

# RPG and R01-Equivalent Funding and Success Rates by Race-Ethnicity FY2010-FY2021

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## Introduction

This is an analysis of funding and success rates for FY2010 to FY2021 Research Project Grant (RPG) and R01-equivalent applicants and applications according to the race-ethnicity of designated Principal Investigators (PIs).

## Methods

### Data Sources

We used data from frozen, official, NIH success rate files. Our analyses focus on RPGs and R01-equivalents. [RPGs are defined](#) as defined as applications or awards that use activity codes DP1, DP2, DP3, DP4, DP5, P01, PN1, PM1, R00, R01, R03, R15, R21, R22, R23, R29, R33, R34, R35, R36, R37, R61, R50, R55, R56, RC1, RC2, RC3, RC4, RF1, RL1, RL2, RL9, RM1, SI2, U3R, UA5, UC1, UC2, UC3, UC4, UC7, UF1, UG3, UH2, UH3, UH5, UM1, UM2, U01, U19, and U34. Research projects were first coded to NLM in fiscal year 2007. Not all of these activities may be in use by NIH every year. [R01-equivalents are defined](#) as applications or awards that use activity codes DP1, DP2, DP5, R01, R37, R56, RF1, RL1, U01 and R35 from select NIGMS and NHGRI program announcements (PAs). Not all of these activities may be in use by NIH every year.

We obtained data on the race and ethnicity of PIs from their entries into the eRA Commons Personal Profile. [As noted by NIH](#), PIs provide these data on a strictly voluntary basis, and these data are not used for making funding decisions. If individuals described themselves as Hispanic in the ethnicity field and not Black in the race field, then race-ethnicity was considered to be Hispanic; otherwise the individual's race-ethnicity was based on their entry in the race field.

### Grant Outcome Metrics

As a reminder, [NIH publishes three main kinds](#) of grant outcome metrics, namely award rates, success rates, and funding rates. Award and success rates are *application-based* metrics, while funding rates are *person-based*.

The award rate is an application-based measure that is calculated as

$$A_{FY} = \frac{\sum_{i=1}^N a}{N} \quad (1)$$

where  $N$  is the number of *unique* applications submitted in a given fiscal year and  $a$  is an indicator of whether application  $i$  was successfully funded (1 if yes, 0 if no). A data frame that calculates award rate will have only *one* observation per application per year. The success rate is related to the award rate except that an application is not counted if a resubmission was received later in the year; more details on success rate methodology is [found here](#).

The funding rate is a person-based measure that is calculated as

$$F_{FY} = \frac{\sum_{j=1}^P a}{P} \quad (2)$$

where  $P$  is the number of *unique* persons (designated-PI applicants) who submitted at least one proposal in a given fiscal year and  $a$  is an indicator of whether person (designated-PI applicant)  $j$  successfully obtained funding for at least one of those proposals (1 if yes, 0 if no). A data frame that calculates funding rate will have only *one* observation per person per year.

For illustrative purposes, Figure 1 shows overall funding (panel A) and success (panel B) rates since 1998, the year the NIH doubling began. Our analyses of demographics focus on fiscal years 2010 to 2021; the [seminal paper by Ginther et al](#) was published in 2011.

Throughout the report we refer for convenience to Principal Investigators (“PIs”) as applicants or awardees. In point of fact, applicants and awardees are institutions who in turn designate PIs; PIs are typically employees of the applicants and awardees.

## Results and Findings

Tables 1 and 2 show characteristics according to race-ethnicity of scientists who were designated as a PI on at least one RPG application submitted in FY2011 (the year the Ginther paper was published) and in FY2021. Over time, a greater proportion of applicants were Asian, Hispanic, and Black. Compared to White scientists, Black scientists were younger, more likely to be women, more likely to have an MD degree, and more likely to submit at least one human subjects research application; they were less likely to submit at least one R01 Equivalent application, less likely to submit at least one multi-PI application, and less likely to submit an animal research application. There were other race-ethnicity distinctions: Asian scientists were more likely to be men and to submit at least one animal research application.

### Funding Rates

Figure 2 shows the number of unique RPG applicants each fiscal year according to race-ethnicity. Figure 3 shows increasing numbers of unique Black RPG applicants and awardees, while Figure 4 shows corresponding values for Hispanic applicants and awardees. Figure 5 shows RPG

funding rates according to race-ethnicity; Figure 6 shows funding rates limited to applicants submitting Type 1 (that is *de novo*) applications. Figures 7 to 11 show corresponding values for R01-Equivalents. While the absolute numbers of Black and Hispanic applicants and awardees remains low, there have been increases in numbers and funding rates over time.

## Success Rates

Table 3 shows *application* characteristics and outcomes according to race or ethnicity classification. There are a number of noteworthy differences. Compared to White-only applications, Black-only applications are less likely to be Type 2, to be R01-equivalents, or to focus on animal research. Consistent with prior literature, Black-only applications were less likely to be discussed at peer review, received less good priority scores and percentile rankings when discussed, and were less likely to be funded.

Figure 12 shows the number of Black-only RPG applications and RPG awards over time, while Figure 13 show corresponding values for Hispanic-only applications and awards. Both the number of applications and the number of awards are increasing. Figures 14 and 15 shows values for R01 Equivalent applications and awards. Figures 16 to 18 show success rates for RPG and R01 Equivalent applications according to race or ethnicity and fiscal year. At all times, White-only applications had the highest success rates; Black-only applications saw an increase in success rates, particularly in FY2020.

Figure 19 shows success rates for Type 2 RPG and R01 Equivalent applications. As might be expected from the small samples (Table 3), the estimates for all groups except White Only were unstable.

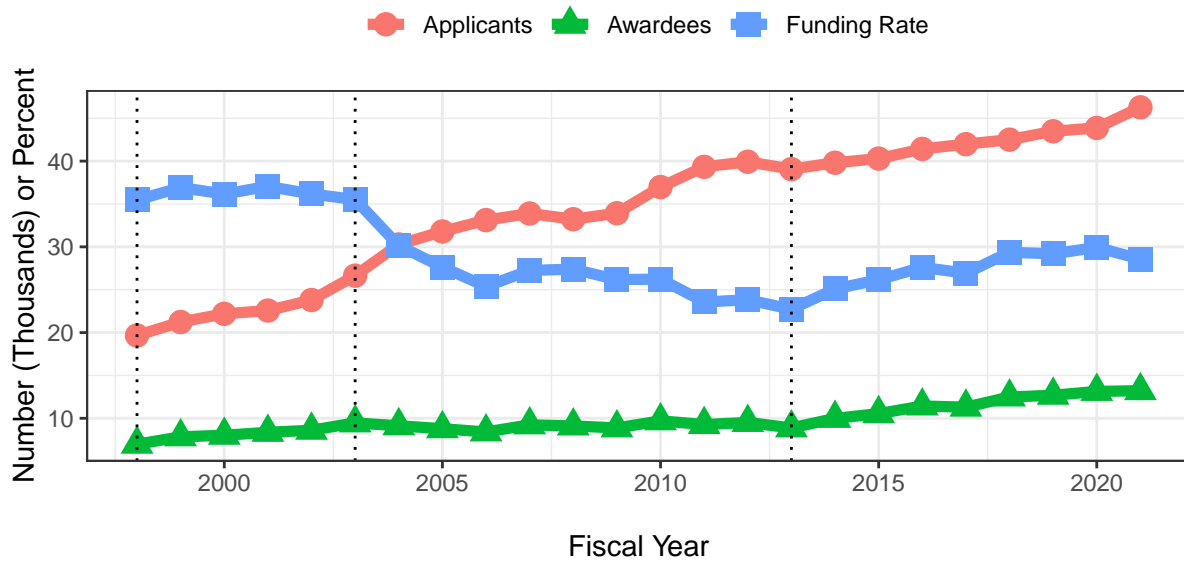
Table 1: Characteristics according to race-ethnicity of scientists who were designated as a Principal Investigator on at least one RPG application in FY2011.

Characteristic		White	Asian	Unknown	Hispanic	Black
Total N (%)		24233 (61.6)	7597 (19.3)	4817 (12.2)	1545 (3.9)	737 (1.9)
Female		8176 (33.7)	2114 (27.8)	1302 (27.0)	600 (38.8)	345 (46.8)
Age (years)	Median (IQR)	50.0 (42.0 to 58.0)	46.0 (40.2 to 51.0)	46.0 (40.0 to 55.0)	47.0 (41.0 to 53.0)	45.0 (40.0 to 53.0)
Degree	MD	3872 (16.0)	884 (11.6)	553 (11.5)	276 (17.9)	144 (19.5)
	MD-PhD	2054 (8.5)	1191 (15.7)	285 (5.9)	191 (12.4)	61 (8.3)
	Other	344 (1.4)	97 (1.3)	1470 (30.5)	35 (2.3)	26 (3.5)
	PhD	17963 (74.1)	5425 (71.4)	2509 (52.1)	1043 (67.5)	506 (68.7)
Submitted an R01-Equivalent		16847 (69.5)	5143 (67.7)	2366 (49.1)	977 (63.2)	389 (52.8)
Submitted a multi-PI application		8199 (33.8)	1955 (25.7)	1872 (38.9)	467 (30.2)	198 (26.9)
Submitted an animal research application		10940 (45.1)	4346 (57.2)	1727 (35.9)	710 (46.0)	226 (30.7)
Submitted a human research application		11848 (48.9)	2766 (36.4)	2412 (50.1)	737 (47.7)	479 (65.0)

Table 2: Characteristics according to race-ethnicity of scientists who were designated as a Principal Investigator on at least one RPG application in FY2021.

Characteristic		White	Asian	Unknown	Hispanic	Black
Total N (%)		25728 (55.6)	11129 (24.1)	5408 (11.7)	2219 (4.8)	1219 (2.6)
Female		9820 (38.2)	3555 (31.9)	730 (13.5)	900 (40.6)	574 (47.1)
Age (years)	Median (IQR)	50.0 (43.0 to 60.0)	48.0 (42.0 to 55.0)	48.0 (42.0 to 56.0)	48.0 (42.0 to 56.0)	46.0 (41.0 to 53.0)
Degree	MD	3890 (15.1)	1334 (12.0)	440 (8.1)	316 (14.2)	209 (17.1)
	MD-PhD	2279 (8.9)	1418 (12.7)	258 (4.8)	214 (9.6)	106 (8.7)
	Other	1092 (4.2)	464 (4.2)	2728 (50.4)	140 (6.3)	116 (9.5)
	PhD	18467 (71.8)	7913 (71.1)	1982 (36.6)	1549 (69.8)	788 (64.6)
Submitted an R01-Equivalent		19453 (75.6)	8332 (74.9)	3275 (60.6)	1594 (71.8)	801 (65.7)
Submitted a multi-PI application		14240 (55.3)	5358 (48.1)	3131 (57.9)	1147 (51.7)	596 (48.9)
Submitted an animal research application		11782 (45.8)	6422 (57.7)	1938 (35.8)	1064 (47.9)	357 (29.3)
Submitted a human research application		13312 (51.7)	4697 (42.2)	2883 (53.3)	1137 (51.2)	841 (69.0)

### A: Funding Rates



### B: Success Rates

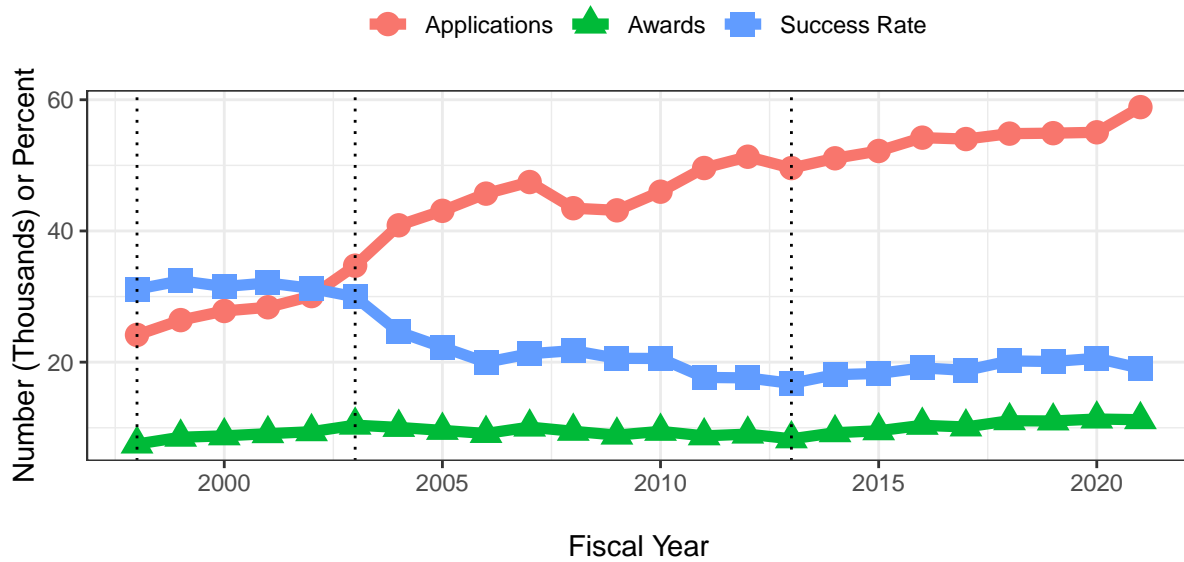


Figure 1: NIH RPG funding (panel A) and success (panel B) rates by fiscal year. The vertical lines depict the beginning (1998) and end (2003) of the NIH doubling and the year (2013) of budget sequestration.

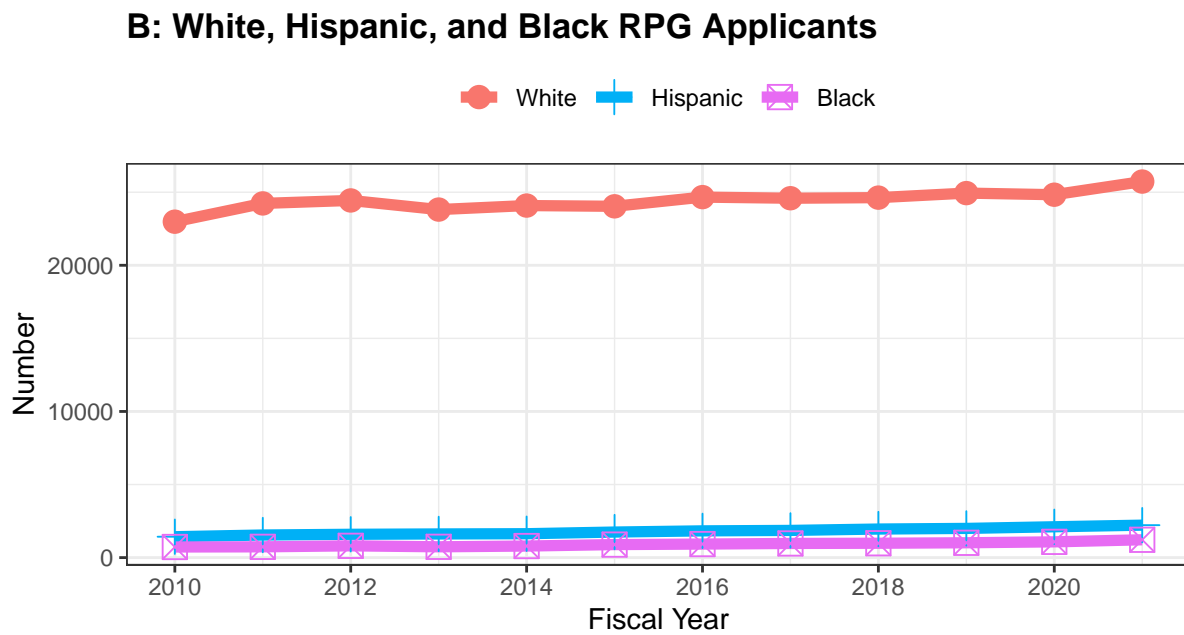
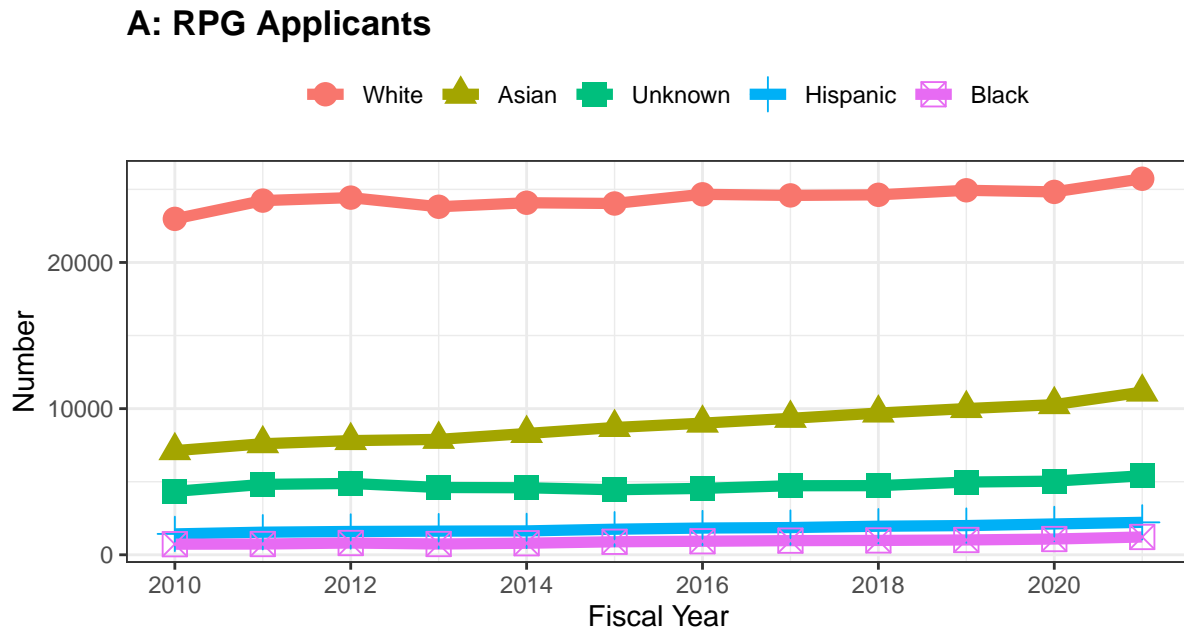
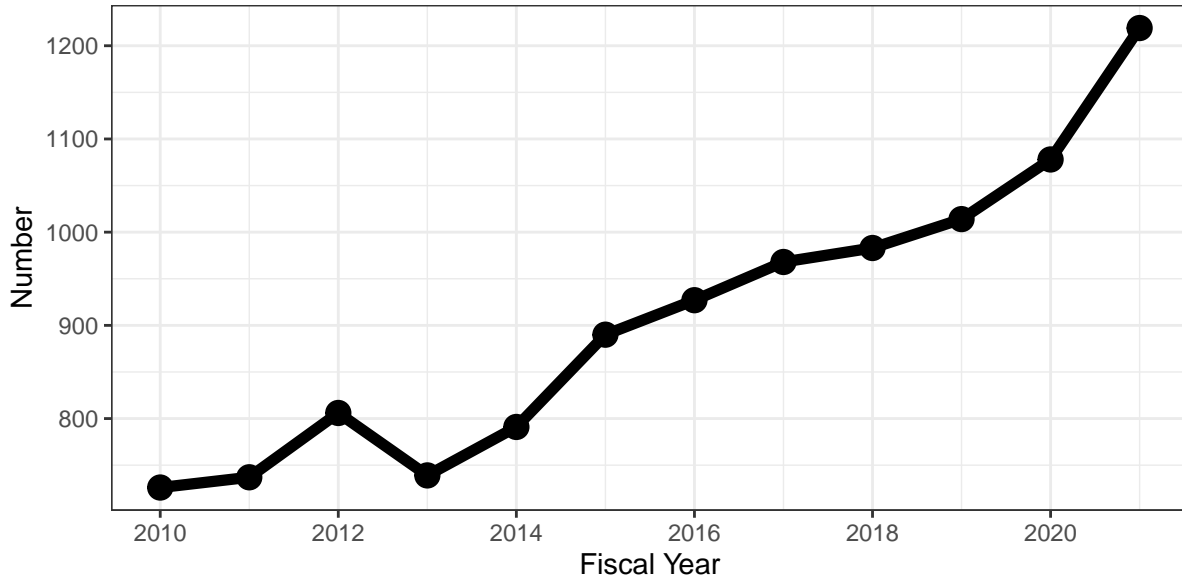


Figure 2: Number of RPG applicants according to race-ethnicity by fiscal year. Panel A shows data for all groups, while Panel B shows the same data but for White, Hispanic, and Black applicants only.

**A: Number of Unique RPG Black Applicants**



**B: Number of Unique RPG Black Awardees**

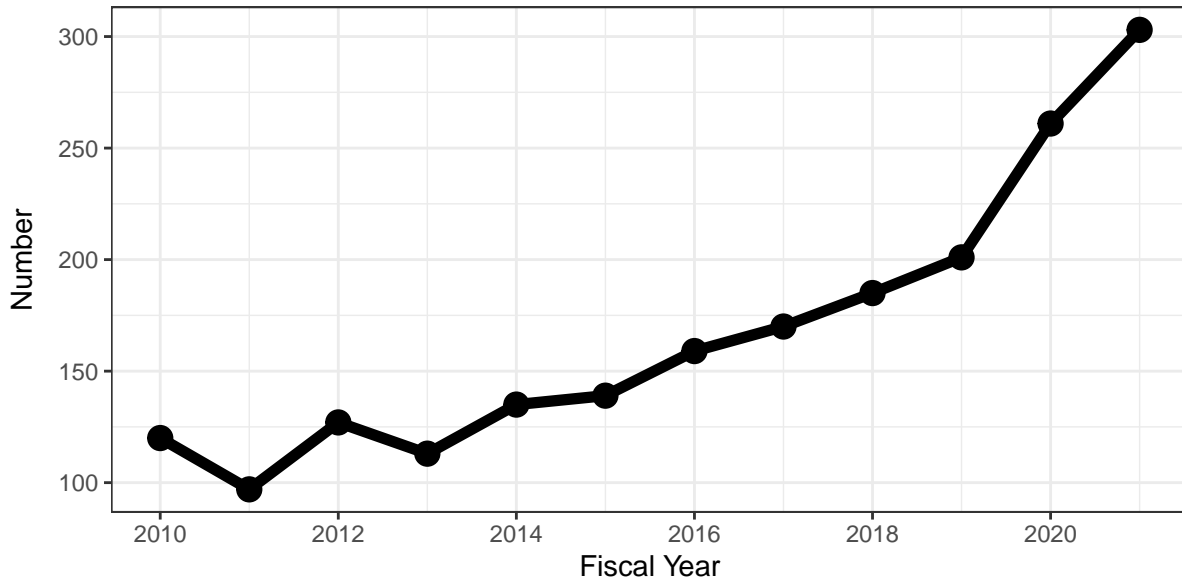
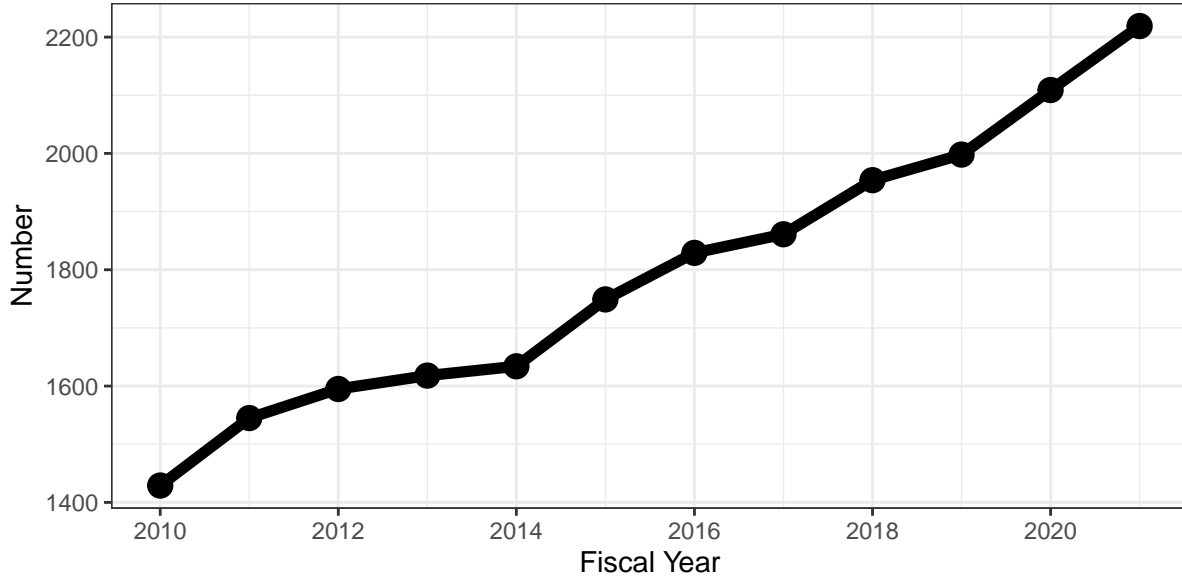


Figure 3: Number of unique RPG Black applicants (Panel A) and awardees (Panel B) by fiscal year

**A: Number of Unique RPG Hispanic Applicants**



**B: Number of Unique RPG Hispanic Awardees**

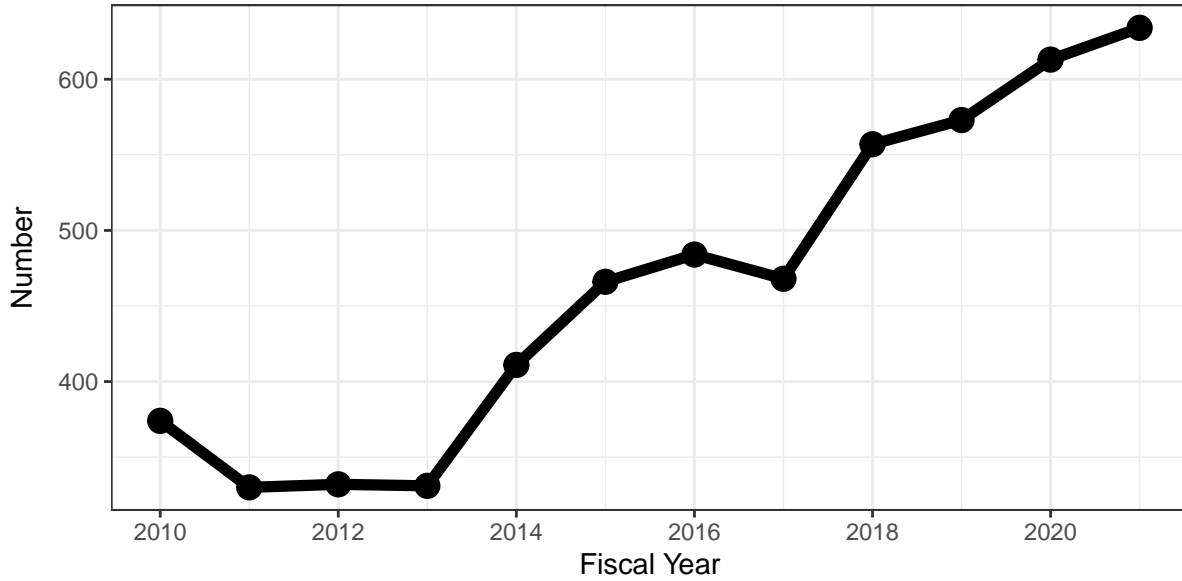
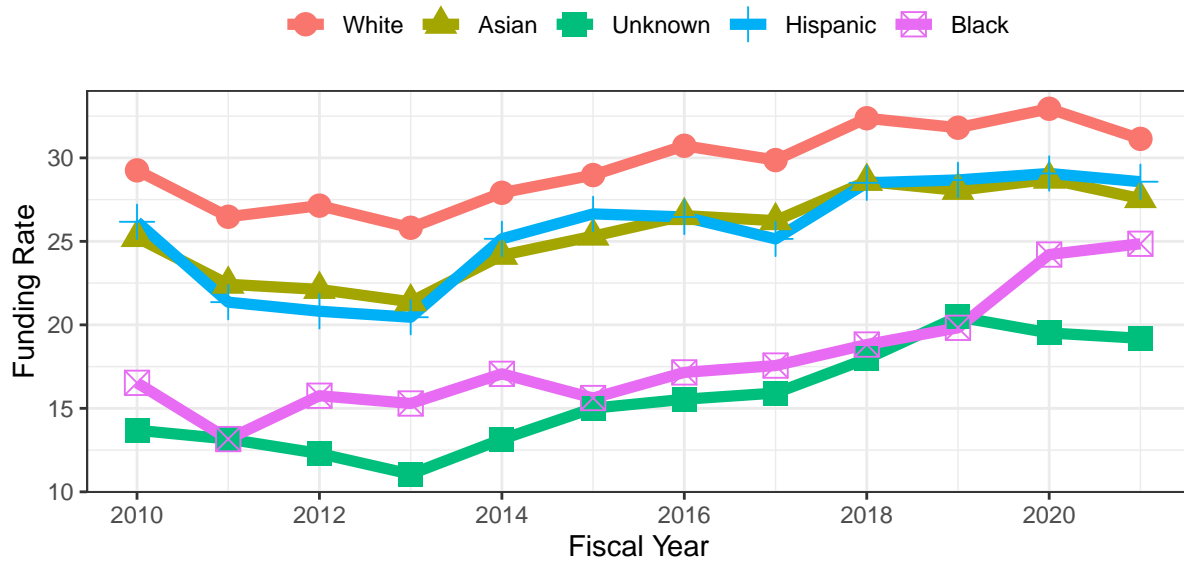


Figure 4: Number of unique RPG Hispanic applicants (Panel A) and awardees (Panel B) by fiscal year



### A: RPG Applicants



### B: White, Hispanic, and Black RPG Applicants

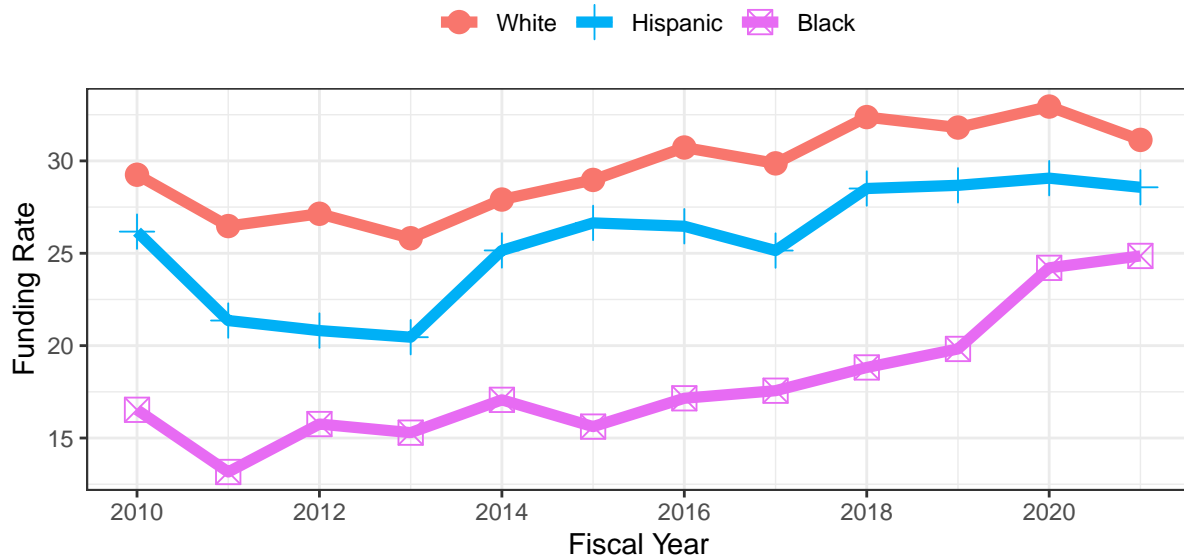
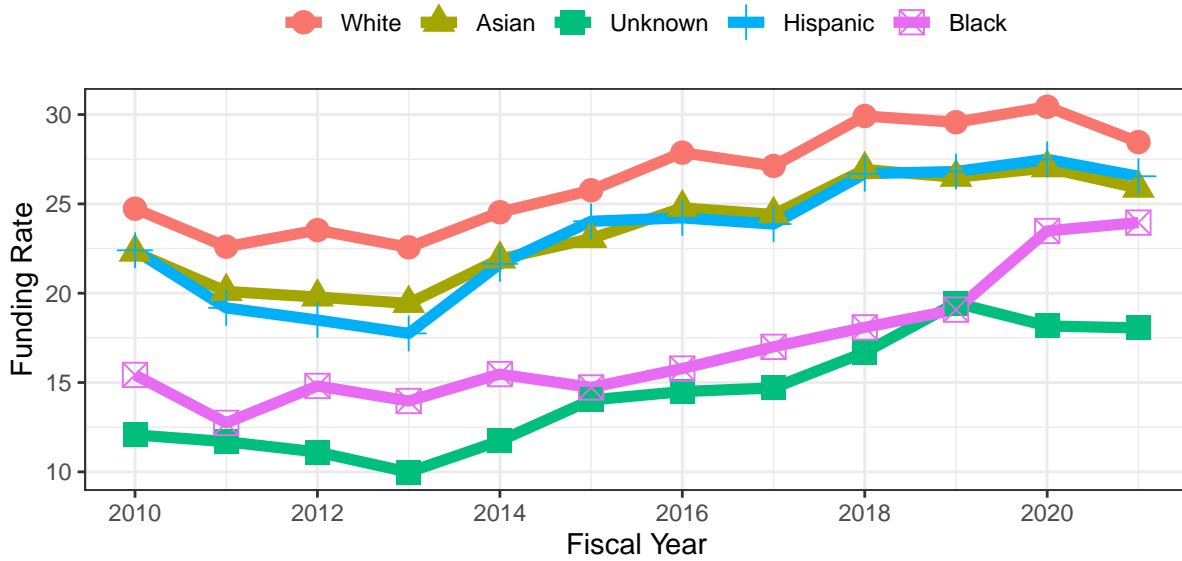


Figure 5: Funding rates for RPG applicants according to race-ethnicity by fiscal year. Panel A shows data for all groups, while Panel B shows the same data but for White, Hispanic, and Black applicants only.

### A: Type 1 RPG Applicants



### B: Type 1 White, Hispanic, and Black RPG Applicants

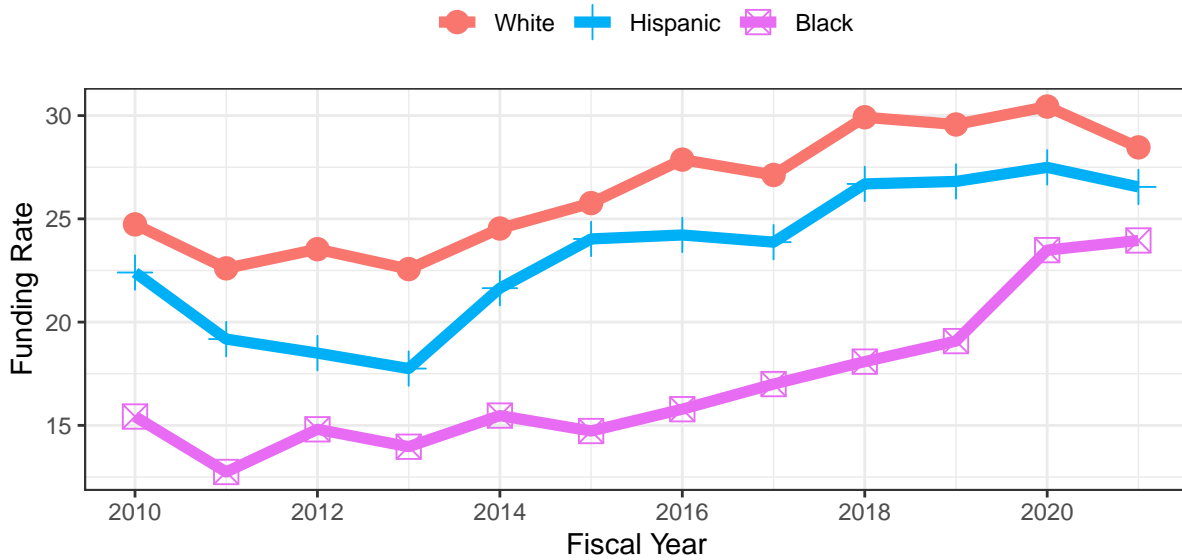


Figure 6: Funding rates for Type 1 RPG applicants according to race-ethnicity by fiscal year. Panel A shows data for all groups, while Panel B shows the same data but for White, Hispanic, and Black applicants only.

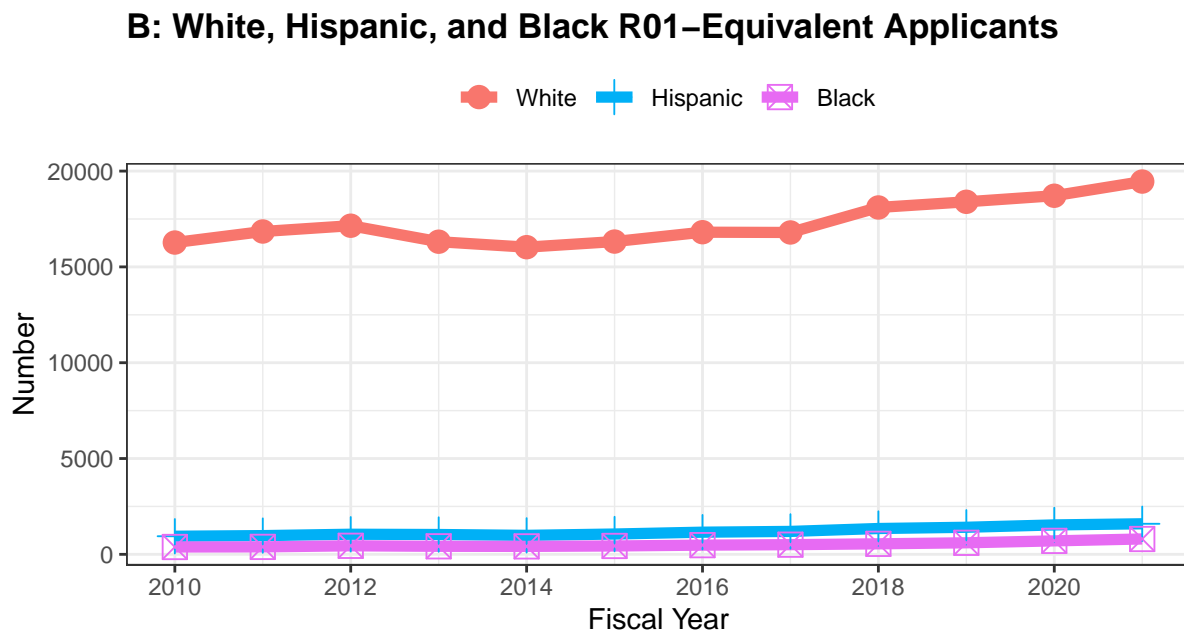
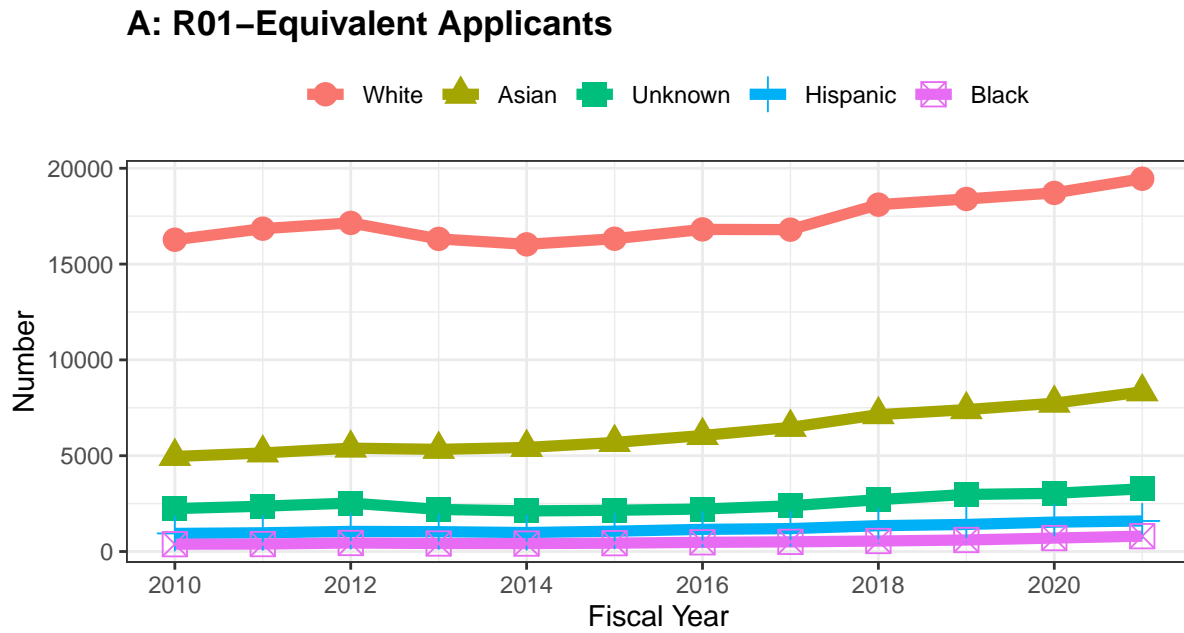
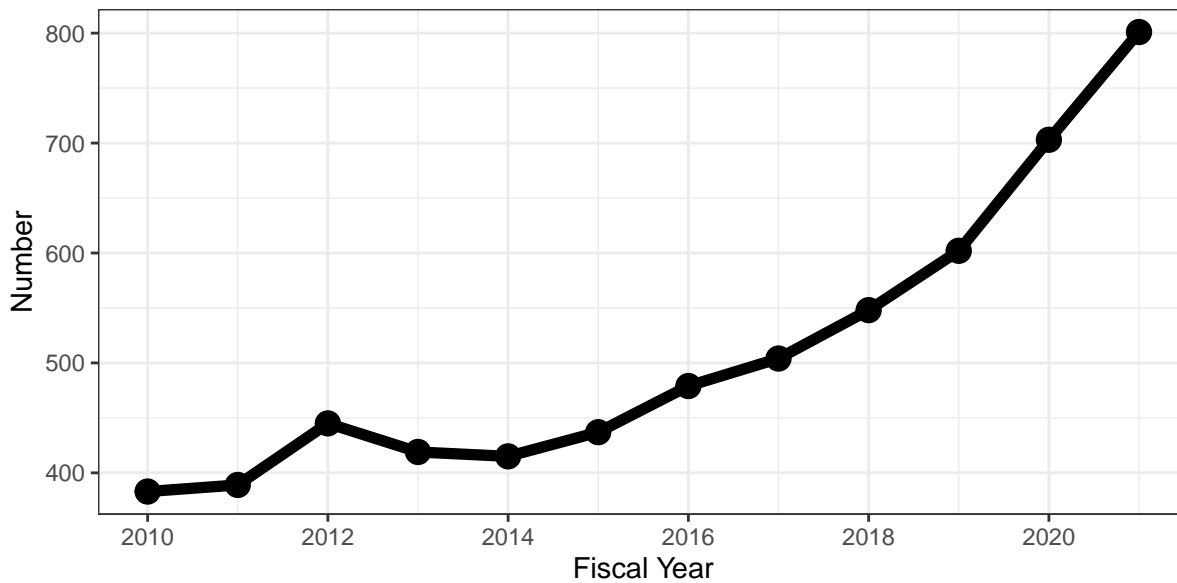


Figure 7: Number of R01-equivalent applicants according to race-ethnicity by fiscal year. Panel A shows data for all groups, while Panel B shows the same data but for White, Hispanic, and Black applicants only.

**A: Number of Unique R01–Equivalent Black Applicants**



**B: Number of Unique R01–Equivalent Black Awardees**

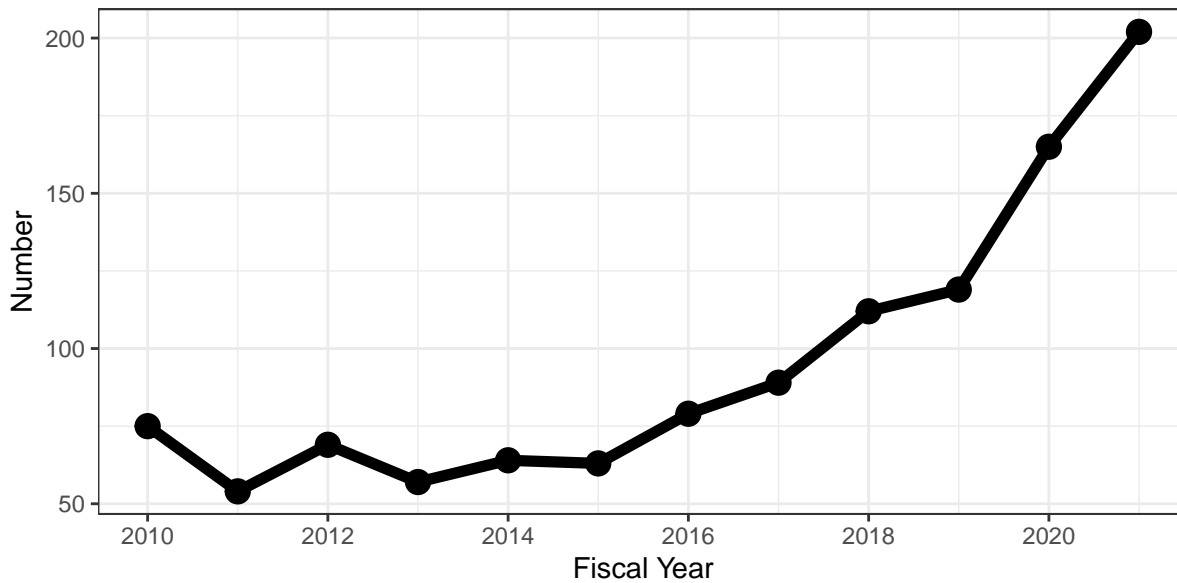


Figure 8: Number of unique RPG Black applicants (Panel A) and awardees (Panel B) by fiscal year

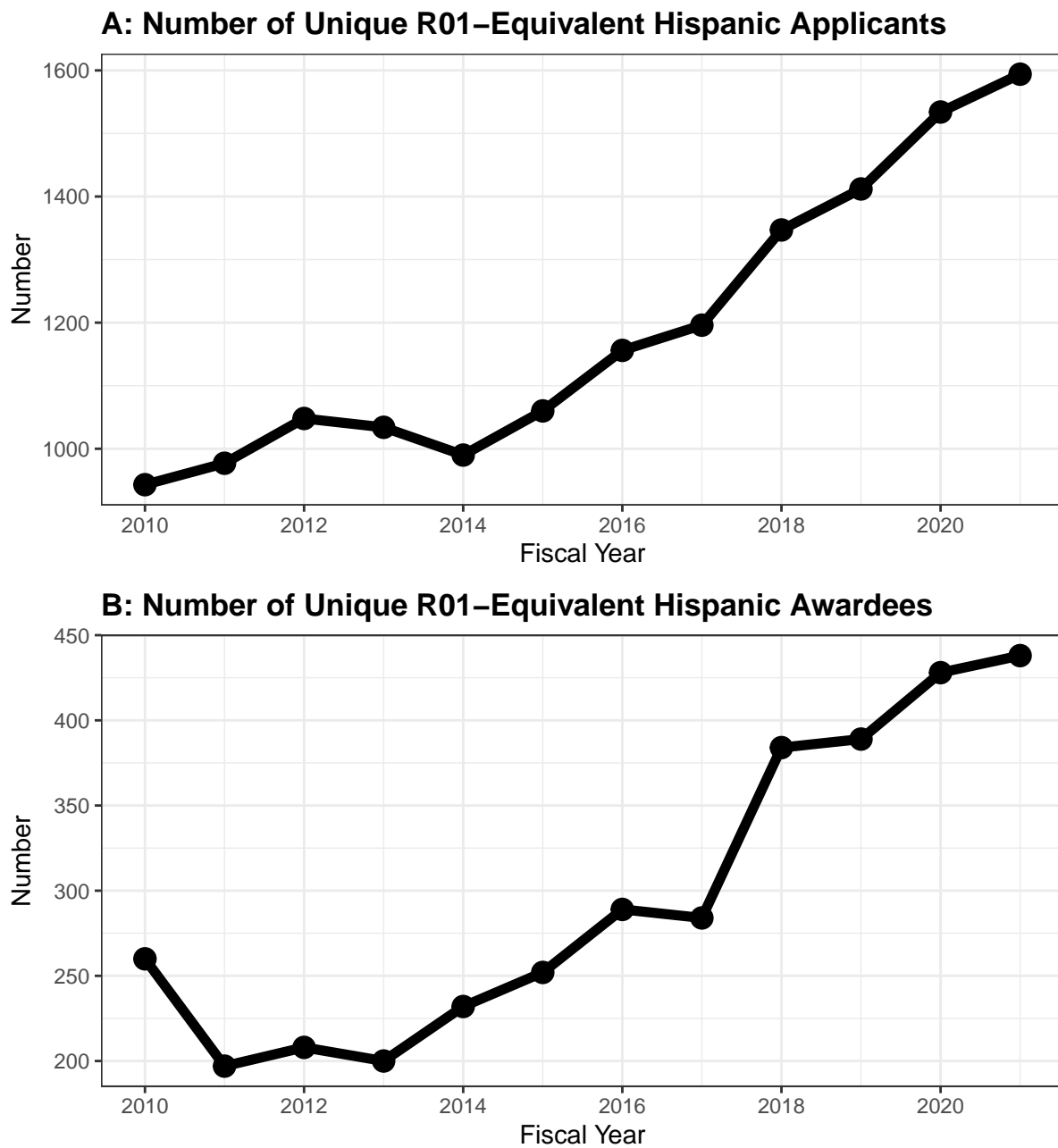
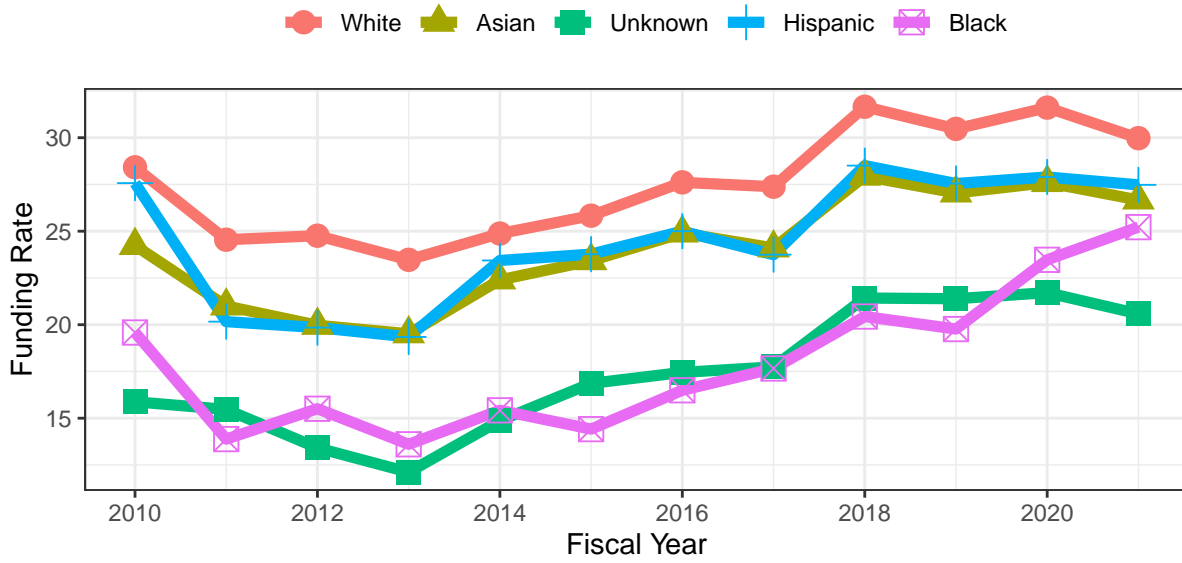


Figure 9: Number of unique RPG Hispanic applicants (Panel A) and awardees (Panel B) by fiscal year

### A: R01-Equivalent Applicants



### B: White, Hispanic, and Black R01-Equivalent Applicants

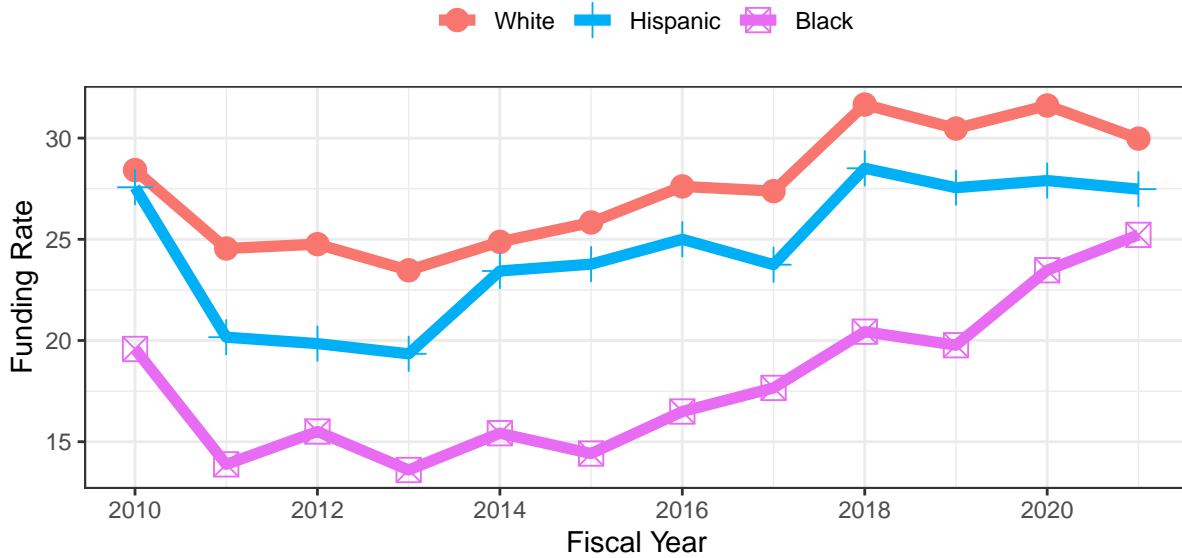
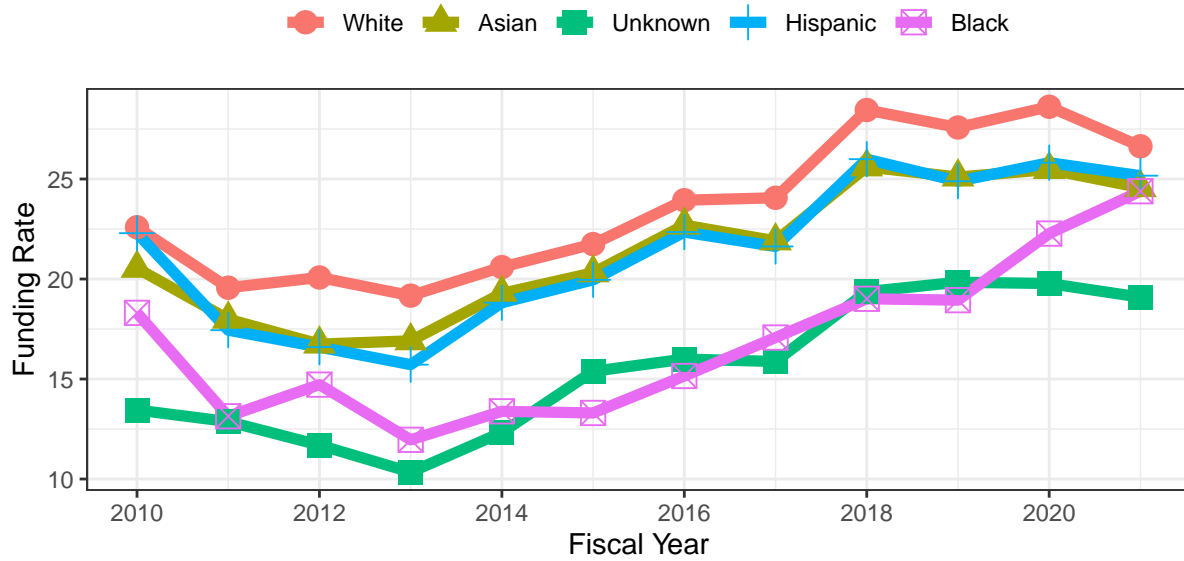


Figure 10: Funding rates for R01-Equivalent applicants according to race-ethnicity by fiscal year. Panel A shows data for all groups, while Panel B shows the same data but for White, Hispanic, and Black applicants only.

### A: Type 1 R01-Equivalent Applicants



### B: Type 1 White, Hispanic, and Black R01-Equivalent Applicants

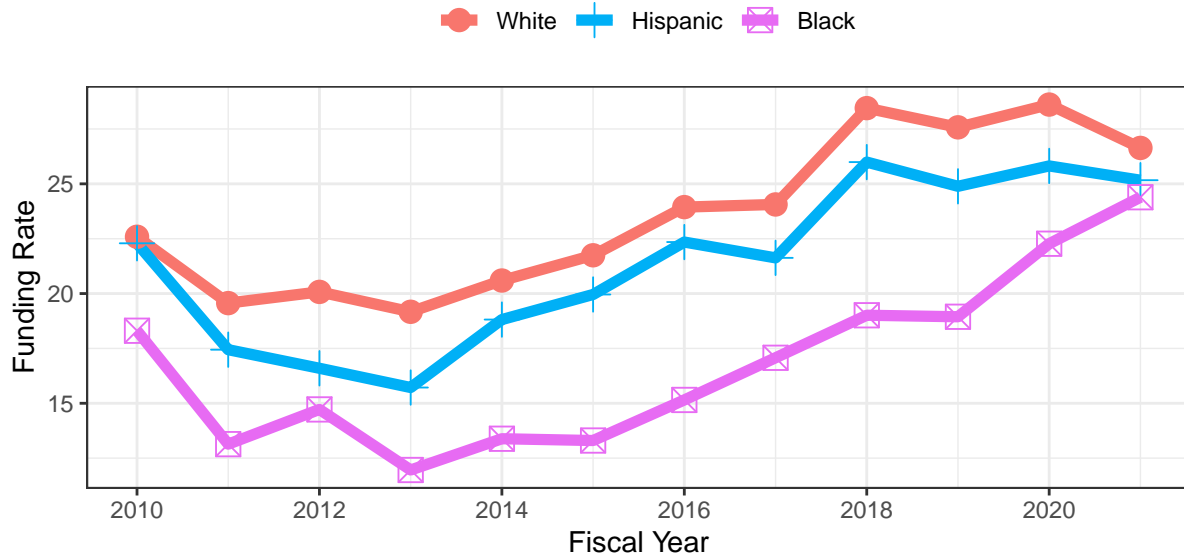


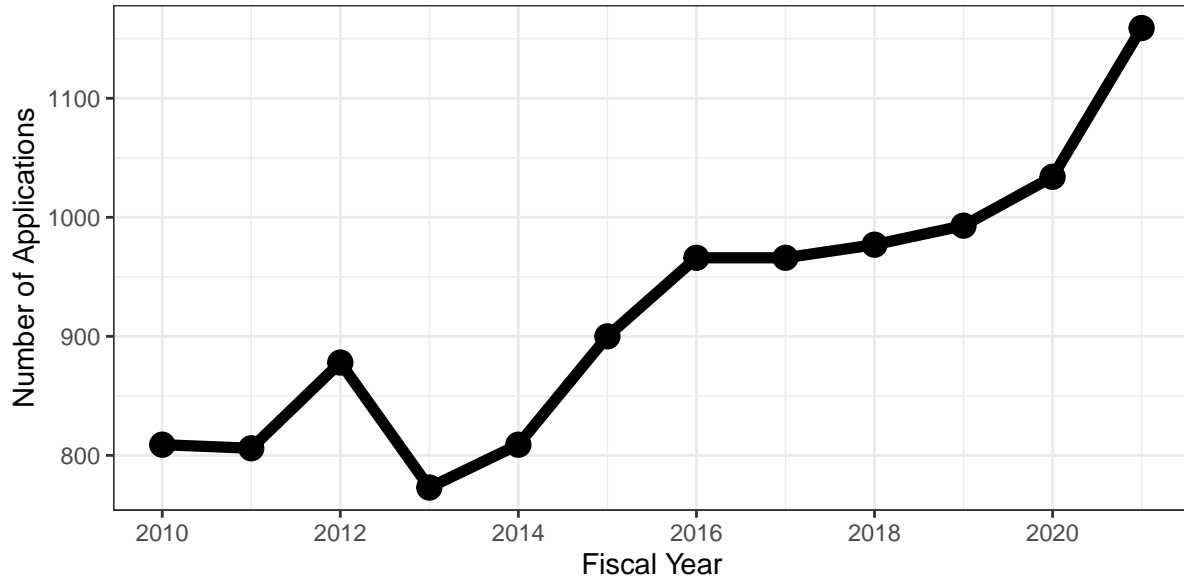
Figure 11: Funding rates for Type 1 R01-Equivalent applicants according to race-ethnicity by fiscal year. Panel A shows data for all groups, while Panel B shows the same data but for White, Hispanic, and Black applicants only.

Table 3: Characteristics and outcomes of FY2010-FY2021 RPG applications according to race-ethnicity. Note that these are application-based analyses based on frozen success rate tables.

Characteristic or Outcome		White Only	Asian Only	Mixed Race	Unknown/Withheld Race Only	Hispanic or Latino Only	Black or African American Only
Total N (%)		342586 (54.3)	141874 (22.5)	61128 (9.7)	46638 (7.4)	22460 (3.6)	11070 (1.8)
Application Type	1	304730 (88.9)	132403 (93.3)	58543 (95.8)	44575 (95.6)	20692 (92.1)	10714 (96.8)
	2	35596 (10.4)	8982 (6.3)	2390 (3.9)	1947 (4.2)	1651 (7.4)	337 (3.0)
	3	1120 (0.3)	251 (0.2)	144 (0.2)	61 (0.1)	59 (0.3)	12 (0.1)
	4	587 (0.2)	59 (0.0)	4 (0.0)	27 (0.1)	30 (0.1)	1 (0.0)
	9	553 (0.2)	179 (0.1)	47 (0.1)	28 (0.1)	28 (0.1)	6 (0.1)
Submitted FY2016 or Later		170050 (49.6)	78374 (55.2)	39306 (64.3)	22932 (49.2)	11978 (53.3)	6095 (55.1)
R01 Equivalent		212615 (62.1)	85390 (60.2)	38839 (63.5)	21614 (46.3)	12721 (56.6)	5373 (48.5)
R21 or R03		97886 (28.6)	46627 (32.9)	15768 (25.8)	19608 (42.0)	7741 (34.5)	4504 (40.7)
Cooperative Agreement		11173 (3.3)	2835 (2.0)	5531 (9.0)	1382 (3.0)	498 (2.2)	349 (3.2)
P01		2812 (0.8)	379 (0.3)	284 (0.5)	149 (0.3)	113 (0.5)	25 (0.2)
Multiple-PI		55114 (16.1)	9295 (6.6)	61121 (100.0)	1952 (4.2)	634 (2.8)	388 (3.5)
Animal Research		161007 (47.0)	85604 (60.3)	27262 (44.6)	19612 (42.1)	11112 (49.5)	3879 (35.0)
Human Research		144172 (42.1)	41191 (29.0)	31478 (51.5)	18780 (40.3)	9038 (40.2)	6295 (56.9)
Early Stage Investigator Application		31570 (9.2)	15827 (11.2)	816 (1.3)	4249 (9.1)	2901 (12.9)	1519 (13.7)
Gender	Female Only	105392 (30.8)	35580 (25.1)	4938 (8.1)	9216 (19.8)	8128 (36.2)	4812 (43.5)
	Male Only	211720 (61.8)	101820 (71.8)	23598 (38.6)	23174 (49.7)	13885 (61.8)	6051 (54.7)
	Mixed Gender	24046 (7.0)	3635 (2.6)	32496 (53.2)	963 (2.1)	295 (1.3)	145 (1.3)
	Unknown/Withheld Gender Only	1428 (0.4)	839 (0.6)	96 (0.2)	13285 (28.5)	152 (0.7)	62 (0.6)
	Discussed at Peer Review	195916 (57.2)	70471 (49.7)	32318 (52.9)	19445 (41.7)	11508 (51.2)	4650 (42.0)
Priority Score	Median (IQR)	36.0 (26.0 to 45.0)	38.0 (28.0 to 47.0)	38.0 (28.0 to 46.0)	40.0 (29.0 to 49.0)	37.0 (27.0 to 47.0)	40.0 (30.0 to 49.0)
Percentile Ranking	Median (IQR)	25.0 (11.0 to 39.0)	27.0 (13.0 to 42.0)	26.0 (13.0 to 40.0)	31.0 (15.0 to 44.0)	26.0 (13.0 to 41.0)	32.0 (16.0 to 44.0)
IC Success Rate	Median (IQR)	19.5 (14.6 to 22.7)	18.8 (13.8 to 22.6)	18.4 (13.7 to 22.2)	18.4 (13.7 to 22.2)	19.5 (14.4 to 22.6)	18.0 (13.0 to 21.9)
Funding Success		73961 (21.6)	23143 (16.3)	10295 (16.8)	5472 (11.7)	4151 (18.5)	1416 (12.8)



### A: Black-only RPG Applications



### B: Black-only RPG Awards

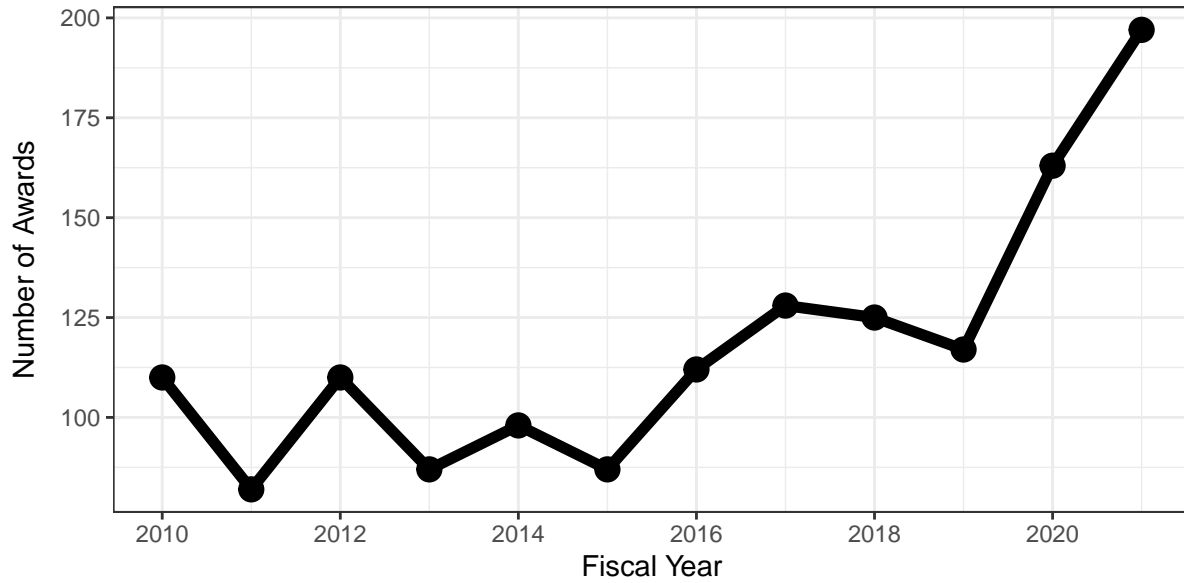
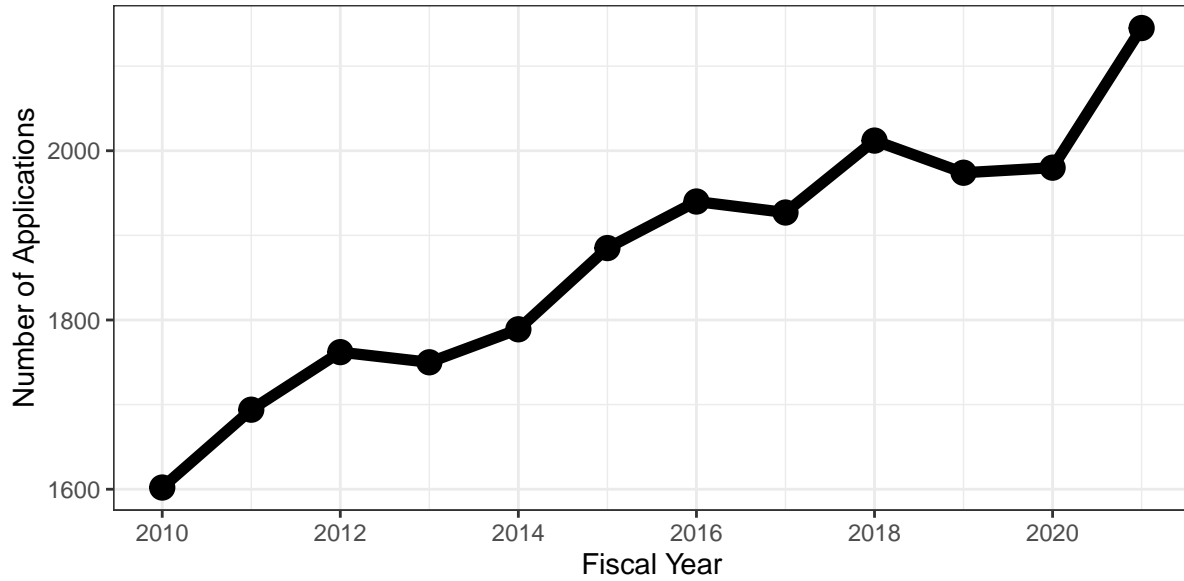


Figure 12: Number of Black-only RPG applications (panel A) and RPG awards (panel B) by fiscal year.

**A: Hispanic-only RPG Applications**



**B: Hispanic-only RPG Awards**

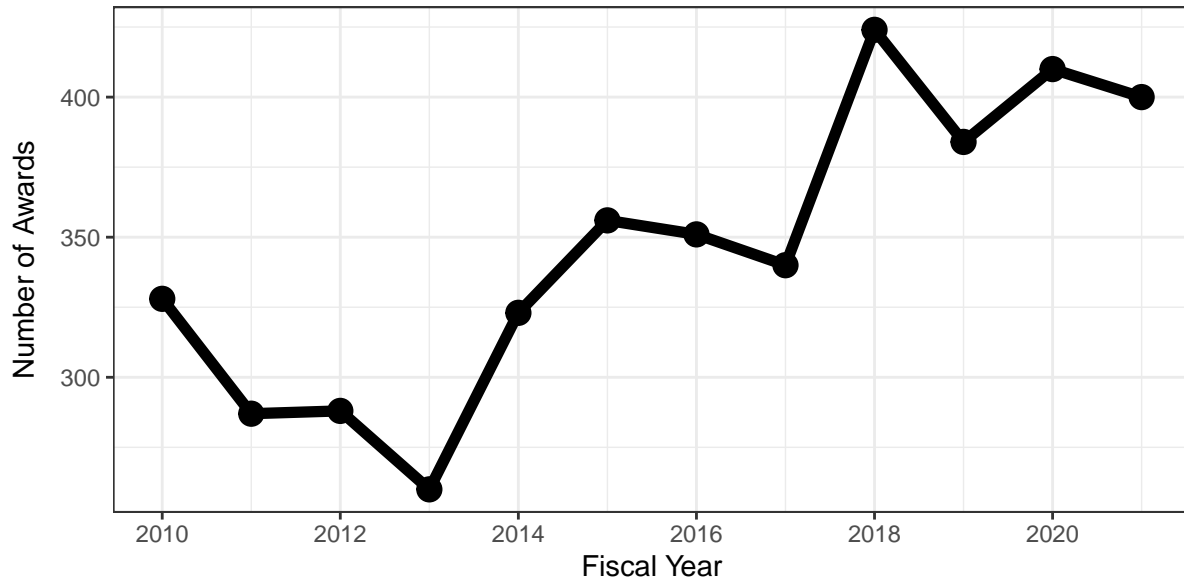
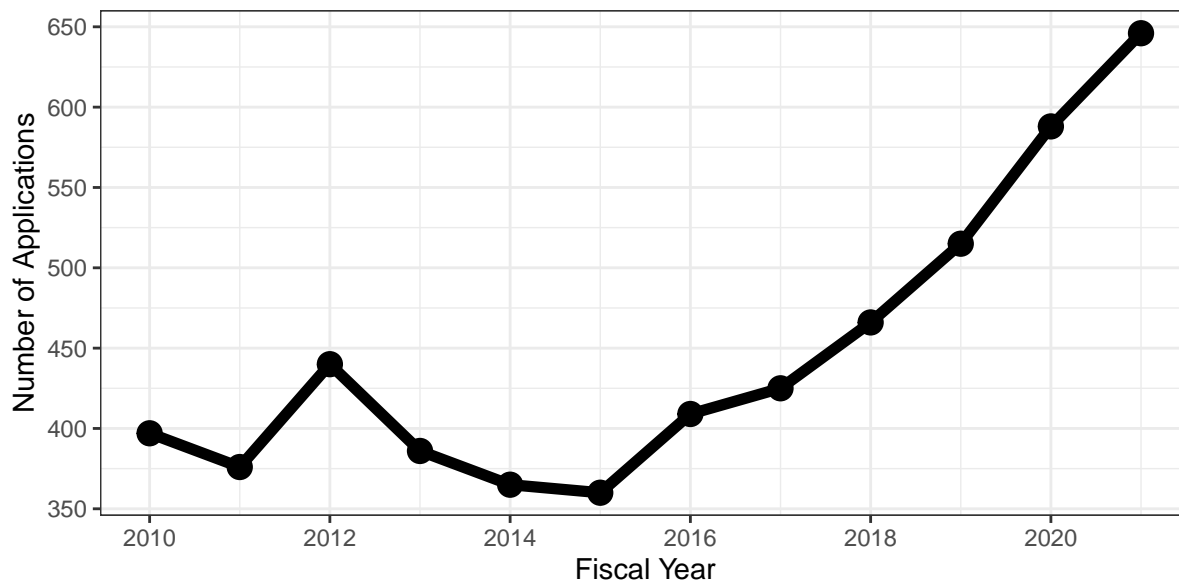


Figure 13: Number of Hispanic-only RPG applications (panel A) and RPG awards (panel B) by fiscal year.

**A: Black-only R01 Equivalent Applications**



**B: Black-only R01 Equivalent Awards**

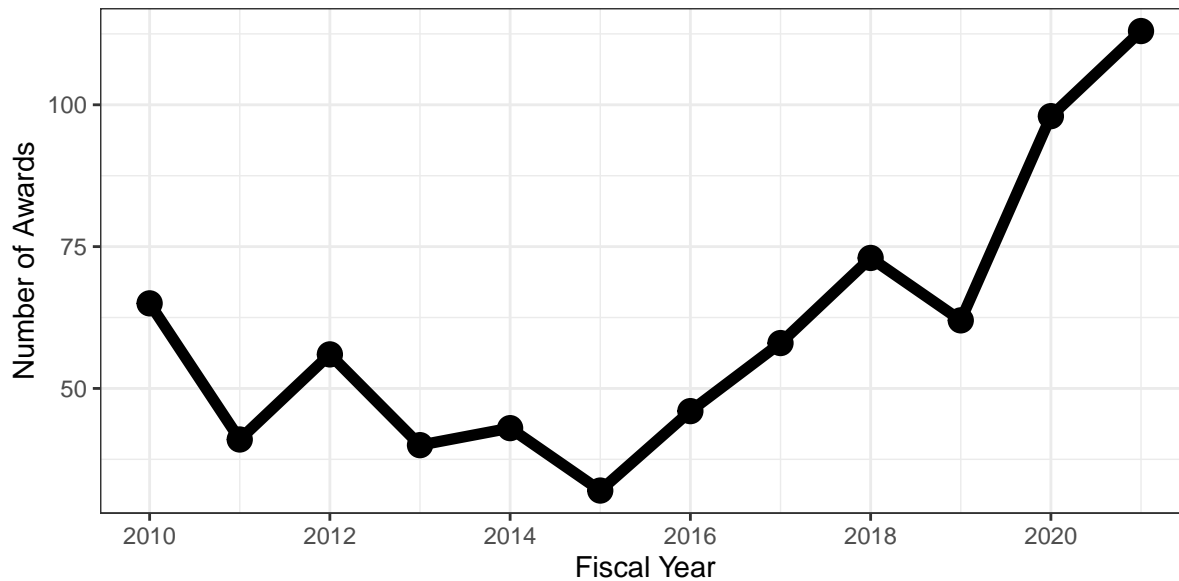


Figure 14: Number of Black-only R01 Equivalent applications (panel A) and R01 Equivalent awards (panel B) by fiscal year.

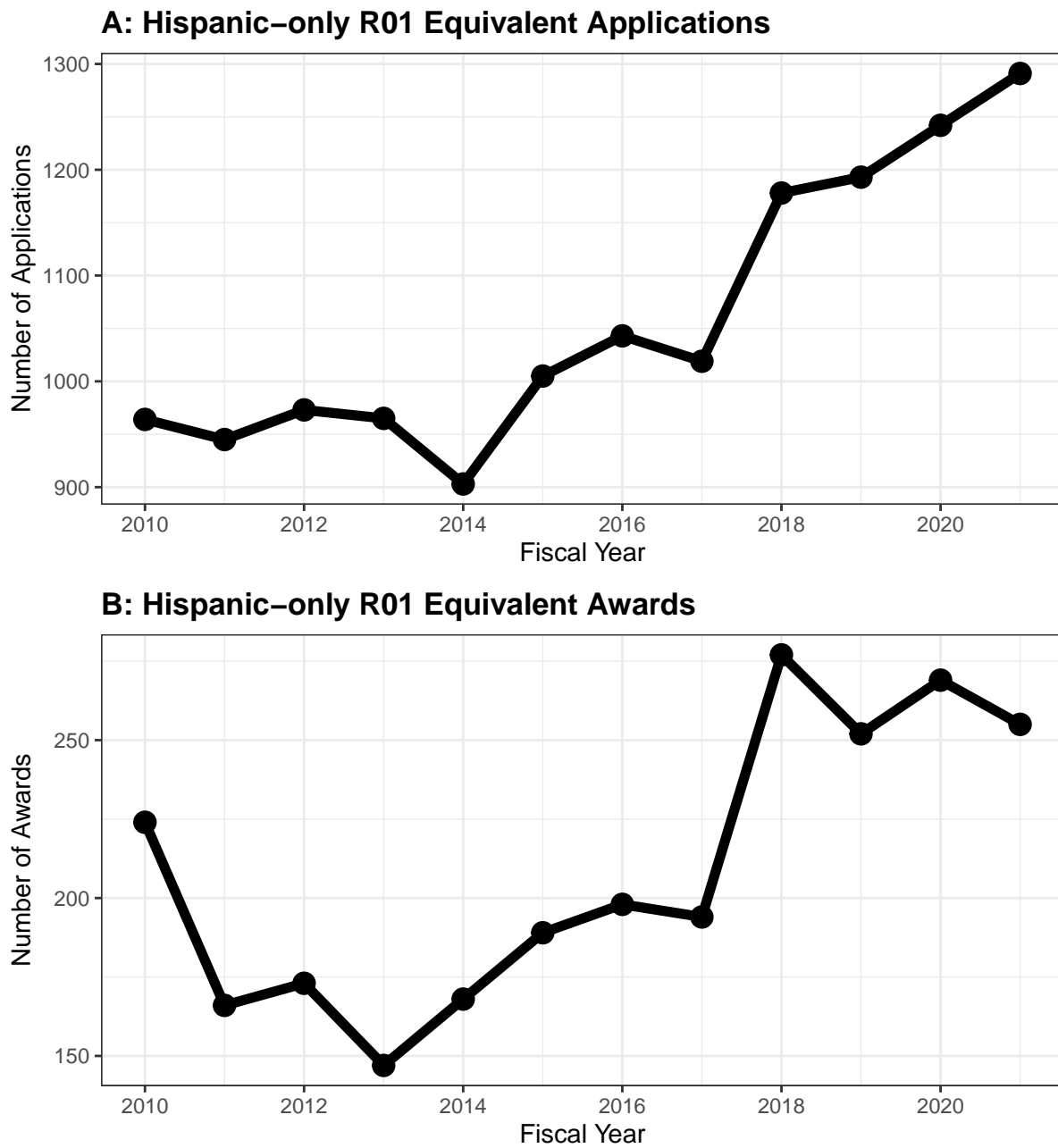
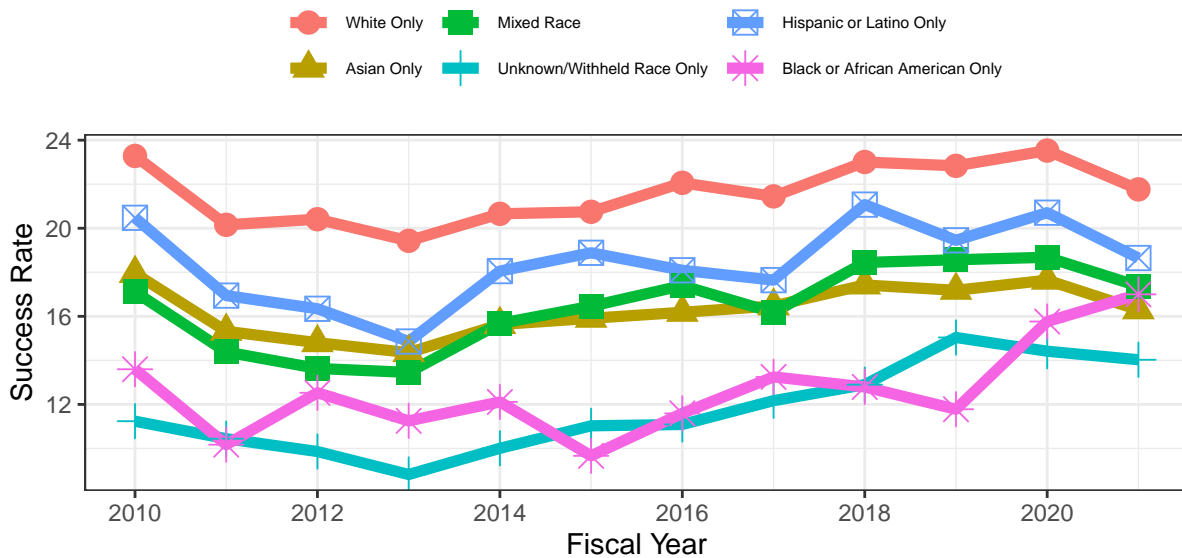


Figure 15: Number of Hispanic-only R01 Equivalent applications (panel A) and R01 Equivalent awards (panel B) by fiscal year.

### A: RPG Success Rates



### B: R01 Equivalent Success Rates

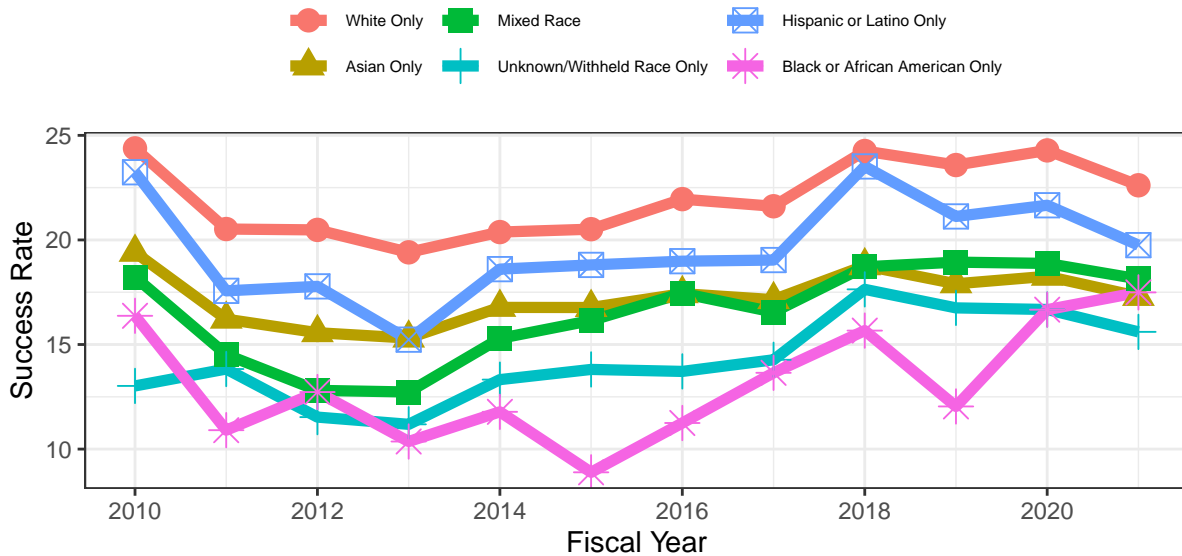


Figure 16: Success rates according to race-ethnicity for RPG (Panel A) and R01 Equivalent (Panel B) applications by fiscal year.

### A: Type 1 RPG Success Rates



### B: Type 1 R01 Equivalent Success Rates

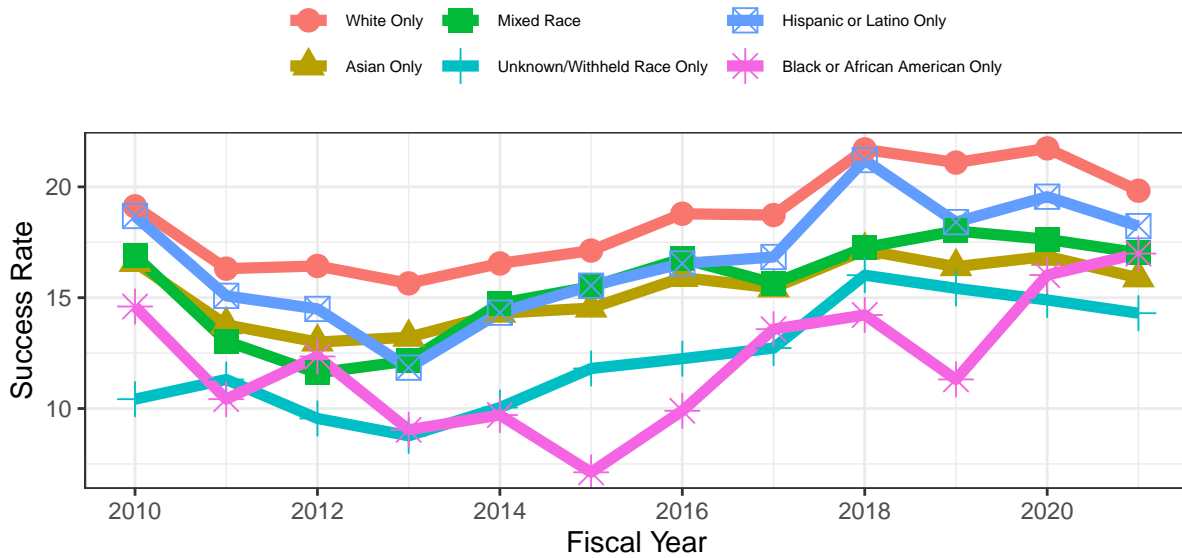
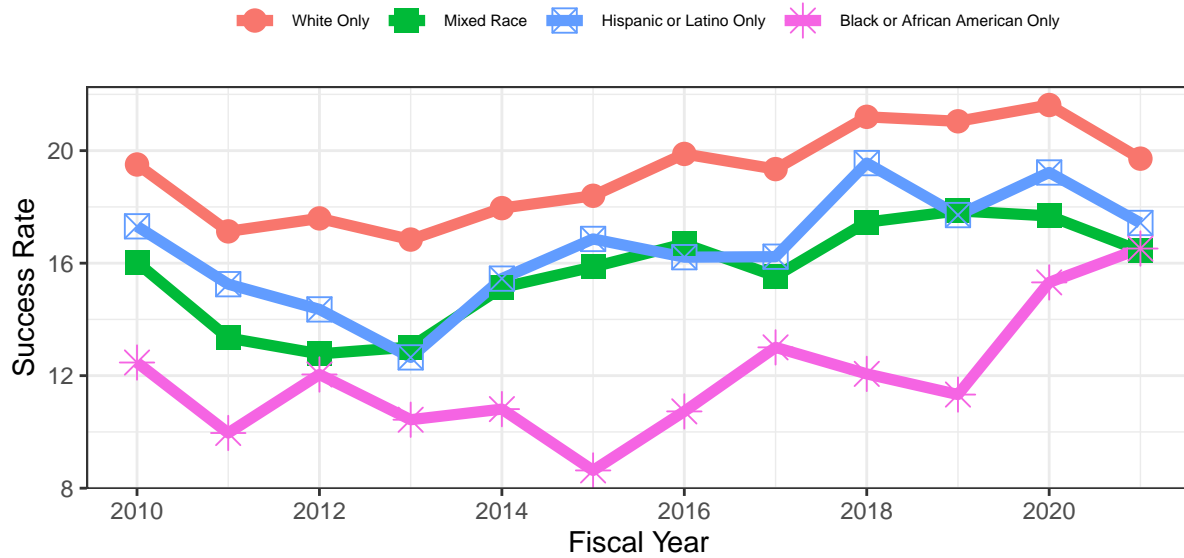


Figure 17: Success rates according to race-ethnicity for Type 1 RPG (Panel A) and Type 1 R01 Equivalent (Panel B) applications by fiscal year.

### A: Type 1 RPG Success Rates



### B: Type 1 R01 Equivalent Success Rates

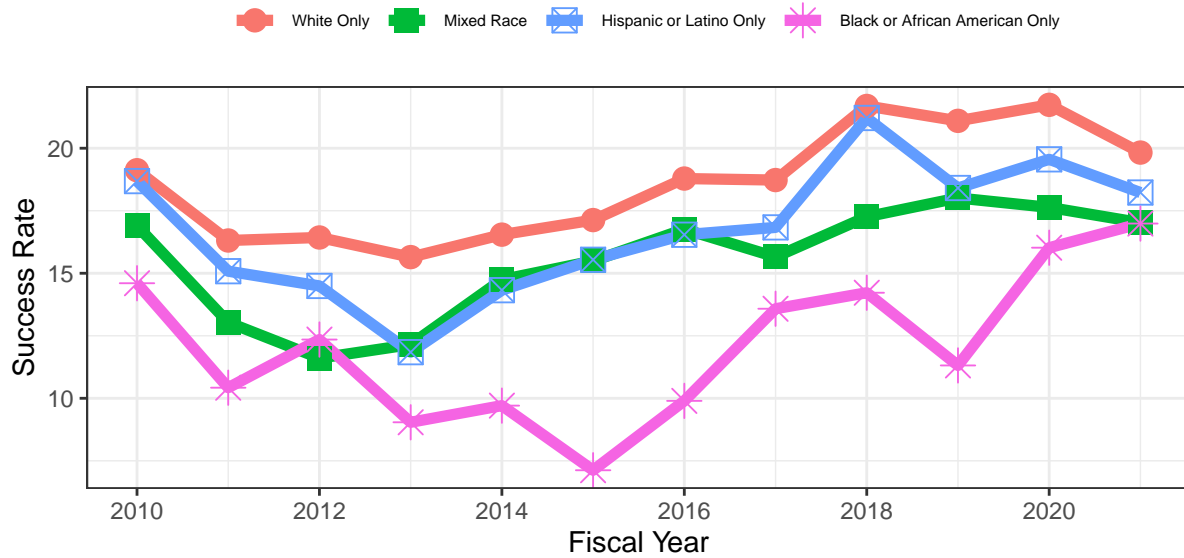
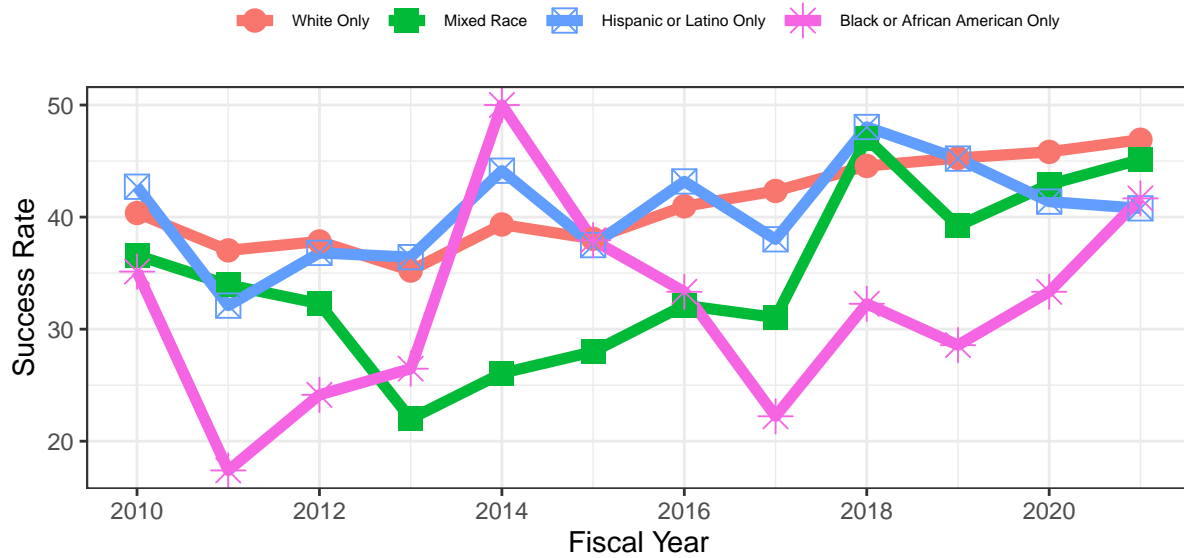


Figure 18: Success rates according to specific race-ethnicity groups for Type 1 RPG (Panel A) and Type 1 R01 Equivalent (Panel B) applications by fiscal year.

### A: Type 2 RPG Success Rates



### B: Type 2 R01 Equivalent Success Rates

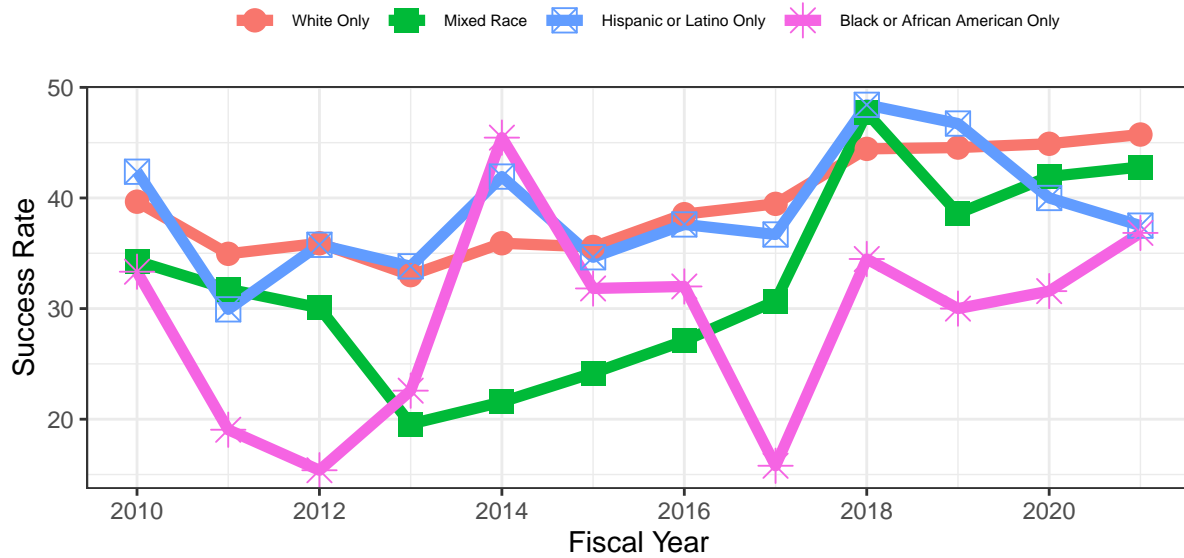


Figure 19: Success rates according to specific race-ethnicity groups for Type 2 RPG (Panel A) and Type 2 R01 Equivalent (Panel B) applications by fiscal year.