

SUPPLEMENTAL MATERIAL

Who Resembles a Scientific Leader – Jack or Jill? How Implicit Bias Could Influence Research Grant Funding

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Table 1. Studies or Data Examining Gender Differences in Review and Outcomes of NIH Grants that Included R01 Awards

Study or Dataset	Significant Findings	Comment	Reference
Gender differences in research awards for 4 federal agencies including NIH (2001-2003)	For NIH (after controlling for age, degree, type of institution, and removing top 1% of awards), women vs. men: <ul style="list-style-type: none"> Less likely to receive award Lower award size 	<ul style="list-style-type: none"> Did not separate out new (Type 1) and renewal (Type 2) R01s Women were less likely to submit another proposal within 2 years than men 	Hosek SD, et al. RAND Corporation. 2005. http://www.rand.org/pubs/technical_reports/2005/RAND_TR307.pdf
Award rates for male and female investigators for 6 NIH award categories (2003-2007)	Lower success rates for women vs. men: <ul style="list-style-type: none"> R01 for first time MD applicants K01s for MD/PhDs R01s to experienced investigators 	<ul style="list-style-type: none"> Significantly fewer women than men applying Women physician's lower R01 success rates for experienced investigators will include Type 2s and can prevent academic career advancement 	Ley T, Hamilton BH. <i>Science</i> . 2008; 322(5907):1472-1474.
National cohort of K08 and K23 career development awardees examined for subsequent R01 funding (1997-2003)	Women were less likely than men to hold an R01 at 5 and 10 years after their K-award	<ul style="list-style-type: none"> Whether women's lower rate of R01 award achievement is due to lower rates of application or lower rates of success in application could not be determined 	Jagsi, et al. <i>Ann Intern Med</i> . 2009; 151(11):804-811.
Award rates for male and female investigators in 17 NIH award categories (2008)	Generally women preformed as well as men and direct costs were comparable However, lower success rates: <ul style="list-style-type: none"> For men applying for F31 (pre-doctoral fellowships) For women renewing R01s (Type 2) 	<ul style="list-style-type: none"> Women's greater success rates than men at early career stages argues against differential talent or research interest Lower success rate for Type 2 R01 renewals affects women on the threshold of eligibility for advancing to top leadership in academic medicine 	Pohlhaus, et al. <i>Acad Med</i> . 2011; 86(6):759-767.
Examined NIH grant funding to faculty in otolaryngology departments (2011, 2012)	<ul style="list-style-type: none"> Women significantly less likely to have R01s than men Individual NIH awards to men were higher than those to women 	<ul style="list-style-type: none"> Did not separate new Type 1 and Type 2 renewal R01s 	Eloy JA, et al. <i>Otolaryngol Head Neck Surg</i> . 2013; 149(1):77-83
Examined success of K-awardees in obtaining any R-level at Johns Hopkins (1999-2012)	No gender difference found		Kalyani RR, et al. <i>J Women's Health</i> . 2015; 24(11):933-939
Text analysis of 454 critiques from R01s originally unfunded and subsequently funded in 2008 from 67 investigators at the University of Wisconsin	<ul style="list-style-type: none"> For the same scores and funding outcomes - women's R01s had more words of praise and those from men's R01s which had more negative evaluation words Critiques with greatest differences were for Type 2 	<ul style="list-style-type: none"> Critique format in 2008 had more free text than the post 2009 format Findings suggest that gender stereotypes might operate in R01 peer review 	Kaatz A, et al. <i>Acad Med</i> . 2015; 90(1):69-75.
Test analysis of 739 critiques of R01s funded 2010-2014 with critiques of previously unfunded applications for those not funded the first time from 125 applicants from the University of Wisconsin	For R01 renewals, reviewers assigned worse priority, approach, and significance scores to applications from women than men despite using standout adjectives (e.g., "outstanding," "excellent") and making	<ul style="list-style-type: none"> Findings suggest that gender stereotypes may continue to create implicitly different referent standards for subjective interpretation of the research proposed by men and women 	Kaatz, A, et al. <i>Acad Med</i> . 2016; 91(8):1080-8.

	references to ability in more critiques of women's applications	<ul style="list-style-type: none"> The R01s represented 103 study sections and funding from 21 NIH Institutes or Centers 	
National sample of R01s submitted 2010-2013 analyzed for predictors of funding success	R01s submitted by female investigators were significantly less likely to be funded than those submitted by male investigators	<ul style="list-style-type: none"> The study did not examine gender differences for R01 Type 2 renewals separately 	Eblen et al., PLoS ONE. 2016; 11(6): e0155060
National data of R01 Type 1 awards (2000-2006) modeled for gender and race/ethnicity-specific a gender differences	<p>R01 award rates in adjusted models were:</p> <ul style="list-style-type: none"> Not lower for women than men new or experienced investigators Lower for Black than White women MDs and PhDs Lower for Asian than White PhDs 	<ul style="list-style-type: none"> Women submitted fewer applications Black investigators were most disadvantaged for men and women Study did not examine R01 Type 2 renewals where the persistent gender gap is observed 	Ginther et al. Acad Med. 2016; 91(8):1098-1107
Combined qualitative and algorithmic text mining analysis of 241 critiques from 79 Summary Statements for 51 R01 renewals awarded to 45 investigators at the University of Wisconsin (some were the same critiques previously analyzed)	<ul style="list-style-type: none"> Male investigators were "leaders" and "pioneers" in their "fields," with "highly innovative" and "highly significant research;" female investigators had "expertise" and worked in "excellent" environments Applications from men received better priority, approach, and significance scores, which could not be accounted for by differences in productivity 	<ul style="list-style-type: none"> Subtle differences in words and descriptors in critiques of R01s from male and female applicants aligns with expected impact of gender stereotypes on judgment 	Magua, W, et al. J Women's Health. 2017; 26(5):560-570
Success rates of junior faculty receiving a new R01 at Harvard Medical School, 2008 and 2015	No gender difference	<ul style="list-style-type: none"> Did not examine R01 Type 2 renewals 	Warner et al., J Women's Health. 2017; ePub Volume 00, Number 00, 2017
NIH data on grant success rates from its public data RePORTER	New Type 1 R01s have equivalent success rates for men and women, but women's success rates for Type 2 R01 renewals are consistently lower than men's 1998-2016	<ul style="list-style-type: none"> The reasons for this persistent gender gap is unknown, but translates into 150-200 fewer women successfully renewing an R01 each year Implicit stereotype-based bias could be contributing to this gap 	U.S, DHHS, NIH Data Book https://report.nih.gov/NIHdatabook/Charts/Default.aspx?showm=Y&chartId=178&catId=15
*R01 includes R01-equivalent funding mechanisms			