

KEY IDEAS

Bias Mitigation Training for Program
Staff and Reviewers

Types of Bias

Bias Mitigation in Peer Review Training

The Bias Mitigation in Peer Review Training defined several types of bias and gave examples of how these biases may manifest during peer review. This handout summarizes these types of bias and select references that present evidence for the impact of said biases on peer review.

[Learn more about the Bias Mitigation in Peer Review Training](#)

Bias is a preference, assumption, belief, attitude, or stereotype towards or against a person, group, or thing.

The table below defines various types of bias, and highlights scenarios or quotes that could exemplify the indicated bias in action. These examples are simplified, condensed versions of what are likely to be **highly nuanced** interactions in real-life review settings. Many of the biases below may not be evident within a single statement from a review meeting, in part because they are better characterized by patterns of behavior over the course of repeated decision making.

Type of Bias	Definition	Example	Selected Refs
Gender bias	Differential treatment based on one's real or perceived gender identity	A lack of detail in a woman's proposal is attributed to a deficit in her ability (quote below), but a similar lack of detail in a man's proposal is considered a flaw in the proposal, not in the applicant himself. <i>"The proposal lacks some detail in the methodology for Aim 1. I don't think she's going to be able to complete the project if she has such an underdeveloped understanding of the techniques she plans to use."</i>	1-8
Institutional bias	Differential treatment or consideration based on institutional reputation, size, type, location, or prior research conducted at that institution	An institution with fewer resources is compared to a better-resourced, prestigious institution and deemed inferior, instead of evaluating whether the resources that are available at the institution are sufficient to carry out the proposed project (irrespective of what may be available elsewhere). <i>"This proposal is innovative and exciting. But I don't think this should score higher than the previous application from Stanford; I'm not as confident that this project will actually be completed. This applicant just doesn't have access to the same caliber of facilities as the previous investigator."</i>	9-11

Type of Bias	Definition	Example	Selected Refs
Racial bias	A person receives different treatment based on the person's real or perceived racial identity	<p>A Black applicant is subjected to harsher evaluative criteria than a White applicant. Language used to describe the Black applicant is less positive than language used to describe a White applicant with similar qualifications.</p> <p>Description of Black applicant: <i>"A competent scientist who has clearly worked hard to be so productive."</i></p> <p>Description of White applicant: <i>"An outstanding investigator whose ability is clearly demonstrated by their productivity."</i></p>	7,12–20
Age bias	Assumptions of expertise or capacity based on one's perceived age	<p>Age bias can be targeted towards older/more senior OR younger/more junior researchers.</p> <p>Bias against younger/junior applicant: <i>"The applicant is carrying out the proposed project in the lab of a young assistant professor; I think they should be advised to resubmit the proposal with a more senior faculty member added as a co-mentor to ensure the applicant is mentored adequately."</i></p> <p>Bias against older/senior applicant: <i>"Dr. X has had a long and successful career in this field, but their lab is decreasing in size – I think they are winding down their research program. I don't think they'll be able to carry out this proposal before they decide to retire."</i></p>	
Cronyism	Partiality towards one's friends or associates	<p>A reviewer gives a vote of confidence to an applicant who is associated with one of their colleagues, and applicants who don't have a similar connection are not viewed with the same confidence.</p> <p><i>"This applicant trained in the lab of Dr. X, who I know quite well and hold in high regard. Any scientist that came out of that lab will be able to excel in this research area."</i></p>	21,22
Innovation bias	Preference against risky or novel projects in favor of incremental advances	<p>Reviewers may apply their own personal values (or lack thereof) of innovation when evaluating proposals, which may or may not align with the value that the funding organization places on innovation.</p> <p><i>"This proposal is exciting, but they're incorporating a lot of new techniques at one time. What if it doesn't work? I think this should score lower than the previous application, which is less novel but is sure to generate some findings."</i></p>	23,24

Type of Bias	Definition	Example	Selected Refs
Expertise bias	The tendency for experts to evaluate work more harshly than non-experts and prefer approaches like their own	A reviewer minimizes the utility of a technique that they've personally had issues with in the past, even though another lab may not experience the same challenges. <i>"I don't think the proposed methodology is feasible – my lab has tried that technique before, and it was impossible to get it to work."</i>	25,26
Language or linguistic bias	Differential treatment based on the writing style, tone, or phrasing of the application.	Applications that deviate from the style/tone/phrasing norms of international academic English are assumed to be of lesser scholarly quality than applications that do adhere to international academic English norms. This can result in the former set of applications receiving a harsher review than is merited by the content of the proposed project. <i>"There were several grammatical errors and unusual phrases in the application, which makes me doubt the quality of the proposed project."</i> <i>"There were several misspelled words and some awkward wording in the application; I think we should recommend that these applicants use an English editing service and resubmit."</i>	27,28
Name bias	The tendency to judge and prefer people with certain kinds of names – often names of Anglo origin	An applicant's name causes the reader to make assumptions about the applicant's demographic characteristics (e.g., race, gender, ethnicity, country of origin), and biases towards or against those characteristics inform their reading of the application.	7,29,30
Proxy bias	A metric is erroneously assumed to be a direct indicator for an evaluation criterion	The journal impact factor of an applicant's prior publications is used as a proxy indicator for the quality of the research, despite theoretically and methodologically sound research being published in both high- and low-impact factor journals. <i>"This applicant has an excellent track record of high quality research, as evidenced by their last several publications being in Nature, Cell, and Science."</i>	31,32
Anchoring bias (also termed conservatism)	Maintaining a prior view, even when presented with conflicting evidence	The review discussion converges around the first opinion that was shared, even though other speakers originally held different opinions. <i>"In my notes I had identified several strengths in this application, but I guess Reviewer 1 is right about areas that this proposal could be improved. I should lower my score..."</i>	

Type of Bias	Definition	Example	Selected Refs
Halo/Horn effect	A single piece of information has an outsized influence on one's perception of someone, either positively (halo) or negatively (horn)	<p><i>Halo effect:</i> A proposal from a well-known, prestigious researcher is assumed to be of high quality based on their previous work, so their proposal is not scrutinized as carefully as a proposal from a researcher who is not as renowned.</p> <p><i>Horn effect:</i> Reviewer 1 makes a tasteless joke early during the review session, and Reviewer 2 is visibly offended. Reviewer 2 then discounts or disagrees with nearly every statement made by Reviewer 1 for the remainder of the review session, regardless of the validity of Reviewer 1's statement.</p>	16,33
Confirmation bias	Greater attendance to evidence that aligns with one's original opinion or assessment	<p>Reviewer discussion of an application included a balance of strengths and critiques, but when the committee chair summarizes the reviewers' discussion of an application, they highlight the critiques and barely mention the application's strengths.</p> <p><i>"To summarize, the proposal is clear but lacking in novelty. There were doubts regarding the investigator's expertise in the proposed techniques."</i></p>	34

By being aware of potential biases, avoiding assumptions, and ensuring review criteria are consistently applied across all applicants, scientific review staff and review committee members can contribute to a more objective and equitable evaluation of research proposals.

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