



# American Institute of Biological Sciences

*Informing Decision-making for Science and Society*

*Scientific Peer Advisory and Review Services*

[www.spars.aibs.org](http://www.spars.aibs.org)

## AIBS History & Background

- American Institute of Biological Sciences (AIBS) is a nonprofit 501(c)(3)
- Founded in 1947 as a part of the National Academy of Sciences
- Became an independent, member-governed organization in the 1950s
- Membership includes:
  - Over 130 professional societies and scientific organizations
- **Mission - to promote the use of science to inform decision-making that advances biology for the benefit of science and society.**



NATIONAL ACADEMY  
OF SCIENCES



## Key AIBS Activities

Supporting AIBS' mission of informing decision making, we:

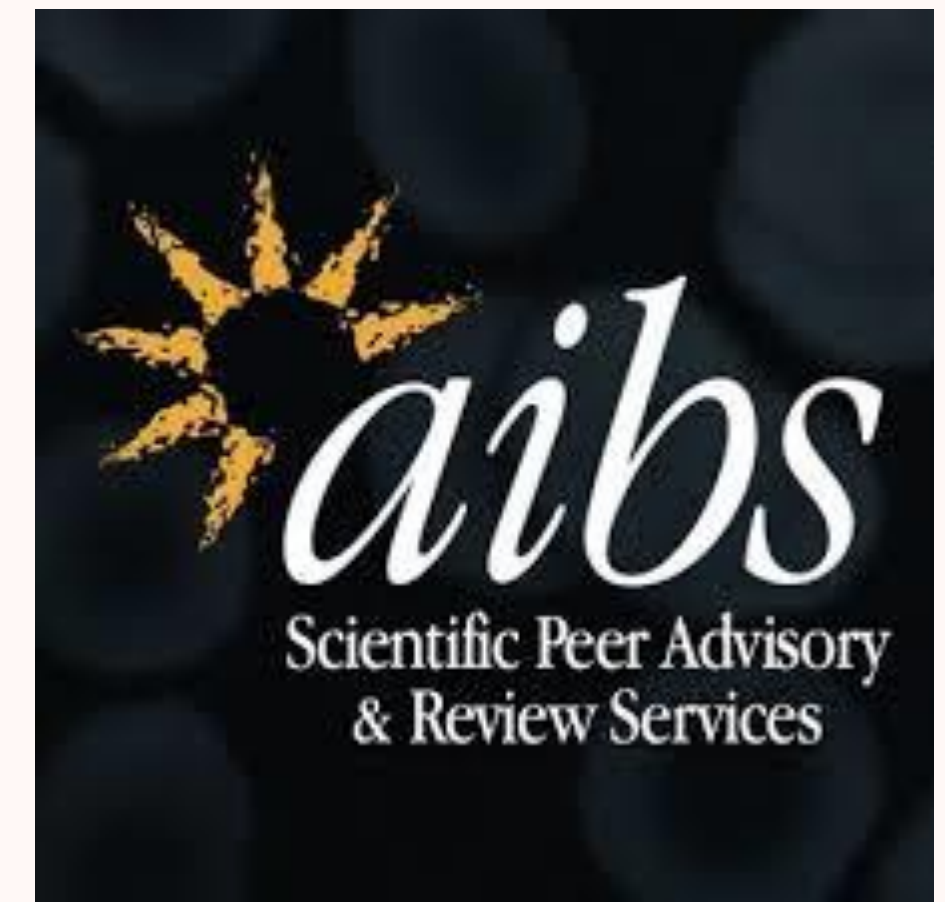
- Publish the peer-reviewed journal BioScience; produces podcasts
- Convene professional development training courses, webinars, etc.
- Promote scientific research and education through public policy
- ***Provide scientific peer review and advisory services to a wide range of government, foundation, and academic clients***



## Scientific Peer Review

- **Scientific Peer Advisory and Review Services (SPARS®)** division of AIBS was established in 1963
- Over 50 years experience providing all manner of expert review and advisory services in diverse topic areas for many different clients
- Since 2007, over 50,000 individual expert peer reviews performed

Valued partner in science®



# AIBS – Practitioner of Peer Review

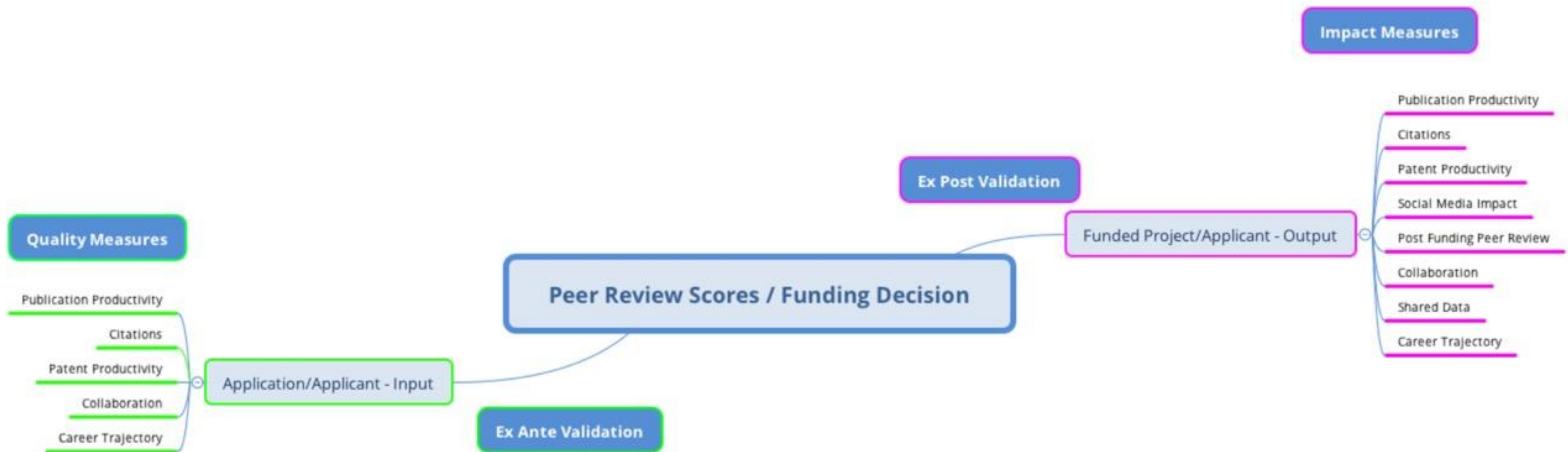


- To ensure the use of best practices, we refer to the scientific literature for validated procedures
- However, there is a limited evidence base surrounding the practice of peer review of grants
- We are committed to analyzing data from our reviews to not only improve our processes, but to contribute to the literature exploring the **science of peer review**

# Expectations of Peer Review Process for Grant Applications

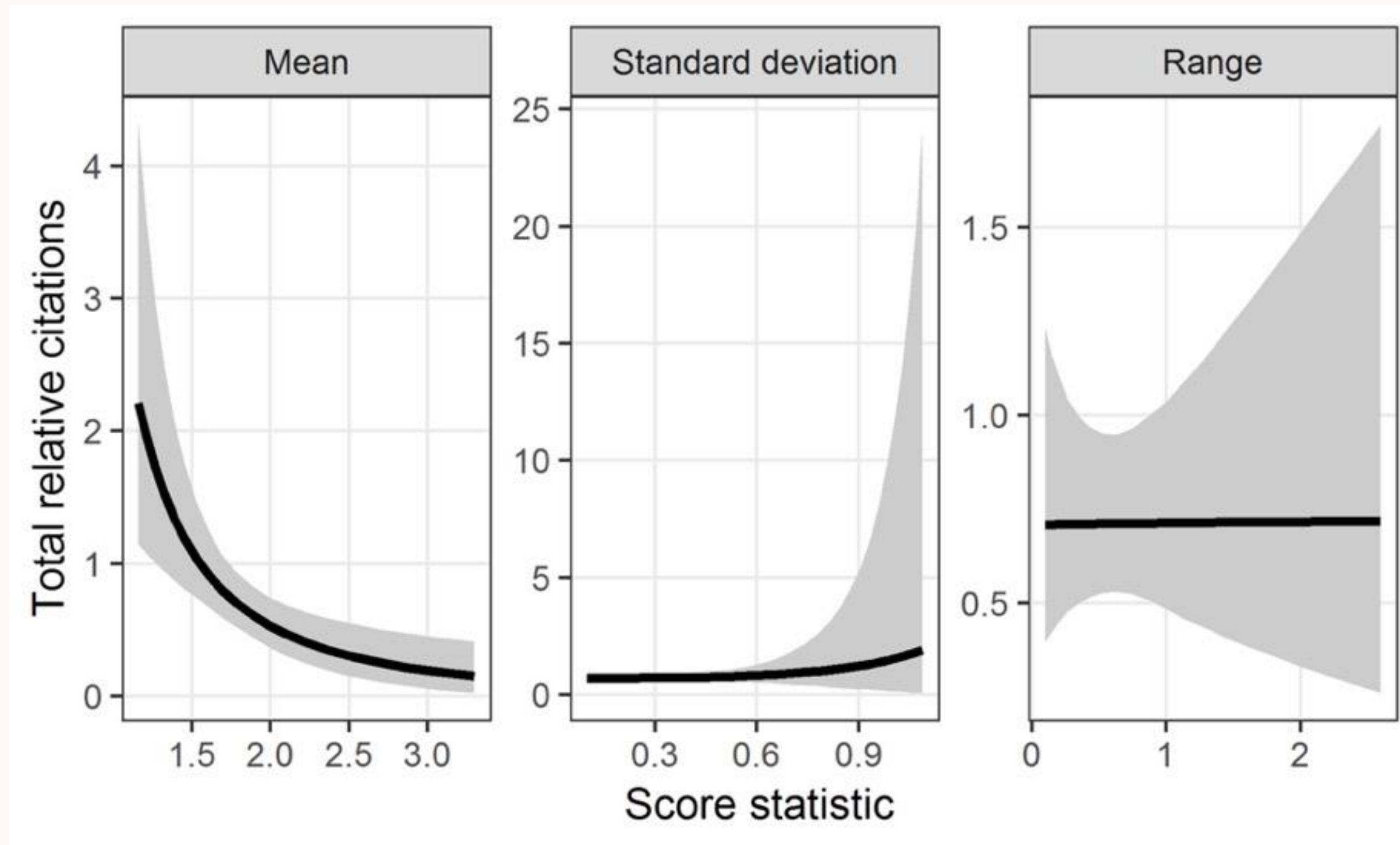


- **Effective** in identifying research which serves the best interests of science and program objectives
- **Efficient** in terms of time, money and energy of participants
- **Accountable** to all stakeholders
- **Rational** and reliable processes
- **Fair** processes with equitable treatment of all applicants
- **Valid** and reliable metrics of both outcomes and processes
- **Responsive** to funder, reviewers, applicants and other stakeholder requirements and needs





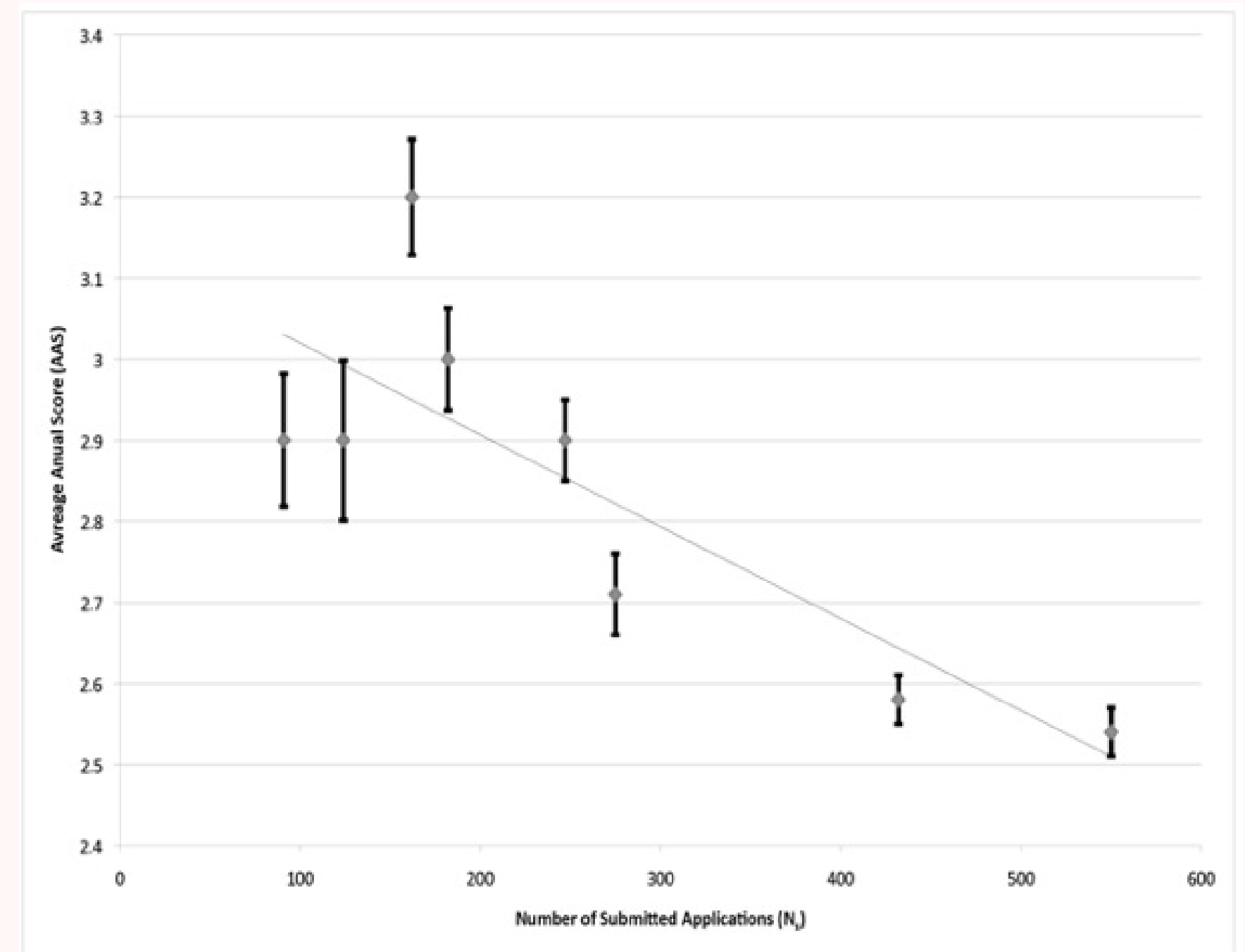
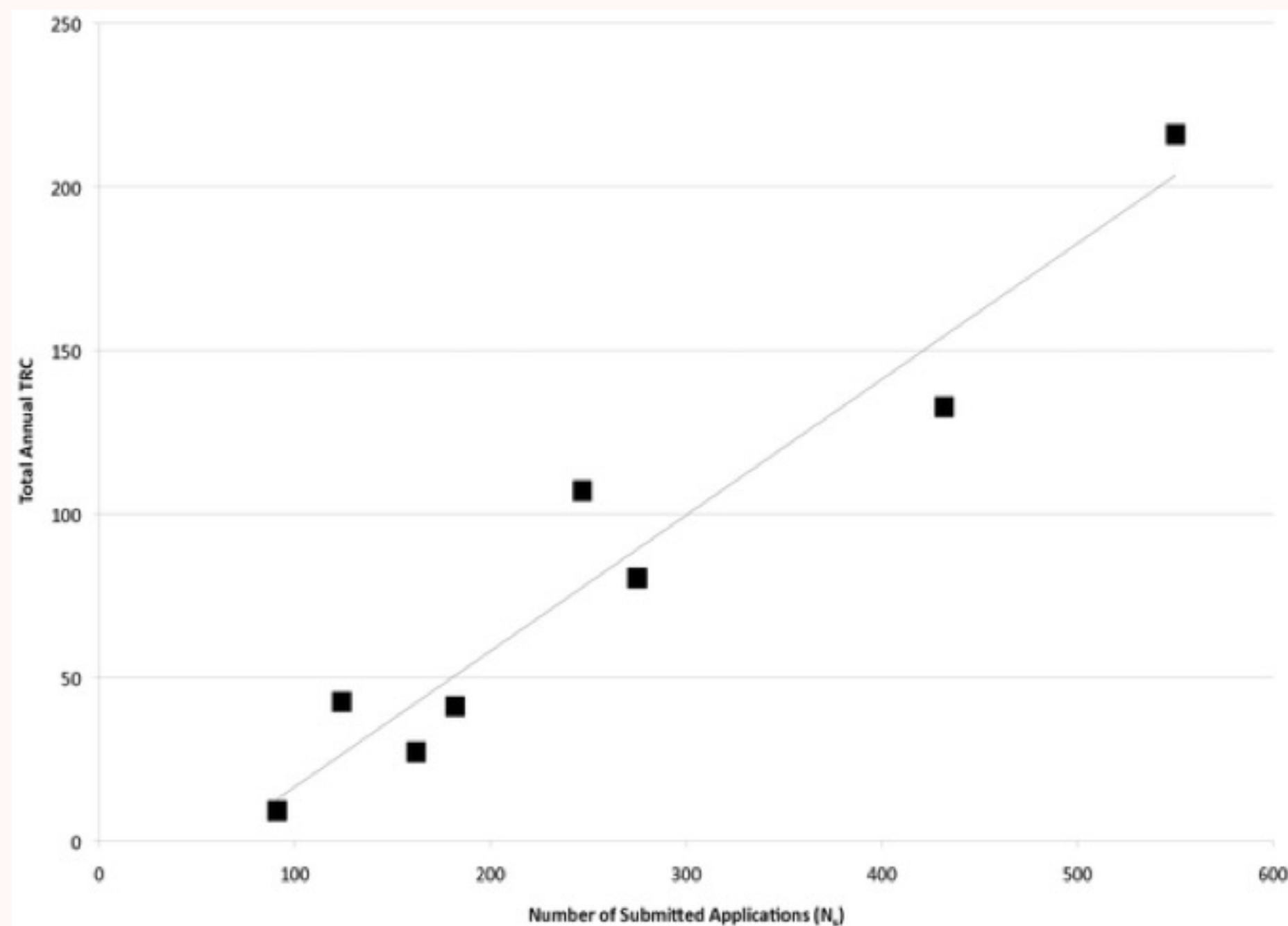
## EFFECTIVE Average Total Relative Citation Level Versus Average Application Score Using Score Grouping



Barnett et al. (2018) Do Funding Applications Where Peer Reviewers Disagree Have Higher Citations? A Cross-Sectional Study. *F1000 Research* 7



## EFFECTIVE PORTFOLIO: Total Annual Relative Citation Versus Number of Submitted Applications



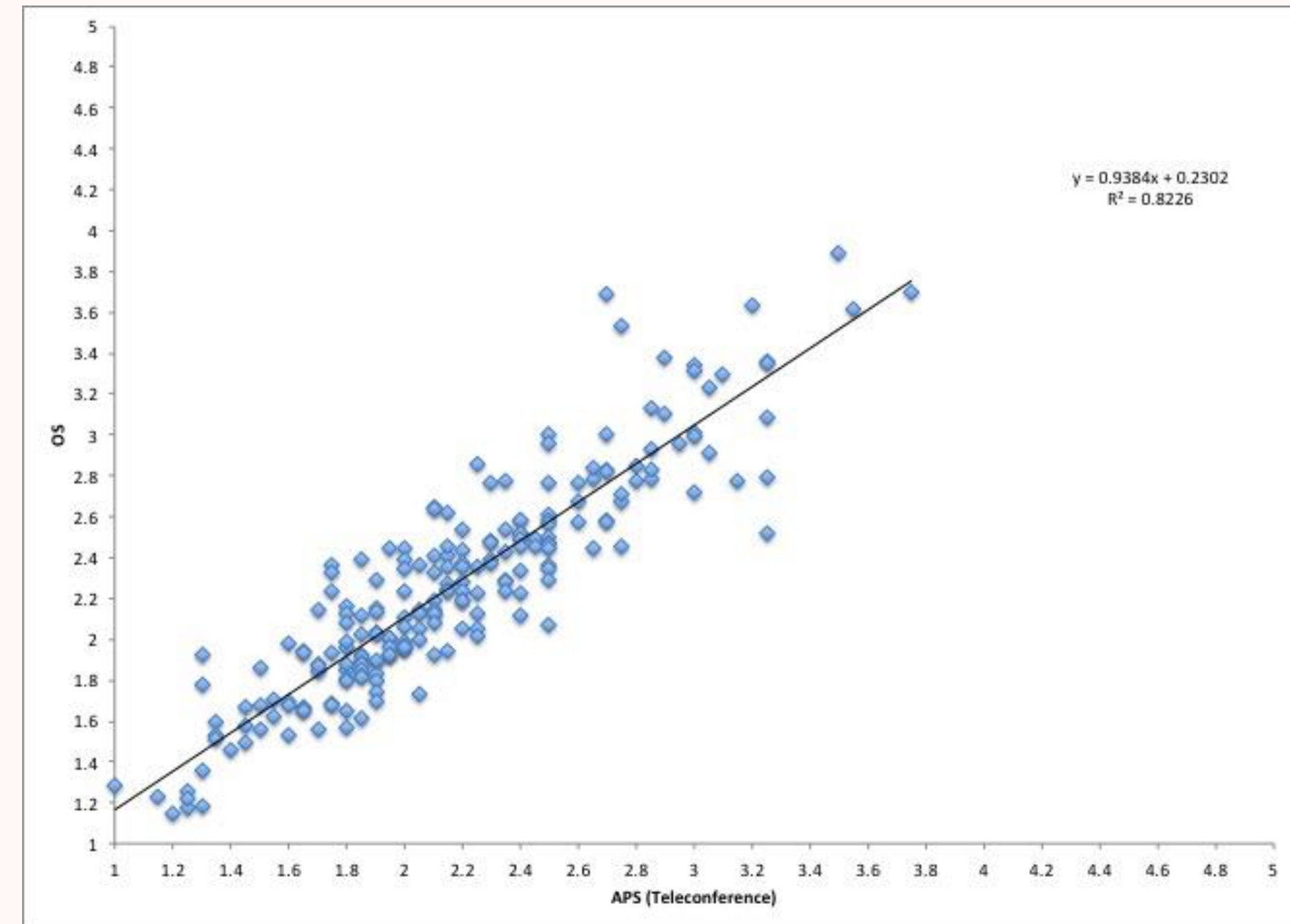
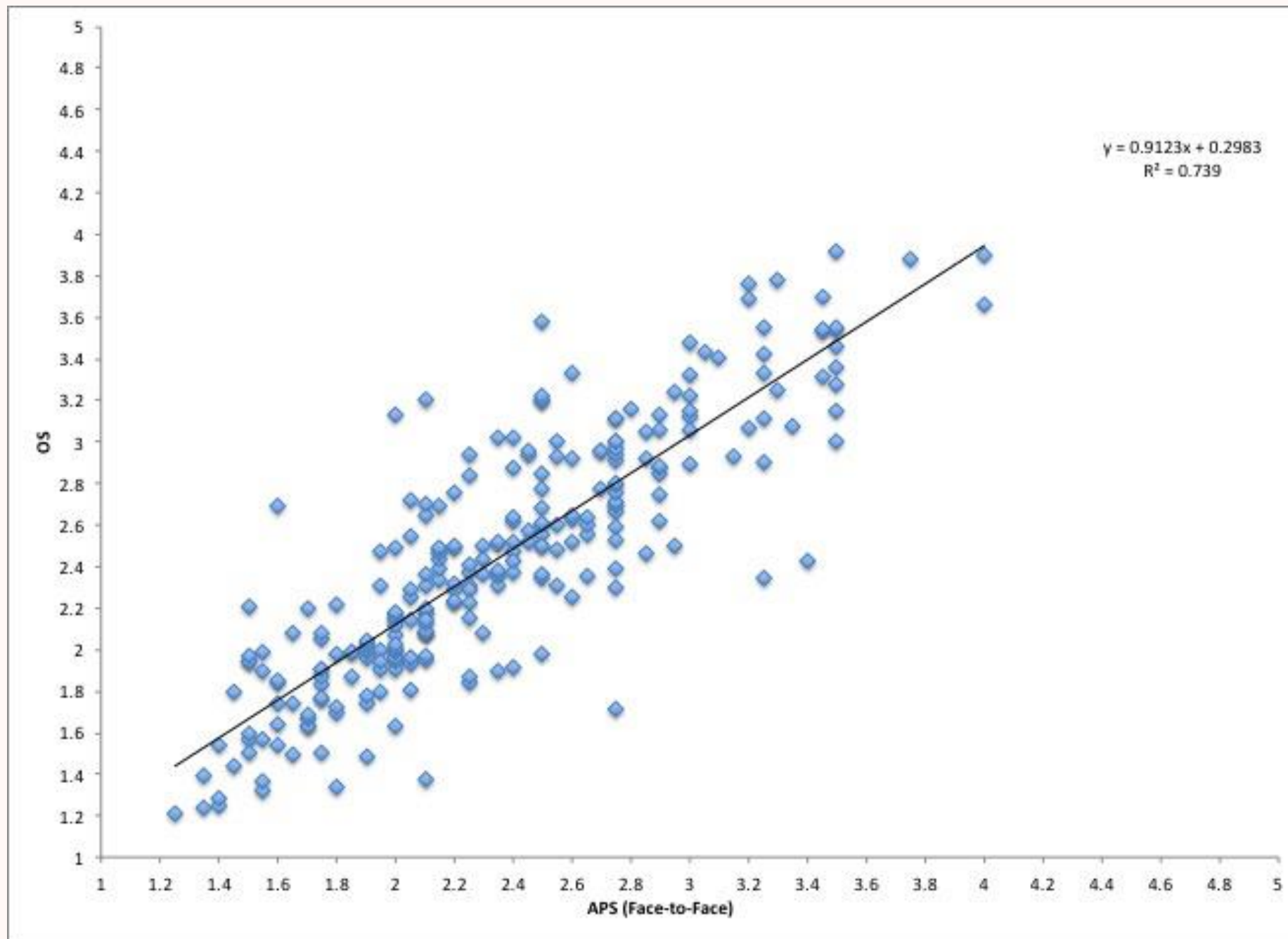
# EFFECTIVE Perceptions of Evaluation of Risk and Innovation in Review Feedback by Applicants and Reviewers (N=850)



	Applicants (%)	Reviewers (%)	Test for Difference
Innovation	24	81	$X^2 (1) = 475$ ( $p<0.001$ ), s.e.=2.2%
Research Team	11	57	$X^2 (1) = 336$ ( $p<0.001$ ), s.e.=2.3%
Risk	27	58	$X^2 (1) = 102$ ( $p<0.001$ ), s.e.=2.8%

Gallo, Stephen, et al. (2018) "Risk evaluation in peer review of grant applications." Environment Systems and Decisions: 1-14.

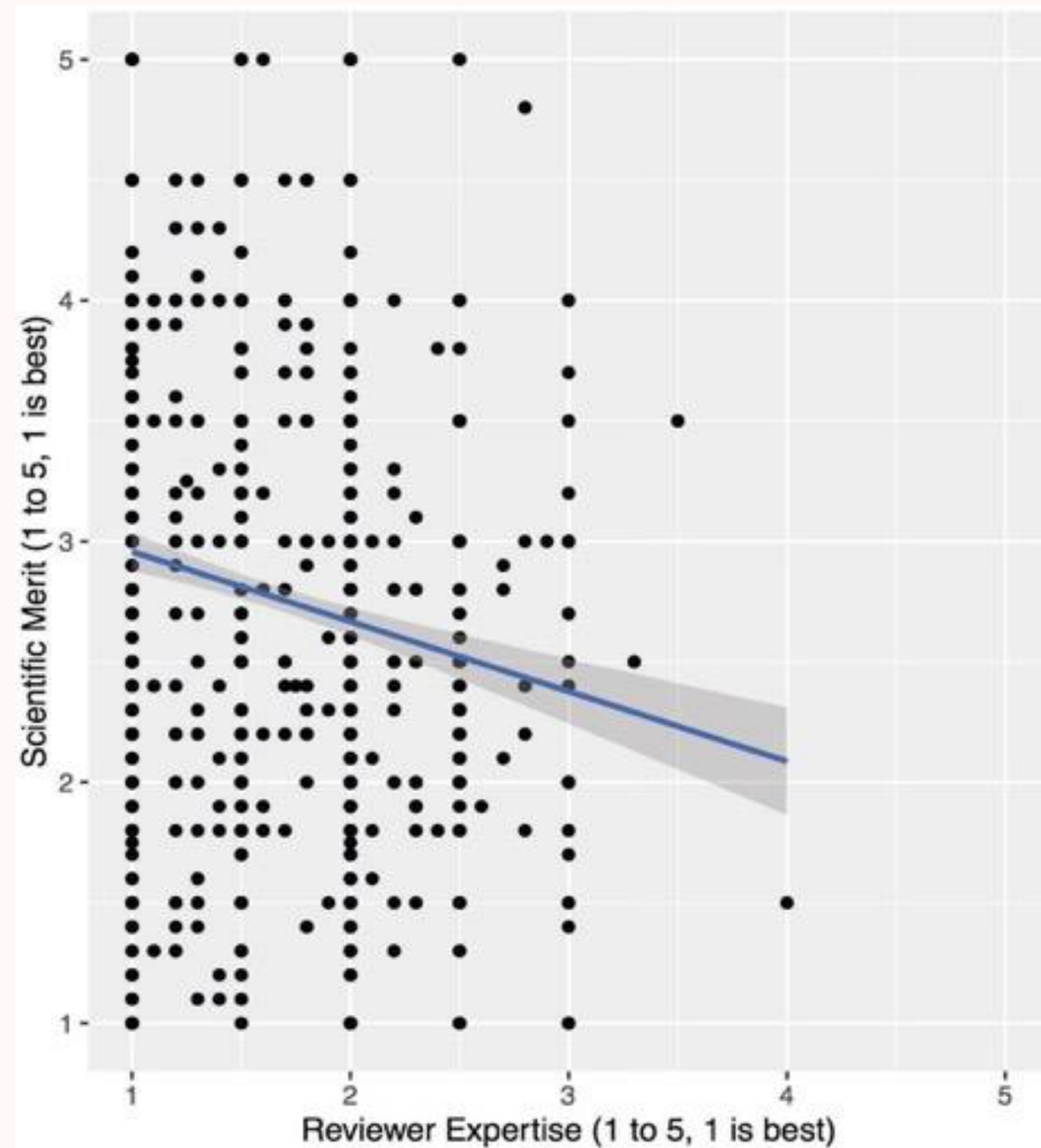
# EFFICIENT? Relationship Between Average Pre-meeting Score (APS) and Overall Score (OS) for Face-to-face and Teleconference Reviews (N=856)



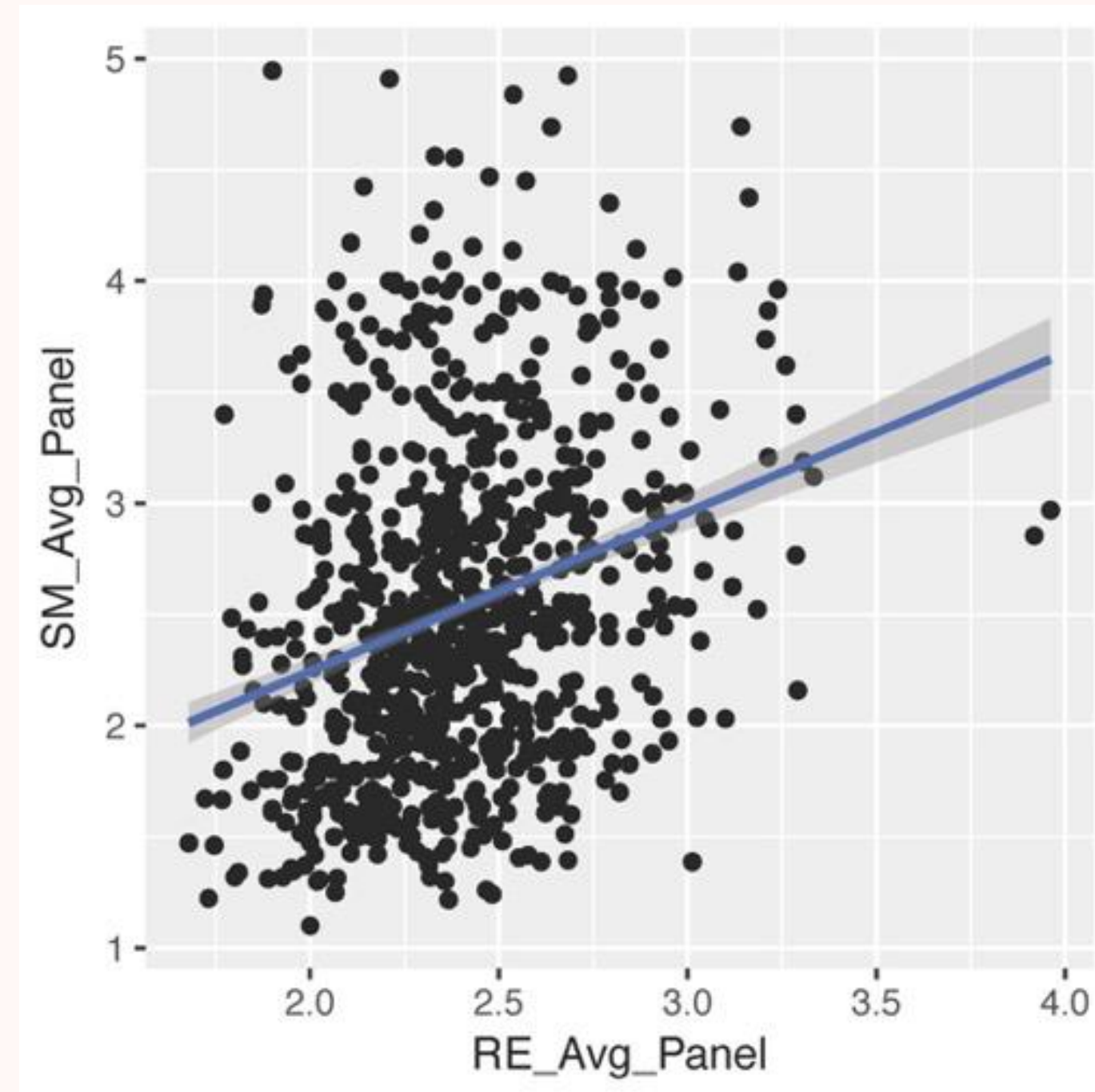


## RATIONAL? Scatterplot of Scientific Merit Versus Reviewer Expertise (N=1450 and 787)

Individual Reviewers– Mail Review



On-Site Panel Average



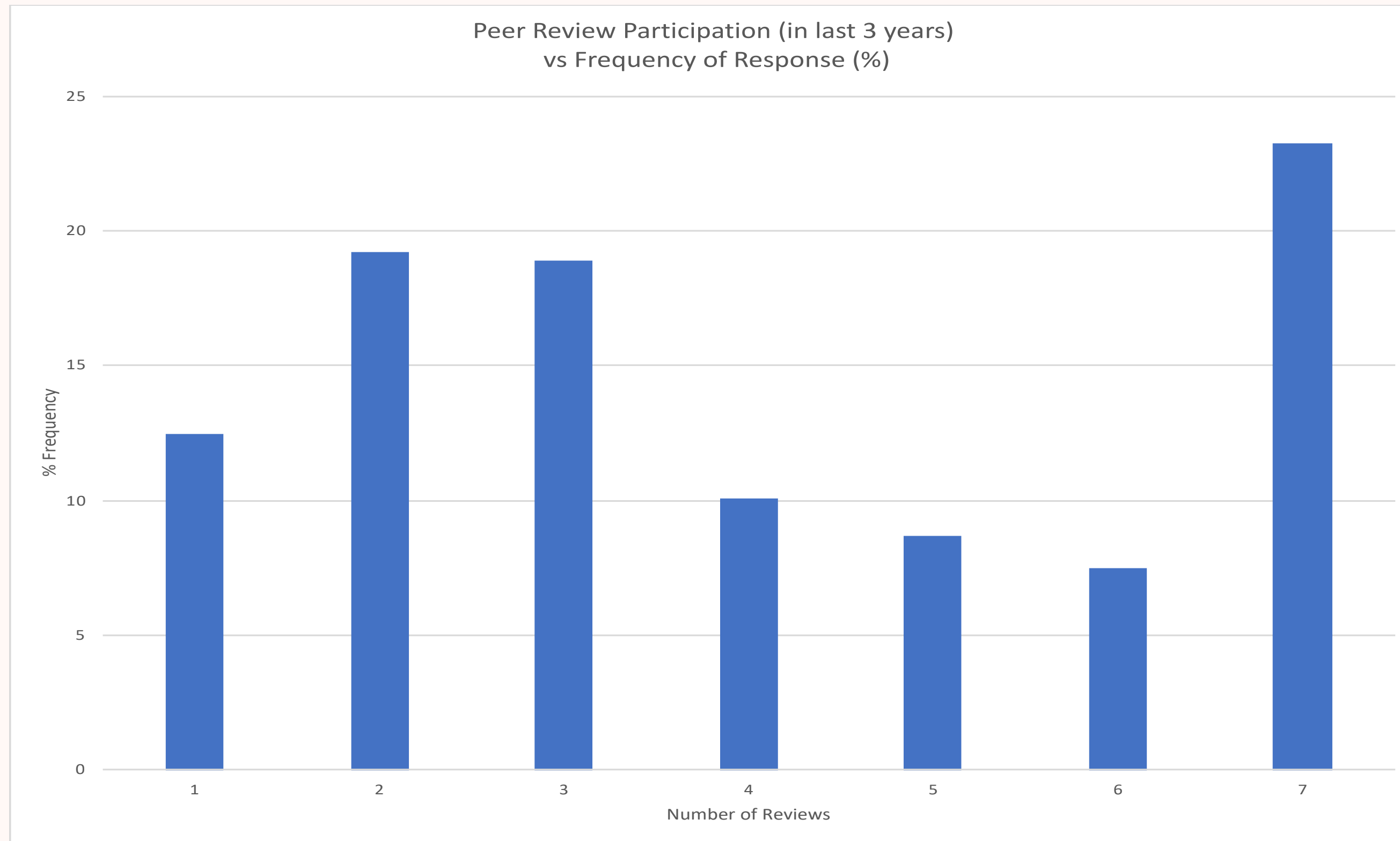


## FAIR? Frequency of Conflict of Interest

<b>Table 1</b>					
<b>Panel</b>	<b>Total COIs</b>	<b>% Total COIs AIBS Detected</b>	<b>COIs (Self-report/Staff-detected)</b>		
			<b>Organizational (1)</b>	<b>Collaborative (2)</b>	<b>Additional (7)</b>
1	8	88%	0/3	1/3	0/1
2	5	100%	0/2	0/3	0/0
3	4	0%	0/0	2/0	2/0
4	3	67%	0/1	1/1	0/0
5	16	75%	0/3	3/9	1/0
6	15	73%	0/11	3/0	1/0
7	6	67%	0/0	2/4	0/0
8	9	22%	0/1	7/1	0/0
<b>TOTAL</b>	<b>66</b>	<b>65%</b>	<b>0/21</b>	<b>19/21</b>	<b>4/1</b>

Stephen A. Gallo, Michael LeMaster, Scott R. Glisson (2016) **Frequency and Type of Conflicts of Interest in the Peer Review of Basic Biomedical Research Funding Applications: Self-Reporting Versus Manual Detection.** *Science and Engineering Ethics*. 22 (1):189-197

## RESPONSIVE? How much Grant Review Participation (N=874)



**RESPONSIVE?** What Predicts Grant Review Participation ( $R^2=0.17$ ,  $p<0.001$ ;  $N=718$ )



Factor	Coefficient (standard error)	p-value
Gender	-0.1 (0.19)	0.60
Age	0.00 (0.01)	0.71
Race	0.01 (0.19)	0.95
Degree	-0.30 (0.21)	0.19
Organization	0.16 (0.26)	0.53
Work Week Hours	0.02 (0.01)	0.11
Career Stage	-0.75 (0.23)	0.001**
Number of Grant Submissions	0.26 (0.04)	<0.001**
Frequency of Journal Reviewing	0.21 (0.05)	<0.001**

## RESPONSIVE? What Motivates Grant Review Participation (N=576)



Motivation to Review or Impact on Career	Non-Rev7 (%/N)	Rev7 (%/N)
<b>Giving back to the scientific community</b>	<b>82% / 420</b>	<b>90% / 139</b>
Gaining exposure to new and innovative scientific areas	54% / 278	60% / 93
Informing your own grantsmanship	51% / 263	67% / 104
Networking opportunities	37% / 188	44% / 68
Enhancing your career/resume	26% / 132	30% / 46
Expectation from the funding agency	18% / 94	18% / 28
Honorarium	9% / 44	9% / 14
<b>Serving as a reviewer on peer review panels had positively impacted career</b>	<b>87% / 434</b>	<b>92% / 142</b>
Influenced career through improvements in grantsmanship	66% / 341	75% / 116
Influenced career through increased exposure to new scientific ideas	61% / 316	68% / 106
Influenced career through improved networking/collaboration opportunities	40% / 204	56% / 87



## RESPONSIVE? What Type of Grant Review Participation (N=645)

	Preference (Non-Rev7)	Experience (Non-Rev7)	Significance	Preference (Rev7)	Experience (Rev7)	Significance
Review Format (Face To Face)	77% (N=382)	44% (N=221)	$\chi^2[1]=110$ , $p<0.001^{**}$	89% (N=133)	68% (N=102)	$\chi^2[1]=18.9$ , $p<0.001^{**}$
Panel Meeting Length (Max)	$2.0 \pm 0.03$	$1.8 \pm 0.03$	$t[962]=5.6$ ; $p<0.001^{**}$	$1.9 \pm 0.05$	$2.1 \pm 0.05$	$t[300]=2.1$ ; $p<0.04^*$
Number of Assignments (Max)	$4.5 \pm 0.08$	$5.6 \pm 0.1$	$t[848]=8.0$ ; $p<0.001^{**}$	$5.4 \pm 0.1$	$6.9 \pm 0.2$	$t[292]=7.4$ ; $p<0.001^{**}$
Number of Panels per year (Max)	$2.0 \pm 0.04$	$1.0 \pm 0.02$	$t[1002]=23.1$ ; $p<0.001^{**}$	$3.1 \pm 0.06$	$2.3 \pm 0.00$	$t[298]=12.6$ ; $p<0.001^{**}$

# Future Directions

- More involvement from academic community  
Psychology, decision science, team science, behavioral economics
- More transparency from research funders  
Access to data and public self-evaluation
- Funds to conduct analyses and potentially prospective trials
- More consolidation of knowledge in this area  
Literature reviews, reports of practices across HRA members
- More communication of these results and interpretation by the community  
Participate in AIBS webinars on peer review and research funding

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