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Skin in the Game: Personal Accountability and Journal Peer Review

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and Mary M. Medlin¹  [AQ1]

Abstract

Two preregistered studies explored the likelihood paper reviewers would request clarification from authors regarding potential questionable research practices (QRPs). Study 1 participants were instructed to imagine reviewing a journal manuscript as either a coauthor or peer reviewer and rate the extent to which they would request clarification from the author when encountering potential QRPs. Participants reported greater likelihood of requesting clarification when assigned to the coauthor relative to the peer reviewer role. Study 2 participants were assigned to either an anonymous or open-review condition and rated the extent to which they would seek clarification from an author regarding potential QRPs. Men (but not women) in the open review condition reported greater likelihood of seeking clarification about potential QRPs than men in the blind review condition. Results provide tentative evidence that motivational factors influence the peer review process, and suggestions are made for improving peer review practices.

Keywords

self, peer review, research accountability, questionable research practices

Research scientists are regularly asked to evaluate scientific research. In so doing, they must alternatively assume a variety of roles. Not only must they routinely scrutinize the quality of their own work to determine where and whether it is publishable, they must also assess the work of immediate colleagues and peers. The latter occurs in variety of contexts, including service on grant application review committees and tenure and promotion proceedings, and peer review of journal articles. Regardless, the specific role that scientists assume in the peer review process may directly influence how they evaluate the quality of the work, and depending on the role, differences may exist in the levels of scrutiny employed (García et al., 2015). Given the importance of various stages of peer review to the quality of the scientific literature and scientific careers, it is important to understand how reviewers' roles influence evaluations.

Peer review is nonetheless far from flawless. Quite apart from recent scandals involving fraudulent peer reviews (Hadi, 2016; Haug, 2015; Schuessler, 2016), many documented instances of manipulated research have passed through the peer review process undetected, prompting numerous observers to question its effectiveness (e.g., Bohannon, 2013). The precariousness of scientific stewardship inspires consideration of new measures to improve the integrity of the peer review process (Smith, 2006), and few question the desirability of improved methods of scientific gatekeeping. The current article presents a program of

research involving two studies that explore how reviewers' roles impact their scrutiny regarding potential questionable research practices (QRPs), a classification of research practices that are increasingly becoming considered detrimental to scientific inquiry.¹ [AQ2][AQ3]

Strategies to Enhance the Quality of Peer Review

There has been much recent discussion and research to identify weaknesses in the peer review process and recommend strategies to improve it so as to facilitate the publication of only valid and reliable scientific findings. Traditional peer review models utilize various kinds of blind review. In a single-blind model, common in the biomedical and natural sciences (Horbach & Halfman, 2018), reviewers' identities are not disclosed to manuscripts' authors. In a double-blind setup, common in the social sciences and humanities (Ware, 2008), neither authors nor

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reviewers are aware of each other's identity. Some commentators even go so far as to advocate a triple-blind model in which authors' identities are also not revealed to editors handling the manuscript (Tennant et al., 2017). Historically, some version or other of blind review has been believed to be the best means of eliminating biases in the peer review process and fostering reviewer objectivity. However, recent findings in the social sciences indicate anonymity often reduces personal accountability, leading to less task effort overall.

Scientists increasingly see value in open peer review in which reviewers' and authors' identities are disclosed. Here again, different models have been adopted. In the least "open" version of open review, only reviewers and authors are made aware of each other's identities. In other versions, peer reviews are published alongside published papers, with the identities of reviewers disclosed to authors and readers alike. Other variants include postpublication reviews, such as those featured on PubPeer, and reader reviews of preprint manuscripts on preprint servers such as arXiv. For the purposes of this article, however, the term "open peer review" refers to the model in which reviewers' identities are disclosed with their review.

A primary motivation for open peer review is the thought that it may improve reviewer accountability implicit in blind review (Kriegeskorte, 2012; Mahoney, 1977). For example, 60% of participants in a recent study believed that open peer review can improve the quality of research findings and enhance the transparency of the evaluation process (Transparent Peer Review One Year On, 2016). However, several reservations about open peer review practices are frequently mentioned (Teixeira de Silva, 2019). Many research scientists indicate that they believe open peer review makes reviewers more reluctant to criticize their peers (Ross-Hellauer et al., 2017). In addition, women and younger researchers express more reservations about open peer review, presumably because prevailing power structures related to age and gender may make open peer review an unattractive option for researchers who are in vulnerable positions (e.g., junior faculty, non-tenure-stream researchers) or from groups that have been historically underrepresented in research (Helmer et al., 2017; Mehta, 2019; Segado-Boj et al., 2019). Thus, one of the primary justifications for journals to use blind review is to reduce the possibility of biases against women and minority researchers (Budden et al., 2008). Authors' sensitivity to the value of blind peer review as a means of debiasing reviews could lead to gender differences in the willingness of men and women to provide anonymized or open reviews.

Motivational Factors and Peer Review

One factor that could potentially influence scientists' evaluations of others' research and the quality of their reviews

is the degree of accountability reviewers perceive themselves as having within the process (Hojat et al., 2003). Feelings of greater personal accountability could increase the level of scrutiny reviewers employ. Considerable research demonstrates that individuals contribute more to tasks when their contributions are identifiable. With blind peer review representing a classic social loafing situation, wherein the ability of an increasing number of individuals capable of providing assistance reduces an actor's predilection to assist themselves (e.g., Latané et al., 1979; Shiue et al., 2010), personal accountability often increases the likelihood of actors to engage in prosocial behaviors (i.e., helping; Williams et al., 1981). Accountability also predicts a greater interest in the consumption of ethically produced goods (Peloza et al., 2013). Pledging to give honest responses on a survey by signing one's name prior to completing a survey, itself an accountability-enhancing behavior, fosters a greater sense of ethicality. Specifically, signing one's name elicits more honest responses than signing one's name after completing the survey in question (Shu et al., 2012).

Within the context of academic publication, research scientists are expected to stand by their work and accurately report findings from research that has been conducted ethically. The connection between researchers' professional identities and the quality of their work incentivizes careful review by authors and coauthors so as not to be associated with low-quality, inaccurate, or even fraudulent work. Many of the retracted papers coauthored by Diederik Stapel, a social psychologist who admitted to extensive data fabrication, were collaborations with other researchers whose careers presumably suffered from Stapel's misconduct, as their names are now permanently associated with unethical research (Retraction Watch, 2015). This fraud could potentially have been mitigated by more careful review of Stapel's research by coauthors.

The considerable motivation individuals have to review their own work more carefully and that of their coauthors, it could be possible that adopting an accountability approach to peer review could facilitate the betterment of scientific research. **AQ4** Various journals have adapted some system of open review, such as through unmasked reviews or publishing the names of reviewers of papers (Godlee, 2002; Kriegeskorte, 2012). Such efforts could encourage individuals to align their behaviors with a consistent positive self-image (Bryan et al., 2013; Kettle & Häubl, 2011). Heightening individuals' self-awareness motivates them to compare their current self to an ideal version of themselves, or themselves as they ought to be (Higgins et al., 1994). To avoid the resulting discrepancies between both aspects of their identities, individuals attempt to reconcile this inconsistency by changing their behavior (Brown & McConnell, 2011). Open review could motivate individuals to do more

to ensure research integrity, which would align with responsible scientific stewardship.

Ambiguity in Research and Reviews

When researchers are asked to evaluate science, they must determine to the best of their abilities whether the research has been conducted rigorously regarding the methodology, the analytic strategy, and the validity of inferences drawn. Although many problematic issues with research are readily apparent to well-qualified peers, reviewers will inevitably be presented with findings that are reported ambiguously. Such ambiguity could prompt a reviewer to ask for clarification before deciding on a manuscript's suitability for publication. Although some ambiguity may be incidental, some aspects of a submitted draft may suggest QRPs that could undermine the work being reviewed (Sacco et al., 2019) and the validity of its findings (Simmons et al., 2011). In addition, even in the absence of deceptive intent, the reporting of the data may be so ambiguous as to undermine other researchers' ability to replicate or reproduce them. To determine whether QRPs have occurred, intentionally or unintentionally, or whether a manuscript's ambiguities represent merely the need for improved descriptions, reviewers may require additional information.

Researchers may vary in their inclinations to request such clarification depending on the role they assume. For example, coauthors on manuscripts reviewing other coauthors' drafts may be strongly motivated to seek clarification for several reasons. First, to the extent that ambiguities in the reporting of the research might slow down or impede the publication process, this potential delay motivates resolving ambiguities prior to submission. In addition, and perhaps no less importantly, seeking clarification can help ensure that drafts report only valid work that was conducted ethically. Given that one's identity will be permanently connected to the work through potential publication, being identifiable through the published work could create a level of accountability that might incentivize more careful review of the work and a motivation to seek clarification when presented with ambiguity.

Conversely, if evaluating research projects as a journal peer reviewer, the incentive for careful review and clarification may not exist to the same degree. Although journal peer review is integral to science, it is typically not rewarded to nearly the same degree as publishing one's own work. The anonymity of blind review may further undermine motivation to review carefully. Muting one's self-awareness could lead reviewers not to exercise as much care in their reviews (Bryan et al., 2013). Requesting additional clarification further extends reviewing responsibilities both in terms of time and effort. Without proper motivation, reviewers may be less inclined to make such requests.

Current Research

Studies that compare the effectiveness of blind and open review to date have reported mixed results and show no appreciable difference in the quality of reviews (Kowalczyk et al., 2015; Schroter et al., 2006). In comparison to most previous findings, which compared actual reviewers' submissions in blind and open review contexts, the strategy used in the present research involved an experimental investigation into reviewer motivation. Given the primacy of one's identity, as manifested through self-interest in ethical decisional processes (e.g., Bryan et al., 2013; Shu et al., 2012), people could be more likely to seek additional clarification when reviewing research containing ambiguous behaviors that could constitute QRPs when acting as a coauthor of the work as opposed to general peer review. Fostering consistency between both one's identity as a researcher and their conception of what constitutes an ideal researcher heightens research scientists' adherence to ethical standards (e.g., Bruton et al., in press; Sacco & Brown, 2019), which could potentially translate to other outlets of the research process, like peer review. **FAQ5**

In this program of preregistered research, we sought to identify contexts in which researchers exercised particular care in identifying potential QRPs (Study 1) while attempting to facilitate researchers' ability to review work with which they have no association in a similar capacity (Study 2). This led us to develop interventions that were designed to heighten participants' interest in seeking greater clarity in ambiguously worded manuscripts as reviewers. We were specifically interested in experimentally manipulating the level of personal connection individuals would have to the material, a methodological decision that reflects our interest in a deliberate and systematic control of experience for participants with respect to the study's variables. We generally predicted that participants receiving such interventions would report greater interest in seeking clarity than participants in control states that do not render personal connections to the material salient. In addition to these experimental variables in shaping peer review behaviors, given the fact that women can benefit under a blind review process (Budden et al., 2008), we were interested in understanding how men and women differ in their interest in conspicuous displays of accountability. We report all measures, manipulations, and data exclusions in this article while providing all data, materials, and the preregistered hypotheses at osf.io/uspek.

Study 1

The purpose of Study 1 was to identify the contexts in which research scientists may differ in their level of scrutiny in the evaluation of others' research practices. Specifically, we compared two different review contexts that ask

federally funded research scientists to evaluate QRP scenarios as either a coauthor on a manuscript or as a peer reviewer. Given the fact their names would be associated with QRPs for a paper on which they would be coauthors, we predicted that participants in the coauthor condition would report greater interest in scrutinizing QRPs as compared with participants serving as peer reviewers. In addition, given previous findings that men are especially prone to demonstrate prosocial behavior (i.e., helping) when motivated to attain social capital (e.g., mates, resources, status; Griskevicius et al., 2007), we additionally hypothesized that men would request more clarification regarding potential QRPs when reviewing manuscripts as peer reviewers.

Participants

Consistent with procedures from similar studies (Sacco et al., 2018, 2019), we recruited participants from a listserv comprising federally funded research scientists from the National Institutes of Health and National Science Foundation from public lists of grant recipients. We emailed waves of 200 to 300 prospective respondents every 2 days for 2 weeks, resulting in a sample of 209 participants having completed the study, a typical response rate in previous work (102 men, 102 women; $M_{\text{age}} = 46.11$ years, $SD = 10.35$; 80% White). We excluded five participants from gender-related analyses who reported their gender as "Other" ($n = 1$) or who did not report their gender ($n = 4$). A sensitivity analysis indicated sufficient power to detect small-medium effects (Cohen's $f = 0.20$) at 80% power. Participants provided an email address to which we sent an Amazon Gift Card (US\$10.00) through a link that was separate from their responses to ensure responses were not connected to any identifying information needed for compensation.

Materials and Procedures

QRP scenarios. Participants were tasked with reviewing 16 different research practices in a manuscript as short vignettes. Each vignette described the participant as a reviewer reading a hypothetical manuscript in which they noticed a research practice in the writing that appeared questionable. These questionable behaviors were selected from several behaviors previously identified as both responsible for inflating the Type I Error rate in research and ambiguously questionable by research scientists (e.g., John et al., 2012; Sacco et al., 2018; Simmons et al., 2011). Some example practices included an author excluding data from final analyses without justification and reporting findings that appear unexpected as hypothesized from the start (i.e., HARKing; Kerr, 1998). We deliberately provided minimal context for these vignettes to simulate the type of ambiguity seen in manuscript review that could lead reviewers to seek

additional clarification through revisions while also ensuring that reported practice was potentially reasonable enough for a reviewer to decline further clarification.

Using face-valid, single-item measures for each (1 = *not at All*; 7 = *very much*; Cronbach's α s > .83), participants indicated the extent to which the ambiguity raised doubts about the work's integrity as well as the likelihood that they would request further clarification from the manuscript's author. Importantly, evaluations of each scenario were made either from the perspective of an anonymous journal peer reviewer or that of a coauthor. Vignettes were normed by ensuring both versions addressing a single QRP were approximately equivalent in length with discrepancies.

Consenting participants were randomly assigned to one of the two conditions and they then reviewed each scenario in a randomized order. Participants then provided demographics information to facilitate better understanding of the sample population before being debriefed through an online form describing the goals of the study. Finally, those interested in receiving compensation were redirected to a form to provide email addresses that were separated from survey responses.

Results and Discussion

Primary analyses. We initially conducted two independent samples t tests to identify differences in responses based on whether participants were acting as reviewers or coauthors. The two outcome measures were only moderately correlated ($r = .463$, $p < .001$), indicating these items as assessing different evaluations. No differences emerged in assessing the integrity of research from the perspective of either a reviewer ($M = 4.90$, $SD = 0.85$) or a coauthor ($M = 4.86$, $SD = 1.08$), $t(207) = 0.28$, $p = .774$, $d = 0.04$, 95% CI [-0.22, 0.30]. That is, participants did not differ in their perceptions of the work's integrity between conditions, suggesting QRPs were viewed similarly in both contexts. However, participants acting as coauthors requested more clarification for these scenarios ($M = 5.94$, $SD = 0.79$) than did those acting as reviewers ($M = 5.76$, $SD = 0.75$), $t(207) = -2.48$, $p = .014$, $d = 0.34$, 95% CI [0.05, 0.47].

Secondary analyses. We conducted a pair of 2 (Condition: Reviewer vs. Coauthor) \times 2 (Participant Gender: Male vs. Female) factorial analyses of variance (ANOVAs) to test for interactive effects of gender. To reduce the likelihood of Type I Error, given that excluding additional participants did not meaningfully alter results, only gender differences and interactions are reported in this section. Women requested more clarification for these scenarios ($M = 5.99$, $SD = 0.68$) than did men ($M = 5.60$, $SD = 0.83$), $F(1, 200) = 15.08$, $p < .001$, $\eta_p^2 = 0.070$. No interaction emerged, $F(1, 200) = 0.18$, $p = .668$, $\eta_p^2 = 0.001$.

Conversely, there were neither main effects nor interactions for perceptions of the work's integrity, $F_s < 1.91$, $p_s > .169$.

This study found evidence that regarding potential QRPs, research scientists are more likely to request clarification from a coauthor than from an unaffiliated author. This suggests, perhaps unsurprisingly, that individuals do not evaluate research using uniform standards or effort within the various roles that researchers assume in the review process. Rather, having more "skin in the game"—evaluating work in which one will be a coauthor on a publication—seems to increase individuals' interest in ensuring that a study's ambiguously reported methods and analyses are clarified prior to submission or publication. Researchers were categorically interested in seeking similar clarification when evaluating the manuscripts as peer reviewers, yet this interest was nonetheless significantly lower than for coauthors. Although participants were especially willing to request clarification overall, the coauthor perspective heightened this tendency. This effect could have been driven by various motives, including a lack of personal accountability or disincentive for peer review (for those in the reviewer role) or greater motivation to improve a paper for publication (for those in the coauthor role).

Study 2

Given the distinction between level of scrutiny in the role of coauthor versus reviewing an unaffiliated author's work documented in Study 1, our second study sought to leverage possible differences in personal accountability by experimentally manipulating the context of peer review to elicit accountability-induced motivation, wherein peer reviewers use a similar level of scrutiny as would a coauthor. We specifically compared the desired scrutiny that prospective reviewers would employ as a function of whether their identity is known in the review process (i.e., open versus blind review; Godlee, 2002; Kriegeskorte, 2012). Considering differences in scrutiny during blind and open review may heighten reviewers' accountability, given the inherent connection between their personal identity and their provided evaluation.

Study 2 assigned participants to one of two reviewer roles. In the blind review condition, participants were instructed that their identities would not be linked to their evaluations. In the open review condition, participants were tasked with viewing the scenarios under the impression that their identities would be revealed if the work were published. In leveraging the fact that heightened self-awareness fosters honesty, wherein individuals seek to view themselves in a positive light (Kettle & Häubl, 2011; Mazar et al., 2008), we thus hypothesized that, compared with the blind review condition, participants in the open review condition would seek more clarification when presented with potential QRPs. Furthermore, we considered gender as a

potential moderating factor in a secondary analysis by predicting that men would be especially likely to request greater clarification when open-reviewing a manuscript compared to blind-reviewing, given men's heightened tendency to display prosocial behavior in the presence of an audience to appear socially desirable (Griskevicius et al., 2007; Van Vugt & Iredale, 2013).

Method

Participants. We recruited research scientists using the same strategy as in Study 1, excluding those who participated in the previous study, in exchange for an Amazon gift card (US\$10.00). A sample of 203 participants completed the study (104 men, 93 women; $M_{\text{age}} = 52.26$ years, $SD = 9.11$; 77.3% White). Participants reporting gender as "Other" ($n = 2$), and those not reporting it ($n = 4$), were excluded from gender-related analyses. A sensitivity analysis indicated our sample was sufficient for small-medium effects (Cohen's $f = 0.20$) at 80% power.

Materials and procedure. Participants were randomly assigned to review each of the 16 QRP scenarios from Study 1 as a peer reviewer. This reviewer task differed critically from Study 1 in that participants were informed their identities either would or would not be disclosed:

Open Review Instructions: "Imagine that you are serving as a peer reviewer for a reputable journal with a policy of open review in which reviewer identities are disclosed if the article is accepted for publication."

Anonymous Review Instructions: "Imagine that you are serving as a peer reviewer for a reputable journal with a policy of blind review in which reviewers remain anonymous throughout the process."

Following the prompts, participants indicated the extent they would request clarification for each vignette as in Study 1 ($\alpha = .75$) before providing demographics information debriefing.

Results and Discussion

Primary analysis. An independent samples t test indicated that, contrary to hypotheses, participants serving as open reviewers did not differ in their requests for clarification ($M = 5.66$, $SD = 0.62$) from those serving as blind reviewers ($M = 5.62$, $SD = 0.76$), $t(201) = 0.37$, $p = .711$, $d = 0.05$, 95% CI $[-0.15, 0.23]$.

Secondary analysis. We conducted a 2 (Condition: Blind vs. Open) \times 2 (Gender: Male vs. Female) factorial ANOVA for participants' desire for clarification on each scenario with

the same reporting criterion as Study 1. No main effect of Gender emerged, $F(1,193) = 3.50, p = .063, \eta_p^2 = 0.018$, though, in contrast to Study 1, men descriptively reported more interest in seeking clarification ($M = 5.73, SD = 0.57$) than did women ($M = 5.55, SD = 0.82$). Interestingly, a significant Gender \times Condition interaction emerged, $F(1,193) = 5.68, p = .018, \eta_p^2 = 0.029$. Simple effects tests revealed that men serving as open reviewers reported greater interest in seeking clarification ($M = 5.90, SD = 0.54$) than did men serving as blind reviewers ($M = 5.61, SD = 0.56$), $F(1,193) = 4.52, p = .035, \eta_p^2 = 0.023, 95\% CI [0.02, 0.56]$. Women's interest in seeking clarification did not differ between the blind ($M = 5.66, SD = 1.02$) and open review conditions ($M = 5.48, SD = 0.64$), $F(1,193) = 1.60, p = .207, \eta_p^2 = 0.008, 95\% CI [-0.47, 0.10]$. Viewed another way, men and women's interest in seeking clarification did not differ when serving as blind reviewers, $F(1,193) = 0.13, p = .719, \eta_p^2 = 0.001, 95\% CI [-0.33, 0.23]$. Conversely, men reported more interest in seeking clarification than did women as open reviewers, $F(1,193) = 9.09, p = .003, \eta_p^2 = 0.045, 95\% CI [-0.70, -0.14]$.

Results from Study 2 provide mixed evidence for the potential value of using open review as method of improving peer reviewer quality, assuming that the likelihood of requesting additional information correlates with the quality of the peer review. That is, men serving as open reviewers were more likely to request further clarification in peer review compared with women in a similar role. This difference could reflect inherent sex differences in conspicuous consumption, a process wherein individuals become especially prosocial (e.g., donating money) when there is a public opportunity to demonstrate their social value, a behavior repertoire more frequently performed by men (Barclay, 2010; Van Vugt & Iredale, 2013). Men could use this public process of peer review as an opportunity to demonstrate their ethicality as a "powerplay" whereby they would have the opportunity to be identified as especially critical or ethical and therefore command more status from others. Serving as a careful peer reviewer could itself be prosocial, with men's proclivity for prosociality in this role being an outgrowth of ancestrally derived motives to appear socially desirable. Conversely, women's reactions were not significantly influenced by reviewer roles.

General Discussion

The current studies explored how motivational factors could foster careful peer review. Historically, blind review has been considered the gold standard for ensuring integrity and objectivity in reviewing manuscripts (Rosenblatt & Kirk, 1981). An unintended consequence of blind review may however be the salience of reviewers' identities is reduced in the process, which could reduce their accountability and produce less careful reviews. Two studies

demonstrated instances within experimental settings that suggest that having "skin in the game" in the review process heightens reviewers' scrutiny. That is, increasing the conspicuousness of the reviewer resulted in greater questioning of ambiguities and potential QRPs.

Gender, Identity, and Peer Review

A pair of interesting gender effects emerged in our results. First, men and women in Study 1 responded as being equally likely to request more clarification for QRPs when serving as a coauthor relative to serving as a reviewer. Although contrary to our secondary hypothesis, this result remains sensible when considering the importance of self-interest in the review process. Men and women similarly appeared disposed to review papers with considerable scrutiny, which could be expected, as men and women should both be interested in improving scientific discourse. The lack of anonymity of a review was especially predictive of men's interest in seeking clarification. This finding could reflect several motivations, ranging from a desire to be more ethical, appear more ethical, or simply communicate greater intellect by critiquing the another's work as potentially sloppy. Given the gendered findings, we hypothesize that it is likely to be one or a combination of the latter two explanations. Men's historically greater motivation to attain higher status could position them to be especially motivated to communicate scientific stewardship, as such displays of ethicality would be conspicuous and therefore allow others to recognize their abilities (Griskevicius et al., 2007; Sundie et al., 2011).

The prospect of providing open reviews did not influence women's interest in seeking clarification regarding potential QRPs. Although continuing to request greater clarification across conditions, women did not desire more clarification when serving as an open reviewer. This lack of effect could reflect potential biases against women in the review process in which greater levels of anonymity foster more gender parity in publications (e.g., Budden et al., 2008; cf. Whittaker, 2008). Women could be deemed highly ethical for indicating that they reviewed a paper carefully, much like men. However, women may deem such exercises to be professionally costly or risky, given the potential experience as an author being reviewed. That is, women could be the subject of reviewers' bias in the instance that reviewers know of their identities; sensitivity to this bias could increase women's hesitancy to adopt an entirely open review model. This difference in responses could reflect consideration of the limitations of open reviews in heightening reviewers' selectivity, given that only men may perceive this process as beneficial. Future research would benefit from considering motivations behind why men and women would engage in open review while also identifying methods to reduce the potential costs women face. Understanding these differences could potentially inform future

measures to foster accountability in the peer review process while minimizing the potential for bias.

Despite the emergence of these findings, such effects nonetheless remain small. This small effect could reflect the hypothetical nature of our experimental manipulation that may not perfectly capture how personal accountability influences the review process. That is, participant responses in the current program of research could have emerged within the experimental setting but may not emerge in actual reviewing. Because of this relatively small effect, future research remains necessary to determine the robustness of these findings. One possibility for future research would be to consider participants' actual reviewer decisions when tasked with thinking about varying levels of personal accountability while reviewing actual scientific research. Moving away from merely simulated situations would allow researchers to better determine the robustness of accountability effects while engaged in actual peer reviews.

Limitations and Future Directions

Several limitations emerged in this program of research. First, our experimental manipulations were rather subtle, and thus the effect sizes of reported findings relatively small. Future research would benefit from identifying stronger manipulations. For example, asking researchers to read and sign an ethical reviewer pledge prior to engaging in peer review may increase personal accountability and more careful peer review, much like signing one's name prior to completing a survey results in more honest survey responses (Shu et al., 2012). In addition, our experimental manipulation of open peer review was perhaps ambiguous, insofar as it was not clear if participant identity would simply be revealed to the authors or more broadly to anyone who might read the manuscript. One hypothesis is that the broader the revelation of identity, the stronger the motivation for accountability (e.g., Shiue et al., 2010), and thus review scrutiny, though future research would benefit from testing this distinction.

Our proposed basis of fostering consistency between one's identity as a researcher and to a perceived ideal of what constitutes being a research scientist necessitates future research to identify if such a motive was specifically driving these effects (Higgins et al., 1994). A study could task participants with indicating the extent they feel motivated to adhere to research ideals while reviewing a manuscript. Alternatively, it could be possible that various other motivational states were driving these effects, including a desire to appear socially desirable in the review process (Paulhus, 1984); future studies could additionally identify whether similar impression management strategies could account for these differences.

In addition, women appeared unaffected by the prospect of assuming a different role in the review process. Despite

finding some evidence that open peer review can enhance the transparency of scientific reporting and can, under some circumstances, lead reviewers to be more probing, it nonetheless has drawbacks that may reduce its overall value. When one's identity is attached to the evaluation of another's work, even valid criticisms could open the individual up to criticism, shaming, reputational damage via retaliation (Teixeira de Silva 2019). Given the strong gender norms that have limited opportunities for women in science, women may be (rightfully) especially cautious regarding open peer review due to the already numerous hurdles they face to establish and maintain their scientific reputations. If so, future research would need to identify modified strategies to enhance accountability in peer review that do not rely on the revelation of the reviewer's identity.

Best Practices

Given evidence regarding the pervasiveness of QRPs (John et al., 2012) and their deleterious consequences for validity and scientific replicability (Simmons et al., 2011), journals could use various strategies of subtly increasing reviewers' accountability. This could include open review, which may enhance the vetting of scientific findings by motivating researchers to seek clarification when presented with work that may contain questionable research practices. By seeking such clarification, this may ultimately lead to fewer published studies shaped by practices that undermine the validity and reliability of the research presented.

Research Agenda

Research scientists in this study were more likely than unlikely to seek clarification from other researchers when the evaluating potential QRPs reflected in the work. However, this effect was most pronounced when they believed they were coauthors rather than journal peer reviewers and for men when review was open as opposed to blind. Using these findings, future research could explore potentially more impactful strategies for increasing reviewers' personal accountability and ways to make peer review more effective. Such strategies would be most beneficial if made easy to implement by journals and they did not create undue burdens on reviewers. Because of the gender specificity of these interventions, it is further incumbent upon researchers to identify how to implement these accountability measures while also being sensitive to the concerns women and minority researchers have with nonanonymized findings.

Educational Implications

Findings offer insight into how journals can subtly leverage principles of personal accountability to foster more careful peer review. Simple strategies that connect the reviewer

with the work being evaluated may lead to greater concerns with accountability in evaluation and foster more careful reviews. Some strategies may include thinking about oneself in the greater context of science or reminders of one's commitment to ethical science (Bruton et al., in press).

Conclusion

Participants reported requesting more clarification regarding potential questionable research practices from a coauthor than from an unaffiliated author. Men (but not women) reported greater interest in seeking clarification from an author when led to believe the review process was open as opposed to blind. Taken together, recognizing one's review work as publicly identifiable appears to foster more careful peer review, and such care can be promoted by reducing the reviewers' anonymity, at least for men.

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Note

1. Following the terminology used by John et al. (2012), we generally use the phrase “questionable research practices” or “QRPs” below, understanding these terms to be more or less equivalent to the notion of “detrimental research practices” used in National Academies of Sciences, Engineering, and Medicine (2017).

References

- Barclay, P. (2010). Altruism as a courtship display: Some effects of third-party generosity on audience perceptions. *British Journal of Psychology, 101*, 123-135.
- Brown, C. M., & McConnell, A. R. (2011). Discrepancy-based and anticipated emotions in behavioral self-regulation. *Emotion, 11*, 1091-1095.
- Bruton, S. V., Brown, M., & Sacco, D. F. (in press). Ethical consistency and experience: An attempt to influence researcher attitudes toward questionable research practices through reading prompts. *Journal of Empirical Research on Human Research Ethics*. **AQ6**
- Bryan, C. J., Adams, G. S., & Monin, B. (2013). When cheating would make you a cheater: Implicating the self prevents unethical behavior. *Journal of Experimental Psychology: General, 142*, 1001-1005.
- Budden, A. E., Tregenza, T., Aarssen, L. W., Koricheva, J., Leimu, R., & Lortie, C. J. (2008). Double-blind review favours increased representation of female authors. *Trends in Ecology & Evolution, 23*, 4-6.
- García, J. A., Rodriguez-Sánchez, R., & Fdez-Valdivia, J. (2015). The principal-agent problem in peer review. *Journal of the Association for Information Science and Technology, 66*, 297-308.
- Godlee, F. (2002). Making reviewers visible: Openness, accountability, and credit. *Journal of the American Medical Association, 287*, 2762-2765.
- Griskevicius, V., Tybur, J. M., Sundie, J. M., Cialdini, R. B., Miller, G. F., & Kenrick, D. T. (2007). Blatant benevolence and conspicuous consumption: When romantic motives elicit strategic costly signals. *Journal of Personality and Social Psychology, 93*, 85-102.
- Hadi, M. A. (2016). Fake peer-review in research publication: Revisiting research purpose and academic integrity. *International Journal of Pharmacy Practice, 24*, 309-310.
- Haug, C. J. (2015). Peer-review fraud—Hacking the scientific publication process. *New England Journal of Medicine, 373*, 2393-2395.
- Helmer, M., Schottdorf, M., Neef, A., & Battaglia, D. (2017). Gender bias in scholarly peer review. *Elife, 6*, Article e21718.
- Higgins, E. T., Roney, C. J. R., Crowe, E., & Hymes, C. (1994). Ideal versus ought predilections for approach and avoidance distinct self-regulatory systems. *Journal of Personality and Social Psychology, 66*, 276-286.
- Hojat, M., Gonnella, J. S., & Caelleigh, A. S. (2003). Impartial judgment by the “gatekeepers” of science: Fallibility and accountability in the peer review process. *Advances in Health Sciences Education, 8*, 75-96.
- Horbach, S. P. J. M., & Halfman, W. (2018). The changing forms and expectations of peer review. *Research Integrity and Peer Review, 3*, Article 8. <https://doi.org/10.1186/s41073-018-0051-5>
- John, L. K., Loewenstein, G., & Prelec, D. (2012). Measuring the prevalence of questionable research practices with incentives for truth telling. *Psychological Science, 23*, 524-532.
- Kerr, N. L. (1998). HARKING: Hypothesizing after the results are known. *Personality and Social Psychology Review, 2*, 196-217.
- Kettle, K. L., & Häubl, G. (2011). The signature effect: Signing influences consumption-related behavior by priming self-identity. *Journal of Consumer Research, 38*, 474-489.
- Kowalczyk, M. K., Dudbridge, F., Nanda, S., Harriman, S. L., Patel, J., & Moylan, E. C. (2015). Retrospective analysis of the quality of reports by author-suggested and non-author-suggested reviewers in journals operating on open or single-blind peer review models. *BMJ Open, 5*, Article e008707.
- Kriegeskorte, N. (2012). Open evaluation: A vision for entirely transparent post-publication peer review and rating for science. *Frontiers in Computational Neuroscience, 6*, 1-18.
- Latané, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology, 37*, 822-832.
- Mahoney, M. J. (1977). Publication prejudices: An experimental study of confirmatory bias in the peer review system. *Cognitive Therapy and Research, 1*, 161-175.
- Mazar, N., Amir, O., & Ariely, D. (2008). The dishonesty of honest people: A theory of self-concept maintenance. *Journal of Marketing Research, 45*, 633-644.

- Mehta, A. (2019, November 5). *RSC report finds publishing pipeline hinders women*. Chemistry World. <https://www.chemistryworld.com/news/rsc-report-finds-publishing-pipeline-hinders-women/4010608.article>
- National Academies of Sciences, Engineering, and Medicine. (2017). *Fostering integrity in research*. National Academies Press.
- Paulhus, D. L. (1984). Two-component models of socially desirable responding. *Journal of Personality and Social Psychology*, *46*, 598-609.
- Pelozo, J., White, K., & Shang, J. (2013). Good and guilt-free: The role of self-accountability in influencing preferences for products with ethical attributes. *Journal of Marketing*, *77*, 104-119.
- Retraction Watch. (2015). *Diederik Stapel retraction count updated to 57*. <https://retractionwatch.com/2015/10/20/diederik-stapel-retraction-count-updated-to-57/>
- Rosenblatt, A., & Kirk, S. A. (1981). Recognition of authors in blind review of manuscripts. *Journal of Social Service Research*, *3*, 383-394.
- Ross-Hellauer, T., Deppe, A., & Schmidt, B. (2017). Survey on open peer review: Attitudes and experience amongst editors, authors, and reviewers. *PLoS ONE*, *12*, Article e0189311.
- Sacco, D. F., & Brown, M. (2019). Assessing the efficacy of a training intervention to reduce acceptance of questionable research practices in psychology graduate students. *Journal of Empirical Research on Human Research*, *14*, 209-2018.
- Sacco, D. F., Brown, M., & Bruton, S. V. (2019). Grounds for ambiguity: Justifiable bases for engaging in questionable research practices. *Science and Engineering Ethics*, *25*(5), 1321-1337.
- Sacco, D. F., Bruton, S. V., & Brown, M. (2018). In defense of the questionable: Defining the basis of research scientists' engagement in questionable research practices. *Journal of Empirical Research on Human Research Ethics*, *13*, 101-110.
- Segado-Boj, F., Martín-Quevedo, J., & Prieto-Gutierrez, J. J. (2019). Attitudes toward open access, open peer review, and Altmetrics among contributors to Spanish scholarly journals. *Journal of Scholarly Publishing*, *50*, 48-70.
- Shiue, Y. C., Chiu, C. M., & Chang, C. C. (2010). Exploring and mitigating social loafing in online communities. *Computers in Human Behavior*, *26*, 768-777.
- Shu, L. L., Mazar, N., Gino, F., Ariely, D., & Bazerman, M. H. (2012). Signing at the beginning makes ethics salient and decreases dishonest self-reports in comparison to signing at the end. *Proceedings of the National Academy of Sciences*, *109*, 15197-15200.
- Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological Science*, *22*, 1359-1366.
- Smith, R. (2006). Peer review: A flawed process at the heart of science and journals. *Journal of the Royal Society of Medicine*, *99*, 178-182.
- Sundie, J. M., Kenrick, D. T., Griskevicius, V., Tybur, J. M., Vohs, K. D., & Beal, D. J. (2011). Peacocks, Porsches, and Thorstein Veblen: Conspicuous consumption as a sexual signaling system. *Journal of Personality and Social Psychology*, *100*, 664-680.
- Teixeira de Silva, J. A. (2019). Challenges to open peer review. *Online Information Review*, *43*, 197-200.
- Tennant, J. P., Dugan, J. M., Graziotin, D., Jacques, D. C., Waldner, F., Mietchen, D., . . . Selvaraju, M. (2017). *A multidisciplinary perspective on emergent and future innovations in peer review*. F1000 Research. <https://doi.org/10.12688/f1000research.12037.3>
- Transparent peer review one year on. (2016). *Nature Communications*, *7*, Article 13626.
- Van Vugt, M., & Iredale, W. (2013). Men behaving nicely: Public goods as peacock tails. *British Journal of Psychology*, *104*, 3-13.
- Ware, M. (2008). Peer review; Benefits, perceptions and alternatives. *Publishing Research Consortium, Summary Paper*, *4*, 1-20.
- Whittaker, R. J. (2008). Journal review and gender equality: A critical comment on Budden et al. *Trends in Ecology & Evolution*, *23*, 478-479.
- Williams, K., Harkins, S. G., & Latané, B. (1981). Identifiability as a deterrent to social loafing: Two cheering experiments. *Journal of Personality and Social Psychology*, *40*, 303-311.

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