high (low) productivity workers from racially-homogeneous networks (Montgomery, 1991; Burks et al., 2015; Pedulla and Pager, 2019; Fernandez and Fernandez-Mateo, 2006), then idiosyncratic differences in race within a team will be correlated with the race of subsequent hires.

Interviewees at the firm suggest it is rare for hires to have prior connections to incumbent workers. Due to this, referrals are not formally tracked at the firm, preventing us from characterizing prior connections directly. Moreover, because shortlisting is centralized rather than position-specific, a manager would need to preemptively contact a regional HR representative and request a member of the applicant pool be shortlisted, justifying the request by citing a word-of-mouth referral. In light of this possibility, we can think through potential channels through which informal referrals could operate.

Referrals, like other worker-driven effects, should be detected by our timing placebo analyses and the results showing that effects are at the level of managers rather than workers in a department (Table 5 and Appendix Table D8). However, referrals would presumably be made by incumbent workers, and managers hire incumbent workers, so it remains possible that a manager's hires affect the race of future hires through a referral channel. To examine this possibility, we examine a specification that further controls for the racial composition of the manager's team. We find a negligible relationship between the fraction of black workers in a department at the time of a given hiring event and the fraction of black workers hired in that event (Appendix Table D9). That is, a higher fraction of black workers in a department, by itself, is not associated with a subsequent increase in black hiring by a manager when controlling for factors like the store location.

An explanation based on referrals is also inconsistent with some of our main results. One, we would expect positive experiences to have impacts at least as persistent as negative ones, since positive experiences should yield positively-selected referrals, yet we do not find that this is the case. Two, negative experiences in the past should predict negative experiences with current hires if hiring responses reflect referrals from past hires. This is fundamental to the homophily hypothesis and idea that referrals are a valuable hiring tool for employers (Montgomery, 1991; Burks et al., 2015). Yet, we find the opposite (Table 4). Moreover,

existing work on referral networks documents that white workers are more likely to provide and be hired through referrals than black workers, inconsistent with the larger and more persistent hiring responses that we document following experiences with black workers (Kirnan et al., 1989; Taber and Hendricks, 2003).

3.4 Could the effects we document reflect labor market shocks?

Given the evidence presented so far, differences in local labor markets or common time shocks at the level of a store cannot explain our results. One potential complication is that demand shocks could affect both hiring and retention efforts, which affect both our experience measures as well as subsequent hiring decisions of a manager. For instance, suppose that high unemployment rates prompt managers to work less hard at retaining black workers and make them less likely to hire new black workers. Then managers will appear to have more negative experiences with black workers before hiring fewer of them.

To be a concern, these demand shocks would need to be at the level of departments within stores and to be race-specific, or at least correlated with race, such that both hiring and retention intensity grows for a worker race in a way that is not captured by store or time effects. However, we find no substantial correlation between the likelihood of a negative experience and the local unemployment rate, nor evidence that the effect of negative experiences on future hiring within a group depends on the unemployment rate (Appendix Table D10). Moreover, if department race-specific demand shocks were driving the observed correlation between a race's retention and hiring, then the effects would not be due to the specific identity of a manager and their experiences on the job. Our placebo analyses above relating to the timing of a manager's arrival, their tenure, and their experiences on the job should therefore reproduce our results. They do not, highlighting that our results are best explained by a manager's tenure and the nature of their idiosyncratic experiences, rather than outside factors, even those changing over time at the level of departments.

3.5 Could the effects we document reflect managers learning about themselves or developing screening capital?

Managers may initially be uncertain about their ability to screen black workers and update their beliefs with experience. Ultimately, we are limited in our ability to pin down what aspect(s) of the hiring or management process managers update about. Still, one of the main patterns we document is that the impact of negative experiences, especially early on, is more

persistent than that of positive experiences. If positive experiences revealed to managers that they are good at screening black workers, then they should instead increase their black hiring in a way that mirrors decreases by managers who learn the opposite. In that case, negative experiences should also be positively serially correlated, while we document the opposite (Table 4).

Alternatively, managers could wish to improve their ability to screen black workers with experience. However, this would conflict with what is perhaps our most striking finding: negative experiences with black workers, especially early in a manager's career, lead to persistent decreases in black hiring. If managers aimed to improve their screening of black workers through experience, then both positive and negative experiences should be valuable and not lead to avoidance of the group.

3.6 Could the effects we document reflect differences in performance or opportunities across worker races?

If black workers have lower performance at the firm, they may be more likely to turn over quickly and less likely to be hired in the first place. If white workers turn over less frequently or leave for better opportunities because they have better outside options, then the correlation between the performance of past hires and current hiring may also differ across race.

It is worth reemphasizing that our measures of performance, both in terms of turnover and objective sales performance for a subset of sales-commissioned workers, are similar across race (Section 1.2 and Appendix B). Updating from negative experiences is also similar in periods of high versus low labor market tightness as measured using unemployment rates above, which may influence the relative quality of outside options across race. Moreover, we find decreases in black hiring following a range of different reasons for turnover in Appendix Table D1.

These explanations are thus unlikely to be driving our results, especially when once again referring to the fixed effects included in our specifications and the placebo tests above highlighting that differences across worker races at the local market or even the department level cannot explain our findings. It follows that explanations relying on differences in productivity or opportunities across worker race could only play a role in shaping our results if they differ at the level of individual managers, for example if they arise from manager bias. We evaluate this possibility next.

3.7 Could the effects we document reflect pre-existing manager bias?

So far, we have established that our findings operate at the level of individual managers. Next, we evaluate whether these manager effects reflect preexisting biases against black workers, rather than dynamically arising from their hiring experiences. To constitute an alternative explanation to experience effects, bias needs to affect both the probability of black hiring and the probability of a good or bad experience (tenure of black hires).[25] Static, preexisting manager biases could affect hiring outcomes through two main channels: an increased hiring bar for black workers to compensate managers for the disutility of hiring black workers (Becker, 1957) and decreased performance or worse conditions for black workers under biased managers (Glover et al., 2017).

The first channel appears improbable since it would predict the opposite of our key empirical result. Suppose a biased manager adopts a higher bar for hiring black workers. Black hires would then presumably be positively selected, and there would be a lower probability that the initial hiring experience is negative. Because we are assuming the manager has a static bias and is not subject to experience effects, they would also hire black workers at a lower rate in the future. Therefore, positive hiring experiences should yield lower future hiring from that group - opposite to what we document. We thus focus on the second channel, although several of the results we discuss below serve to dispel either notion of static bias.

The second potential channel is that biased managers are more likely to have negative experiences and also less likely to hire black workers. First, if such bias were widespread at the firm, we would not expect a similar distribution of tenure and negative experiences for black and white workers as we observe. Second, the initial fraction of black hires by a manager and the number of hiring events until they hire their first black worker would, under this alternative explanation, constitute measures of initial bias by the manager that should correlate with the likelihood that they have negative experiences with their black hires. However, managers who initially hire a lower share of black workers or take longer to hire their first black worker than predicted based on their location are no more likely to have a negative experience with their black hires and respond similarly to a first negative experience with their black hires as managers who hire their first black worker more quickly than predicted

[25] If it only led to less black hiring but did not affect outcomes conditional on hiring, then it would have no impact on estimated coefficients on past experiences and its effects would be absorbed by manager fixed effects.

(Appendix Tables D8 columns 3-4 and D11).[26] Third, beyond initial experiences, if a static pre-existing bias led managers to fire or drive black workers to quit, then we should observe that managers who have negative experiences with black workers tend to repeat them.[27] We document the opposite in Table 4. Fourth, there is little reason to expect that the responses of managers would decay over subsequent hiring events after a negative experience (Figures 3 and 4) and with tenure/hiring experience (Table 5) as we document if they represent an inherent bias.

A different explanation is that some biases may operate dynamically. For instance, a negative experience with black workers may change a manager's taste for discrimination or their behavior toward them. These mechanisms are more difficult to assess, but we consider them as falling under the umbrella of experience effects and potentially reinforcing them. Indeed, our chief purpose is to document the effects of *dynamic*, *experienced-based* channels for hiring discrimination, in contrast to static sources of discrimination that have been the hallmark of the literature.

4 Theoretical framework

Our findings can be explained by a simple model of experience effects in hiring. The model relies on two conditions. The first condition is that managers consider a worker's group when hiring, even though they may be uncertain to what degree it is informative of their performance. The second condition is that managers observe their hires' performance, which they use to update their perception not only of the worker, but also of their group.[28] In other words, condition 1 is that group perceptions affect hiring, and condition 2 is that hiring outcomes affect group perceptions. We then discuss additional conditions under which

[26] Similarly, whether the manager is black or not does not help predict whether they will have a more negative or positive first experience with their black hires (Table D14). Moreover, although it requires excluding store fixed effects from the estimation, we find that managers in states with above-median prejudice are no more likely to have a negative experience with their first black hires and do not respond more strongly to a first negative experience with those hires (Appendix Table D2).

[27] Recall that we also document manager responses to black workers quitting for reasons plausibly unrelated to the manager, like dissatisfaction with firm-level policies (Appendix Table D6). Moreover, we document that initial negative experiences with black workers do not affect the remaining tenure of incumbent black workers (Appendix Table D7). These findings are suggestive of hiring experiences affecting subsequent hiring behavior rather than reflecting a worse working environment for black workers or affecting managers' treatment of black workers on the job.

[28] A model of evolving taste-based discrimination through contact could yield similar implications as one of belief updating, but both approaches as consistent with our primary proposition that group perceptions evolve with experience.

experience-based discrimination disproportionately affects minority hiring. A more formal exposition of the framework's main predictions with proofs is presented in Appendix A.

Like in our setting, we model vacancies and the group composition of the applicant pool as exogenous to the manager. We abstract from wages entirely, since they are not decided or paid by managers.

Setting and information. In each period $t \in \{1, ..., T\}$, a manager is tasked with hiring a worker. Each worker belongs to an observable group $g \in \{B, W\}$. Each period, the manager has a pool of candidates with n_g candidates from group g and $n_W > n_B$. When hired, a worker yields a positive ($y_t = 1$) or negative ($y_t = 0$) experience, drawn from the true group-level distribution $y_t \sim Bernoulli(q_g)$. $q_g \in (0, 1)$ is unknown to the manager, who relies on their posterior beliefs $\hat{q}_g^t$. For simplicity, we consider the case in which $\hat{q}_W^0 = \hat{q}_B^0$ and $q_g = q$ for $g \in \{B, W\}$, making clear that differences in priors or performance across groups are not necessary to rationalize our results. Managers also observe an individual signal of performance, s_i, drawn i.i.d. from a continuous distribution F_s with bounded support $[0, 1]$, such that worker i's expected performance is given by

$$\mathbb{E}[y_i^t] = (1 - \lambda)\hat{q}_{g_i}^t + \lambda s_i \tag{3}$$

where $\lambda \in [0, 1]$ is the weight put on the individual signal.

Analysis. In period t, the manager hires worker $i_t^* = \arg\max_i \mathbb{E}[y_i^t]$ and observes outcome y_t.[29] Denote g_t^* as worker i_t^*'s group – the group hired in period t. The manager updates their belief using a simple linear rule

$$\hat{q}_{g_t^*}^{t+1} = \hat{q}_{g_t^*}^t + \delta(y_t - \hat{q}_{g_t^*}^t) \tag{4}$$

where $\delta \in [0, 1]$ is the responsiveness to the outcome. We do not take a stance on whether updating is Bayesian; Equation 4 nests Bayesian updating but also allows for a set of alternative updating rules that depart from it. Beliefs about the other group remain

[29] When managers make repeated hires, it could be optimal for them to value learning about groups to improve subsequent hiring, rather than hiring based on current beliefs. At the firm, most managers hire relatively few times (fewer than 10) over their tenure, so the value of learning should be small and unlikely to be pivotal in hiring decisions. Prior evidence also documents that individuals underestimate the value of learning in practice, further suggesting that this simplification is unlikely to be important (Meyer and Shi, 1995; Banks et al., 1997; Li et al., 2020). Moreover, incorporating the value of learning into hiring is unlikely to affect qualitative takeaways since it does not impact the direction of belief updating following a good or bad experience. See Lepage (2024) for details.

unchanged because beliefs about a group are only updated when it is hired, $\hat{q}_{g'}^{t+1} = \hat{q}_{g'}^{t}$ for $g' \neq g_t^*$.

The employer repeats the process for periods $t \in \{t+1, ..., T\}$, but now with updated beliefs about group g_t^*. Positive experiences ($y_t = 1$) lead to more optimistic beliefs ($\hat{q}_{g_t^*}^{t+1} > \hat{q}_{g_t^*}^{t}$) and vice versa for negative experiences ($y_t = 0$, $\hat{q}_{g_t^*}^{t+1} < \hat{q}_{g_t^*}^{t}$). Denote $P_g^t = P\left(\max_{i \in g} \mathbb{E}[y_i^t] > \max_{j \in g' \neq g} \mathbb{E}[y_j^t]\right)$ as the probability that group g is hired in period t. It follows that a positive (negative) experience also increases (decreases) the probability that group g is hired in $t+1$, $P_g^t < P_g^{t+1}$ ($P_g^t > P_g^{t+1}$) (Appendix A, Result 1). Furthermore, since belief updating is determined by hiring, the probability that beliefs about group g are updated in period t is equal to the probability that group g is hired in period t, so it also follows that positive experiences increase the likelihood that the manager updates their beliefs about group g_t^* in period $t+1$ while negative ones decrease it, helping to preserve pessimistic beliefs (Appendix A, Result 2). The impact of negative experience on beliefs is thus more persistent.

Discussion. This simple stylized model predicts experience effects from how managers hire and update their beliefs. There are also reasons to expect these effects to be more pronounced for group B, although we do not take a stance on which mechanism(s) generates this finding in our context. First, all else equal, group B is less likely to be hired in any period ($P_B^t < P_W^t$) because it is a minority, so the probability that the highest observed individual signal belongs to one of its worker is lower (Appendix A, Result 3). Intuitively, mistaken perceptions about the majority group can be more quickly corrected just by virtue of having more hires and therefore more instances from which to update beliefs. In addition, prior work documents conditions under which experiences may differentially influence belief updating and hiring for group B, which in the model is governed by δ. Managers may have noisier initial information about minority workers, precisely because they have less experience with them (Cornell and Welch, 1996; Benson et al., 2024; Lepage, 2024). Alternatively, minority groups may be stereotyped; managers may update more or differently upon observing the same information as for majority groups (Allport et al., 1954).[30] We therefore assume that $\delta_B > \delta_A$, although we take no stance on the underlying mechanism(s) generating this asymmetry in our context.

To recap, the model generates the following predictions, consistent with our main empirical

[30]Psychologists assert that whiteness is largely invisible; in the US, the white majority perceives black people as a category, whereas white people are assessed as individuals or along nonracial categories (Macrae and Bodenhausen, 2000). The salience and persistence of experiences could also differ across race due to behavioral factors like confirmation bias, memory and selective recall, or motivated beliefs (Kunda, 1990; Bordalo et al., 2023).

findings:

1. Positive/negative experiences, especially with black workers, positively/negatively affect the share of future hires from the group.

2. Negative experiences, especially with black workers, have a more persistent impact on the share of future hires than positive experiences.

Furthermore, under some minimal additional assumptions, the model also generates predictions consistent with our findings in Section 2.4. The first follows from simply restating existing model predictions. Following a positive (negative) hiring experience with group g, a manager requires a lower (higher) individual signal s_i to hire from group g given their more optimistic (pessimistic) group beliefs. The second follows from assuming that managers learn with experience, i.e. δ_g decreases with each hire from group g since uncertainty about group performance decreases. The third follows from assuming that δ_B/δ_W (and/or potentially n_B/n_W) is larger in areas with low than areas with high black population, which again could arise due to relative uncertainty or various prior exposure effects. The fourth follows from assuming that δ does not depend on experiences of other managers, which was already implicitly assumed by restricting attention to a single manager.

To summarize these additional predictions:

a Past positive/negative experiences with black workers predict a lower likelihood of a current positive/negative experience with the group.

b Experience effects with black workers decrease with a manager's number of hiring experiences with the group.

c Experience effects with black workers are larger and more persistent in areas with relatively fewer black workers.

d Experience effects with black workers are manager-specific.

5 Policy discussion and conclusion

Our analysis is motivated by whether labor market discrimination against minority workers arises from individual experiences of managers on the job, consistent with a simple theoretical framework in which managers update their perception of minority workers through their experiences hiring them in the past.

Using administrative data from one of the biggest employers in the US, we find evidence of experience effects in hiring discrimination: whether experiences of a department manager hiring black workers are positive or negative seeds the race of their future hires. Early negative experiences in particular reduce the likelihood that the manager hires black workers substantially and quite persistently.

Experience effects are seldom put forth in the literature as an explanation for labor market discrimination, likely due to a shortage of suitable data as well as the limited scope for individual experiences to shape discriminatory behavior in classical theories of discrimination. Yet, we show that they systematically and substantially decrease black hiring at the firm, contributing to our understanding of persistent racial inequality.

The experience effects we document appear to be a product of managers having broad hiring authority within a decentralized screening process typical among large organizations. Our results suggest that delegating such authority to individual managers is not only prone to bias, but also inefficiency, as managers draw from relatively little experience and information when making hiring decisions. Moreover, the firm's organization and the labor market in general appear to provide little corrective information to managers with individual idiosyncrasies in their hiring fueled by personal experience. This sharp degree of specificity largely reflects evidence on experience effects in other contexts like financial decisions (Malmendier, 2021a,b).

Several types of policies could help mitigate the hiring discrimination we document. Organizations themselves may have incentives to mitigate these disparities through organizational policies that aggregate or provide additional information to managers. Centralizing hiring, cluster hiring (the hiring of multiple candidates at once) or the use of hiring algorithms could ensure that hiring decisions are based on larger, store or firm-wide information sets. For example, aggregating first experiences across the 4-5 department managers typically present at a store would decrease the odds of a negative experience - namely all black hires being fired or quitting within 3 months - from 20-25% at the manager level to less than 1% at the store level. Additional pre-employment testing, by reducing the manager's uncertainty about the performance of potential hires, could also reduce scope for discrimination to arise. In addition, encouraging manager rotations across stores or regions or even within stores could increase their exposure to minority workers and weaken the extent to which they must rely on their own previous experiences. This could play a particularly important role when information about minority workers is scarce, namely in locations with lower black population.

Broader labor market policies which induce additional minority hiring, like affirmative

action, quotas, or hiring subsidies could both enhance efficiency and reduce bias when the underlying friction is a lack of employer learning about different worker groups. More generally, our results imply that interventions fostering meaningful inter-group contact may improve attitudes towards minorities even on average, by helping correct negative biases arising from potentially few negative experiences (Paluck et al., 2019).

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Appendix A Theoretical framework formal statements and derivations

Result 1 (Experiences influence subsequent hiring) *Fix any period t and let g_t^* be the group hired in t, with realized outcome $y_t \in \{0,1\}$. If $y_t = 1$, then $P_{g_t^*}^{t+1} > P_{g_t^*}^t$ and if $y_t = 0$, then $P_{g_t^*}^{t+1} < P_{g_t^*}^t$.*

Proof 1 *Define $M_g^t \equiv \max_{i \in g} s_{it}$ as the maximum signal for group g in period t. Note that the optimality condition to hire a worker from group g in period t can be written as*

$$M_g^t - M_{g'}^t > \frac{1-\lambda}{\lambda}(\hat{q}_{g'}^t - \hat{q}_g^t).$$

Hence, the probability of hiring a worker from group g in period t is

$$P_g^t \;=\; P\left(M_g^t - M_{g'}^t > \frac{1-\lambda}{\lambda}(\hat{q}_{g'}^t - \hat{q}_g^t)\right).$$

Define the random variable $\Delta M_{g,g'}^t$ as the difference between M_g^t and $M_{g'}^t$. Therefore, the previous probability can be expressed as:

$$P_g^t \;=\; P\left(\Delta M_{g,g'}^t > \frac{1-\lambda}{\lambda}(\hat{q}_{g'}^t - \hat{q}_g^t)\right).$$

For a given distribution of $\Delta M_{g,g'}^t$, P_g^t is strictly increasing in $\hat{q}_g^t$ (and decreasing in $\hat{q}_{g'}^t$). By definition, belief updating about group g_t^* is $\hat{q}_{g_t^*}^{t+1} = \hat{q}_{g_t^*}^t + \delta(y_t - \hat{q}_{g_t^*}^t)$ and there is no belief updating about the other group, $\hat{q}_{g'}^{t+1} = \hat{q}_{g'}^t$. Hence, if $y_t = 1$, then $\hat{q}_{g_t^*}^{t+1} > \hat{q}_{g_t^*}^t$; if $y_t = 0$, then $\hat{q}_{g_t^*}^{t+1} < \hat{q}_{g_t^*}^t$. Since P_g is strictly increasing in $\hat{q}_g$ holding $\hat{q}_{g'}$ fixed, it follows that $P_g^{t+1} \gtrless P_g^t$ with the same inequality sign as $y_t - \hat{q}_g^t$.

Result 2 (Experiences influence subsequent belief updating) *For any group g and period t, the probability that beliefs are updated in period t is equal to P_g^t. Moreover, combining with Result 1, a positive (negative) experience with group g at t strictly increases (decreases) the probability that beliefs about g will be updated again at $t+1$, implying greater persistence of pessimistic beliefs after negative experiences.*

Proof 2 *By the updating rule, beliefs about g change if and only if g is the hired group in that period; otherwise they are held fixed: $\hat{q}_{g'}^{t+1} = \hat{q}_{g'}^{t}$. The probability that beliefs about group g are updated in period t is*

$$P(g_t^* = g) \;=\; P_g^t.$$

By Result 1, a positive (negative) outcome for g at t increases (decreases) P_g^{t+1}. Since the probability that beliefs about group g are updated in period $t+1$ is P_g^{t+1}, positive experiences raise the chance of further updating, while negative experiences lower it. Thus pessimistic beliefs are self-preserving following negative shocks.

Result 3 (The minority group is less likely to be hired) *If beliefs are equal across groups in period t, i.e. $\hat{q}_B^t = \hat{q}_W^t$, then the hiring rule reduces to selecting the candidate with the highest signal. In that case, $P_B^t = = \frac{n_B}{n_B+n_W}$, $\quad P_W^t = \frac{n_W}{n_B+n_W}$, and $n_W > n_B$ implies $P_B^t < \frac{1}{2} < P_W^t$.*

Proof 3 *With $\hat{q}_B^t = \hat{q}_W^t$ and $\lambda > 0$, the expected performance comparison simplifies to*

$$E[y_i^t] = (1-\lambda)\hat{q}^t + \lambda s_i,$$

so the manager hires the candidate with the largest signal. Since signals are i.i.d. and continuous, ties occur with probability zero and

$$P_B^t \;=\; P(M_B^t > M_W^t) = P(\Delta M_{W,B}^t < 0).$$

Note that since M_g^t is defined as the maximum among random variables, its distribution and its density are given by

$$F_{M_g}(x) = P(M_g^t \le x) = [F_S(x)]^{n_g}, \quad f_{M_g}(x) = n_g f_S(x)[F_S(x)]^{n_g-1}.$$

Hence, the distribution of $\Delta M_{B,W}^t$ is given by

$$\begin{aligned} F_{\Delta M_{W,B}^t}(x) = \mathbb{P}(\Delta M_{W,B}^t < x) &= \int_{-\infty}^{\infty} F_{M_W^t}(m+x) f_{M_B^t}(m) dm \\ &= \int_{-\infty}^{\infty} F_S(m+x)^{n_W} n_B f_S(m) F_S(m)^{n_B-1} dm \end{aligned}$$

Then,

$$F_{\Delta M_{W,B}^t}(0) = n_B \int_{-\infty}^{\infty} f_S(m) F_S(m)^{n_W+n_B-1} dm.$$

Let $u = F_s(x)$ and $du = f_s(x)\,dx$, then we can write the previous expression as

$$P_B^t \;=\; n_B \int_{-\infty}^{\infty} u^{n_B+n_W-1}\,du \;=\; \frac{n_B}{n_B+n_W}.$$

Since $P_W^t = 1 - P_B^t$, we can conclude that $P_W^t = n_W/(n_B+n_W)$. Lastly, whenever $n_W > n_B$, we have that $P_B^t < \frac{1}{2} < P_W^t$.

Appendix B Worker performance and tenure

Our main results use tenure to measure negative and positive hiring experiences. This is based on the proposition that departures can be used as "revealed preference" for whether the manager and worker would like to continue the employment relationship. In this way, our approach follows canonical models that imply that the duration of an employment spell is governed by match quality.

Our data permit us to validate our turnover-based approach with other markers of whether the manager had a positive or negative hiring experience, which we explore in Table B1. First, for a subset of 7,606 commissioned salespeople hired during our sample period, we observe the monthly revenue associated with their sales divided by their sales targets, which is the main performance measure for these positions. To account for skewness, we winsorize this variable and take its logarithm. For the 102,746 person-month observations among salespeople, we regress sales performance as a function of our tenure-based experience measures: whether the worker was quit of fired within 3 months or achieved at least one year of tenure in their position, as well as location and month fixed effects. Workers who achieved tenure of at least 12 months had about 11 percent higher monthly sales versus their target compared to workers who were fired or quit within three months. Not only did these hires last longer, but they were more likely to outperform their targets while employed. This outcome conforms to the standard proposition that higher match quality will beget longer job tenure and greater productivity, both desirable outcomes for the hiring manager.

We also observe the reported reason for which the worker turned over. For this variable, turnover is categorized as voluntary or involuntary, and these broad categories include detailed subsets of classifications. Although the distinction between types of turnover can be subjective, our approach relies on the assumption that involuntary turnover generally suggests a more negative experience, particularly terminations for poor performance. For these analyses, we use the full sample of jobs considered in the main analysis, but restrict the sample to 240,176

workers who left within 3 months or after 12 months. Among observed departures, we then examine the reasons for turnover as outcomes. We find that 22.8% of workers who left within 3 months were involuntarily terminated, versus 16.2% for those who achieved at least 12 months of tenure. More strikingly, workers who departed within 3 months were twice as likely to be terminated for poor performance. These statistics suggest short tenures are more likely to reflect a negative experience for the manager.

Finally, we evaluate separations classified as an employee-initiated voluntary departure for better opportunities under the premise that such employee-initiated separations are more likely to correspond to a positive experience for the period that the worker was employed. Workers who leave within 3 months are substantially less likely to be classified as quits for better opportunities compared to those who had tenures of at least 12 months.

Put together, evidence from sales workers and turnover reasons corroborate that short and long tenures can be used as a measure of negative and positive experiences.

Table B1: Worker performance and experience measures

Related performance outcomes	Mean	Std. error	P-value
(a) Sales performance relative to target			
Among workers who quit or were fired within 3 months	-0.136	0.017	< 0.0001
Among workers who achieved tenure of at least 12 months	0.005	0.017	
(b) Sales performance relative to target, first 3 months			
Among workers who quit or were fired within 3 months	-0.136	0.017	< 0.0001
Among workers who achieved tenure of at least 12 months	0.027	0.018	
(c) Worker was involuntarily terminated			
Among workers who quit or were fired within 3 months	0.228	0.001	< 0.0001
Among workers who achieved tenure of at least 12 months	0.162	0.001	
(d) Worker was terminated for unsatisfactory performance			
Among workers who quit or were fired within 3 months	0.116	0.001	< 0.0001
Among workers who achieved tenure of at least 12 months	0.058	0.001	
(e) Worker quit for better opportunities			
Among workers who quit or were fired within 3 months	0.068	0.001	< 0.0001
Among workers who achieved tenure of at least 12 months	0.169	0.002	

NOTE. This table shows alternative performance measures and their relation to our two main measures of good and bad experiences. Outcome (a) restricts the data to commissioned salespeople who were hired and either fired or quit within 3 months or achieved at least 12 months of tenure in the position for which they were hired. Each worker's sales performance is calculated monthly, corresponding to 102,746 person-month observations. The measure corresponds to the log of monthly commissioned sales in dollars divided by the worker's sales target and is also purged of store and month effects. A value of zero means that the worker exactly hit their target. Outcome (b) is similar to outcome (a) but restricts to performance during the first three months of employment even for workers who eventually achieve tenure of at least 12 months. Outcomes (c), (d), and (e) use all jobs represented in our main analysis, but restrict the sample to 240,176 individuals who were hired and terminated during our sample period, either because they were fired or quit within 3 months or because they separated from their position after achieving at least 12 months of tenure. Turnover reasons are reported by the manager and approved by the local HR representative, and include involuntary reasons and voluntary reasons; outcome (c) includes all involuntary reasons, whereas outcome (d) focuses on a subset of involuntary terminations relating to unsatisfactory performance and attendance. Outcome (e) includes voluntary separations for the worker's career advancement or return to studies. Robust standard errors are presented in the second column. P-values are for the test that the two adjoining means are equal.

Appendix C Variation in black hiring across managers

We describe heterogeneity in the hiring of black workers across managers and examine how much of it appears due to idiosyncratic variation across individual managers versus external factors. To estimate how much heterogeneity in black hiring is explained by manager effects net of other factors that vary by store, department, job, time period, or economic condition, we first take Abowd et al. (1999)'s approach of analyzing connected sets of workers.[31] Over a quarter of managers hire in more than one store and around 8% hire in more than 2 stores, generating substantial variation to separately identify manager fixed effects. Indeed, the largest connected set of managers and stores covers over 90% of new workers hired at the firm during our sample period.

We implement this approach using a linear probability model of the form

$$Black_{imjlt} = X_{mjlt}\beta + \gamma_m + \alpha_j + \lambda_l + \theta_t + \zeta_{imjlt} \tag{5}$$

where the dependent variable indicates that worker i hired by manager m for job j in location l at time t is black. X_{mjlt} includes whether the worker was hired for a part-time or full-time job, the manager's cumulative number of hires, the yearly state unemployment rate, and the fraction of the state population with at least some college education. γ_m, α_j, λ_l, and θ_t correspond to manager, job, store, and month and year fixed effects.[32] We compute the predicted value for each individual hire and average predicted values at the manager level to obtain the predicted share of black hires for each manager. This procedure yields higher predicted shares for managers recruiting in jobs, locations, periods, and market conditions associated with more black hires.

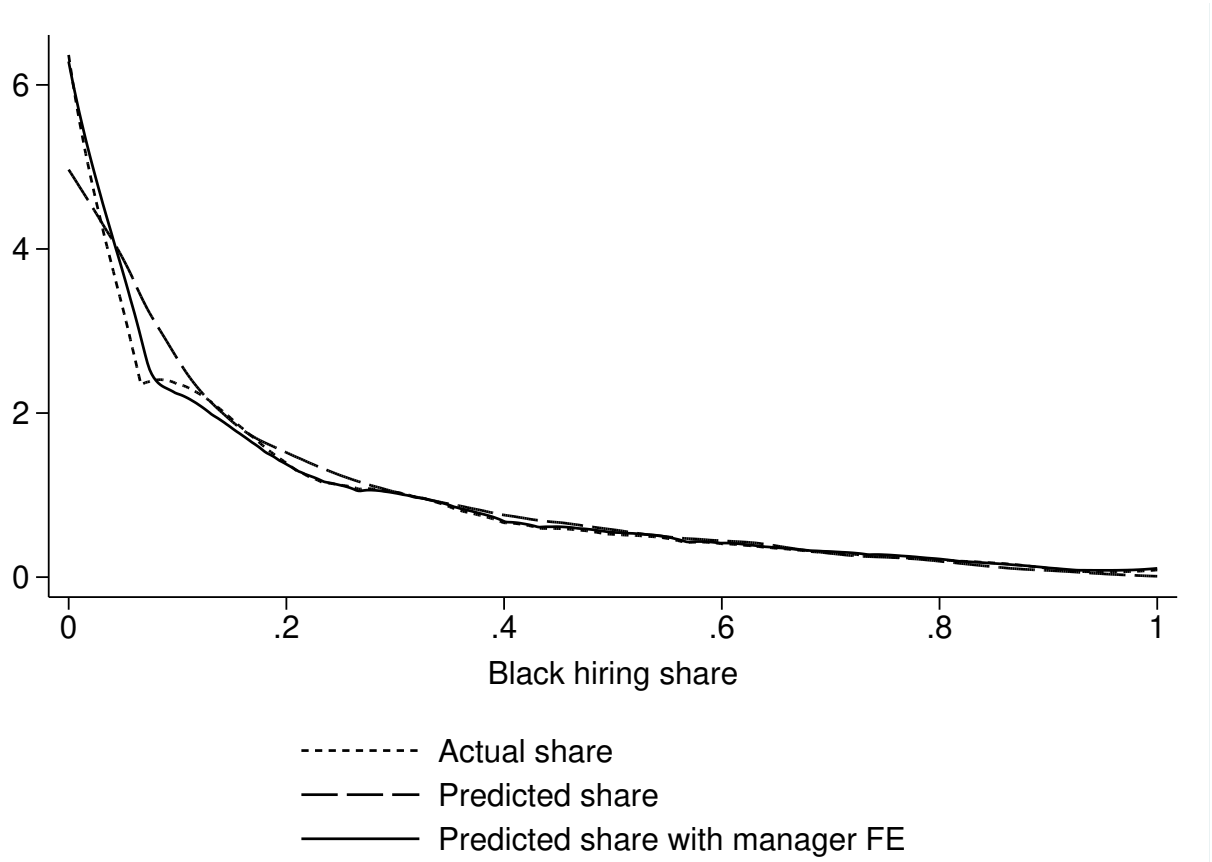
Figure C1 contrasts predicted black hiring shares across managers with the actual values, for managers who hired at least 5 workers over our sample period. By construction, predicted shares approximate the middle of the distribution, but even without manager fixed effects, a lot of of the variation appears driven by the hiring context, namely store fixed effects. At the bottom of the distribution, predicted values are below the true shares, especially without manager fixed effects. Manager fixed effects alone explain 4-5% of the total variation in black hiring and most of the discrepancy between actual shares and those predicted by the model without manager fixed effects. This exercise suggests that, beyond store and contextual

[31] Several recent papers have also applied this approach to estimate manager fixed effects net of sets of highly correlated covariates e.g. Lazear et al. (2016) and Benson et al. (2024).

[32] The results are similar when including department fixed effects as well as worker age and gender.

factors, the specific identity of the hiring manager is an important predictor of black hiring in a department. Our main findings further indicate that these manager-specific effects appear in part driven by dynamic experience effects of managers on the job.

Figure C1: Kernel density estimates of predicted black hiring shares



NOTE. Predicted shares are obtained by averaging predicted values for each manager from an individual hire level linear probability model regression including whether the worker was hired for a part-time or full-time job, the manager's previous number of hires at the time that the current worker is hired, yearly state unemployment rate and fraction with at least some college education, and month and year, store, job title, and individual manager fixed effects. The estimation sample is restricted to managers with at least 5 hires over our sample period. A small fraction of predicted values outside of the 0-1 range were replaced with values of 0 or 1 for ease of visualization. Actual share bandwidth: 0.066. Predicted share bandwidth: 0.059. Predicted share with manager FE bandwidth: 0.068.

Another question is whether managers who hire at least one black worker are selected, such that our evidence may come from a set of managers who are less initially biased than average. We investigate this using two approaches. First, we ask whether instances of managers hiring no black workers appear expected from the hiring context, for example whether the store is

in an area with low black population, rather than reflect instances where specific managers unexpectedly and persistently hire no black workers. In particular, we predict the likelihood that a given hire is not black for all hires in our sample and compute the probability that each manager hires no black worker over their entire tenure as the joint probability of these individual likelihoods, assuming independence.[33] The actual share of managers who never hire a black worker is 31.5% and the expected share of managers who would never hire a black worker based on our prediction is 31.2%, suggesting that essentially all instances of managers hiring no black workers may be idiosyncratic rather than reflect a specific subset of managers with inherent bias in hiring against black workers. Second, if the decision to hire no black worker at all reflected inherent manager bias, rather than specific hiring contexts associated with little black hiring, then it should presumably be less likely to arise among black managers. Yet, we find that the manager's race, which is a strong predictor of the *share* of black hires – black managers hire about 20% more black workers on average over their tenure – does not help predict the extensive margin of whether a manager will hire any black worker after controlling for the total number of hires over a manager's tenure as well as store and month fixed effects (coefficient of -0.001 with a standard error of 0.001). As such, while our evidence should be interpreted as arising within a set of managers at least willing to hire black workers, it appears that this set is broadly representative of managers at the firm.[34]

[33]Predicted values are obtained from a linear probability model controlling for whether the worker was hired for a part-time or full-time job, the yearly state unemployment rate, the fraction of the state population with at least some college education, as well as job, store, and month and year fixed effects.

[34]Note that it is also unclear whether managers who are initially unwilling to hire black workers would respond more or less strongly to a hiring experience with black workers, were they to have one.

Appendix D Additional results on the impact of hiring experiences

Table D1: Cumulative impact of previous experiences with black and white workers on current black hiring, expected tenure with a time panel

Black fraction hired	(1)
Black expected months of tenure	0.051
	(0.012)
White expected months of tenure	-0.021
	(0.011)
Manager FE	Y
Store FE	Y
Hiring month and year FE	Y
Worker and event controls	Y
Outcome mean	0.362
P-value: B = -1 * W	0.089
Standard deviation black	0.300
Standard deviation white	0.332
Observations	34,542

NOTE. The table shows OLS estimates where the dependent variable is the fraction of black hires in a given month and the independent variables are a manager's expected months of tenure with their black and white hires. Expected months of tenure corresponds to the cumulative average deviation from expected tenure at the firm for all previous black and white hires by a manager. One observation corresponds to a manager-month. Controls include the fraction of full-time and female hires, average age of hires, total number of workers hired in the month, number of previous hires, time since the last hire, and yearly unemployment and college attainment rates in the state. Clustered standard errors at the manager level are presented in parentheses.

Table D2: State-level prejudice and hiring experiences

	DV: Black fraction quit/fired $\leq$ 3 months (1)	DV: Black fraction tenure $\geq$ 12 months (2)	DV: Black fraction hired High prejudice state (3)	DV: Black fraction hired Low prejudice state (4)
High-prejudice state	-0.030	0.003		
	(0.021)	(0.006)		
Black fraction quit/fired $\leq$ 3 months, first event			-0.057	-0.060
			(0.025)	(0.020)
Controls (not baseline, see notes)	Y	Y	Y	Y
Outcome mean	0.232	0.161	0.404	0.318
Observations	24,278	24,278	14,230	10,231

NOTE. The table shows OLS estimates where the dependent variables are 1) the share of black hires in a given event who were fired or quit within 3 months of being hired, 2) the share of black hires in a given event who achieve at least one year of tenure in their position, 3-4) the fraction of black hires in a given event. The independent variable in columns 1-2 is an indicator variable for whether the manager is in a state with above-median racial prejudice as measured in Stephens-Davidowitz (2014). In columns 3-4, the independent variable is the share of black hires in a manager's first hiring event with black workers who were fired or quit within 3 months of being hired and the analysis is restricted to managers in states with above (below) median prejudice in column 3 (4). Controls include baseline controls described in Table 2 along with the ratio of black-white population in the zip code where a store is located, and excluding store fixed effects since the prejudice measure is invariant at the state level. Standard errors clustered at the store level are presented in parentheses. For details regarding samples and definitions, see the notes for Table 2.

Table D3: Different sample restrictions for the impact of a first negative experience with black workers

Hiring events after the first experience	Baseline sample (1)	Managers with at least 6 events (2)	Managers predicted to hire 1 B and 1 W (3)
1 to 3	-0.049	-0.06	-0.057
	(0.013)	(0.015)	(0.016)
Outcome mean	0.445	0.42	0.0433
Observations	9,197	6,739	6,638
4 to 6	-0.015	-0.014	-0.014
	(0.014)	(0.015)	(0.017)
Outcome mean	0.359	0.352	0.036
Observations	7,312	6,871	6,417
7 to 9	0.001	0.001	-0.001
	(0.018)	(0.018)	(0.019)
Outcome mean	0.365	0.365	0.364
Observations	5,056	5,056	4,816
Baseline controls	Y	Y	Y

NOTE. The table shows OLS estimates where the dependent variable is the fraction of black hires in a given event. The independent variable is the share of black hires in a manager's first hiring event with black workers who were fired or quit within 3 months of being hired. The estimates in column 1 correspond to those from Figure 2, including all managers in our baseline analysis. Those in column 2 are restricted to managers who hire workers at least 6 more times after their first negative experience. Those in column 3 are restricted to managers who are predicted to hire at least one black and one white hire based on the store they hire at and their total tenure as a manager. In particular, we first regress the number of black hires and the number of white hires of a manager on their total number of hiring events as managers and store fixed effects. Based on the resulting estimates, we then restrict the analysis in column 3 to managers predicted to hire at least one black and one white worker. Coefficients in each row are obtained from separate regressions. Controls include baseline controls described in Table 2. Standard errors clustered at the store level are presented in parentheses. For details regarding samples and definitions, see the notes for Table 2.

Table D4: Impact of the first three experiences with black and white workers on current black hiring

Black fraction hired	(1)	(2)	(3)	(4)	(5)	(6)
Black fraction quit/fired	-0.043	-0.049	-0.042			
$\leq$ 3 months	(0.013)	0.013	(0.014)			
White fraction quit/fired			-0.013			
$\leq$ 3 months			(0.017)			
Black fraction tenure				0.035	0.009	0.020
$\geq$ 12 months				(0.018)	(0.017)	(0.018)
White fraction tenure						0.018
$\geq$ 12 months						(0.020)
Manager FE		Y	Y		Y	Y
Worker and event controls		Y	Y		Y	Y
Store FE	Y	Y	Y	Y	Y	Y
Hiring month and year FE	Y	Y	Y	Y	Y	Y
Outcome mean	0.405	0.404	0.402	0.400	0.430	0.401
Standard deviation black	0.200	0.239	0.239	0.200	0.200	0.200
Standard deviation white	0.214	0.205	0.205	0.214	0.214	0.214
Observations	34,136	31,772	27,829	29,300	25,041	23,527

NOTE. The table shows OLS estimates where the dependent variable is the fraction of black hires in a given hiring event and the independent variables are the cumulative fractions of a manager's experiences over their first three hiring events which were positive or negative, for black and white workers. For details regarding controls, samples, and definitions, see the notes for Table 2. Clustered standard errors at the manager level are presented in parentheses.

Table D5: Cumulative impact of previous experiences with black and white workers on current black hiring, bottom and top quartiles of tenure

Black fraction hired	(1)	(2)
Black expected tenure in the bottom quartile	-0.050	
	(0.007)	
White expected tenure in the bottom quartile	0.022	
	(0.007)	
Black expected tenure in the top quartile		0.065
		(0.007)
White expected tenure in the top quartile		0.026
		(0.007)
Manager FE	Y	Y
Store FE	Y	Y
Hiring month and year FE	Y	Y
Worker and event controls	Y	Y
Outcome mean	0.380	0.380
Observations	35,883	35,883

NOTE. The table shows OLS estimates where the dependent variable is the fraction of black hires in a given hiring event and the independent variables are whether the manager is in the bottom or top quartile of managers based on the expected tenure of their hires, based on the achieved tenure of all their previous black and white hires. For details regarding controls, samples, and definitions, see the notes for Table 2. Clustered standard errors at the manager level are presented in parentheses.

Table D6: Cumulative impact of previous experiences with black workers on current black hiring, additional experience measures

Black fraction hired	Fired (1)	Quit (2)	Relative white (3)	Relative CBSA (4)	"Exogenous" separation (5)
Black fraction quit/fired $\leq$ 3 months	-0.087	-0.057	-0.068	-0.079	-0.039
	(0.027)	(0.018)	(0.014)	(0.016)	(0.018)
Manager FE	Y	Y	Y	Y	Y
Store FE	Y	Y	Y	Y	Y
Hiring month and year FE	Y	Y	Y	Y	Y
Worker and event controls	Y	Y	Y	Y	Y
Outcome mean	0.367	0.37	0.348	0.369	0.349
Observations	33,971	33,971	31,911	33,675	34,025

NOTE. The table shows OLS estimates where the dependent variable is the fraction of black hires in a given hiring event and the independent variable is the cumulative fraction of a manager's past experiences with their black hires which were negative. Column 1 restricts negative experiences to those arising from workers being fired and column 2 to those arising from workers quitting. Column 3 calculates negative experiences with black hires as the share of negative experiences with black hires minus the average share of negative experiences with white workers at the firm and Column 4 as the share of negative experiences with black hires minus the average share of negative experiences with workers in the same CBSA. Column 5 restricts negative experiences to those unlikely to result from manager behavior: dissatisfaction with pay, compensation, and benefits, which are not decided by the manager. For details regarding controls, samples, and definitions, see the notes for Table 2. Clustered standard errors at the manager level are presented in parentheses.

Table D7: Impact of the first experience on auxiliary outcomes

	DV: Black Incumbent Tenure	DV: Total Hiring Events
	(1)	(2)
Black fraction quit/fired $\leq$ 3 months	-0.765	0.822
	(0.567)	(0.520)
White fraction quit/fired $\leq$ 3 months	-0.809	0.576
	(0.518)	(0.397)
Worker and event controls	Y	Y
Store FE	Y	Y
Hiring month and year FE	Y	Y
Outcome mean	21.161	10.790
Observations	15,127	3,254

NOTE. The table shows OLS estimates where the dependent variable is the remaining tenure of incumbent workers after managers' first experience in Column 1 and managers' total number of hiring events over our sample period in Column 2. The independent variables are the shares of the manager's black and white hires from their first event with each group who were fired or quit within 3 months of being hired. For details regarding samples and definitions, see the notes for Table 2. Standard errors clustered at the store level are presented in parentheses.

Table D8: Placebo tests

	(1) DV: Fraction hired	(2) DV: Negative experience	(3) DV: Negative experience	(4) DV: Negative experience
Placebo	Negative experiences before manager	Black hiring before manager	Hiring in event t-1 and negative experience t	Hiring in event 1 and negative experience t
Black fraction quit/fired $\leq$ 3 months, first event	0.018 (0.022)			
Black fraction hired		0.010 (0.033)	0.0001 (0.006)	-0.009 (0.014)
Manager FE			Y	
Store FE	Y	Y	Y	Y
Hiring month and year FE	Y	Y	Y	Y
Worker and event controls	Y	Y	Y	Y
Outcome mean	0.478	0.219	0.265	0.225
Observations	9,741	7,827	36,256	19,200

NOTE. Column 1 presents results of a time placebo test where the independent variable corresponds to the share of black hires in the 3 months before a manager begins in their position that quit or were fired within 3 months of being hired and the dependent variable is the fraction of black workers hired by the manager in their first hiring event. Column 2 presents results of a time placebo test where the independent variable corresponds to the share of black hires hired in the 3 months before a manager begins in their position and the dependent variable is the share of black workers in the manager's first event which quit or were fired within 3 months of being hired. Column 3 presents results of a placebo test where the independent variable is the share of black hires in the manager's latest hiring event with black workers and the dependent variable is the share of black workers in the manager's current event which quit or are fired within 3 months of being hired. Column 4 presents results of a placebo test where the independent variable is the share of black hires in the manager's first hiring event with black workers and the dependent variable is the share of black workers in the manager's current event which quit or are fired within 3 months of being hired. All hiring events of each manager are included in the analysis sample for Columns 3-4 and the first event only for Columns 1-2. For details regarding controls, see the notes for Table 2. Standard errors clustered at the store level are presented in parentheses for columns 1-2 and at the manager level for columns 3-4.

Table D9: Correlation between the existing share of black workers in a department and the black hiring share

Black fraction hired	(1)
Lagged share of black workers in the department	-0.002
	(0.001)
Manager FE	Y
Store FE	Y
Hiring month and year FE	Y
Outcome mean	0.290
Observations	47,669

NOTE. The table shows OLS regression estimates where the dependent variable is the fraction of black hires by a manager in a given hiring event and the independent variable is the share of black workers in the manager's department before the current hiring event. For details regarding samples and definitions, see the notes for Table 2. Standard errors clustered at the manager level are presented in parentheses.

Table D10: Placebo tests and unemployment rate

	DV: Black fraction hired		DV: Black fraction quit/fired ≤ 3 months	DV: White fraction quit/fired ≤ 3 months
	Low unemployment	High unemployment		
	(1)	(2)	(3)	(4)
Black fraction quit/fired ≤ 3 months, latest event	-0.052	-0.036		
	(0.009)	(0.009)		
White fraction quit/fired ≤ 3 months, latest event	0.033	0.037		
	(0.009)	(0.009)		
Unemployment rate			-0.886	-0.853
			(1.191)	(0.910)
Manager FE	Y	Y	Y	Y
Worker and event controls	Y	Y	Y	Y
Store FE	Y	Y	Y	Y
Hiring month and year FE	Y	Y	Y	Y
Outcome mean	0.342	0.355	0.266	0.208
Observations	16,478	15,110	35,879	44,731

NOTE. Columns 1 and 2 show OLS estimates where the dependent variable is the fraction of black hires in a given hiring event and the independent variables are the shares of a manager's black and white hires in their latest hiring event with each race who were fired or quit within 3 months of being hired. Columns 3 and 4 show OLS estimates where the dependent variable is the fraction of black or white hires in a given hiring event who are fired or quit within 3 months of being hired and the independent variable is the state unemployment rate. Column 1 (2) restricts the analysis to hiring events during which the state unemployment rate is below (above) median. For details regarding controls, samples, and definitions, see the notes for Table 2. Standard errors clustered at the manager level are presented in parentheses.

Table D11: Speed of a manager's first black hire and hiring experiences

	Black fraction quit/fired $\leq$ 3 months (1)	Black fraction tenure $\geq$ 12 months (2)	First black hire earlier than expected (3)	First black hire later than expected (4)
First black hire later than expected	-0.011	0.003		
	(0.009)	(0.006)		
Black fraction quit/fired $\leq$ 3 months, first event			-0.023	-0.026
			(0.010)	(0.013)
Baseline controls (see notes)	Y	Y	Y	Y
Outcome mean	0.219	0.093	0.453	0.279
Observations	22,870	22,870	22,421	13,862

NOTE. The table shows OLS estimates where the dependent variables are 1) the share of black hires in a given event who were fired or quit within 3 months of being hired, 2) the share of black hires in a given event who achieve at least one year of tenure in their position, 3-4) the fraction of black hires in a given event. The independent variable in columns 1-2 is an indicator variable for whether the manager hired their first black worker earlier or later than expected. We first estimate a manager-level regression where the dependent variable is the number of hiring events before the manager hires a first black worker and the independent variables are the total number of hires per hiring event and store fixed effects. We then compute predicted values and classify a manager as having hired their first black worker earlier (later) than expected if the number of hiring events before their first black hire is lower (higher) than the corresponding predicted value. In columns 3-4, the independent variable is the share of black hires in a manager's first hiring event with black workers who were fired or quit within 3 months of being hired and the analysis is restricted to managers who hired their first black worker earlier (later) than expected in column 3 (4). Standard errors clustered at the store level are presented in parentheses. For details regarding samples and definitions, see the notes for Table 2.

Table D12: Impact of a manager's first experience with black and white workers on current black hiring, both experience measures in the same regression

Black fraction hired	(1)	(2)
Black fraction quit/fired $\leq$ 3 months	-0.029	
	(0.008)	
White fraction quit/fired $\leq$ 3 months		0.012
		(0.007)
Black fraction tenure $\geq$ 12 months	-0.017	
	(0.010)	
White fraction tenure $\geq$ 12 months		-0.008
		(0.007)
Worker and event controls	Y	Y
Store FE	Y	Y
Hiring month and year FE	Y	Y
Outcome mean	0.387	0.270
Observations	31,195	41,067

NOTE. The table shows OLS estimates from a version of Equation (2) in which both positive and negative experience measures are included in the same regression. See Table 2 for details. Clustered standard errors at the manager level are presented in parentheses.

Table D13: Impact of a manager's latest experience with black workers on current black hiring, by time elapsed since the experience

	$\leq$ 3 months	$>$ 3 months
Black fraction hired	(1)	(2)
Black fraction quit/fired $\leq$ 3 months	-0.048	-0.015
	(0.007)	(0.012)
Worker and event controls	Y	Y
Store FE	Y	Y
Hiring month and year FE	Y	Y
Outcome mean	0.458	0.224
Observations	20,830	13,781

NOTE. The table shows OLS estimates from a version of Equation (2) testing the impact of a manager's latest experience with black workers split by whether the experience happened in the last three months or more than three months ago. The specification used is the same as in Figure 4. Clustered standard errors at the manager level are presented in parentheses.

Table D14: First experience and manager race

	Black fraction quit/fired $\leq$ 3 months (1)	Black fraction tenure $\geq$ 12 months (2)
Black manager	0.004	-0.032
	(0.024)	(0.039)
Worker and event controls	Y	Y
Store FE	Y	Y
Hiring month and year FE	Y	Y
Outcome mean	0.246	0.205
Observations	3,710	1,990

NOTE. The table shows OLS estimates where the dependent variable is the remaining tenure of incumbent workers after managers' first experience in Column 1 and managers' total number of hiring events over our sample period in Column 2. The independent variables are the shares of the manager's black and white hires from their first event with each group who were fired or quit within 3 months of being hired. For details regarding samples and definitions, see the notes for Table 2. Standard errors clustered at the store level are presented in parentheses.

Appendix E Additional groups

Table E1: Cumulative impact of previous experiences on current hiring, other groups

Black or Hispanic fraction hired	Female workers (1)	Hispanic workers (2)	Female workers (3)	Hispanic workers (4)
Black fraction quit/fired $\leq$ 3 months	-0.057			
	(0.022)			
Hispanic fraction quit/fired $\leq$ 3 months		-0.025		
		(0.019)		
White fraction quit/fired $\leq$ 3 months	0.031	0.029		
	(0.027)	(0.023)		
Black fraction tenure $\geq$ 12 months			0.072	
			(0.031)	
Hispanic fraction tenure $\geq$ 12 months				0.003
				(0.024)
White fraction tenure $\geq$ 12 months			-0.047	-0.016
			(0.038)	(0.027)
Manager FE	Y	Y	Y	Y
Store FE	Y	Y	Y	Y
Hiring month and year FE	Y	Y	Y	Y
Worker and event controls	Y	Y	Y	Y
Outcome mean	0.403	0.293	0.402	0.290
Standard deviation black	0.291	0.294	0.2221	0.253
Standard deviation white	0.232	0.205	0.205	0.209
Observations	19,546	27,349	16,198	22,482

NOTE. The table shows OLS estimates where the dependent variable is the fraction of black or Hispanic hires in a given hiring event and the independent variables are the cumulative fraction of a manager's past experiences with their black, white, or Hispanic hires which were positive or negative. Columns 1 and 3 restrict the analysis to female hires, while columns 2 and 4 restrict the analysis to Hispanic and white hires. For details regarding controls, samples, and definitions, see the notes for Table 2. Clustered standard errors at the manager level are presented in parentheses.