Reflections on Race/Ethnicity & NIH Research Awards

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March 27, 2023

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Acknowledgements

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Laurel Haak, Mighty Red Barn

Walter T. Schaffer, Senior Scientific Advisor for Extramural Research, National Institutes of Health

Ginther et. al. (2011) research was funded in part by NIH Grant R01-AG036820 and NSF Grant SES-0353703 to Ginther and through support from NIH contracts HHSN276200800458U and HHSN276200900100U to Discovery Logic made possible through an NIH Evaluation Set-aside Award (07-6008 OD OER)

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Outline of Talk & Preview of Findings

- Previous Findings
- Ginther et al (2018) Main Results
- Analysis of Scholarly Achievements
  - Sum of impact factors of journals is key and explains half of the funding gap.
- Subsequent Research on Peer Review, etc.
- NIH Reported Improvements

Introduction

- This is the continuation of a series of **NIH-commissioned** studies exploring race/ethnicity differences in biomedical careers.
  - Work was initiated and designed by Raynard Kington and Walter Schaffer.
  - Data and analysis were contracted to Thomson Reuters (now Clarivate)
    - Estimation and analysis by yours truly.

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Starting in 2008, we wrote papers

Science

VOL 333 19 AUGUST 2011

Race, Ethnicity, and NIH Research Awards

Donna K. Ginther,[1*] Walter T. Schaffer,[2] Joshua Schnell,[3] Beth Masimore,[3] Faye Liu,[3] Laurel L. Haak,[3] Raynard Kington[2†]

Are Race, Ethnicity, and Medical School Affiliation Associated with NIH R01 Type Award Probability for Physician Investigators? *Academic Medicine* (November 2012)

Gender, Race, Ethnicity and NIH R01 Research Awards: Is There Evidence of a Double Bind? *Academic Medicine* (August 2016).

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Major Finding: NIH Award Probability

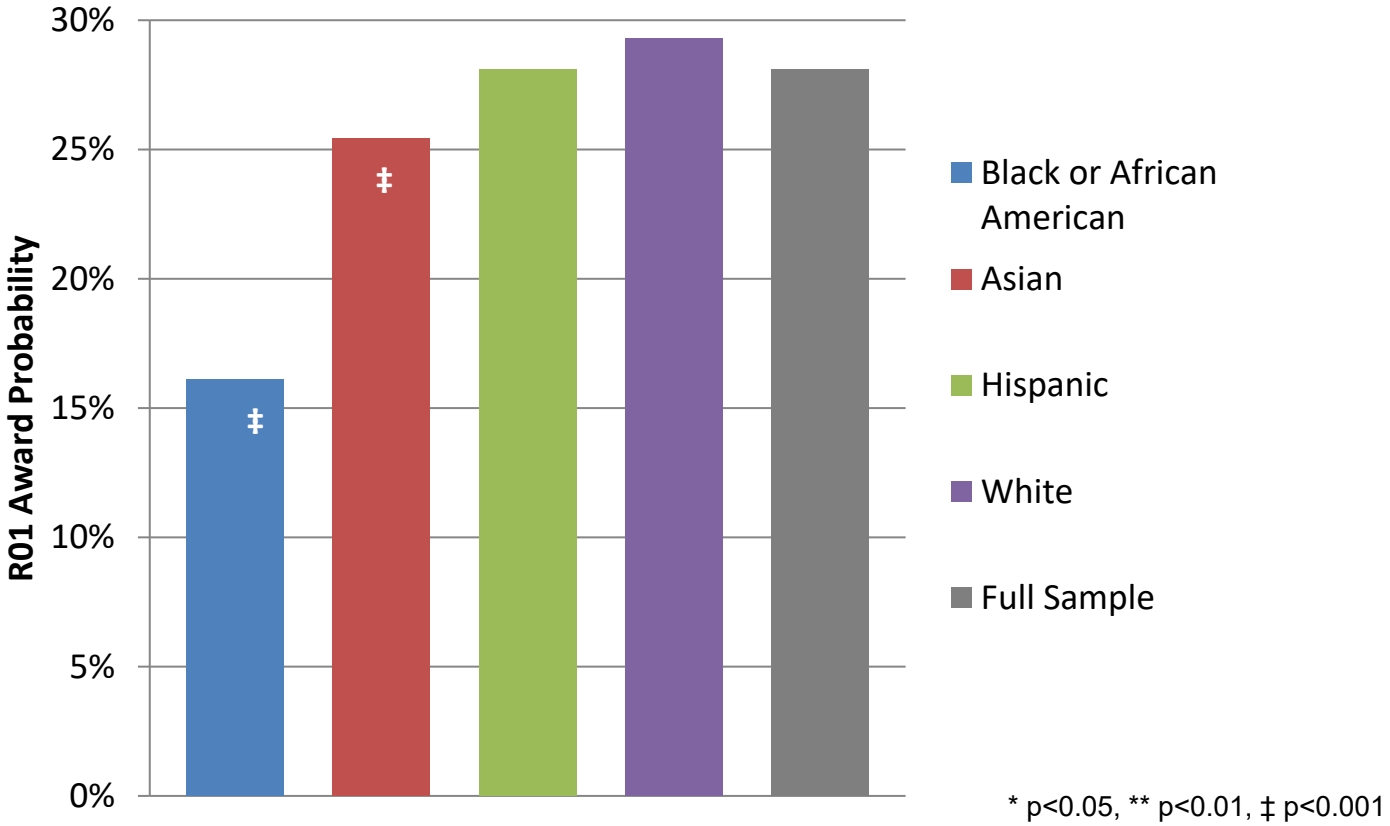
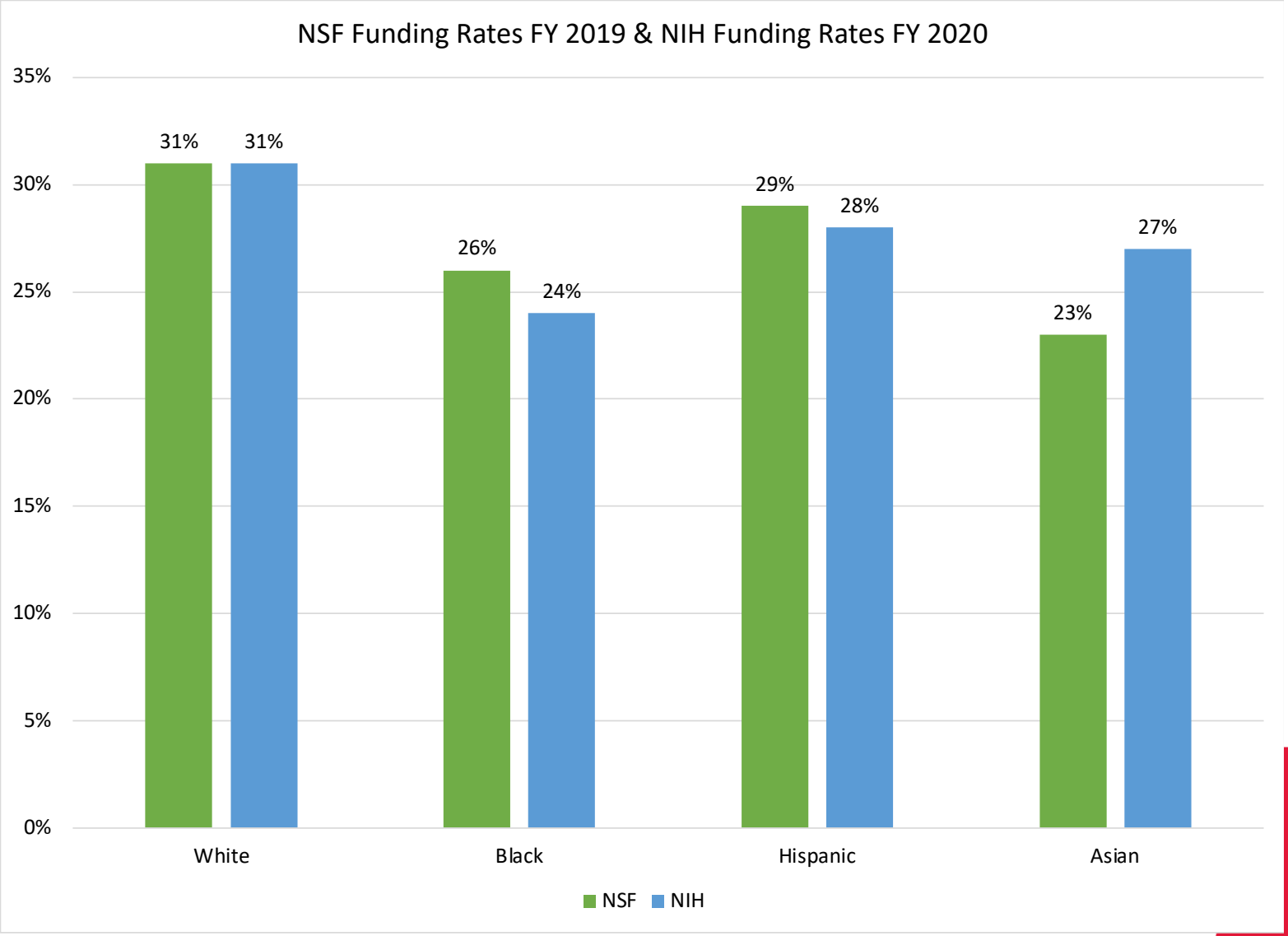


Figure 1. Probability of NIH R01 award by race and ethnicity, FY 2000-2006 (n=83,188 applications). SOURCE: NIH IMPAC II, DRF, AAMC faculty roster.

There is a significant difference in R01 award probability for PhD scientists by race and ethnicity.

Ginther, Kahn & Schaffer (2016) found no evidence of worse outcomes for women of color (disadvantaged at the same rate as men).

Comparison of NIH & NSF Funding Rates by Race



- Pieced together data from NIH report & NSF Merit Review.
- White & Hispanic funding rates are similar across two agencies.
- Black or AA investigators do worse at NIH compared to NSF.
- Asian investigators do much worse at NSF.

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Previous Findings

- *Science* (2011) found that applications from Blacks were one-third (13 percentage points) less likely to be funded than Whites
  - Black/white gap could not be explained by a large number of covariates
- *Academic Medicine* (2012) found a much smaller gap for MDs working in medical schools.
  - Gap for MDs in medical school could be explained by grants using human subjects

Previous Findings con't

- *Academic Medicine* (2016) found little to no evidence of a double-bind for women of color in NIH awards.
  - White women New Investigators were 2 percentage points more likely to receive a Type 1 R01 award.
  - White women Experienced Investigators were equally likely to receive NIH funding.
  - Women of color had disadvantages that were the same as men of color. Race not gender was the most salient.

PLOS ONE 2018

PLOS ONE

RESEARCH ARTICLE

Publications as predictors of racial and ethnic differences in NIH research awards

Donna K. Ginther[1,2☯]*, Jodi Basner[3‡], Unni Jensen[3‡], Joshua Schnell[3‡], Raynard Kington[4☯], Walter T. Schaffer[5☯]

NIH was concerned that bias in the review process was contributing to race/ethnicity differences in NIH funding. Our 2018 study found that black investigators published fewer papers and this difference narrowed the race/ethnicity funding gap.

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Are the findings in Ginther et al (2011) due to omitted variable bias?

- NIH ACD Diversity Committee Requested Additional Analyses to examine the following hypotheses to explain the funding gap:
  1. Undergraduate, graduate and postdoctoral training
  2. Academic rank
  3. Scholarly Achievement and Awards
  4. Prior grant history outside of NIH
  5. Productivity
     - Publications / Citations / Bibliometrics
- Source: NIH Biosketch

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Donna K. Ginther	Professor of Economics
eRA COMMONS USER NAME (credential, e.g., agency login) DGINTHER	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
University of Wisconsin-Madison	B.A. Honors	1987	Economics
University of Wisconsin-Madison	M.S.	1991	Economics
University of Wisconsin-Madison	Ph.D.	1995	Economics

A. PERSONAL STATEMENT

I'm the greatest thing in science since sliced bread . . .

B. POSITIONS AND HONORS

1995—2009 The early years of struggling in obscurity. . .
2009—present Professor University of Kansas, Department of Economics

C. SELECTED PEER-REVIEWED PUBLICATIONS

1. Ceci, Stephen J., **Ginther, Donna K.**, Kahn, Shulamit, and Williams, Wendy M. (2014) "Women in Academic Science: Explaining the Gap." *Psychological Science in the Public Interest.*
2. **Ginther, Donna K.**, Laurel L. Haak, Walter Schaffer and Raynard Kington. (2012). "Are Race, Ethnicity, and Medical School Affiliation Associated with NIH R01 Type Award Probability for Physician Investigators?" *Academic Medicine* 87(11): 1516-1524.
3. *Other peer-reviewed publications. . . .*

D. RESEARCH SUPPORT

Ongoing Research Support

R01AG036820 (PI: Ginther) 2009 - 2015
National Institute of Aging
Economic Explanations for Gender Differences in Biomedical Careers
This project examines gender differences in postdoctoral appointments, tenure and promotion and pay in the biomedical sciences.

New Analysis Required Additional Data

- Stratified Random sample of 2,397 applications
  - ~600 Black, White, Asian, and Hispanic applications sampled from original data used in *Science* (2011)
  - Restricted to FY2003-FY2006 in order to have Biosketch information
- Thomson Reuters hand-coded over 1 million items from the Biosketches
  - Undergraduate, graduate, postdoctoral training
  - PhD and postdoctoral adviser*
  - Scholarly awards, etc.
- Matched 50,000 + publications listed on Biosketch to Medline and Web of Science

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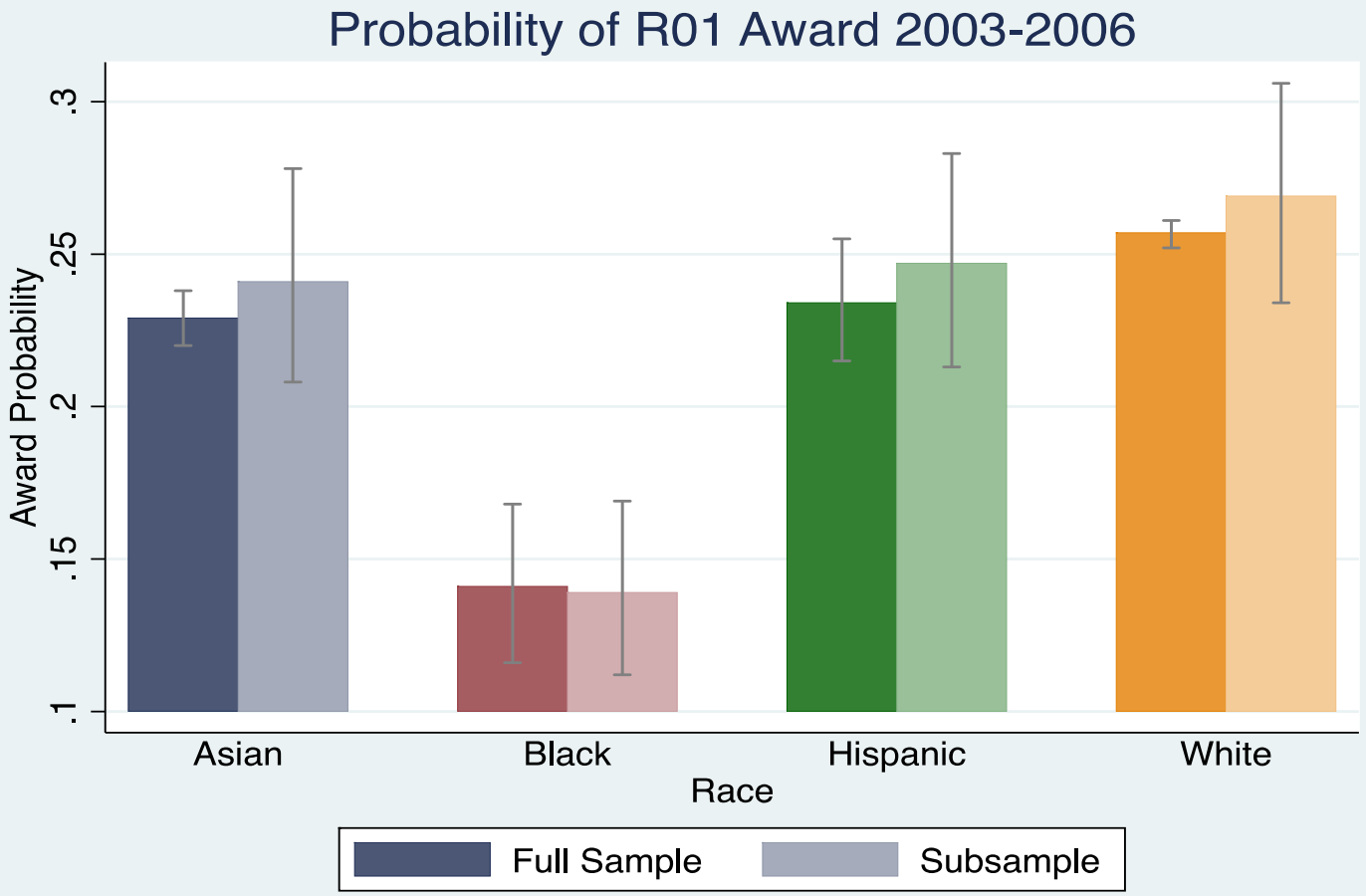
Data comparison: Probability of R01 Award by Race/Ethnicity—Full Sample & Subsample



No significant difference in award probabilities by race/ethnicity between the two samples. Grants from FY 2003-FY2006.

Economics of Gender/Race Differences

- We assume that equally productive/capable researchers will have the same likelihood of receiving NIH funding regardless of race/ethnicity or gender.
- We used probit models to investigate award probability differences, SEs clustered on applicant.
- Control for factors associated with research productivity:
  - No research design
  - Instead—high quality, “Big Data”

Probit Model Methodology

NIH R01 Applications FY2003-06 from PhDs (n=2,397)

MAIN MODEL: Demographic Characteristics: Gender, Race, Ethnicity, Age, Foreign PhD, Year dummies

FULL MODEL : MAIN MODEL + Employer NIH Funding Rank, Prior NIH Grants, NIH Review Committee, Human Subjects, NIH Institute dummies, resubmission (relevant covariates from previous studies)

Publication Data

- Over 50,000 publications were identified from the biosketches and linked to Medline and Web of Science.
- Unlike *Science* (2011) we could confirm these publications and associated metrics were written by the applicant.
  - The previous study used a very conservative set of decision rules to assign publications to applicants
  - New data found average of 22 publications
  - Old data found average of 18 publications
- However, applicants may not report all of their publications on the biosketch

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Field Normalized Bibliometrics

- Do field normalized bibliometrics explain more the the black/white funding gap?
- Received field normalized bibliometrics including:
  - Ratio of publication citations / benchmark publication citations (maximum, median, minimum)
  - Minimum Impact Factor Quartile Rank
  - Median Impact Factor Quartile Rank
  - Percent Uncited
  - Percent of Impact Factor Quartile Ranks in Top Quartile
  - Mode of Impact Factor Quartile
  - Sum of Impact Factor
  - Sum of Total Cites * Impact Factor
  - Maximum and Median Bibliometric Percentiles
  - Maximum and Median Bibliometric Deciles

Bibliometric Horse Race

Problem:

Too many bibliometric measures with too little explanatory power

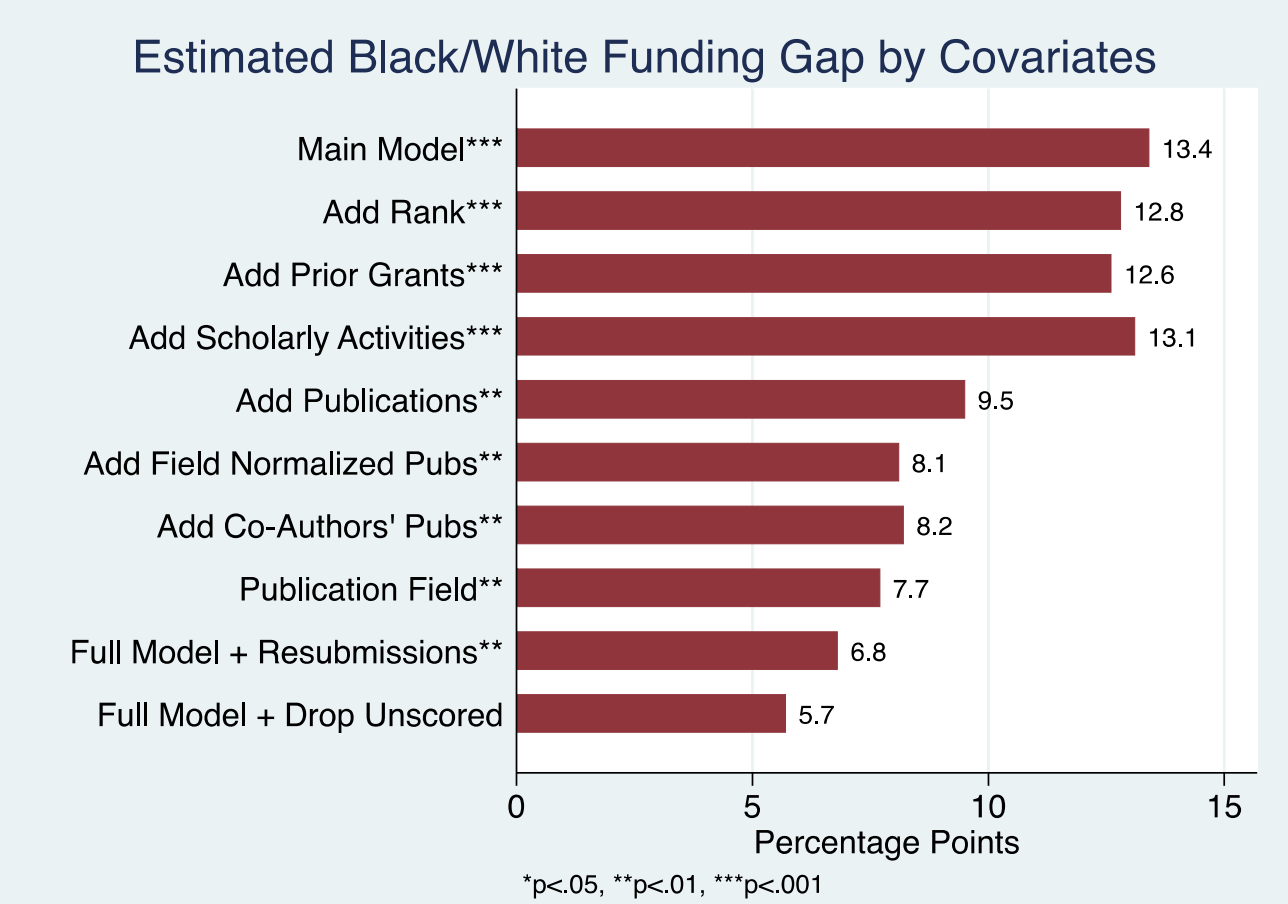
Solution: Specification search to pick the winners

Best measures:

- Log of Sum of Impact Factors
- First-authored papers
- Percentage of papers in top quartile of field
- Percentage of uncited papers
- Percentage of co-authors' papers in top quartile of field

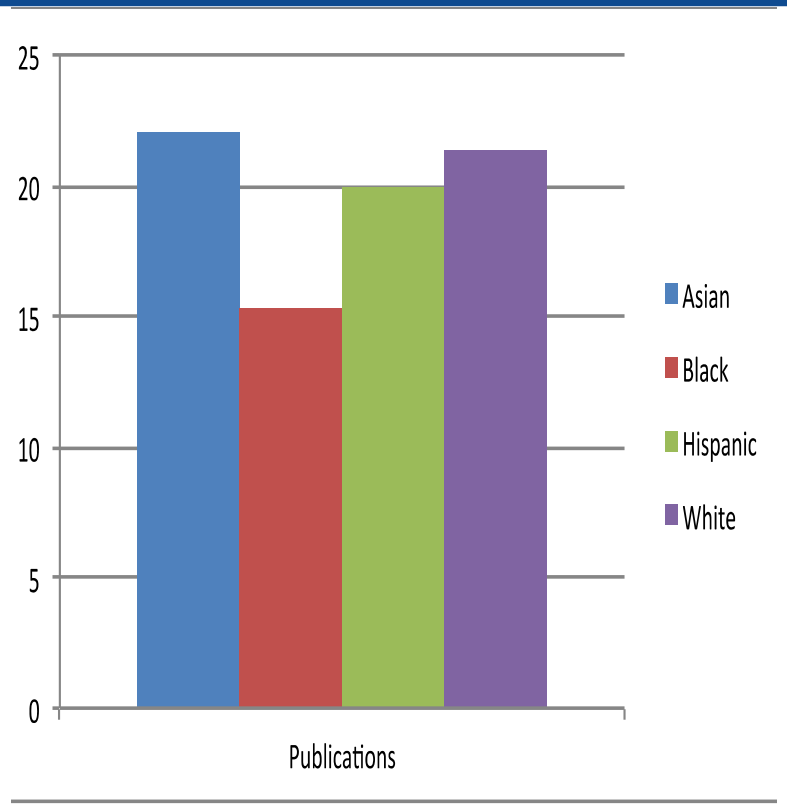
Source: *Sports Illustrated*

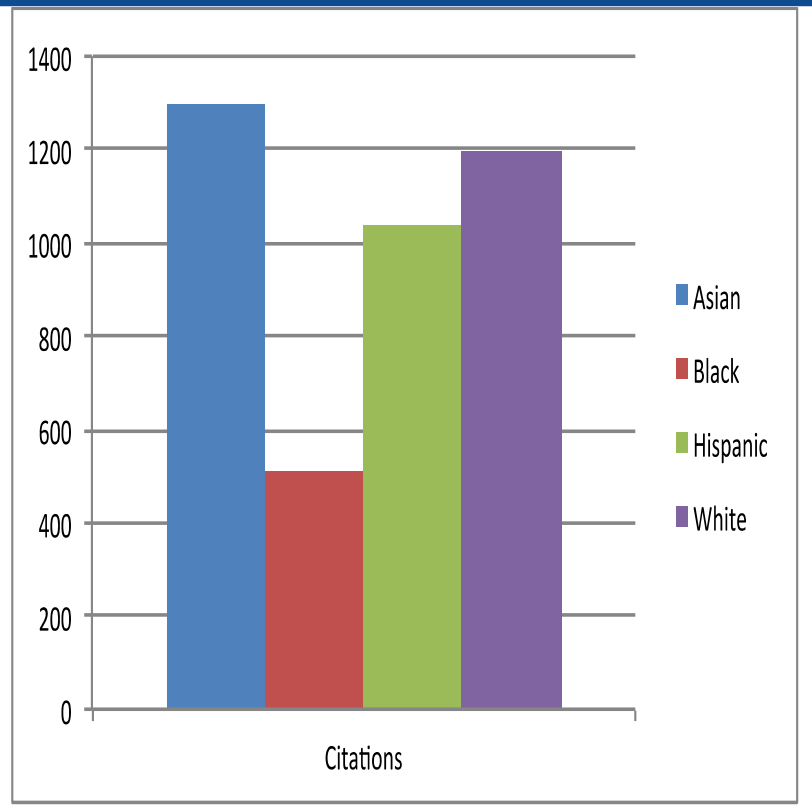
Publications explain much of the Black/White R01 Funding Gap



- Log sum of impact factors and having a large number of first authored publications explain the gap.
- Having a high percentage of uncited papers reduces funding probability.
- If control for resubmissions and unscored grants are dropped the black/white funding gap is no longer significant.

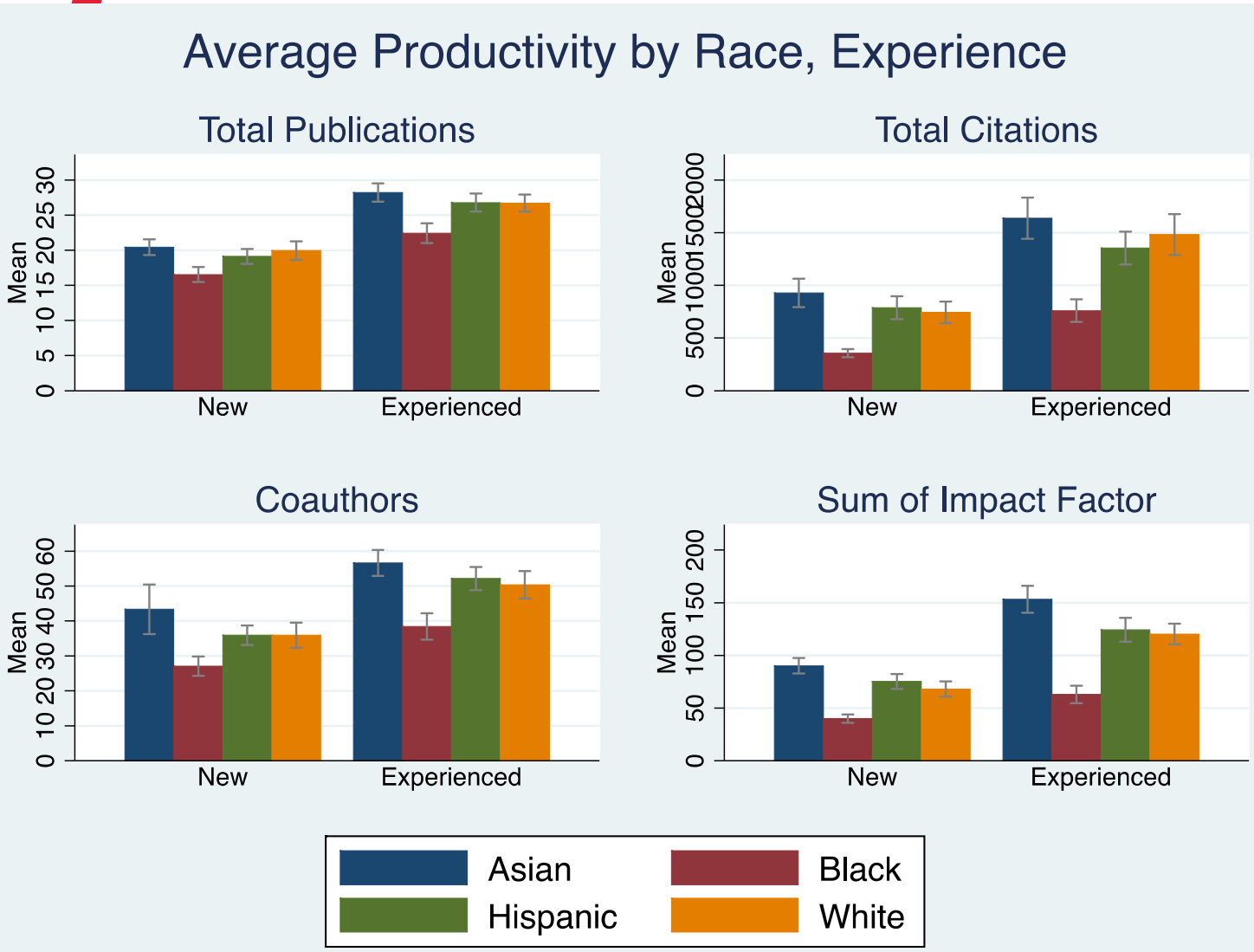
A Closer Look at Publications & Awards





Black or African/American investigators publish significantly fewer articles and have fewer citations.

Publications by Race/Ethnicity and Experience



Experienced Black Investigators have larger gaps that new investigators.

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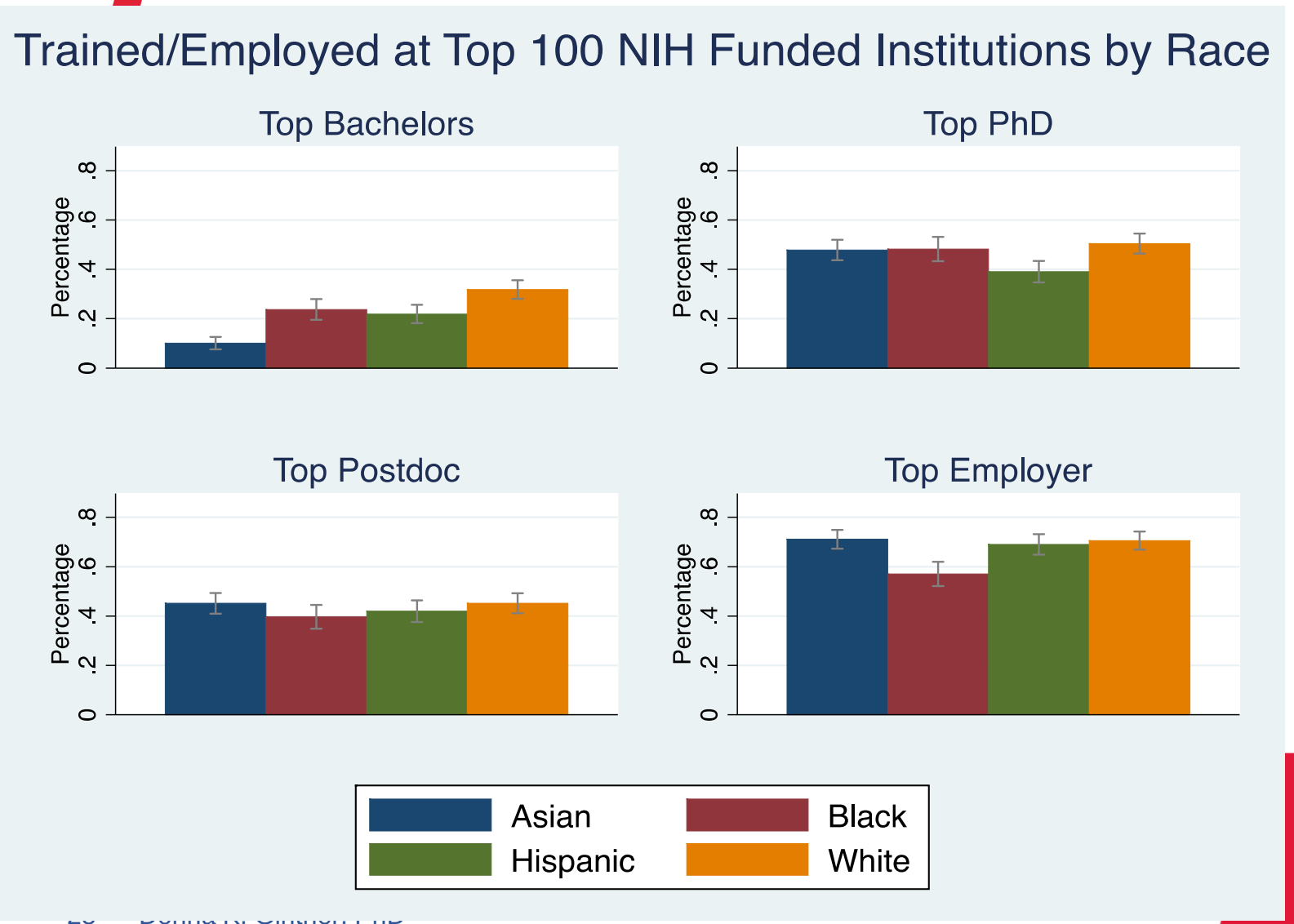
Cumulative Disadvantage in Careers

- Cumulative Advantage Model: Where small advantages (or disadvantages) accumulate over time and affect subsequent career outcomes.
  - Advantage accumulation: smaller recognitions lead to larger awards / prizes.
  - Disadvantage accumulation: rejections and denials lead to worse outcomes overtime.
    - Starting a job during a recession leads to much lower wage growth over time.

Cumulative Disadvantage in Careers con't

- We examine Cumulative Advantage / Disadvantage by observable career milestones.
- How does prior training (undergraduate, PhD, Postdoc), employer characteristics, and productivity influence subsequent NIH funding?

Probability of Top 100 NIH Funded Training & Employer Institutions



- Black investigators were less likely to attend Top BAs and have top employers.
- But they were equally likely to attend top PhD & Postdoc

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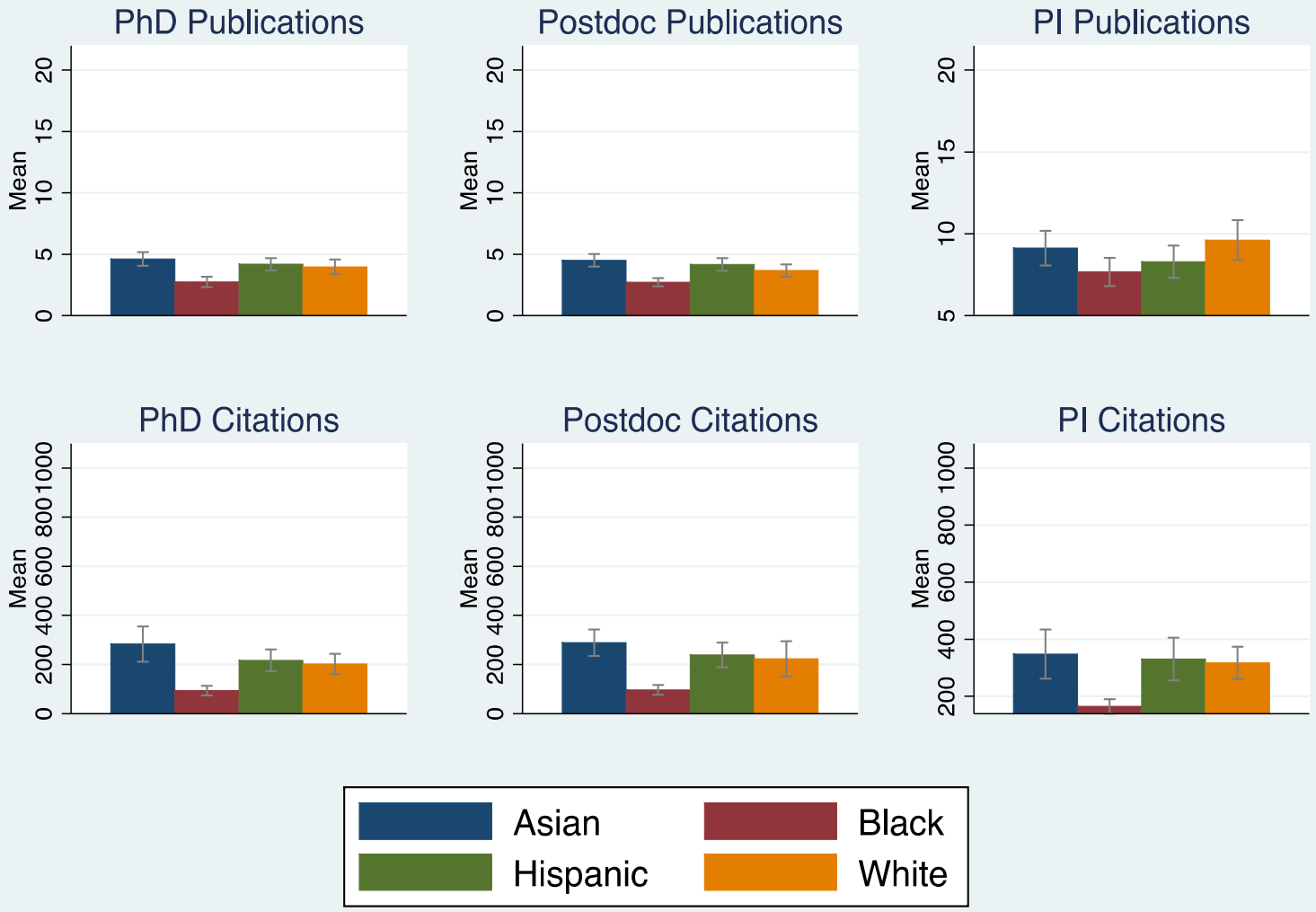
Citations Diverge at the PhD—New Investigators

Average Productivity by Career Stage, Race, New Investigators



- Black New Investigators publish same as white investigators during PhD and postdoc.
- However, their publications are less likely to be cited and the difference grows with career stage.

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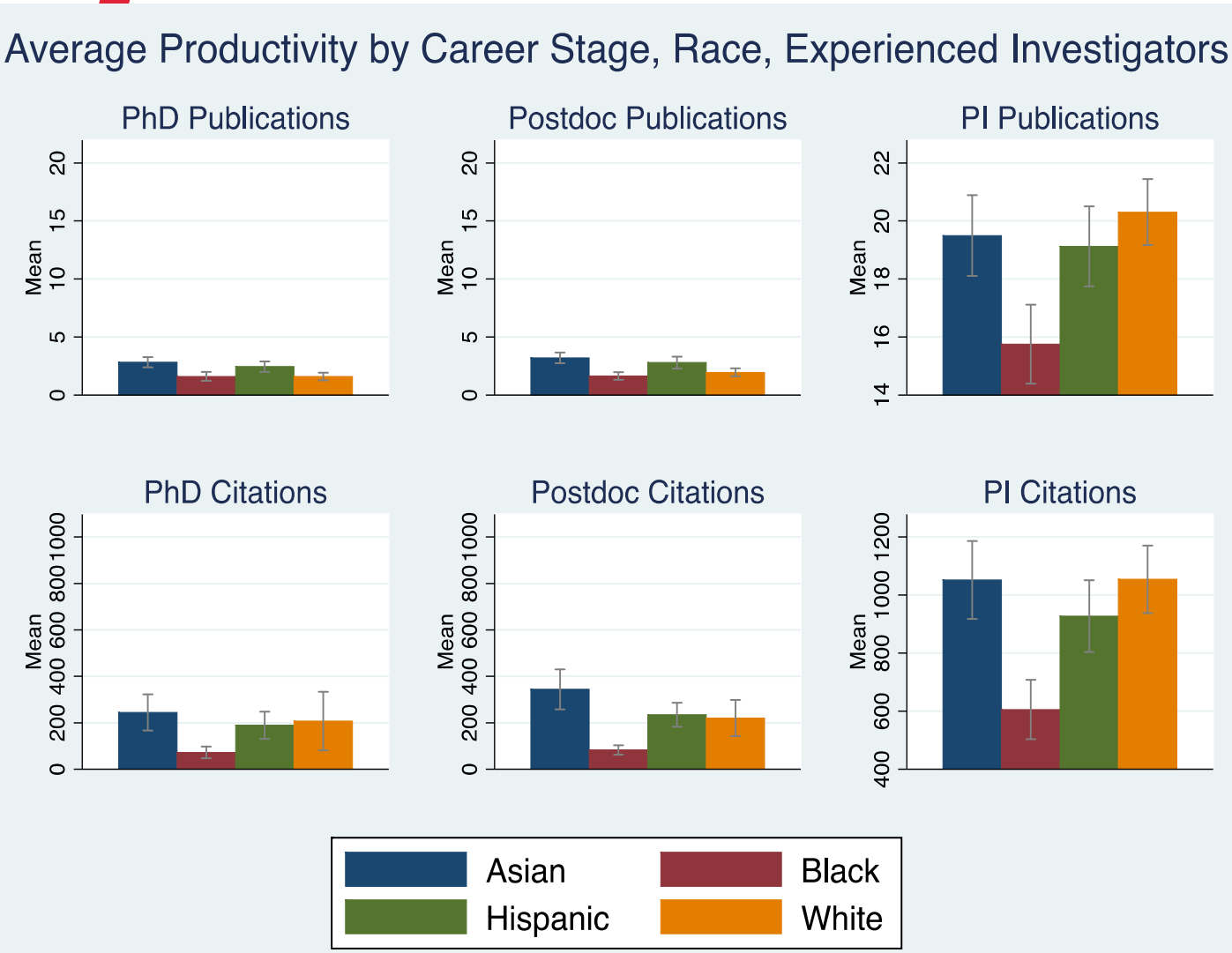
Citations Diverge at the PhD—Experienced Investigators



Black Experienced Investigators publish same as whites during PhD and postdoc, but their publications are less likely to be cited.

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Conclusions

- New and improved publication measures combined with previous insights explain the black/white funding gap for scored proposals.
- Blacks are cited less and publish in lower impact journals than other race/ethnicity groups.
- The Black/white gap in New Investigator funding can be fully explained by differences in productivity.
- The Black/white gap in Experienced Investigator funding is partially explained by productivity.
- There is no Black/White funding gap for researchers publishing in Social & Behavioral science fields.

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Conclusions

- Black New Investigators are significantly less likely to receive a priority score.
- Although Black Experienced Investigators are not significantly different from whites in terms of receiving a score, they are marginally less likely to be funded?
  - Could this be evidence of the “Black Tax”—where the scarcity of black faculty increase the service demands and crowd out research?

Conclusions

- Using publications and bibliometrics, we examined where careers diverge:
  - Black investigators publish same number of papers during PhD and postdoc.
  - These publications have much lower citation rates.
- Black investigators have significantly smaller coauthor networks.

Conclusions

- Why are the citation patterns so different?
  - Research topics and/or approaches?
- Evidence suggests that academic careers diverge starting during graduate school and that the disadvantage accumulates.
  - Funding gap for New Investigators can be fully explained, but not necessarily for Experienced investigators.
- Policies designed to improve the mentoring of Black researchers (especially in Science fields) are likely to improve outcomes.

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Subsequent Research

NIH Review Process & Other Explanations for Race/Ethnicity Funding Gap

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Ginther & Heggeness (2020)

Research Policy 49 (2020) 103953

Contents lists available at ScienceDirect

Research Policy

journal homepage: www.elsevier.com/locate/respol

Administrative discretion in scientific funding: Evidence from a prestigious postdoctoral training program☆

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[b] Federal Reserve Bank of Minneapolis, 90 Hennepin Avenue, Minneapolis, MN 55401, United States
[c] U.S. Census Bureau, Research and Methodology Directorate, 4600 Silver Hill Road, Washington DC 20233, United States

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Overview of Paper

- Research Question: What is the effect of program officer discretion on subsequent NIH funding and independent research careers?
- Use administrative data from the NIH and matching methods to identify the effect.
- Bottom line: We find significant amount of program officer discretion in the F32 postdoctoral fellowship program. Those scientists who were identified by peer review have better outcomes compared to those chosen by program officer discretion.

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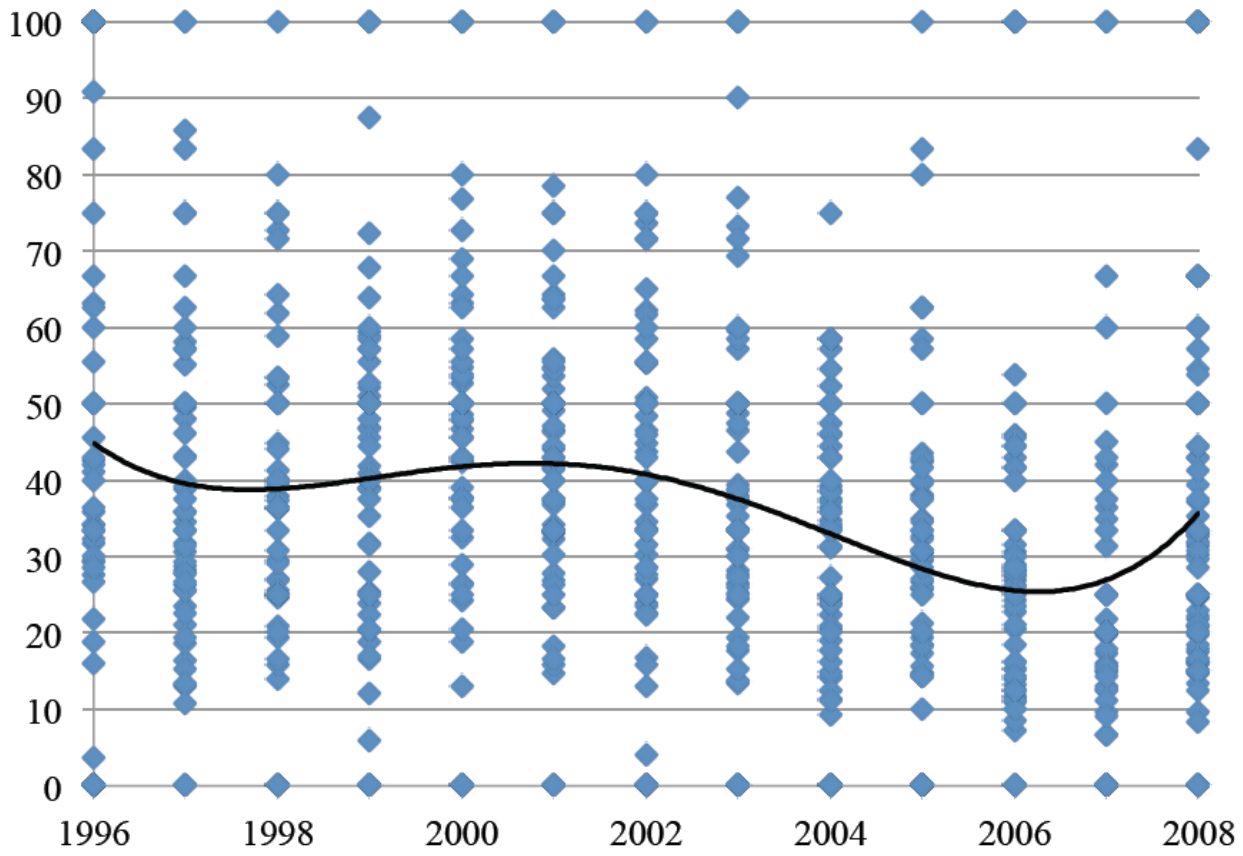
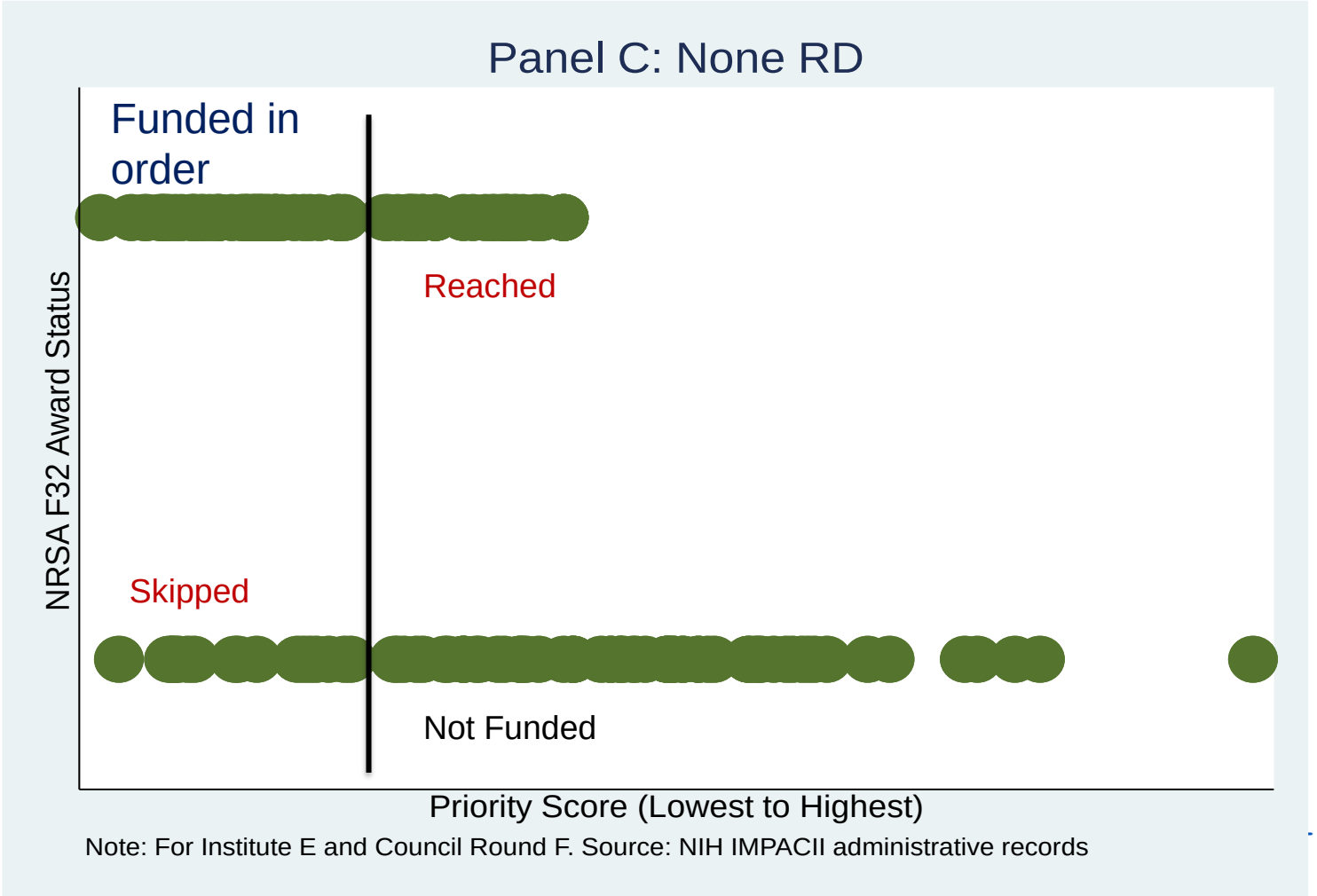
Percent of F32s Funded Within Payline

Panel D. Percent of NRSA F32 Applications Funded within Pay Line by Year, Institute, and Council Round, 1996 to 2008



Source: National Institutes of Health IMPACII, 1996 to 2008.

How Discretion Operates at IC



Note: For Institute E and Council Round F. Source: NIH IMPACII administrative records

Examining the Impact of Discretion

- Divided proposal data into samples based on how they were chosen (or not) for F32 awards:
  - Reached vs. Not Funded [N= 5,215]
  - Reach vs. Funded In Order [N= 9,602]
  - Reach vs. Skip [N=2,538]
  - Skip vs. Not Funded [N=5,211]
  - Skip vs. Funded In Order [N=9,058]
  - In Order vs. Not Funded [N=11,735]
- ATE estimates of Number of RPG awards, applications, probability of an RPG (R01) funded, and probability of never applying for RPG.

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Compare Outcomes

ATE	# RPGs	# RPG Applic.	Prob RPG	Prob R01	Never Apply
Reach vs. Not Funded	0.174***	0.801***	0.071***	0.078***	-0.119***
Reach vs. In Order	-0.096*	-0.495**	-0.050**	-0.038*	0.063**
Reach vs. Skip	-0.176**	-0.333	-0.051**	-0.047**	0.025
Skip vs. Not Funded	0.243***	0.655***	0.085***	0.083***	-0.083***
Skip vs. In Order	-0.047	-0.342*	-0.051**	-0.025	0.069***
In Order vs. Not Funded	0.246***	0.983***	0.106***	0.086***	-0.140***

Those chosen by discretion ***(Reached)*** have higher rates of future funding than those not funded.

However, the ***Reached*** group does worse than those who had better scores, but were ***Skipped*** over.

Conclusions on Discretion

- NIH F32 fellowships do not comply with a regression discontinuity design.
  - ICs use discretion as well as proposal merit in determining funding.
  - RD assumptions should be examined before applying the method.
- Proposals chosen by discretion are less likely to receive subsequent NIH funding than those funded in order.
  - But they have better outcomes than those not receiving funding.
- These results have implications for the debate about peer review.

What Explains the Persistent Race/Ethnicity Funding Gap?

- Ginther et al (2011) argued for two potential explanations:
  - Omitted variables
  - Bias in review process

- Ginther et al (2018) explained 50% of the gap with improved bibliometric measures.

- Since that time, NIH-affiliated researchers have probed these issues further.

Bias in Peer Review--Scoring?

- Researchers have investigated peer review at NIH.
  - NIH funding is awarded according to scoring (Eblen et al 2016, Erosheva 2020)
  - Erosheva et al (2020) found no evidence of commensuration bias—where overall score differs from individual-level evaluation scores.

Bias in Peer Review--Anonymization?

- Forscher et al (2019) randomized the names on 48 NIH proposals by changing names to reflect different gender and race combinations. They then solicited over 1200 reviews of these proposals from 412 scientists.
  - They found little evidence of gender or race bias in these reviews.

Bias in Peer Review—Anonymization?

- Nakamura et al (2021) used 1200 NIH grant applications from Black and white investigators and redacted all information about the identity of the investigator. These applications were sent to over 2000 reviewers who produced over 7000 reviews
  - They found that Black redacted and unredacted proposals received the same score, but redacted proposals from white investigators scored worse.
    - They conclude: "The data reveal little evidence of systematic bias based on knowledge of, or perceptions of PI race per se." (p. 19)
    - Halo effect for white investigators

Hoppe et al (2019) and Topic Choice

- Hoppe et al (2019), examined each stage of the NIH review process to evaluate whether grant topic choice could explain the Black/white funding gap.
  - They found that Black researchers chose topics that were less likely to receive funding.
  - However, their study found that topic choice was only salient once the analysis is limited to those proposals that are discussed and receive a priority score.
    - The funding gap we investigated in our previous work Ginther et al (2011, 2012, 2015, 2018) and the funding gap where topic choice had explanatory power were not the same.

Lauer et al (2021): Topic Choice does not Explain the Gap

- Lauer et al (2021) reexamined the topic choice result controlling for the success rates at NIH Institutes and Centers (ICs) that received these proposals.
  - Upon reanalysis, the Lauer et al (2021) abstract concludes: “The lower rate of funding for these topics was primarily due to their assignment to ICs with lower award rates, not to peer-reviewer preferences.”
  - Policy implication: increase funding for institutes where Black investigators are more likely to apply

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New Data from NIH

The Funding Gap Narrowed Significantly

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NIH Type 1 R01 Awards to Black Investigators Increased by 25%

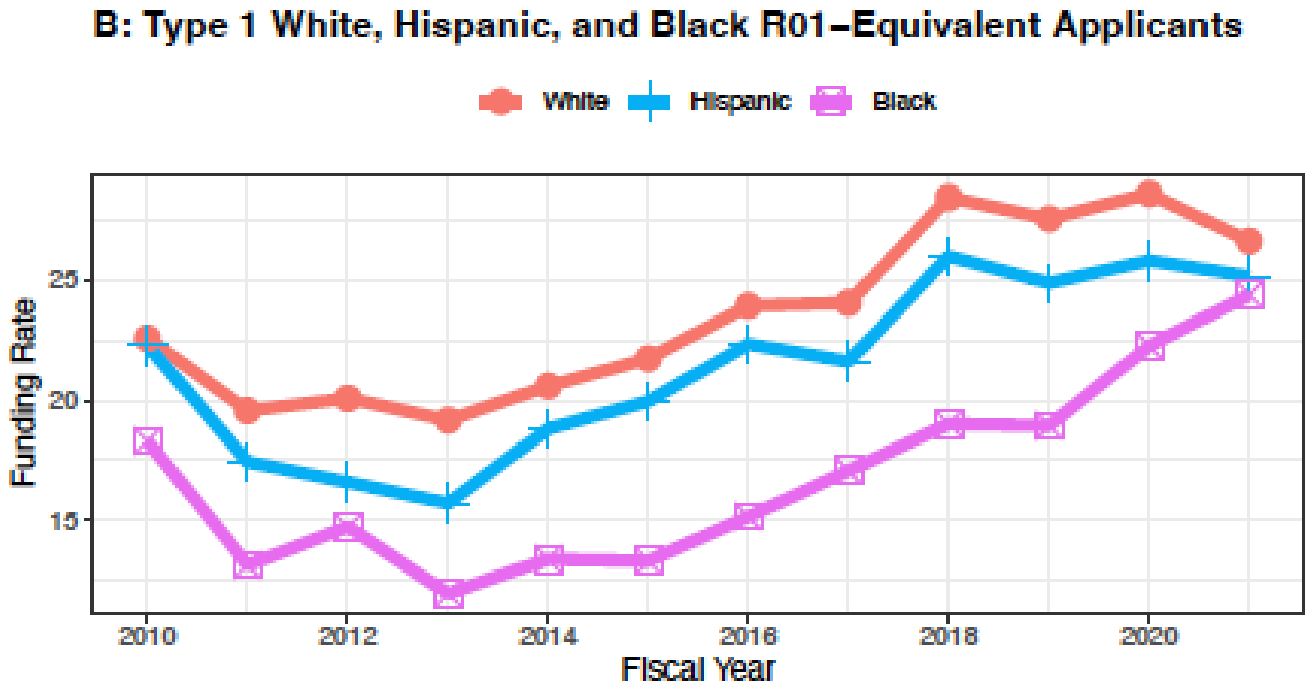

Figure 11: Funding rates for Type 1 R01-Equivalent applicants according to race-ethnicity by fiscal year. Panel A shows data for all groups, while Panel B shows the same data but for White, Hispanic, and Black applicants only.

Source: Lauer et al 2022

- Black R01 Type 1 Funding Rates Jumped 5 percentage points in two years!

- Reporting data comparable to
- Ginther et al (2011, 2018)

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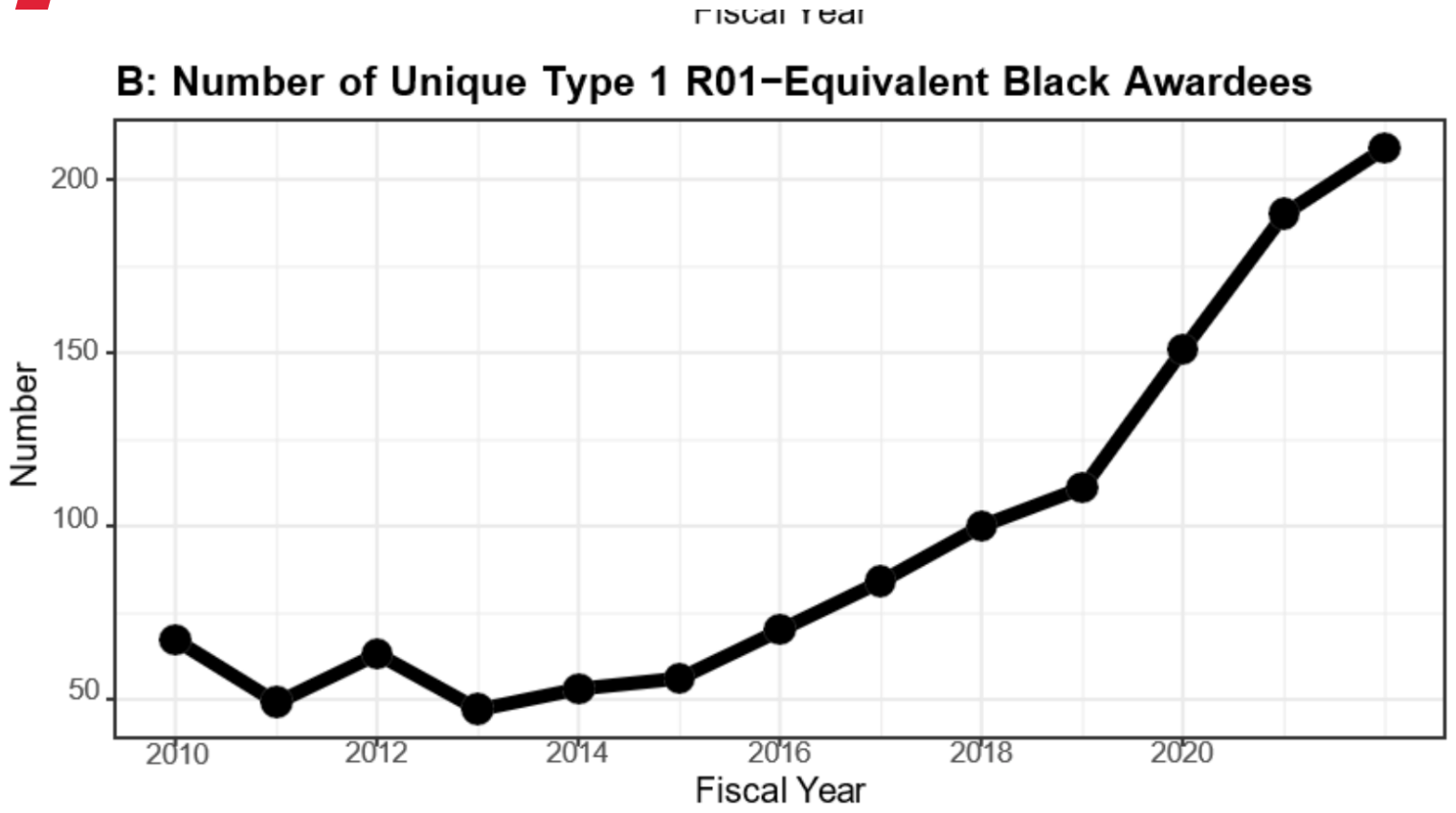
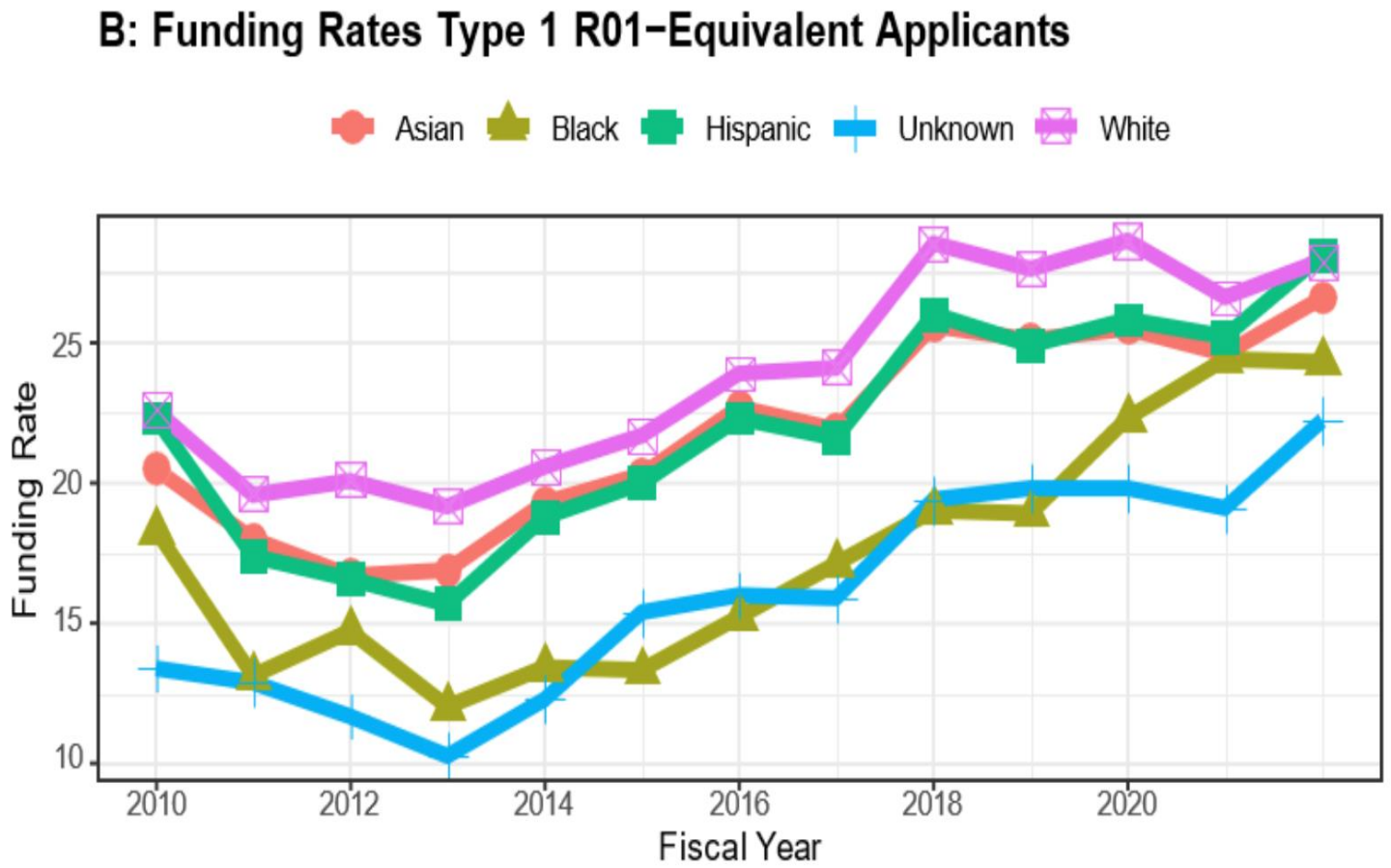
NIH Black Investigators Funded Increased 100%



- Over 200 Unique Black Investigators have been funded as of FY 2022

Source: https://nexus.od.nih.gov/all/2023/03/16/analyses-of-demographic-specific-funding-rates-for-type-1-research-project-grant-and-r01-equivalent-applications/

Success Rates Have Also Increased



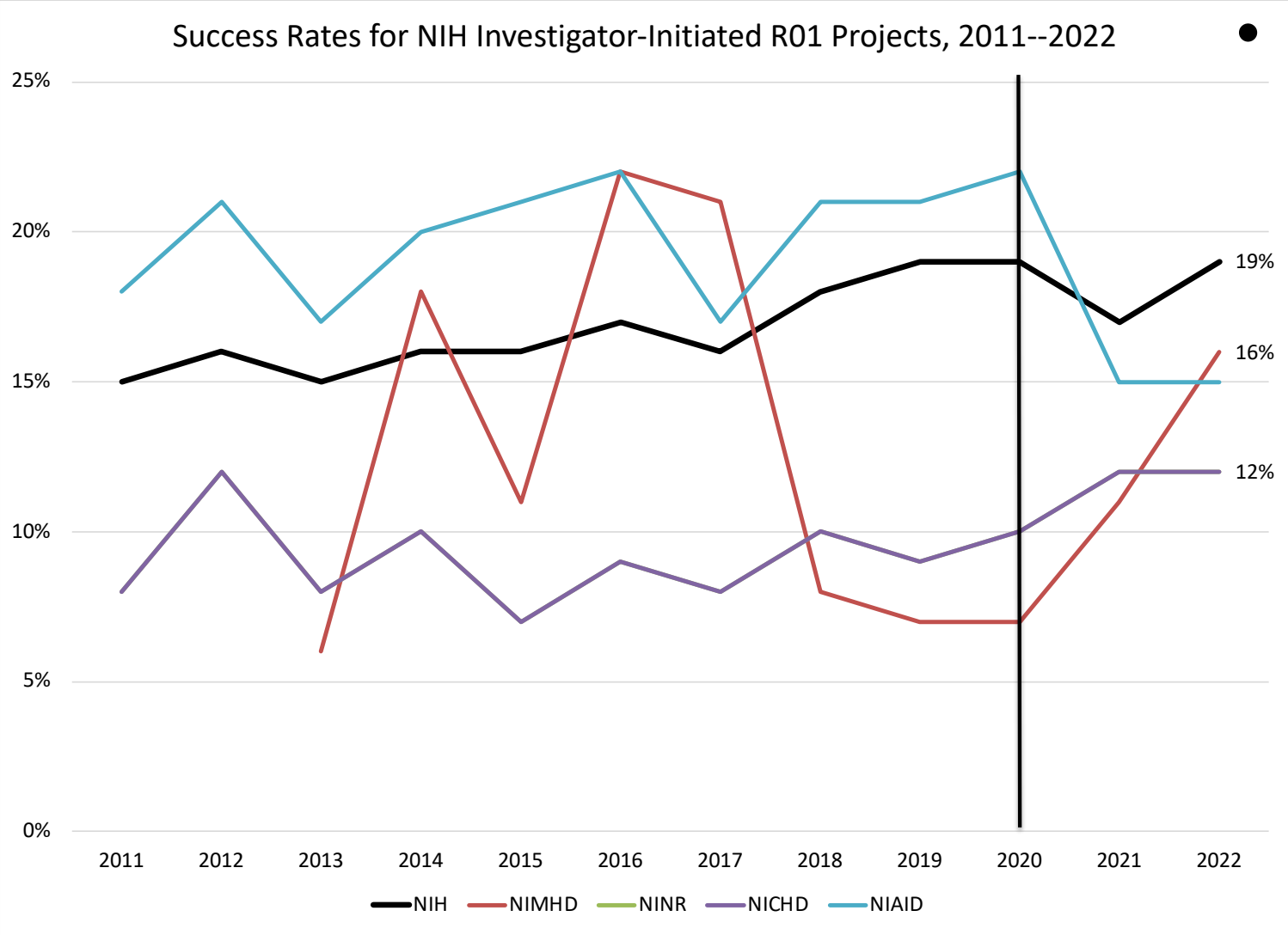
- Success rates have also narrowed

Source: https://nexus.od.nih.gov/all/2023/03/16/analyses-of-demographic-specific-funding-rates-for-type-1-research-project-grant-and-r01-equivalent-applications/

Lauer et al (2021) Share of Black Investigators by IC

- Lauer et al (2021) reexamined the topic choice.
  - Table 1 shows share of Black Investigator Applications by Institute
    - NIMHD—14.8% of applications
    - NINR—4.7% of applications
    - NICHD—3.1% of applications
    - NIAID—2.1% of applications

NIH Funding Rates by IC



Success Rate Increases by IC:

- NIMHD—by 8 percentage points (or 100%)
- NINR—by 2 percentage points (or 20%)
- NICHD—by 2 percentage points (or 20%)
- NIAID—Success rates decreased by 6 percentage points.

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Ginther (2022) "In addition, others have found that applications from African American/Black researchers are being assigned to NIH ICs with lower award rates (Lauer *et al.,* 2021). Clearly, adjustments in the referral process or increasing budget allocations to those ICs is an important step in the right direction toward funding more African American/Black researchers."

Thank You!

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