Bias in Judgments of Scientific Validity

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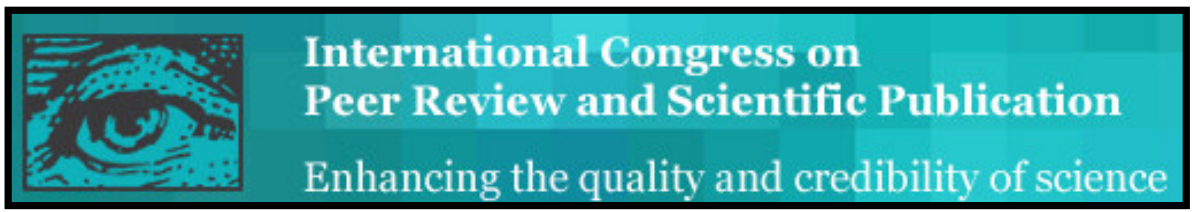
- https://arxiv.org/abs/1802.01270

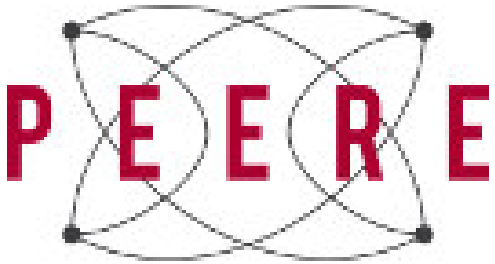
LISH Laboratory for Innovation Science at Harvard

PLOS ONE

A tale of 2 conferences…

PEERE





Reviewer 1 (accept):

"…Overall, I think that the paper definitely merits acceptance at the conference…"

Reviewer 2 (accept):

"…The paper is appropriate for the conference and I recommend to accept it…"

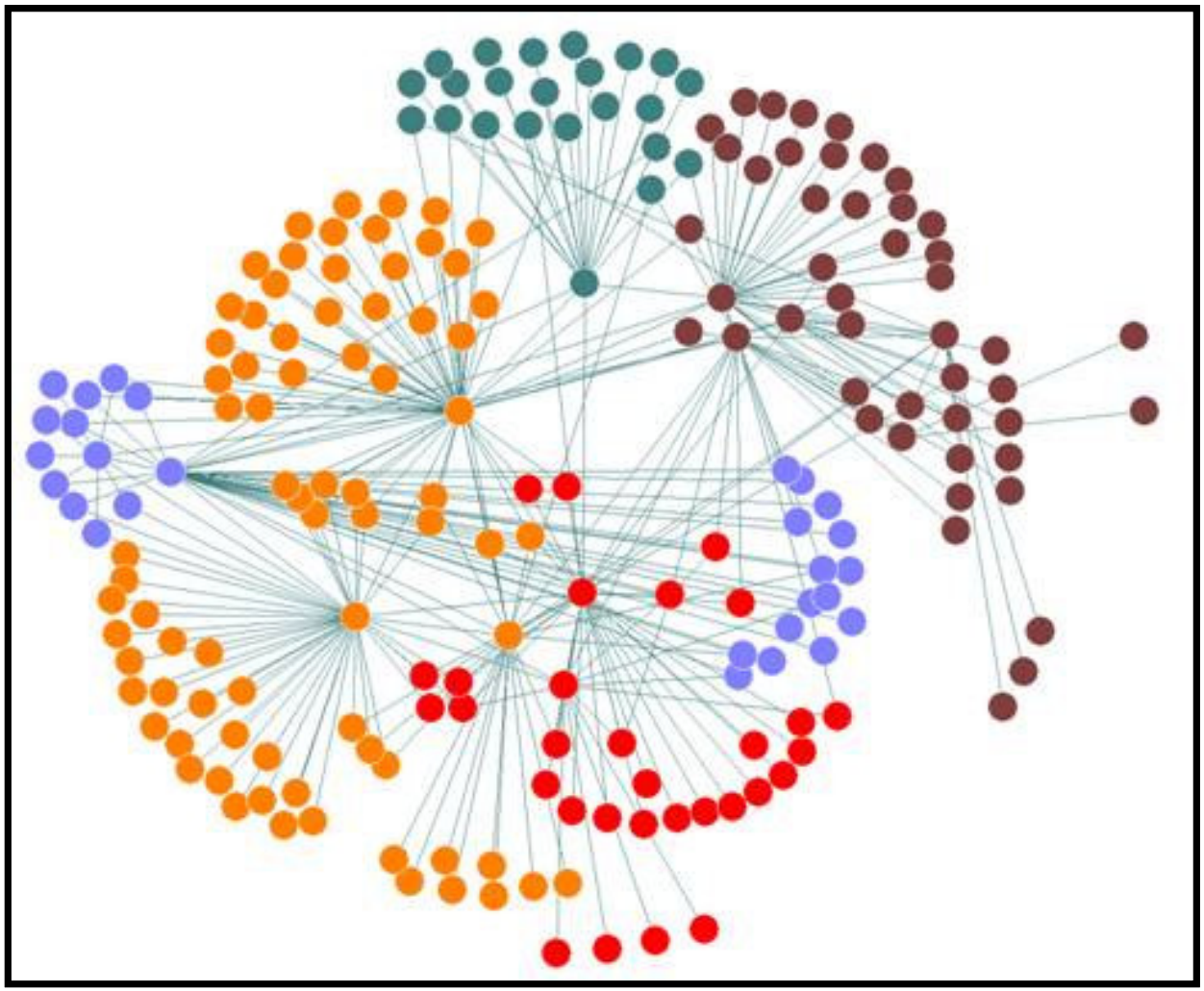
Overall decision (reject)**:**

"I regret that we are unable to find space for your abstract to be presented, either from the podium or as a poster."

Reviewer 1 (reject)**:**

"Despite multiple readings of your abstract, I have not a clue what you did.

This needs to be rewritten … there is no science to evaluate"



1. **Do *manuscript* reviewers favor "close" authors?**

   Prospective vs. retrospective

   a. expertise differences

   b. uncertainty

2. **What causes this "bias"?**

   a. Nepotism

   b. Homophily in tastes

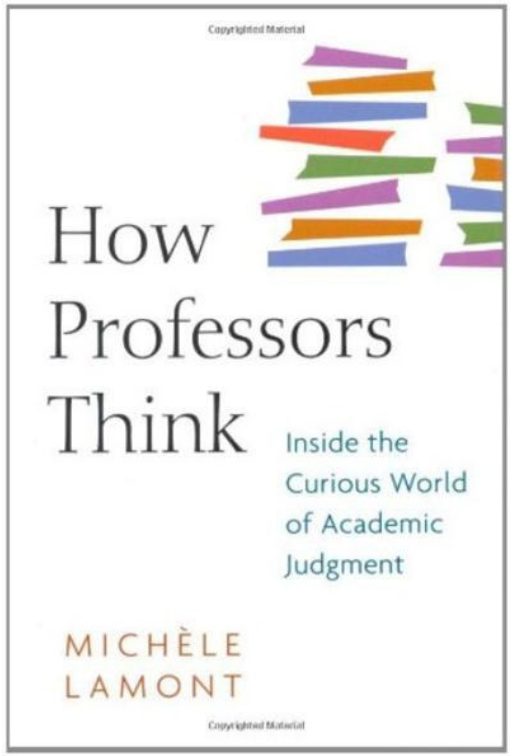
   c. *Schools of thought* (scientific validity)

1. Nepotism

- Scientific method = consensus/objectivity
- “particularistic” biases (Merton 1942, Zuckerman & Merton 1971)

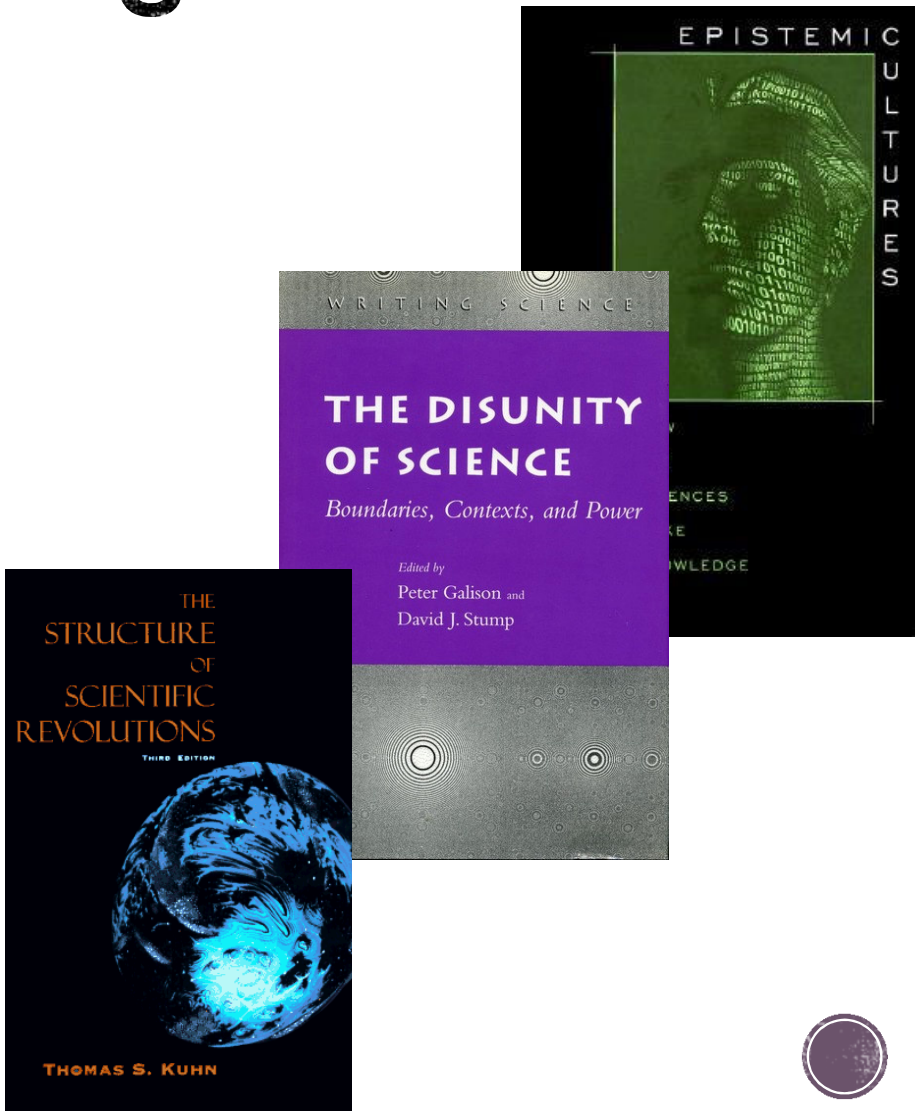
2. Homophily in tastes

"I see scholarly excellence and excitement in this one project on food, possibly because I see resonance with my own life, my own interests, who I am… Excellence is in some ways … what looks most like you." (Lamont 2009: 131)



3. "Schools of thought"

- Epistemic communities
  - "Invisible colleges" (Crane 1961)
  - "Schools of thought" (Merton 1968)
  - "Epistemic cultures" (Knorr 1999)…
- Schools of thought share
  - Assumptions
  - Tacit knowledge (Polanyi 1958, Collins 1974)
  - Trust (Solomon 1992)



Three mechanisms, same outcome

- Founded 2006
- Publishes ~30,000 papers/year
- Relatively low competition
  - 70% acceptance rate

Chris Surridge, *PLOS ONE* founding editor:

> *… a lot of peer reviewing consists of asking questions like: "How significant is this? How surprising are the conclusions?"*
> *Essentially, these are* ***subjective*** *questions. A more* ***objective*** *question to ask would be: "Is this properly done science?"*

(interview on Poynder Blog, June 15, 2006).

PLOS ONE evaluation criteria

- **Validity**: "Experiments and other analyses are performed to a high technical standard …. Conclusions are supported by the data."
- ~~**Novelty, significance**~~**, …**

2. What causes this "bias"?

a. Nepotism

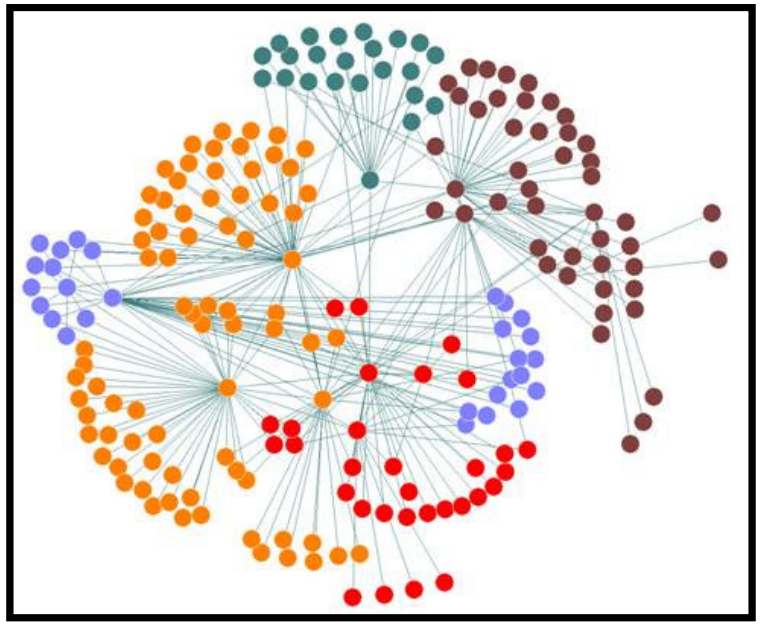
~~b. Homophily in tastes~~

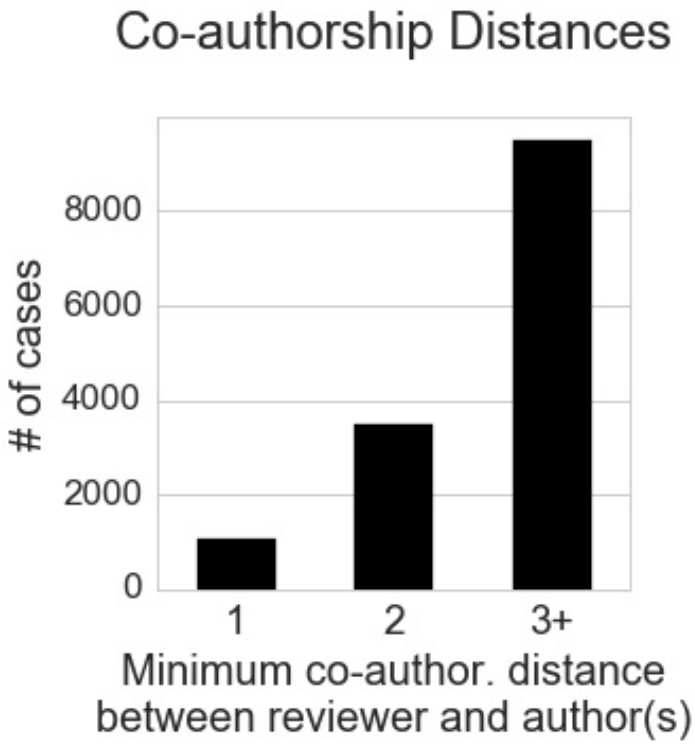
c. *Schools of thought* (scientific validity)

Data & Methods

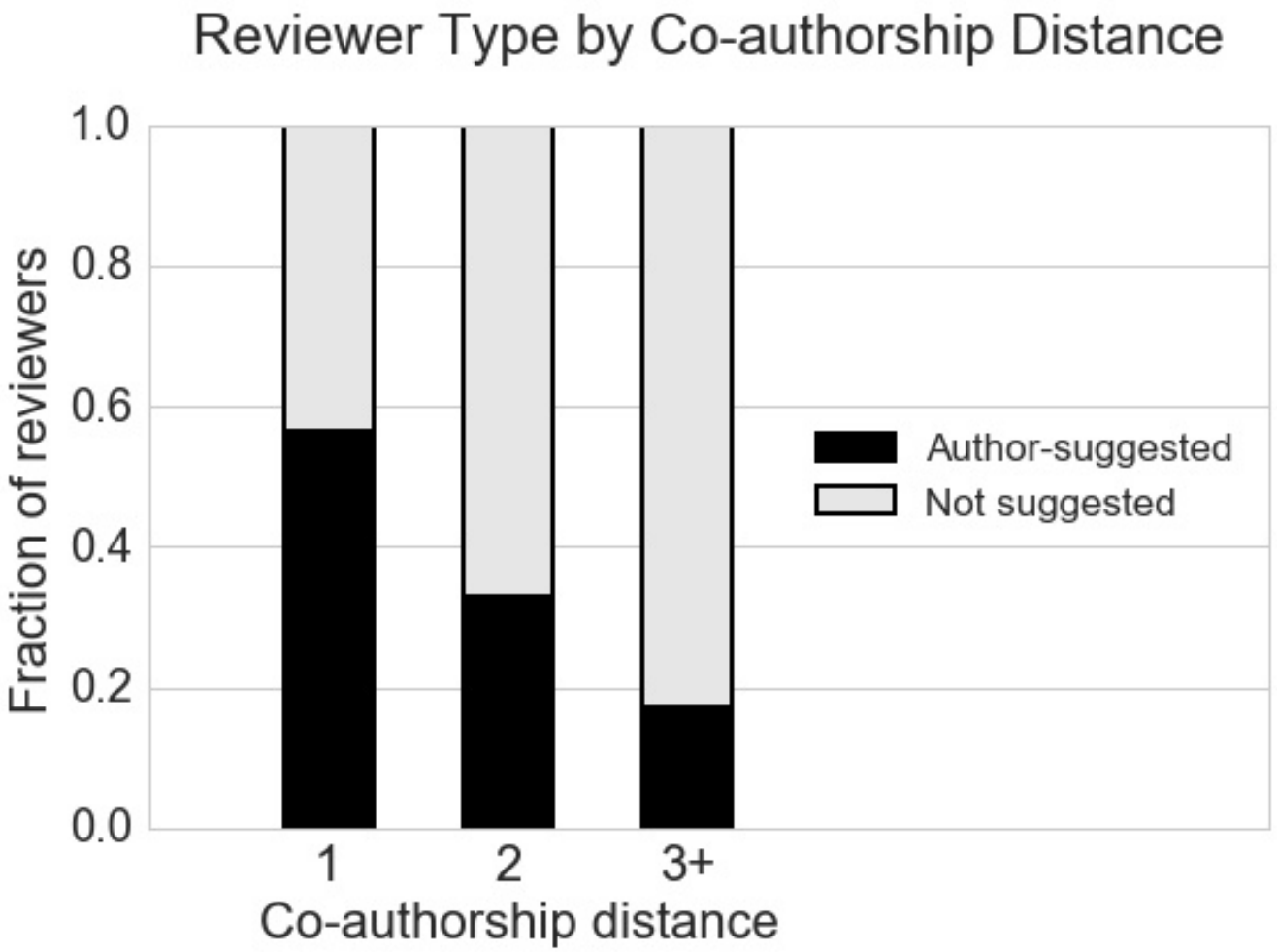
n = 7,981 **neuroscience** manuscripts submitted in 2011-2

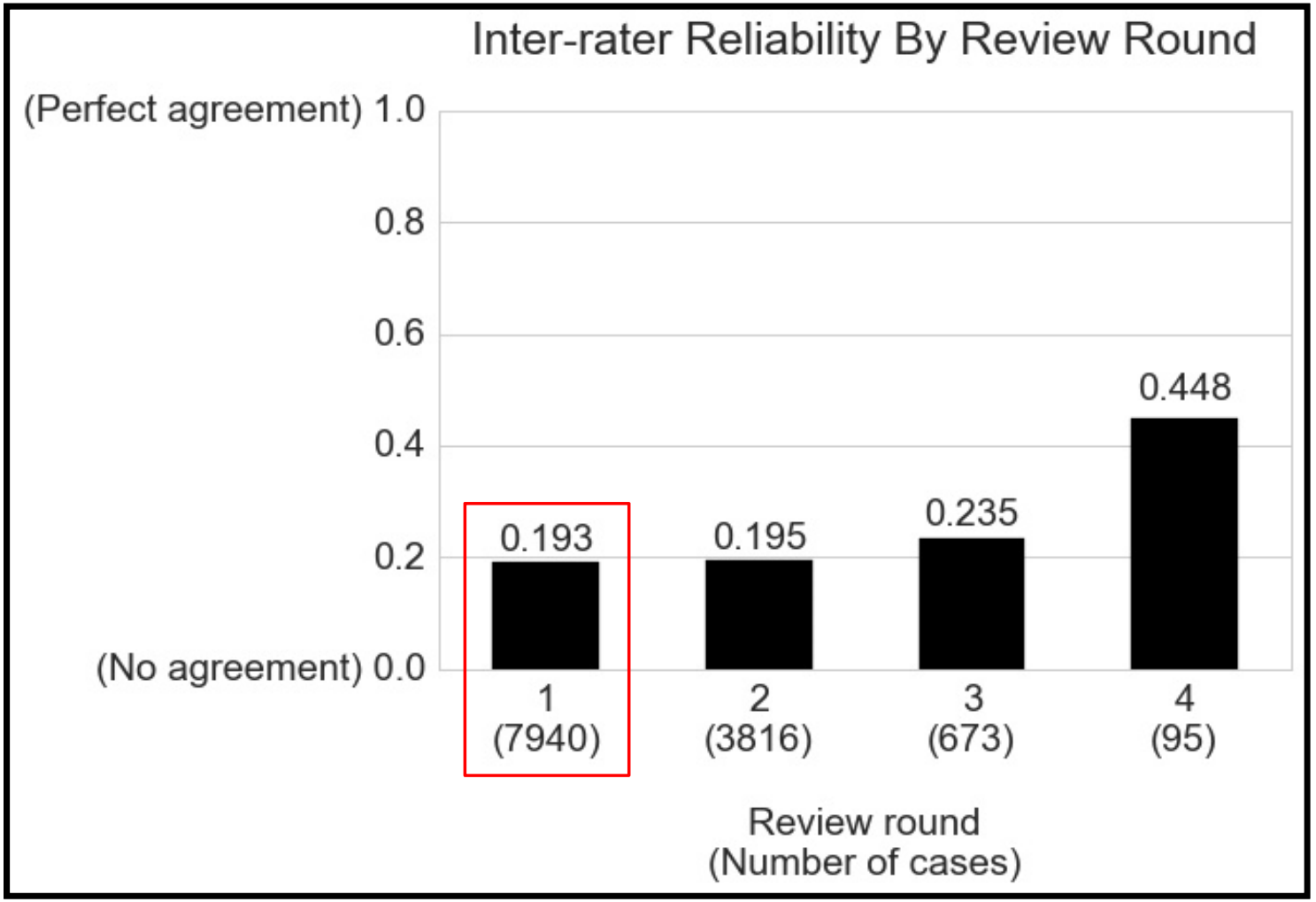
- 46,455 authors
- 21,665 reviewers



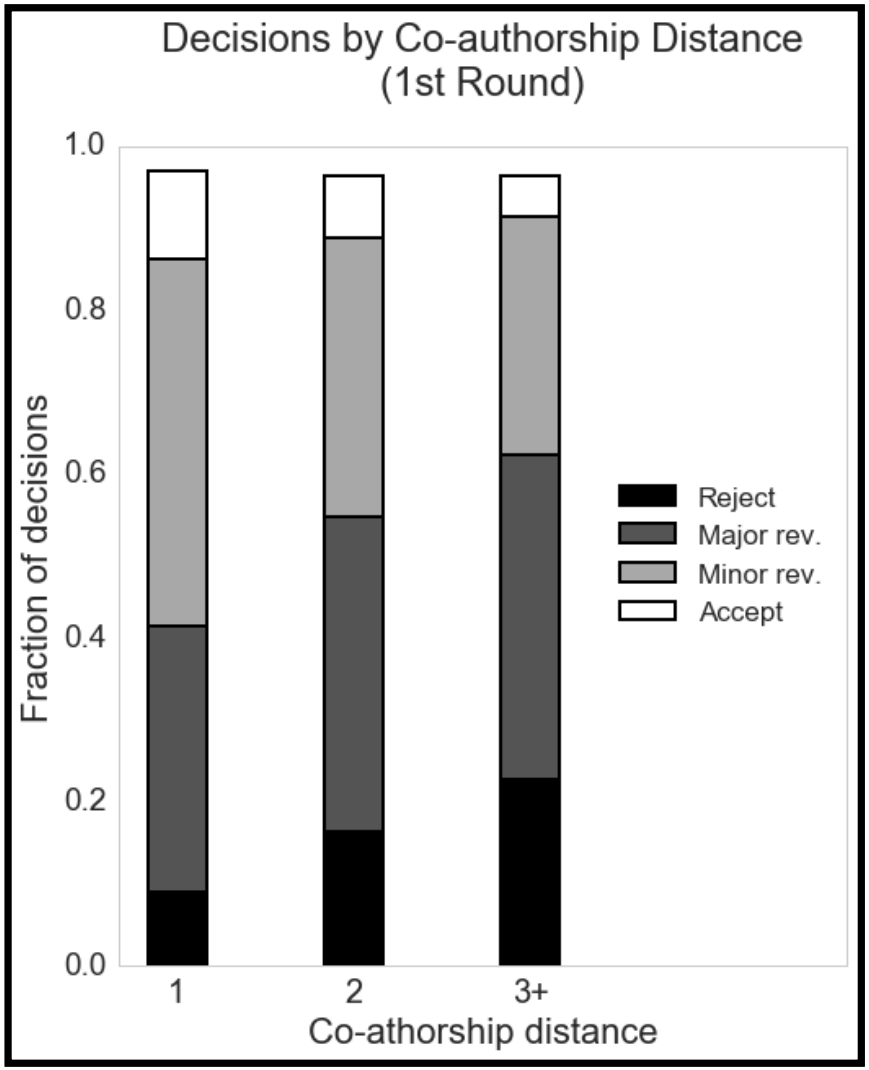


Does co-authorship measure .. anything? Yes

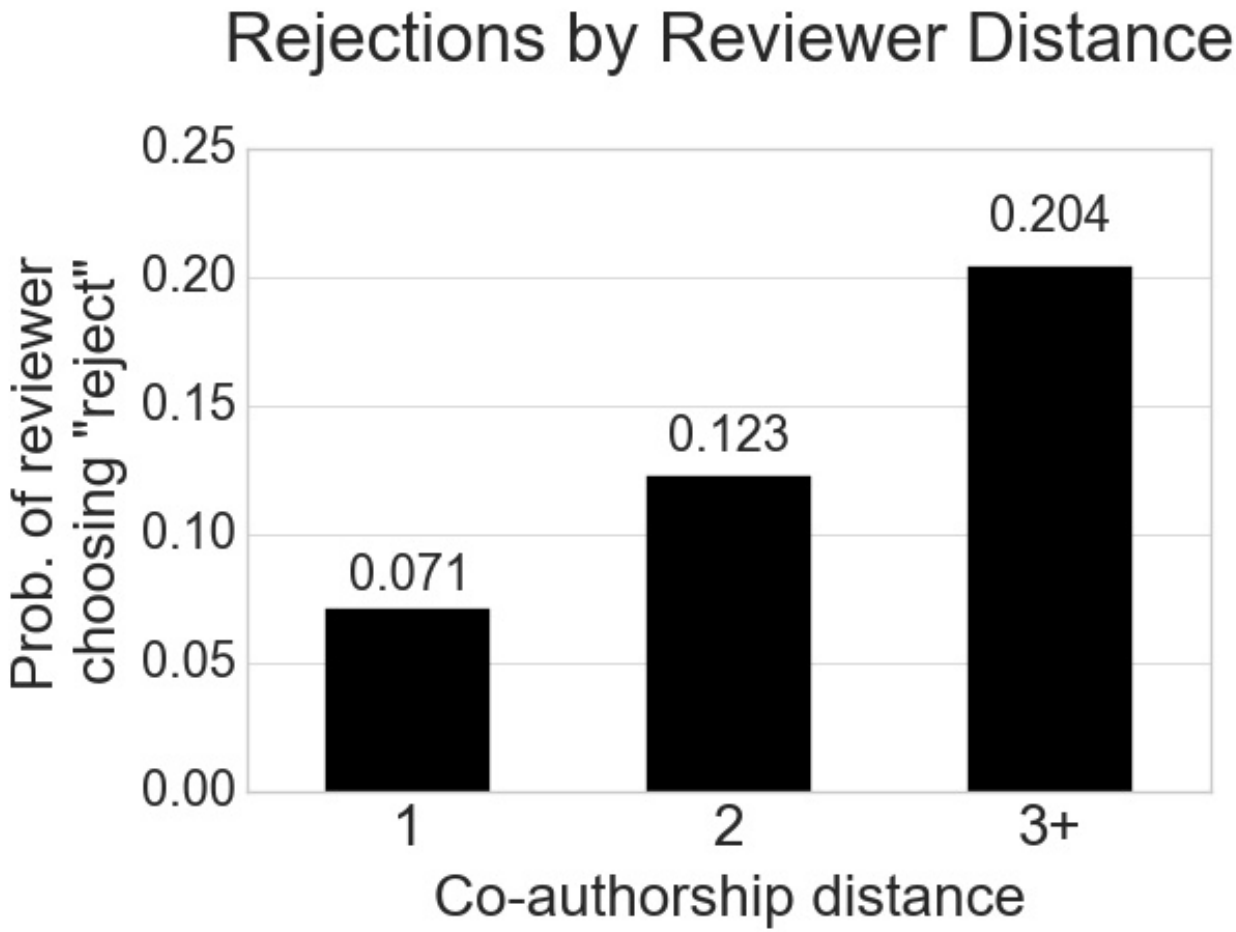



Inter-rater Reliability By Review Round
(Perfect agreement) 1.0
0.8
0.6
0.4
0.2
(No agreement) 0.0
0.193
0.195
0.235
0.448
1
(7940)
2
(3816)
3
(673)
4
(95)
Review round
(Number of cases)

Co-author favoritism: across papers



Different reviewers of same paper

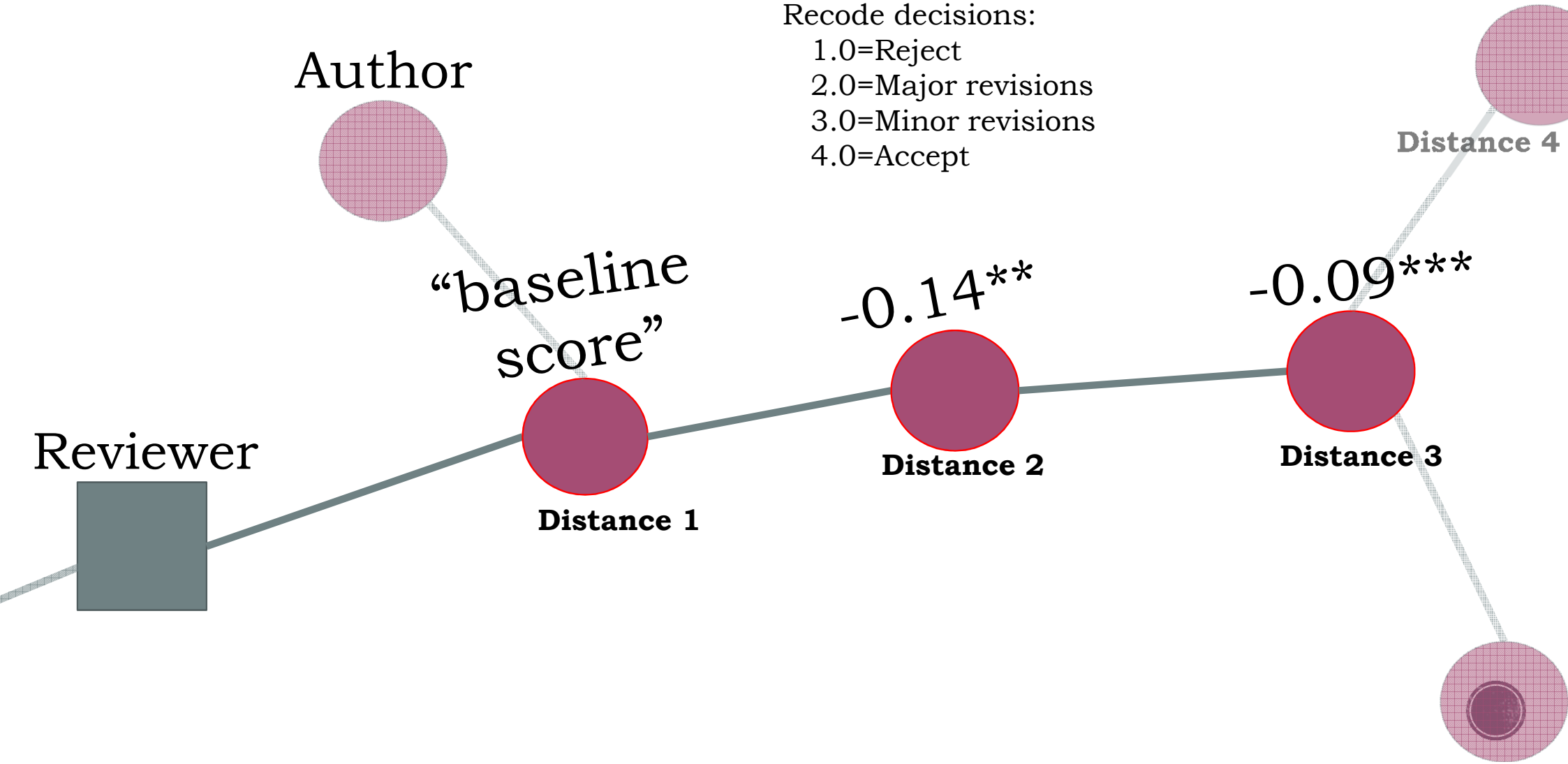


Logistic regression Pr(Reject), (with controls for *h*-indeces, network connectivity)

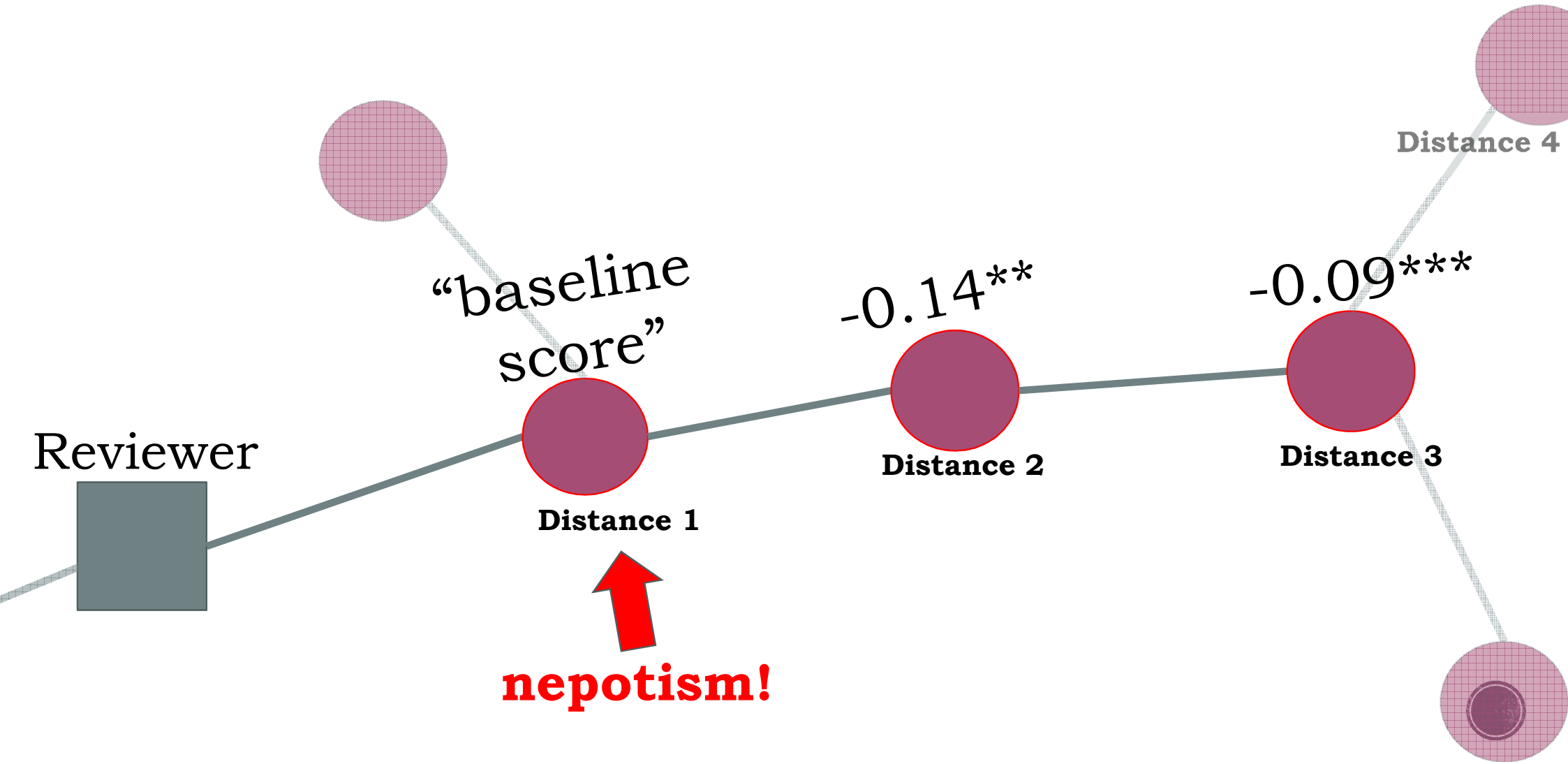
1. **Do *manuscript* reviewers favor "close" authors? Yes**

2. **What causes this bias?**
   a. Nepotism
   b. ~~Homophily in tastes~~
   c. Schools of thought

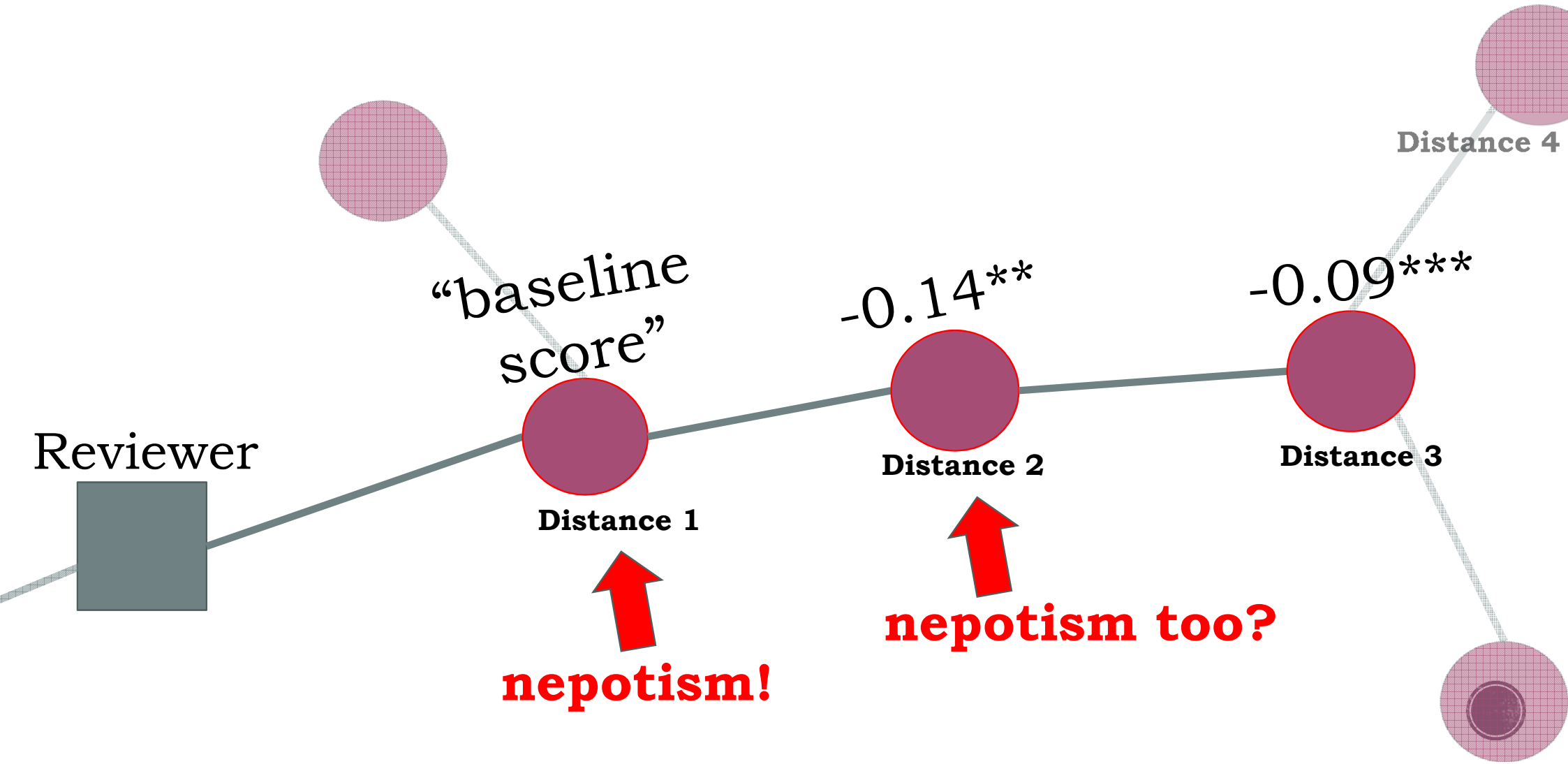
Nepotism vs. schools of thought



Nepotism vs. schools of thought



Nepotism vs. schools of thought



What we learned

- Even when judging **scientific validity**, reviewers favor "close" authors
- Why? Schools of thought?
- Policies to remove bias
  - ~~"Just evaluate the science"~~
  - ~~Recuse closest reviewers only~~
  - Meta-objectives
    - Select reviewers in diverse professional networks → robust publications
- Limitations
  - No direct measure of quality
  - Low R^2 → most judgments of validity are uncontroversial?
  - *PLOS ONE* is single-blind