



# Publishing Research Consortium

## Peer review survey 2015

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Mark Ware Consulting

## Overall satisfaction with peer review system

Attitudes towards peer review have remained remarkably stable between 2007 and 2015.

**Overall satisfaction** is essentially identical across all three surveys, with most researchers satisfied (65%, compared to 65% in 2007 and 69% in 2009), and only 9% dissatisfied (9% in 2007, 11% in 2009).

**Peer review remains broadly supported:** 82% agreed with the statement “without peer review there is no control in scientific communication”, unchanged from the 83% response in 2007 and 2009.

Researchers continue to value the **benefits of peer review**, with 74% agreeing that it improves the quality of the published paper, very similar to 2009 (77%). (The question was asked in a different form in 2007 that does not allow direct comparison.)

Researchers saw **the effectiveness of peer review** was strongest in improving the quality of the published paper (74% agreeing it *currently is able* to do this), and determining the originality of the manuscript (63%) and the importance of the findings (59%), while it was least effective at detecting fraud (41%) and plagiarism (44%).

In contrast, when researchers were asked what peer review *should be able* to do, detecting fraud and plagiarism are ranked much higher, with 81% and 78% respectively agreeing.

Between 2009 and 2015, the gaps between the “is able” and the “should be able” responses were either stable or shrank as a result of higher scores on the “is able” side. Most notably, the proportions agreeing that peer review *is able* to detect fraud rose from 33% to 41%, and for detecting plagiarism from 38% to 44%. (T&F2015 found even higher support at 52% and 51% respectively.)

Support for **peer review as a way to select the best manuscripts for the journal** fell a little, however, both in terms of the purpose of peer review (76% agreed it should be able to do this, down from 86% in 2009), and in terms of its effectiveness (50% agreeing it is able, down from 61%). We speculate this may be attributable to the growth of the megajournal “soundness not significance” reviewing model.

The **desire for improvements** to peer review reported in 2007 appears to be increasing. While the fraction agreeing that the current peer review system is the best we can achieve remained stable at 34%, and that “peer review in journals needs a complete overhaul” was not statistically different from in 2007, the fraction disagreeing with the need for a complete overhaul fell (from 35% to 26%). The proportion agreeing that peer review holds back scientific communication rose a little (from 19% in 2007 to 26%), and the proportion believing peer review helps scholarly communication has fallen, although it remains high in absolute terms (75%, down from 85%). In a similar vein, the proportion seeing peer review as unsustainable because there are too few willing reviewers has risen (from 19% in 2009 to 28%).

## Attitudes to different types of peer review

Researchers express a clear **preference for conventional pre-publication review** (single or double blind), both as authors and as reviewers, when asked which type of review makes them more or less likely to submit to, or review for, a journal.

There is no clear-cut preference shown for **single compared to double blinded review** in this survey. This is different from 2007, when respondents were asked *how effective they thought* each type of review to be, when double blind was clearly preferred over single blind (71% vs 52% thinking it effective). The result is also markedly different from the results found in the Taylor & Francis survey (Q18), where respondents ranked double blind significantly higher than all other styles of review, and ranked single blind review their least preferred. The wording of the T&F question and the options were significantly different, however, and respondents may have been influenced by previously answering a series of questions that explicitly referenced problems (such as reviewer bias) often associated with single blind review. Conversely, the PRC result may have favourably influenced respondents towards single blind review by describing it as “traditional anonymous peer review” (in parenthesis after “Article is peer reviewed and the reviewers’ identities are not revealed”) where T&F2015 only used more neutral language. Another recent survey by the publishers Wiley also found a preference for double blind review (Warne 2016). It seems that surveyed author attitudes towards types of review are sensitive to language and presentation of the survey instrument, and results should be treated with caution.

**Open peer review** was ranked significantly behind blinded review by authors and reviewers (though ahead of single review in the T&F2015 survey). Nonetheless, support for open review appears to have grown between 2007/2009 and 2015. There is now about 50–70% of researchers supportive of it (i.e., said it would make them more likely to submit/review), or prepared to accept (i.e. were neutral towards) open review, though this falls to 35–55% if it includes publishing signed reviews alongside the paper. It seems to be the combination of signed reports that is the issue, since simply publishing the reviewers' names with the article doesn't have this effect. (The T&F2015 survey also had "open and published" reviews rated lower than "open" though the effect was not as large.) The roughly 50% acceptance of open review is also consistent with accounts from journals that offer reviewers the choice of remaining anonymous or being named (e.g., see Pulverer 2010).

**Attitudes towards different types of review vary between subject areas**, with Computer science/Maths/IT being the most willing to accept open review, and Materials sciences and Chemistry/Chemical engineering the most firmly wedded to traditional single-blind review. (There are indications that Neurosciences may have an even stronger willingness to accept open review, but the number of responses are too low for this finding to be statistically significant.)

## Author experience

Authors value the benefits of peer review in **improving their last published article**: rating how beneficial it was on a 0–10 scale, 64% rated it 7 or higher, giving an average rating of 6.8 out of 10. (T&F2015 asked the same question but using a 1–10 scale, and found 75% scored 7 or higher, and an average rating of 7.5 (STM).) There was no variation between disciplines or between STM and AHSS (confirmed in T&F2015) or by geography. Younger respondents saw it as slightly more beneficial, and the over-65s as slightly less beneficial than the average. (It's worth noting, incidentally, that a low score on the benefits of improving the article is not necessarily negative from the author's perspective: an excellently written paper by an experienced author may need little work and hence have little scope for improvement.)

It is not clear whether authors' view of the benefits of peer review to improving their articles has changed since 2007/2009 because the question was not asked in a comparable form. The results do, however, suggest that their views are similar: in 2007, 89% of authors said that peer review "had improved" their last published paper (without specifying the degree of improvement); in 2015 89% rated the benefit at 5 or higher on a 0–10 scale.

Multiple rounds of submission and reviewing as articles are rejected by one journal and then submitted to another are often seen as one of the current problems with peer review, causing delays to publication and increasing the burden on reviewers.

Critics of the negative effects of multiple reviewing may, however, overlook the benefits it may bring. Respondents whose paper had been previously rejected were asked if they believed the prior journal's peer review had helped them improve their article: 67% said that it had led to some or to substantial improvement. One respondent commented: "After two rejections at other journals, the prior reviews helped me reposition the results in a way that made the overall article more interesting and impactful".

## Reviewer experience

The majority of researchers in the survey had some experience of reviewing, with 86% having reviewed in the last 2–3 years. Active reviewers (those who estimated they reviewed 1 or more papers a month) comprised 72% of all respondents.

The modal **number of articles reviewed per month** was 1–2. It is difficult to compare this to previous surveys, because the data were collected differently: in 2007 the modal number of articles reviewed *per year* was 3–5, with an estimated mean of 8.

The **average time per article spent reviewing** was a median 5 hours, unchanged from 2007. This suggests that reviewers are not feeling it necessary to trim the time per review in response to increased reviewing (or other) pressures. There is a steady reduction in the mean time needed per review with increasing age from the under-36s (9.6h) to the over-65s (5.8 h). Similarly, reviewers in Europe, N America and Oceania take less time per review than those in Asia, C&S America and Africa. This may be due to increased experience (though there is no correlation with number of papers published), or other factors may be important (e.g. older researchers may have more other demands on their time; possible language barriers for Asian reviewers).

The **reasons given for reviewing** were unchanged from 2007. The most popular reasons related to social factors (93% playing a part as a member of the community; 75% reciprocating others' reviewing work) and intrinsic factors (83% enjoy helping improve the paper; 72% enjoy seeing work ahead of publication). Instrumental or self-interested reasons were much less cited (e.g., 16% to increase the chance of future acceptances; 24% to increase chance of a place on the editorial board; 42% to enhance reputation or further career).

Respondents were invited to give examples of how reviewing had enhanced or furthered their careers, and those who disagreed that this was a reason for them were invited to give examples of what could be done to help it become so. The main types of example included: (a) formal recognition or institutional requirements in promotion, performance appraisal, etc.; (b) improved scientific skills and knowledge; and (c) networking and visibility to editors and established members of the academic community.

Reasons for declining were headed by "too busy generally" (46%) and "paper was outside your area of expertise" (35%). Improvements in the matching of manuscripts to reviewers would be valuable here. On the other hand, only 13% said they had declined because they had too many prior reviewing commitments.

Comparison of "reasons for declining" with prior surveys is complicated by the fact that the different surveys filtered respondents differently before presenting them with the options. With that important caveat, it appears that reviewers being sent papers outside their area of interest has fallen since 2009 (when it was the most frequently given reason for declining), but remains much higher than in 2007; and that having too many prior reviewing commitments dropped steadily as a reason for declining from 2007 (56% of respondents) to 2015 (14%), while being "too busy generally" increased.

## Predicting satisfaction with peer review from demographic factors

Overall satisfaction or dissatisfaction with peer review cannot be usefully predicted from the demographic factors: a multivariate analysis shows that collectively the respondents' demographics predict only 5% of the observed variation in satisfaction (i.e.,  $R^2 = 0.05$ ). Or to put this another way, if you know that a researcher studies economics and is an Asian-based male aged 56–65, the best estimate of his satisfaction score (using Very satisfied = 1, Satisfied = 2... Very dissatisfied = 5) that you can make at a 95% confidence level is that it lies in the range 1.1–4.3, which clearly tells us almost nothing useful.

Demographic factors are also poor predictors of agreement with critical statements like "peer review in journals needs a complete overhaul".

There is also only a weak correlation between satisfaction and the number of articles published ( $p = 0.127$ ) and an even weaker correlation between satisfaction and the number of journals to which the respondent's last published article was submitted before it was accepted ( $p = 0.382$ ).

Or to turn this round, no useful generalisations can be made about the "dissatisfied" group in terms of their demographics or quantitative publishing statistics. We speculate that improving satisfaction levels would therefore depend on addressing the issues raised in this (and other) studies across the board: delays, (perceived) biases, low-quality and/or variable quality review, and so on.

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Peer review, the process by which researchers' reports of scientific and other scholarly advances are reviewed prior to (or in some cases, following) publication in research journals, is a matter of importance not just to researchers and journal publishers, but also to researcher funders, policy-makers, and indeed the general public.

Since the 1950s, peer review has been seen as central to scholarly communication, one of the key factors supporting confidence in the scientific literature – indeed, “peer reviewed journal” is widely seen as synonymous with credibility in scientific terms, and publishing in peer reviewed journals is essential to advancement in a scientific career.

The role played by peer review in engendering trust in the scientific literature was underlined in a recent study by the CIBER group, which “examined how trustworthiness is determined in the digital environment when it comes to scholarly reading, citing, and publishing”. (Nicholas et al. 2015). The authors report “that peer review is still the most trustworthy characteristic of all. ... peer review remains clearly the central pillar of trust. As one respondent explained, it provides ‘a degree of certainty about the quality of the product. It shows that someone has put in an effort and that it has been validated by a community of scholars’”.

This high-level support by researchers for peer review has been confirmed by other studies (such as the precursors to this current study, discussed in more detail below): for example, large majorities of researchers agree that peer review helps scholarly communication and that without peer review there would be no control in scholarly communication.

Nonetheless, in recent years peer review has come under scrutiny, with its effectiveness, validity, fairness, delays caused to publication, sustainability and cost-effectiveness all subject to challenge and debate. A further factor has been the so-called “crisis” in reproducibility, in which the findings in important scientific papers (for instance in cancer research) were found not to be reproducible. This is clearly a matter of considerable policy and public concern (and widely reported as such – for example, the Economist's October 2013 cover story “How science goes wrong”), and while it would be absurd to lay the whole (or even the majority of) blame for such shortcomings at the doors of peer review, there is an active debate on the changes that could be made to peer review to help address the issue.

At the same time, technology developments have progressed rapidly, supporting and enabling innovation and experimentation in peer review at a pace probably not seen since its beginnings in the 17th century. Innovations include the “soundness not significance” criteria pioneered by open access

journal *PLOS ONE*; various flavours of open peer review; evolution of the online submission and peer review managements systems; post-publication review; “portable” peer review; platforms to assign academic credit based on peer review activity; etc. Technology has also enabled services that arguably reduce the role of peer review, such as preprints repositories, post-publication “altmetrics”, and research sharing platforms.

(For a more detailed discussion of these trends and debates, see for example the Publishing Research Consortium's \*Introduction and Guide to Peer Review\* (Ware 2013) and the further reading listed therein.)

Against this background of debate, challenge and innovation, the Publishing Research Consortium felt it was important to establish whether researchers' opinions and attitudes towards peer review were changing. We take as our baseline two studies conducted some 7–9 years ago:

- “PRC2007” – the PRC's own study based on an international survey of researchers, conducted in 2007 (see Ware & Monkman 2008) (3040 responses; 7.7% response rate)
- “SaS2009” – a survey conducted in 2009 by Sense About Science (Sense About Science 2009). This repeated many of the questions used in PRC2007 for comparison, and included new questions about future improvements, public awareness and new pressures on the system. (4037 responses; 10% response rate)

This present survey was intended to deliver both a snapshot of current opinions and attitudes and also a comparison with these earlier studies. To achieve this, the overall methodology, sources and questionnaire design were kept as similar as possible to these studies.

We also compare some results with a third survey, conducted by the large scholarly publisher Taylor & Francis in 2015 (“T&F2015”). This survey (7330 responses) includes a few questions repeated from PRC2007 (though with different scoring scales), but also extends the questioning into more detailed areas of ethics in publishing. The sample also differs from PRC2007 and SaS2009 by having a much higher proportion of Humanities and Social Sciences (HSS). This study is therefore best seen as a valuable complement to the present survey, rather than a primary point of comparison.

Fieldwork was conducted in the last quarter of 2015. A total of 2004 completed responses was obtained (a response rate of 2.7%). This sample size implies a confidence interval (error margin) of  $\pm 2.2\%$  at a 95% confidence level. Further methodological details and the questionnaire text are given in the Appendix.

# Attitudes to peer review

# Overall satisfaction

Overall satisfaction remains strong, with 65% satisfied (the 66% shown in the graphic is due to rounding), and only 9% dissatisfied with peer review.

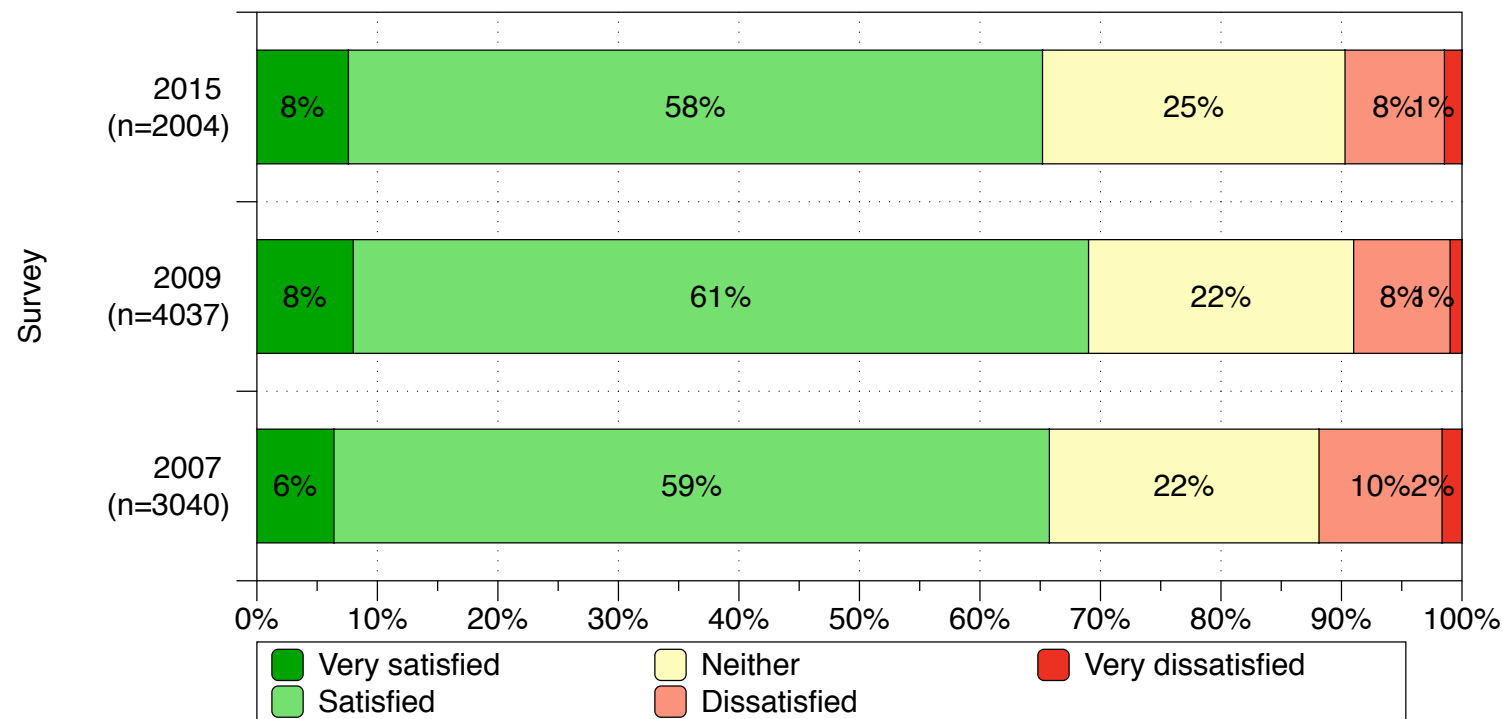
There have been **no material changes in overall satisfaction** between 2007 and 2015

There are **very few variations in level of overall satisfaction by any of the demographic factors** (see next slide) (this was also the case in 2007):

- it does not vary by age or gender. The former is a little surprising, given responses to some later questions. (For example, younger respondents are more likely than older to say peer review needs a complete overhaul; conversely, younger respondents rate the benefit of peer review in improving their articles higher than older respondents.)

- there is little variation by broad discipline, except for the social sciences (58% satisfied/very satisfied vs average 65%)
- by subject groupings there are few statistically significant variances, but the Biochemistry/Genetic & molecular biology/Immunology & microbiology grouping is less satisfied (55% vs 65%)
- regionally, respondents from Europe (58%) and N America (60%) are less satisfied than the average, while this from Asia (76%) and Africa (80%) are more satisfied than average. All regions, however, have a majority that is satisfied.
- (Note: the geographic distribution varied a little between the 2015 and 2007/2009 surveys (owing to use of different source lists, see *Demographics* for details). Using weighted responses to allow for this has only a very slight effect and does not change the overall conclusion that there has been no material changes.)

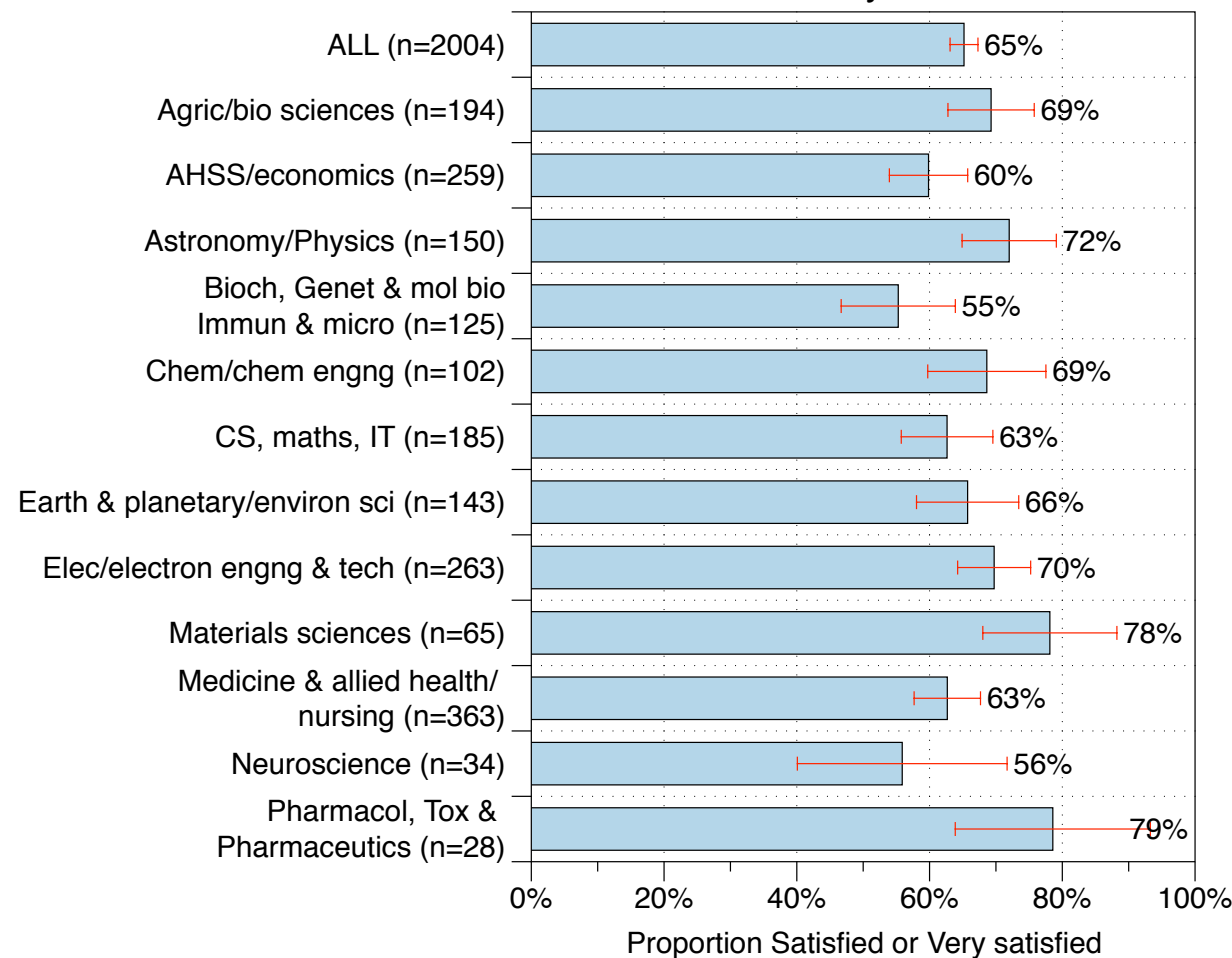
Q: Overall, how satisfied are you with the peer review system used by scholarly journals? (q1 Base: All)



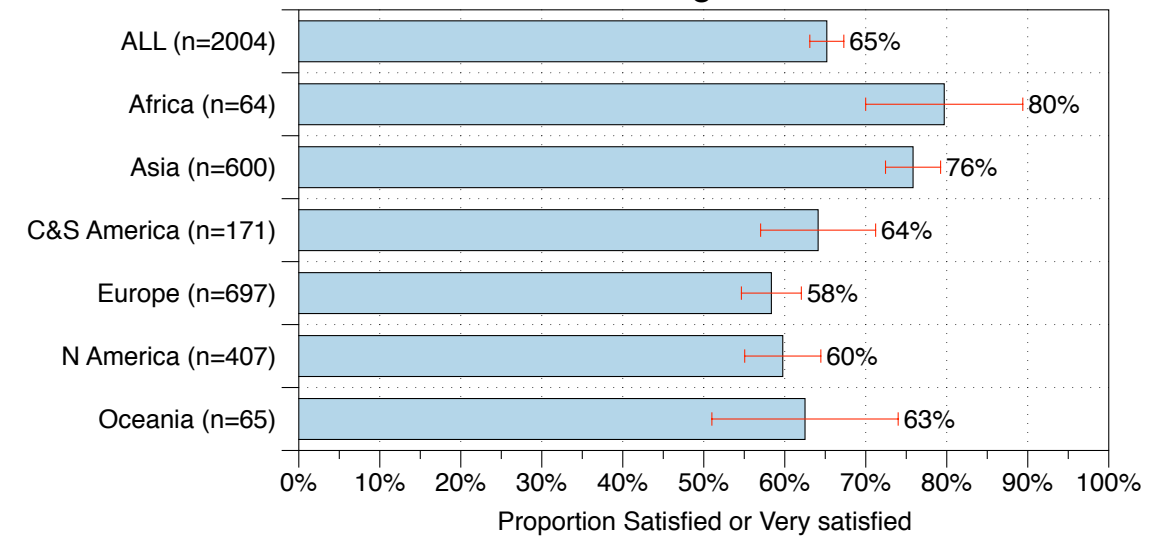


# Overall satisfaction, breakdown by demographics

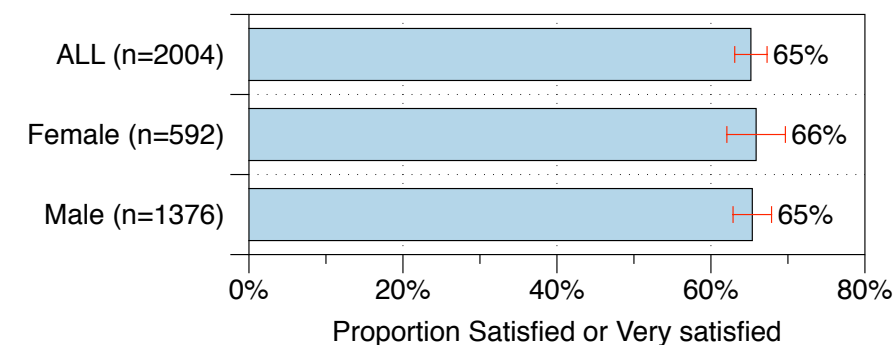
## Subject



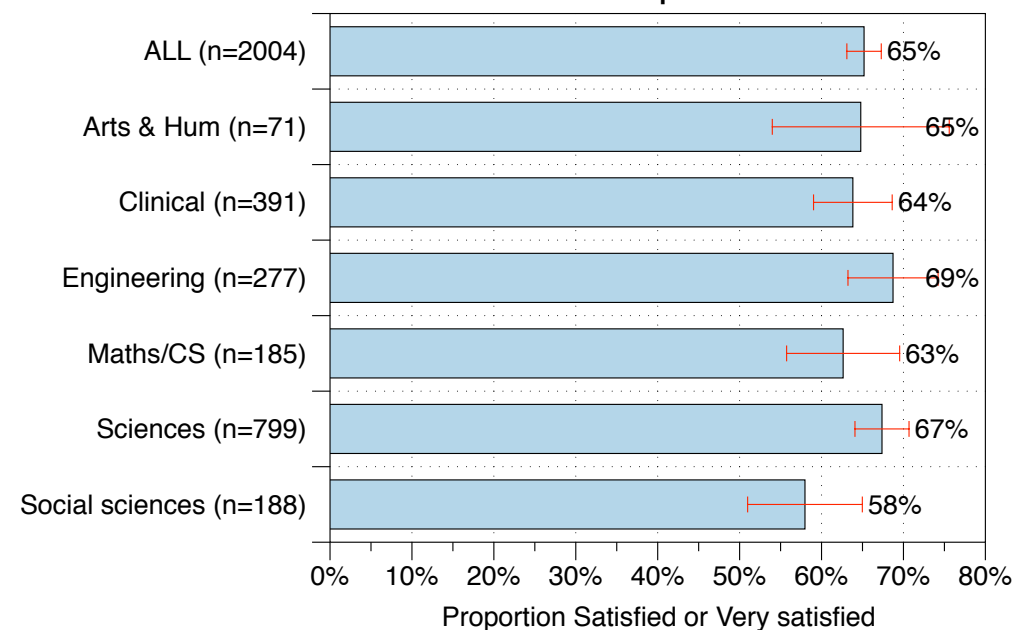
## Region



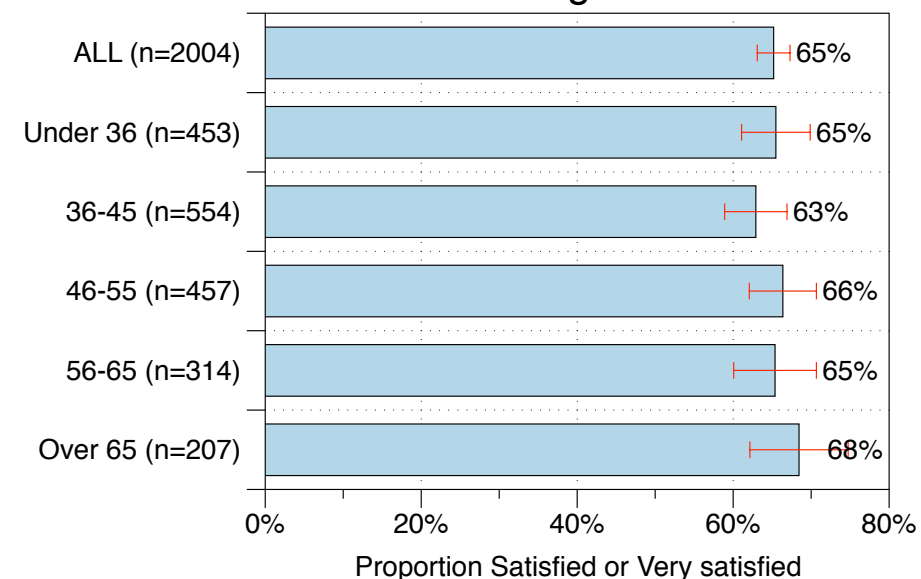
## Gender



## Discipline



## Age



Q: Overall, how satisfied are you with the peer review system used by scholarly journals? (q1 Base: All). Error bars show the 95% confidence level throughout

# Attitudes towards peer review

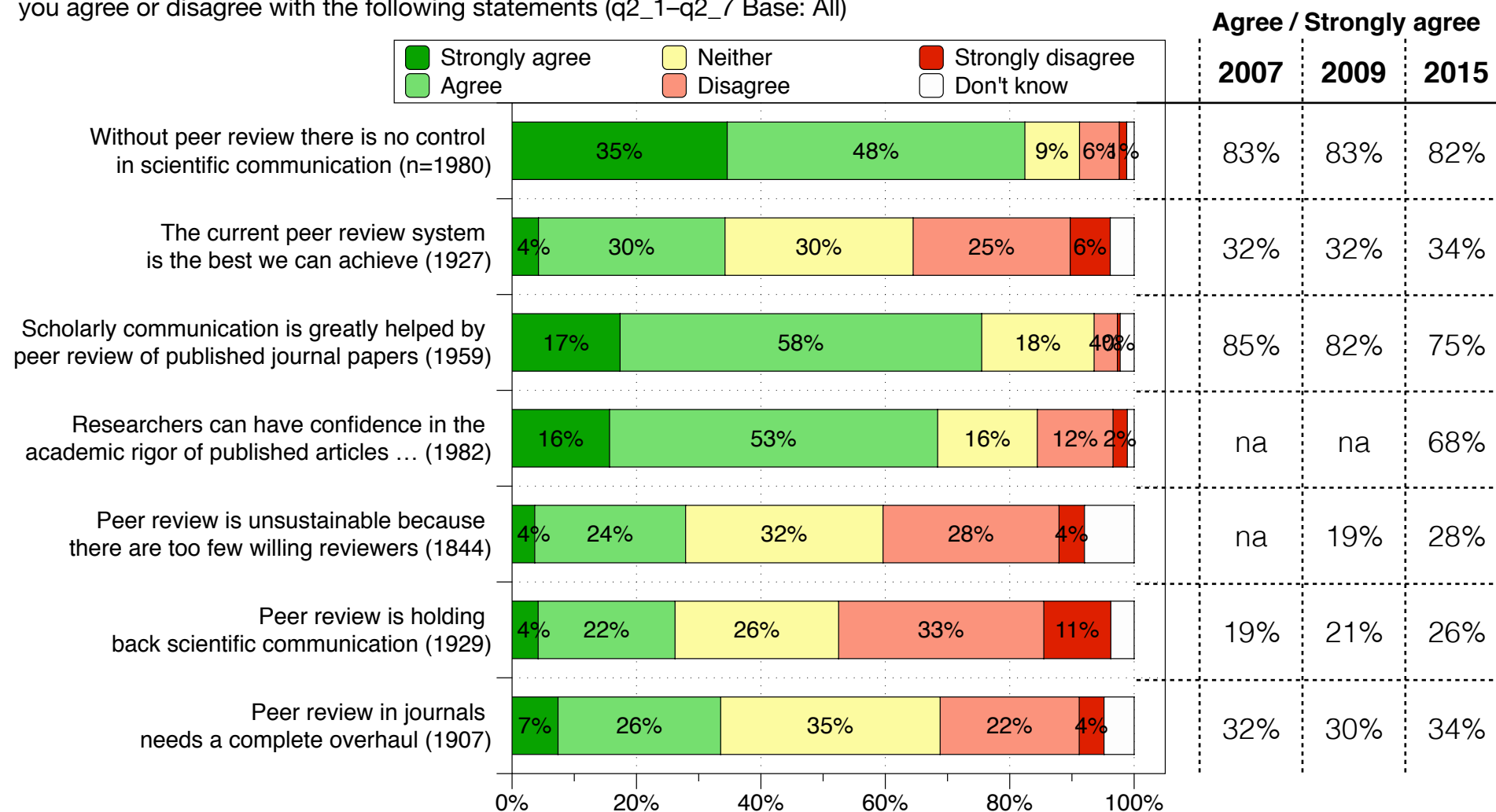
Peer review remains widely supported: 82% agree that “without peer review there is no control in scientific communication”.

Many statements show remarkable consistency between surveys. The exceptions, however, tend to suggest a growing desire for improvements in peer review:

- \* belief that peer review helps scholarly communication has fallen, though still high (85% → 75% A/SA)
- \* the proportion thinking peer review holds back scientific communication has risen (19% → 26% A/SA)
- \* the proportion seeing peer review as unsustainable has risen (19% → 28% A/SA)
- \* disagreement with peer review needing a complete overhaul has fallen (35% → 26% D/SD)

The picture here is unclear, however, with the fraction agreeing that the current system is the best achievable remaining constant

To better understand your attitudes towards research and scholarly publishing, please indicate how much you agree or disagree with the following statements (q2\_1–q2\_7 Base: All)



## Researchers' reasons for **disagreeing** with the specified statements

### Peer review in journals needs a complete overhaul

- “ Peer review serves a purpose in vetting articles - there are known problems that should be addressed, but the system as a whole still works. (Electrical / Electronic Engineering, 26-35, USA)
- “ The system is far from perfect--too few reviewers, variability in quality of reviews, and potential biases, but still offers quality appraisal of the strengths and weaknesses of research that benefit the authors (Medicine and Allied Health, 46-55, USA)
- “ There needs to be some quality assurance step to validate scientific papers (Biological Sciences, 56-65, USA)
- “ Peer review is the best defense against bad science. (Psychology, Prefer not to say, USA)
- “ I would not say that the system needs a "complete" overhaul. The peer review system always can be improved. (Arts and Humanities, 56-65, Chile)
- “ It needs reasonable and wise changes (None of the above, 56-65, Costa Rica)
- “ "Complete Overhaul" seems a bit strong. The system could be tweaked to ensure faster turn around and to create more visibility into the process, but complete overhaul seems unnecessary. And, complete overhaul to what? (None of the above, 36-45, USA)
- “ Peer review is the more reliable method to publish scientific research. I only think that the process is still too much slow. (Computer Sciences / IT, 26-35, Brazil)
- “ I think the system generally works, despite there being some problems such as the lag time of submission to actual publication. (Psychology, 26-35, USA)
- “ There is always room for improvement but not a complete overhaul. The current system emanated from research and has several good aspects. (Medicine and Allied Health, 46-55, Nigeria)

### Peer review is unsustainable because there are too few willing reviewers

- “ Good Journals usually have access to many willing reviewers (Electrical / Electronic Engineering, 36-45, USA)
- “ Having served as an associate editor for a major journal, I know that there are reviewers willing and available to do the work. The main problem appears to be maintaining adequate databases to best determine, and then contact, appropriate reviewers. (Biological Sciences, 56-65, USA)
- “ The majority of tenure-track probationary faculty are required to be involved in service to their profession. It's just a matter of finding those in need to augment the reviewer pool. (Agriculture, 46-55, USA)
- “ Peer review is an essential process of the scientific communication process. Doing away with it simply because there are few willing reviewers will impede quality of the work being put out. (Chemistry, 36-45, USA)
- “ While I am not privy to the exact demand for reviewers of the primary journals in my field, I have not seen nor heard any strong evidence that the number of available reviewers is strongly lacking. Most if not all of my peers are generally willing to share their time as their "civic responsibility" for the process of disseminating results via publication. (Astronomy, 36-45, USA)
- “ I know many qualified scientists who could review but are not contacted. This may be a lack of knowledge of who it out here. (Earth and Planetary Sciences, 36-45, USA)
- “ I am not sure that there is a lack of reviewers; for me the time pressure, deadline to send the review is a much greater problem (Medicine and Allied Health, Over 65, Belgium)
- “ There are many researchers who are willing to do reviewer's job but did not get invitation. (Medicine and Allied Health, 36-45, China)
- “ Since a paper on average has 3-4 authors, you only have to review ~ 1/4 as many papers as you contribute to, which is reasonable. (Physics, 26-35, Norway)
- “ There are many willing reviewers but the time limit given to a review may not be agreeable to them. (Arts and Humanities, Prefer not to say, Malaysia)

Q: You indicated that you disagree with the statement [XX]. What is the main reason why you disagree? (q2d)

## Researchers' reasons for **disagreeing** with the specified statements

### Scholarly communication is greatly helped by peer review of published journal papers

- “ Most of the papers I read have not been through peer review yet. My papers have sometimes been a bit improved by anonymous referees, but I think those same people would have written to me with their comments anyway. (Mathematics, Prefer not to say, United Kingdom)
- “ conventional unwisdom preached by the incrowd= peer review (Medicine and Allied Health, Over 65, USA)
- “ Researchers have their bias and will reject papers that run counter to them. Also, I have submitted papers whose ideas were stolen by the reviewer and used for his own publication (Medicine and Allied Health, 56-65, USA)
- “ Many reviewers use the forum to push ideas that are not themselves defended, idea timeliness is more important than results, few reviewers are involved in practice. (Electrical / Electronic Engineering, 56-65, USA)
- “ The peer review process often slows down publication of scholarly work to such an extent that novel findings see the light of day only very late. (Economics, 36-45, Germany)
- “ Journal paper publication is too slow. More information is gained by attending conferences. (Electrical / Electronic Engineering, 46-55, USA)
- “ The peer review process takes a lot of time and resources, which could be rationalized and used better. (Environmental Sciences, 26-35, Belgium)
- “ I think there are other ways to help scholarly communication (Business/Finance, 36-45, France)

### The current peer review system is the best we can achieve

- “ Anonymity is counterproductive (Biological Sciences, 36-45, USA)
- “ I think we can improve training and support for reviewer to make it better (Medicine and Allied Health, 36-45, USA)
- “ we could, for example, count peer reviewing on tenure, promotion evaluations, merit pay decisions, and lateral hiring. (Social Science, Over 65, USA)
- “ In my experience it the peer review, which is absolutely crucial, is prone to reviewers' biases, frequently not rigorous and sometimes not competent. (Mathematics, 46-55, USA)
- “ Some original results will not be accepted by the current peer review system. The review time is too long for some papers. (Electrical / Electronic Engineering, 36-45, China)
- “ The review process is highly biased. The research papers from young researchers is very difficulty to accept. (Electrical / Electronic Engineering, 26-35, India)
- “ It is necessary to define clearly the characteristics of good, useful reviewing and apply them to the reviewing process. The variety in the quality of current reviews is enormous. (Social Science, 56-65, Italy)
- “ Methodologically questionable Experts disagree Confidentiality of review: Questionable practice (Social Science, Over 65, Switzerland)
- “ It is inefficient, takes too long (Engineering and Technology, 46-55, Mexico)
- “ Because sometimes there are conflict of interest of some reviewers that harm the follow up of an unbiased peer review system. This may affect the work of a non-established research group. (Agriculture, 26-35, Brazil)



33% agreed – 26% disagreed

## AGREE

- “ The whole publishing sphere is broken. From the publish or perish, minimum publishable unit, to the peer review, to the high cost of publishing. (Biological Sciences, 36-45, USA)
- “ Too many methodologically sound studies are being rejected. This discourages young researchers and ruins careers. (Psychology, 56-65, USA)
- “ Takes too long to get something reviewed and published and you don't know if the review was not influenced by bias (Medicine and Allied Health, 56-65, USA)
- “ Basically all of the empirical studies of peer review show that it's largely random and biased. (Computer Sciences / IT, 26-35, New Zealand)
- “ More efficient way to review the papers exists... (Earth and Planetary Sciences, 36-45, Taiwan)
- “ Peer review, combined with rankings of journals, helps publishers not researchers (Social Science, Over 65, Switzerland)
- “ nobody holds reviewers accountable for what they say (Computer Sciences / IT, 26-35, Germany)
- “ Yes, they do. As I mentioned in the previous answer, the current review process, even in mainstream journals, is tainted by politics and personal relationship, all under the cover of anonymity. (Computer Sciences / IT, 46-55, Brazil)
- “ There needs to be transparent open process that include post publication review of articles and an editorial process to ensure validity before publication. Too often reviewers write the article they would have written not evaluate the article. (Medicine and Allied Health, 36-45, South Africa)
- “ Ensure that the evaluation is fair. Every review should be taken seriously. Acquaintance should be avoid. everyone should be response for his words (Medicine and Allied Health, 36-45, China).

## DISAGREE

- “ Peer review serves a purpose in vetting articles - there are known problems that should be addressed, but the system as a whole still works. (Electrical / Electronic Engineering, 26-35, USA)
- “ The system is far from perfect--too few reviewers, variability in quality of reviews, and potential biases, but still offers quality appraisal of the strengths and weaknesses of research that benefit the authors (Medicine and Allied Health, 46-55, USA)
- “ There needs to be some quality assurance step to validate scientific papers (Biological Sciences, 56-65, USA)
- “ Peer review is the best defense against bad science. (Psychology, Prefer not to say, USA)
- “ I would not say that the system needs a "complete" overhaul. The peer review system always can be improved. (Arts and Humanities, 56-65, Chile)
- “ It needs reasonable and wise changes (None of the above, 56-65, Costa Rica)
- “ "Complete Overhaul" seems a bit strong. The system could be tweaked to ensure faster turn around and to create more visibility into the process, but complete overhaul seems unnecessary. And, complete overhaul to what? (None of the above, 36-45, USA)
- “ Peer review is the more reliable method to publish scientific research. I only think that the process is still too much slow. (Computer Sciences / IT, 26-35, Brazil)
- “ I think the system generally works, despite there being some problems such as the lag time of submission to actual publication. (Psychology, 26-35, USA)
- “ There is always room for improvement but not a complete overhaul. The current system emanated from research and has several good aspects. (Medicine and Allied Health, 46-55, Nigeria)



26% agreed – 44% disagreed

## AGREE

- “ Worthy scholarly work is often delayed or even prevented from appearing. This is particularly true for groundbreaking work. (Medicine and Allied Health, 56-65, USA)
- “ It is slowing down the process, and making some work unavailable (or behind a pay wall) to many scientists. The value added by the journals is very small, and what value is added is given by unpaid referees, yet the journals later charge for access to those papers. (Mathematics, Prefer not to say, United Kingdom)
- “ Because it prevents the publication of papers that could make a contribution. Publish the paper, then let the community decide what to do with it. (None of the above, 46-55, Canada)
- “ publications depends largely on reviewers' opinions and orientation (very difficult to realistically obtain objective reviewing) and it takes too long until papers are published. (Arts and Humanities, 46-55, Cyprus)
- “ Because it is a biased means of assessing a scientific paper; it is for editors, not reviewers to determine what is published in their journals. (Medicine and Allied Health, 56-65, United Kingdom)
- “ Open scientific communications takes more time because of the rigid peer review system. (Environmental Sciences, 26-35, Belgium)
- “ It takes long time for the process. Evaluation of the reviewers many times become not appropriate. It discourages the researchers. (Engineering and Technology, 56-65, India)
- “ Editors and reviewers are too often too subjective, don't declare true conflicts of interest and delay advancement of science (sometimes by years!). A more self-organising open community review system is more appropriate, with editors working more openly as curators. (Computer Sciences / IT, 36-45, Portugal)
- “ Because there are numerous valuable ideas and findings that are kept from readers because of the peer review process and politics at the journals. (Medicine and Allied Health, 56-65, USA)

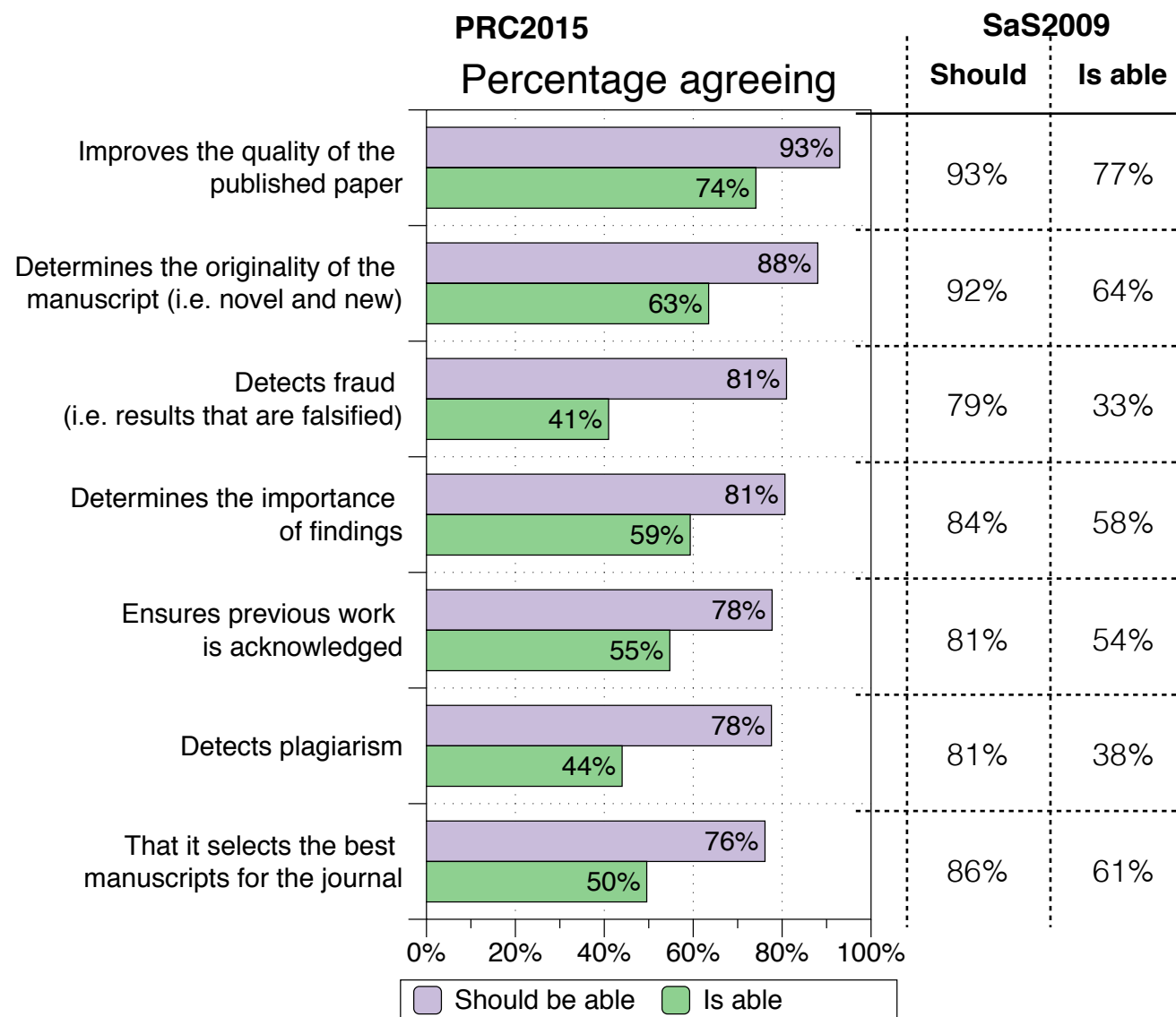
## DISAGREE

- “ I think that we can learn from our peers. Yes, there have been some ground-breaking works that were rejected multiple times before acceptance. That's the exception, rather than the rule in my opinion. (Social Science, 56-65, USA)
- “ Several weeks of review process is not that long comparing with the time spent on research (Electrical / Electronic Engineering, 46-55, USA)
- “ Peer review is essential in scientific communications. So, even if it takes some time for the reviewers to evaluate an article, communications without peer review are not scientific communication. (Chemistry, 26-35, Brazil)
- “ Why would it? Usually the author receives free feedback (which he or she should appreciate) and can communicate through the reviewing editor with the reviewer. (Arts and Humanities, Prefer not to say, Belgium)
- “ Quality control of scientific publications is crucial for maintaining minimal standards (Medicine and Allied Health, Over 65, Israel)
- “ From my experience - at least for some papers - peer review was extremely helpful to improve the paper. Although it takes time to satisfy some reviewers... (Electrical/Electronic Engineering, 26-35, Germany)
- “ ..., it is rather facilitating scientific communication with a common acceptable ground. Otherwise, the communication will not be scientific. (Medicine and Allied Health, 26-35, Ethiopia)
- “ Peer review is not holding back scientific communication, it is rather help moving it forward by filtering off unscientific "background noise". (Chemistry, 36-45, United Kingdom)
- “ I think that the opposite is the case. Peer review helps the improvement of the quality of the research. (Social Science, 46-55, Greece)

# Purpose & effectiveness of peer review

Researchers rank improving the quality of the published paper and determining the originality of the manuscript at the top of the list of things peer review should be able to do, and the list of things it is able to do. This is unchanged since 2009.

Confidence in peer review's ability to detect fraud and plagiarism has increased, though it remains lower than for the other benefits. These also show the biggest gaps between what peer review is thought able to do, and what it should be able to do.



## Changes from 2009 (not asked in 2007)

- the gaps between “should be able” and “is able” have all remained roughly stable or shrank between 2009 and 2015 as a result of higher scores on the “is able” side
- increased confidence in peer review to detect fraud (33% → 41%) and plagiarism (38% → 44%)
- decreased belief that purpose of peer review is to select best mss for the journal (86% → 76%; drops from 3rd to 7th ranked) – may be understandable in terms of the spread of the megajournal “sound science” reviewing model?

The T&F2015 survey asked very similar questions but used 1–10 rating scale for responses, and hence the results are not directly comparable. The overall pattern, however, appears similar.

Q: There are some differences on what individuals believe peer review should do, is currently able to do, and how well it meets these objectives. To what extent do you agree or disagree that ... (Strongly agree/Agree/Neither/Disagree/Strongly disagree (pr1\_1 – pr1\_7; pr2\_1 – pr2\_7 Base: All)).

## A selection of the 403 responses

- “Uphold research quality standards -- blind studies, reproducibility, etc. (Computer Sciences / IT, 36-45, USA)
- “Influences the quality of the work itself being done. People take more care in how they conduct their research when they know they are planning to publish it. (Engineering and Technology, 46-55, USA)
- “Determine the soundness and adequacy of experiments performed. (Agriculture, 46-55, Brazil)
- “Consolidates a scientific community (Immunology and Microbiology, 46-55, Colombia)
- “To achieve the above without imposing excessive delays in publication (e.g. by demanding that "related" but non-essential scientific questions be addressed) (Medicine and Allied Health, 56-65, USA)
- “The peer review process should assure repeatability of the experiments/protocols and importance of results for advancement in science and technology. (None of the above, 36-45, Italy)
- “Comments should be practical and in some ways guide the authors to advance to the next phase. (Immunology and Microbiology, 56-65, USA)
- “Provide developmental advice on clear and cogent writing and argumentation if needed. (Arts and Humanities, 46-55, USA)
- “Accurate description of methodology so the research can be repeated and proven to be correct. (Medicine and Allied Health, Over 65, USA)
- “Evaluate the quality of the reviewers. For example, how well did they determine the importance of findings? detect plagiarism? detect fraud? etc... (Computer Sciences / IT, Under 36, USA)
- “Provide feedback to authors in a constructive manner, even if the work is not accepted. (None of the above, 36-45, USA)
- “To ensure that there is a contribution to knowledge, of any kind, rather than emphasising the sensational that will lead to lots of noise on the internet. (Social Science, 56-65, Canada)
- “To aid the authors to produce a high quality piece of research in a way that other researchers can follow and have access to. (Earth and Planetary Sciences, 36-45, USA)
- “Providing an outlet for competing views of the science. Many journals are too biased to a narrow clientele. (Environmental Sciences, Over 65, USA)
- “Some times an article is extremely important to one country but it will only be consider important in this country if it is publish by an international journal,and the reviews, usually don't have this concept. (Biological Sciences, 46-55, Brazil)
- “Detects quantitative or logical errors (i.e., both "honest mistakes" and "overly wishful thinking" from the authors). (Astronomy, 46-55, USA)
- “It is my opinion that peer review should not police or determine the content of publications. Peer review should only review compliance to journal standards and determine sound scientific practices. (Materials Science, 36-45, USA)
- “To encourage innovation - generally this is frowned upon and tends towards a conservative approach to science (Medicine and Allied Health, 56-65, United Kingdom)
- “Quality and appropriateness of methodology and analysis techniques is not listed here as explicitly as it should be. (Psychology, 36-45, Germany)
- “The peer review could give new ideas for future research. (Biological Sciences, Over 65, Finland)

# Purpose of peer review, by Subjects

There is relatively little variation in researchers' opinions on what *should be* the purpose of peer review.

*"That it selects the best manuscripts for the journal"* is the most divisive statement, with the widest spread of support (though a clear majority still agrees in every subject, ranging from 65% in Neuroscience to 82% in AHSS/economics)

Differences from overall percentage agreeing or strongly agreeing that peer review should be able to do stated objective

Statement	ALL	Agric/bio sciences	AHSS/economics	Astro/Physics	Biochem, Genet & mol bio/Immun & micro	Chem/chem engng	CS, maths, IT	Earth & planetary / environ sci	Elec/electron engng & tech	Materials sciences	Medicine & allied health/nursing	Neuro-science	Pharmacol Tox & Pharmaceutics
n	2004	193	257	150	121	101	181	141	261	65	360	33	28
That it selects the best manuscripts for the journal	76%	2%	6%	-8%	-7%	-4%	1%	-3%	3%	4%	2%	-11%	-1%
Determines the originality of the manuscript (i.e. novel and new)	88%	-2%	-3%	4%	2%	-2%	3%	2%	3%	6%	-2%	-3%	1%
Improves the quality of the published paper	93%	0%	2%	-2%	1%	-1%	-4%	3%	-2%	-1%	2%	4%	-7%
Ensures previous work is acknowledged	78%	2%	-3%	2%	2%	-5%	1%	1%	3%	8%	-2%	5%	8%
Determines the importance of findings	81%	-2%	-3%	-3%	-1%	7%	3%	2%	-0%	6%	2%	2%	2%
Detects plagiarism	78%	-2%	-2%	1%	0%	1%	4%	4%	8%	4%	-5%	-1%	-3%
Detects fraud (i.e. results that are falsified)	81%	-4%	-2%	-2%	-2%	-1%	4%	4%	7%	7%	-3%	-5%	1%

Q: There are some differences on what individuals believe peer review should do, is currently able to do, and how well it meets these objectives. To what extent do you agree or disagree that ... the following objectives SHOULD BE the purpose of peer review (pr1\_1 – pr1\_7 Base: All)

# Effectiveness of peer review, by Subjects

Respondents from materials sciences appear more confident than other subjects about the effectiveness of peer review. Conversely, those in Medicine etc. and Biochemistry etc. appear to hold less positive views about its effectiveness.

The objectives “*detects plagiarism*” and “*detects fraud*” show the widest spread of opinion on effectiveness among Subjects (ranging from 36% (Medicine/Allied health etc.) to 53% (Electrical/electronic engineering etc.) for plagiarism, and from 33% (Medicine/Allied health etc.) to 52% (Materials science) for fraud)

Differences from overall percentage agreeing or strongly agreeing that peer review is currently able to do stated objective

Statement	ALL	Agric/bio sciences	AHSS/economics	Astro/Physics	Biochem, Genet & mol bio/Immun & micro	Chem/chem engng	CS, maths, IT	Earth & planetary / environ sci	Elec/electron engng & tech	Materials sciences	Medicine & allied health/nursing	Neuro-science	Pharmacol Tox & Pharmaceutics
n	2004	186	251	140	112	98	178	137	254	64	347	31	27
That it selects the best manuscripts for the journal	50%	2%	-1%	-3%	-6%	5%	1%	0%	4%	9%	-1%	-5%	4%
Determines the originality of the manuscript (i.e. novel and new)	63%	-1%	-3%	-2%	-4%	-3%	5%	0%	2%	10%	1%	-11%	4%
Improves the quality of the published paper	74%	0%	-3%	3%	-4%	3%	-3%	8%	-2%	3%	1%	5%	1%
Ensures previous work is acknowledged	55%	-0%	0%	6%	-9%	-4%	4%	5%	2%	18%	-6%	1%	20%
Determines the importance of findings	59%	4%	-5%	0%	-4%	7%	1%	-1%	-0%	8%	1%	2%	1%
Detects plagiarism	44%	2%	-5%	5%	-5%	4%	8%	2%	9%	7%	-8%	3%	-5%
Detects fraud (i.e. results that are falsified)	41%	2%	-8%	8%	-6%	2%	11%	-0%	9%	11%	-8%	-9%	6%

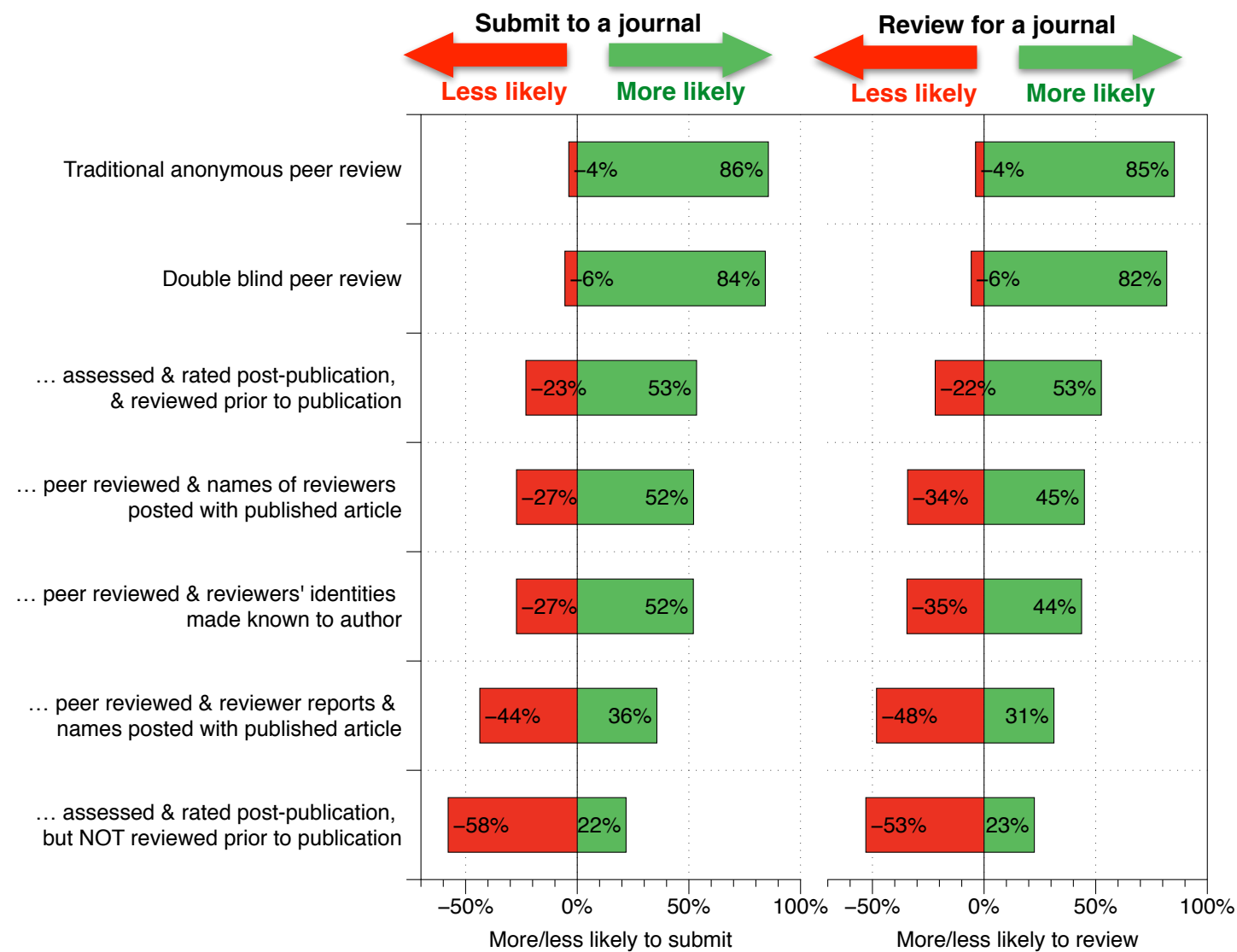
Q: There are some differences on what individuals believe peer review should do, is currently able to do, and how well it meets these objectives. To what extent do you agree or disagree that ... peer review CURRENTLY DOES the following? (pr2\_1 – pr2\_7 Base: All)



# Researcher attitudes to different types of peer review

Researchers retain clear preference for single or double blinded pre-publication review, both as authors and as reviewers.

About 50–70% of researchers appear comfortable with (VL/L) or prepared to accept (N) open peer review, though this falls to 35–55% if it includes publishing signed reviews alongside the paper. It seems to be the combination of signed reports that is the issue, since simply publishing the reviewers' names with the article doesn't have this effect.



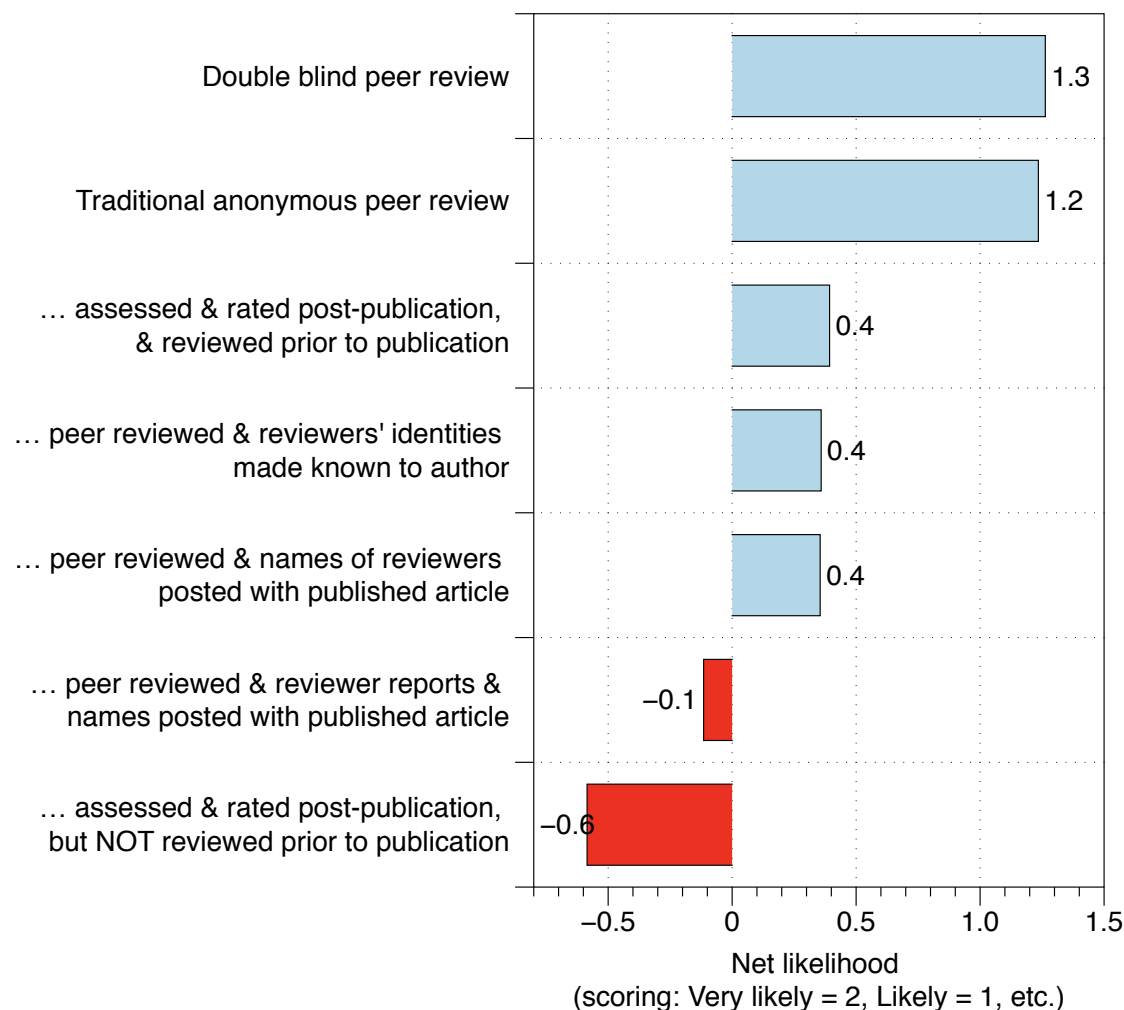
Q: There are different types of peer review, each type has the potential to impact behavior and outcomes. How likely is it that you would SUBMIT a research article to a journal that conducted the following form of assessment (pr9 Base: All; n=2004) / How likely is it that you would REVIEW or ASSESS a research article for a journal that conducted the following form of assessment (pr10 Base: All)

# Authors' attitudes to different types of peer review

Authors in the PRC survey continue to prefer conventional peer review, whether single or double blind, with no statistically significant preference for either blinding approach.

The T&F2015 survey reported a substantially greater preference for double over single blind; however, we believe this is most likely to be attributable to differences in approach to survey design rather than reflecting actual differences in opinion between the T&F2015 and PRC2015 respondents' views

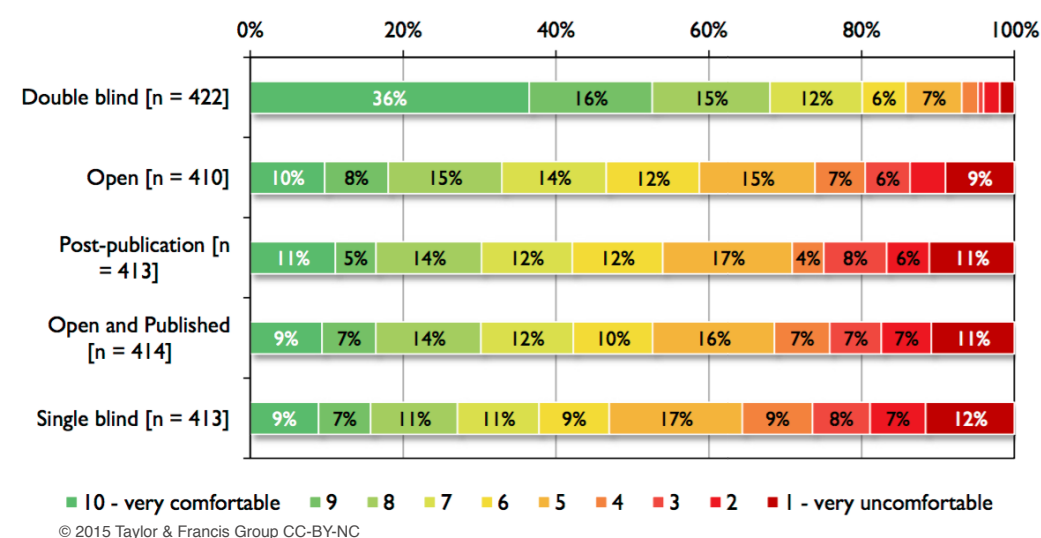
Net likelihood researcher would submit



(See questionnaire for full text of statements)

The Taylor & Francis survey (2015) found a different rank order of preferences, with double blind still at the top but single blind review the least preferred. The graphic below shows the results for STM respondents; for HSS the preference for double blind was even stronger. The wording was, however, significantly different (see below) – and probably more important – respondents had previously answered a series of questions that explicitly referenced problems often associated with single blind review, such as “how capable are each of the following types of peer review of preventing discrimination based on aspects of the author's identity (such as gender, nationality or seniority)?”

T&F2015 Q18: As an author: suppose you could choose the method of peer review for your paper. Please rate how review for your paper. Please rate how comfortable you are with each of the following methods. [STM respondents]

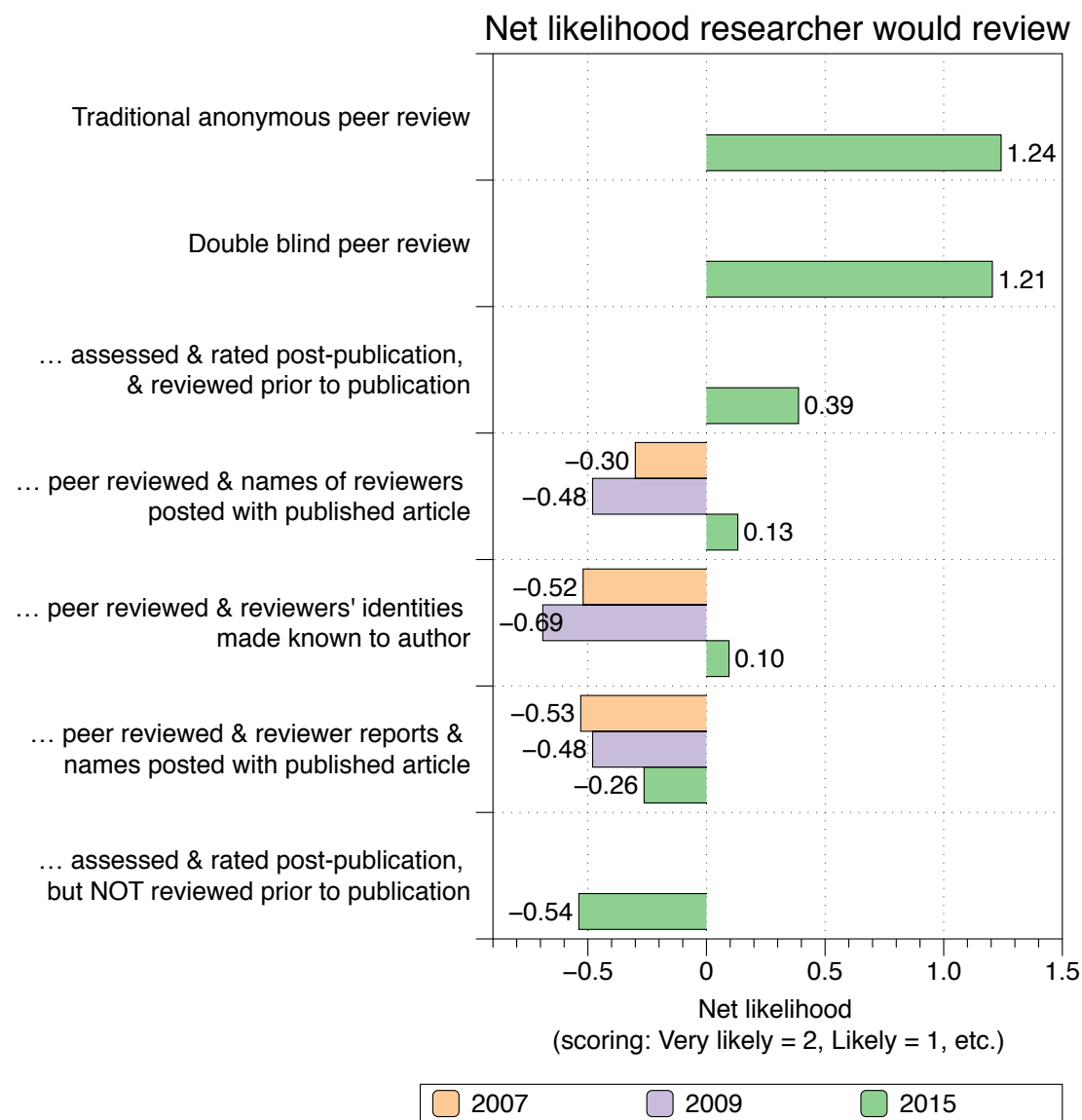


# Reviewers' attitudes to different types of peer review

Overall a very similar pattern to that for researchers in their roles as authors: a clear preference for traditional single-blind and double-blind review, and suspicion of post-publication peer review.

Reviewers appear to have more positive attitudes to open review than in 2007/09 (but see caveat in the footnote):

- having the reviewer's name known to the author, and having the reviewer's name posted alongside the paper have switched from being net deterrents to slightly positive factors
- having the reviewer's report published with the paper remains a net negative, but significantly less so than in 2007/09



Q: How likely is it that you would REVIEW or ASSESS a research article for a journal that conducted the following form of assessment (pr10 Base: All; n=1741–1965).  
Note that wordings of the questions and rating scales were similar but not identical across the three surveys, and this may have affected responses

# Willingness to submit, by type of review & Subject

There are differences in attitude towards types of peer review among some different subjects.

The types of review that show the largest variation are (ignoring Neuroscience and Pharmacology etc. because of their low number of responses) were: “peer reviewed & names of reviewers posted with published article”, “peer reviewed & reviewer reports & names posted with published article”, and “assessed & rated post-publication, & reviewed prior to publication” with in each case CS/maths/IT being the most willing and Materials science the least willing. Chemistry & chemical engineering is similar to Materials science in emphasising the preference for single-blind review and having lower than average preferences for open review.

Differences from overall percentage Likely or Very likely to SUBMIT

Statement	ALL	Agric/bio sciences	AHSS/ economics	Astro/ Physics	Biochem, Genet & mol bio/ Immun & micro	Chem/ chem engng	CS, maths, IT	Earth & planetary / environ sci	Elec/ electron engng & tech	Materials sciences	Medicine & allied health/ nursing	Neuro-science	Pharmaco I Tox & Pharma-ceutics
n		194	258	146	122	102	180	141	260	65	360	34	28
Traditional anonymous peer review	86%	-3%	1%	4%	-0%	7%	3%	-4%	-2%	2%	1%	-15%	-7%
Double blind peer review	84%	-1%	10%	-6%	5%	-11%	0%	-6%	-4%	-9%	5%	-9%	-6%
... peer reviewed & reviewers' identities made known to author	52%	-3%	-4%	-2%	-1%	-10%	1%	4%	5%	-7%	4%	9%	-6%
... peer reviewed & names of reviewers posted with published article	52%	-1%	-3%	-5%	-3%	-9%	7%	6%	1%	-17%	5%	10%	2%
... peer reviewed & reviewer reports & names posted with published article	36%	-4%	-2%	-6%	3%	-12%	8%	-3%	1%	-14%	6%	11%	0%
... assessed & rated post-publication, & reviewed prior to publication	53%	-5%	-3%	3%	0%	-7%	11%	-8%	2%	-10%	2%	13%	-3%
... assessed & rated post-publication, but NOT reviewed prior to publication	22%	-8%	-5%	-2%	-8%	-4%	10%	-5%	12%	-7%	1%	15%	-10%

Q: How likely is it that you would SUBMIT a research article to a journal that conducted the following form of assessment (pr9\_1–pr9\_8 Base: All, excluding Don't knows/unsures)

# Willingness to review, by type of review & Subject

As with authors, reviewers show differences in attitude towards types of peer review among some different subjects.

The pattern is similar to that for authors, but the spreads are even wider. The types of review that show the largest variation are (ignoring Neuroscience and Pharmacology etc. because of their low number of responses) were: “peer reviewed & names of reviewers posted with published article”, “assessed & rated post-publication, & reviewed prior to publication”, and “peer reviewed & reviewer reports & names posted with published article”, with in each case CS/math/IT being the most willing and Materials science (followed by Chemistry/chemical engineering) the least willing.

Differences from overall percentage Likely or Very likely to REVIEW

Statement	ALL	Agric/bio sciences	AHSS/economics	Astro/Physics	Biochem, Genet & mol bio/Immun & micro	Chem/chem engng	CS, maths, IT	Earth & planetary / environ sci	Elec/electron engng & tech	Materials sciences	Medicine & allied health/nursing	Neuroscience	Pharmacology Tox & Pharmaceuticals
		194	255	146	122	100	180	142	256	65	356	34	28
Traditional anonymous peer review	85%	-4%	4%	5%	-4%	4%	-0%	-5%	0%	-1%	2%	-9%	-7%
Double blind peer review	82%	-4%	9%	-1%	3%	-3%	0%	-7%	-5%	-8%	4%	-3%	-14%
... peer reviewed & reviewers' identities made known to author	44%	-1%	-1%	-7%	0%	-3%	-1%	2%	4%	-3%	1%	9%	1%
... peer reviewed & names of reviewers posted with published article	45%	-1%	-2%	-4%	-2%	-7%	7%	5%	2%	-22%	2%	23%	-4%
... peer reviewed & reviewer reports & names posted with published article	31%	-4%	-1%	-6%	1%	-7%	9%	-2%	1%	-14%	3%	16%	-5%
... assessed & rated post-publication, & reviewed prior to publication	53%	-4%	-4%	3%	4%	-10%	10%	-3%	3%	-18%	-0%	17%	-3%
... assessed & rated post-publication, but NOT reviewed prior to publication	23%	-9%	-8%	5%	-10%	-1%	11%	-2%	7%	-2%	0%	18%	-4%

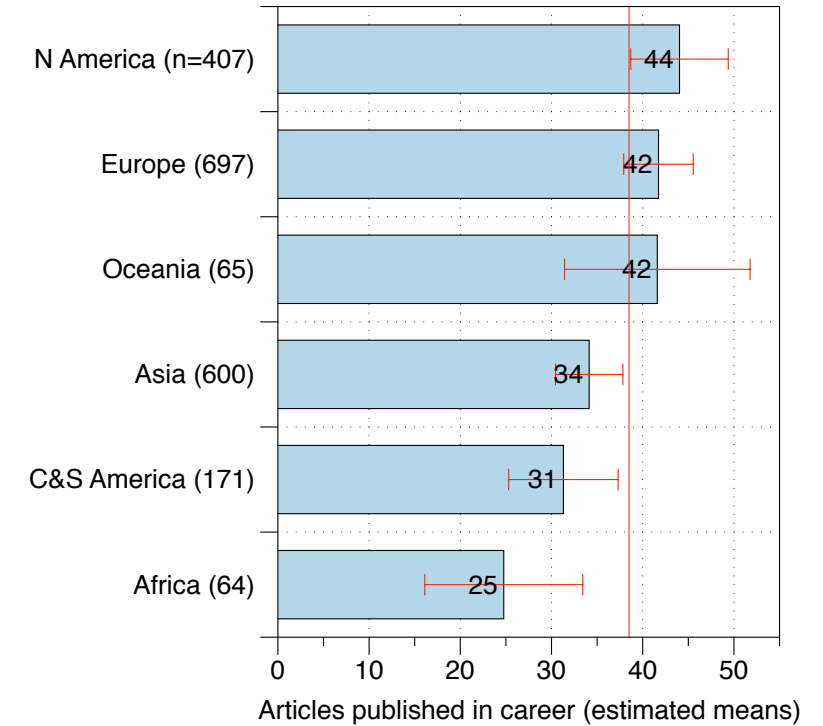
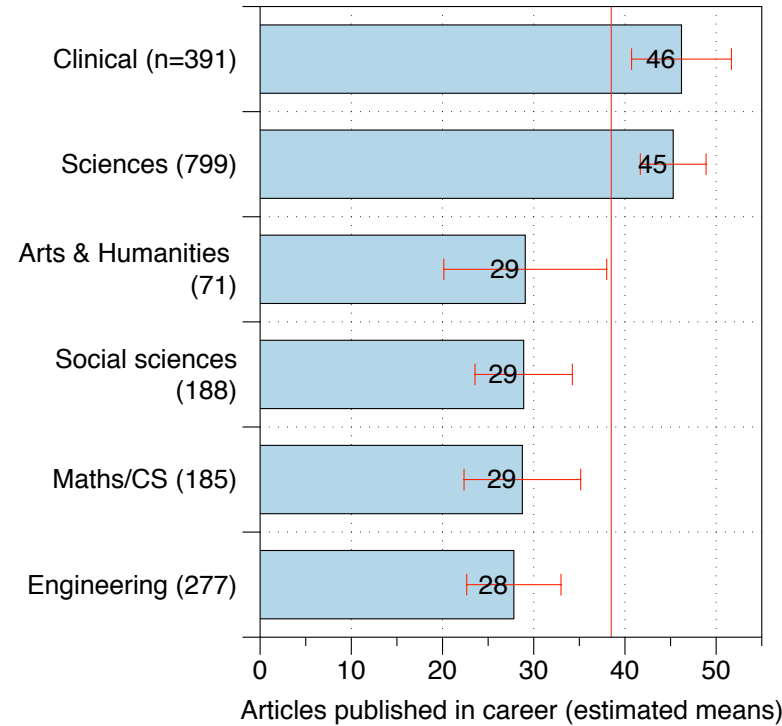
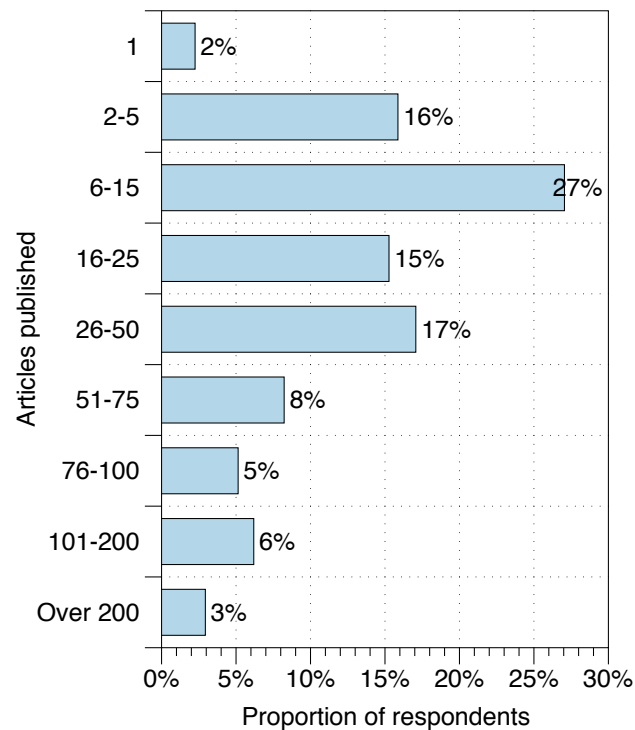
Q: How likely is it that you would REVIEW or ASSESS a research article for a journal that conducted the following form of assessment (pr10 Base: All, excluding Don't knows/unsures)



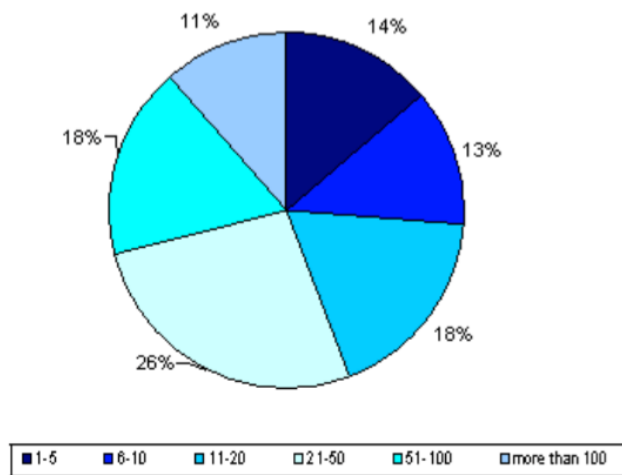
# Authors' experience of peer review

# Number of articles published

Respondent had published an estimated mean of 39 papers (modal range 6–15)

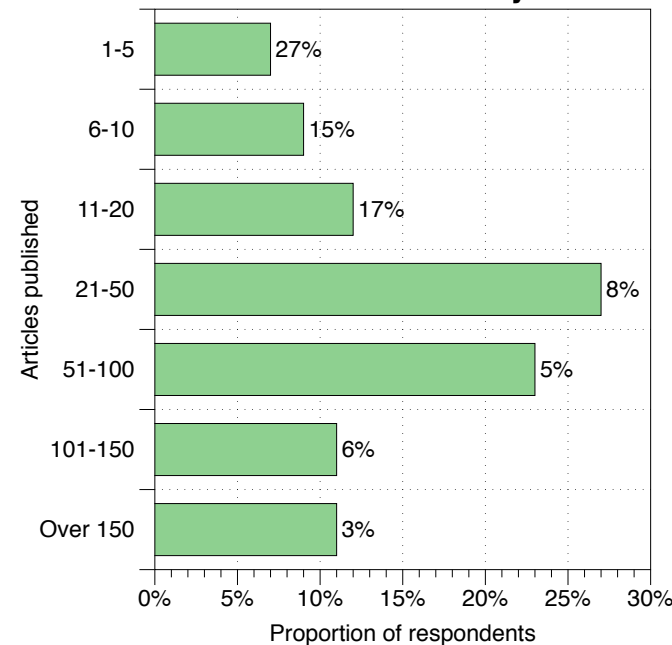


**SaS 2009 survey**  
No. of articles published in career to date



n=4037

**PRC 2007 survey**



Direct comparison with 2007/2009 (articles published) is not possible because:

- \* question wording was different: 2007/2009 both included "in your career to date"
- \* all three surveys used slightly different ranges (bins) for responses

With that caveat, however, the averages suggest that the 2007 survey may have had a more published respondent base than in 2009 and 2015 (although the age distributions were similar):

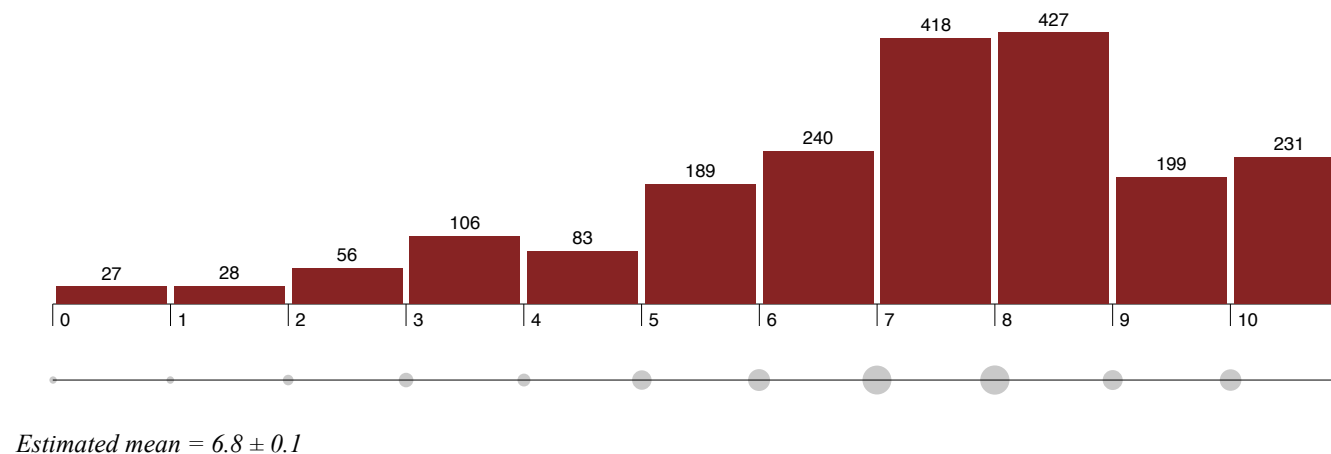
- \* SaS2009: estimated mean 39, mode 11-20
- \* PRC2007: estimated mean 49, mode 21-50

# Benefit of peer review to author

On a 0–10 scale, 64% rated the benefit of peer review in improving their article at 7 or higher, giving an average rating of 6.8 out of 10.

Variation by demographic factors is small: taken together, the demographic factors collectively are poor predictors of the rating of the benefit of peer review ( $R^2 = 0.05$ ). In particular, respondents from all Disciplines rate the benefit similarly, which is perhaps surprising given the different nature and approaches to review in say the humanities, social sciences, experimental life sciences and mathematics.

Distribution of Please rate how beneficial the peer review process was to improving your article



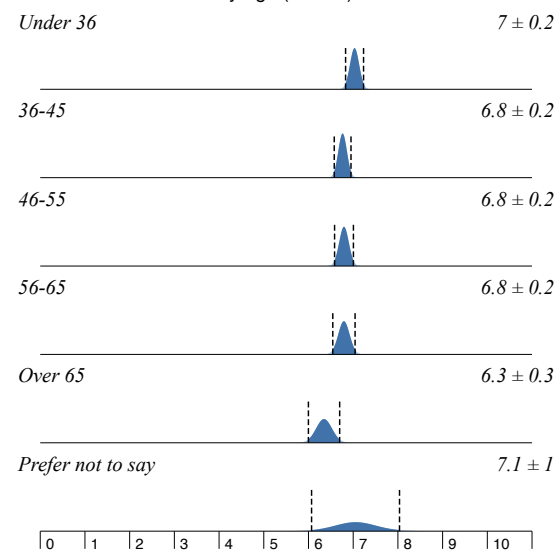
## Variation by demographics:

- \* Discipline and STM/HSS: none significant
- \* Subject: see right. Earth & Planetary Sciences (n=143) rate highest, Astronomy/Physics (n=150) lowest. These variations may be result of small sub-sample sizes – there is no significant variation by broader Discipline groups
- \* Age: Under-36s rate higher, Over-65s lower
- \* Gender: women rate slightly higher than men
- \* Others are not statistically significant

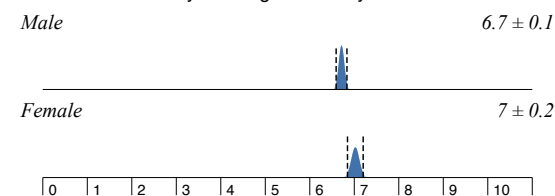
## Comparison with 2007/2009:

- \* not asked previously in this form – in 2009 the subset that said peer review had improved their article then rated improvements to various aspects of the paper on a 1–5 scale

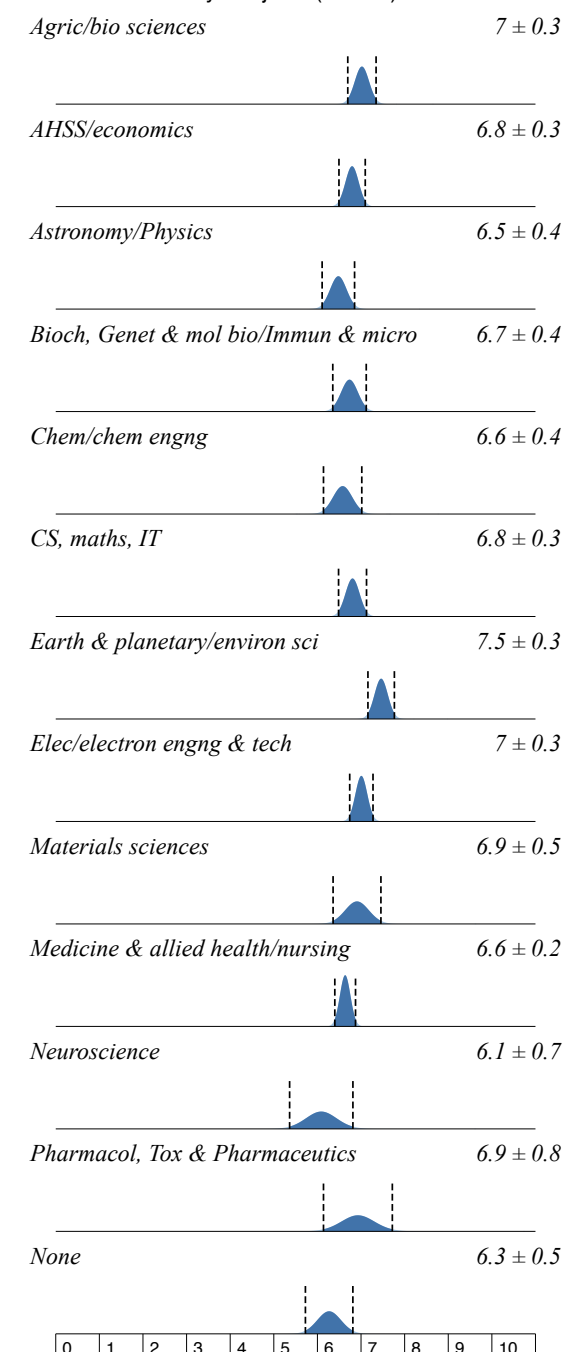
Please rate how beneficial the peer review process was to improv  
by Age (recode)



Please rate how beneficial the peer review process was to improv  
by Which gender are you?



Please rate how beneficial the peer review process was  
by Subjects (recode)



Q: Please rate how beneficial the peer review process was to improving your article (rating scale form “0 - not at all beneficial” to “10 - very beneficial”). (pranew\_1 Base: All; n=2004) Distributions indicate the 95% confidence interval

## A selection of the 487 responses

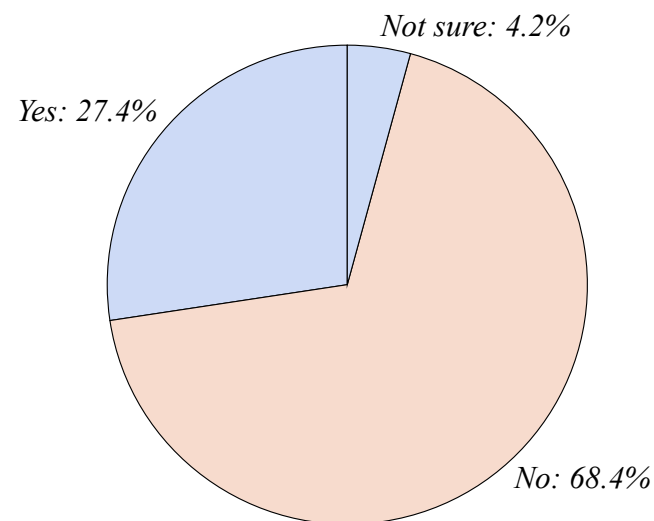
- “I don't recall being asked to make any significant change that affected the quality of the article. The edits requested were minor. (Computer Sciences / IT, 36-45, USA)
- “Reviewers and associate editor demonstrated immature understanding of statistics and probability and forced us to be needlessly conservative in our conclusions (Biological Sciences, 36-45, USA)
- “I did not feel the reviewers comments reflected the intent of the paper, just that they had to comment on something . (Medicine and Allied Health, 46-55, Canada)
- “I got some useful comments, but nothing very constructive. They mainly confirmed that I was on track. (Arts and Humanities, Over 65, USA)
- “there was not improvements only correction in the last paper (Mathematics, Over 65, Spain)
- “It was a very sound article. and the reviewers did not add much to it. (Economics, 46-55, South Africa)
- “In my opinion, they are very often considered valid only American experiences and Northern Europe (Business/Finance, 46-55, Italy)
- “Reviewers fail to focus on methodology and contribution. Most of their comments are superficial. (Computer Sciences / IT, Under 36, New Zealand)
- “The reviewers' comments gave only minor amendments and asked to incorporate some extra references. There was no substantial critique. (Arts and Humanities, 36-45, Australia)
- “Reviewers correct minor things like style, language, forms. Reviewers are not sufficiently competent in the field. (Engineering and Technology, 46-55, Croatia)
- “Some of the comments from the reviewers were instructive to improve the manuscript. But some were not relevant to the manuscript at that time. (Engineering and Technology, 36-45, Japan)
- “Very short comments by reviewers (about one sentence). No crucial information added. Was the article really so good that there was nothing to improve? (Electrical / Electronic Engineering, Under 36, Poland)
- “The major comments made were due to the lack of expertise of the reviewer on the manuscript subject. Some minor errors were detected and corrected. (Medicine and Allied Health, 46-55, Portugal)
- “A list of unnecessary expensive experiments that cost a fortune and did not substantially change both the quality and the end conclusion of the paper. (Biochemistry, Genetics, and Molecular Biology, 56-65, Belgium)
- “Most reviews are superficial. Researchers have no time. We only pay close attention if we find a paper to be competing with our own ideas. (Engineering and Technology, 46-55, Canada)
- “1st reviewer: Good job, no comments. 2nd reviewer: no significant work, incoherent comments. 3rd reviewer: Comments that help some aspects the quality of the work but rejected. (Social Science, Under 36, Mexico)
- “no improvement on language, on data interpretation, on emerging points for discussion (Medicine and Allied Health, Over 65, Italy)
- “Some comments were interesting. Others were out of scope. Some were unfeasible. (Biochemistry, Genetics, and Molecular Biology, 46-55, France)

## A selection of the 857 responses

- “The reviewers reoriented us to an implication of our work that we had missed - we also conducted some suggested additional analyses that turned out to be valuable. (Psychology, 46-55, USA)
- “It forced me to examine in a more detailed and specific way potential linkages that were not fully explored. (Earth and Planetary Sciences, 56-65, Barbados)
- “The reviewers' comments guided me to reframe the presentation of my findings to a much more general audience. My paper was originally written with a very narrow focus on the main findings. The feedback allowed me to realize the broader implications of my findings and have greater impact in the related scientific literature. (Psychology, 26-35, USA)
- “Provided some viewpoints that we had not considered, and allowed us to clarify those points. (Medicine and Allied Health, 56-65, United States Minor Outlying Islands)
- “We submitted a 10 pages paper and got over 12 pages of reviews. The level of details in the reviews helped tremendously in improving the paper. The final result was favourably accepted by the community; I doubt our original submission would have been received as favourably. (Computer Sciences / IT, 36-45, Canada)
- “We submitted the paper three times, and got rejected two times. But every review gave us important information how to make the paper better, so finally we got it published in a top journal. (Medicine and Allied Health, 56-65, Austria)
- “After two rejections at other journals, the prior reviews helped me reposition the results in a way that made the overall article more interesting and impactful (Economics, 36-45, USA)
- “... improved the structure and clarity of the paper. It also makes the research more well-rounded when reviewers suggest additional experiments. (Biological Sciences, 26-35, USA)
- “Reviewers asked for further analyses, which helped the paper. They also pointed out things that were not properly defined, and solving this improved the readability of the paper. (Biological Sciences, 36-45, Sweden)
- “Helpful suggestions, on the text, data processing, relevant references, comments on limitations of the work done, further work suggestions. (Earth and Planetary Sciences, 56-65, Portugal)
- “The reviewers did a really important work and contributed to improve the quality of the paper, both for the readability and for its scientific content. (Earth & Planetary Sciences, 36-45, Taiwan)
- “It was the first paper I entirely wrote by myself - the data I presented was very good, but the paper itself was not. The reviewers recognized the importance of the data (did not just reject the paper) and greatly helped with their thorough reviews to improve the [ms]. (Earth & Planetary Sciences, 26-35, USA)
- “very clear guidance on what to add and how to improve, kind and containing constructive criticism (Arts and Humanities, 26-35, United Kingdom)
- “... really helped me to reassess my discussion of the findings and greatly improved my discussion section. I think the paper is much stronger as a result. (Social Science, 36-45, Canada)
- “Insightful comments, which really engaged with what I was trying to do and how it could be taken further, as opposed to simply suggesting I write a different paper altogether (which has happened in the past, regrettably) (None of the above, 26-35, Australia)



# Peer review history of last published paper /1



**Had your last published article previously been submitted to another journal?**

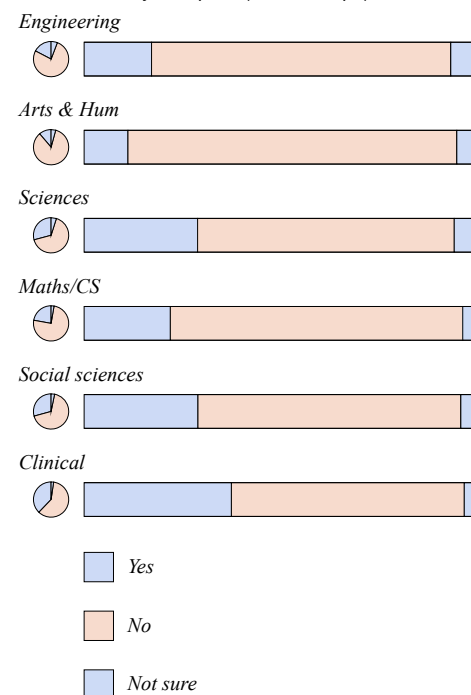
About two thirds of respondents (68%) said their last published paper had not been previously submitted to another journal prior to the one that accepted it.

This figure is higher than commonly accepted figures for average acceptance rates (typically said to be about 50% when averaged over all journals), so it is possible that respondents may have found the question ambiguous (for instance, respondents might have interpreted the question as implying parallel submissions; or perhaps if heavily revised after an earlier rejection, a paper may have been regarded as a new submission)

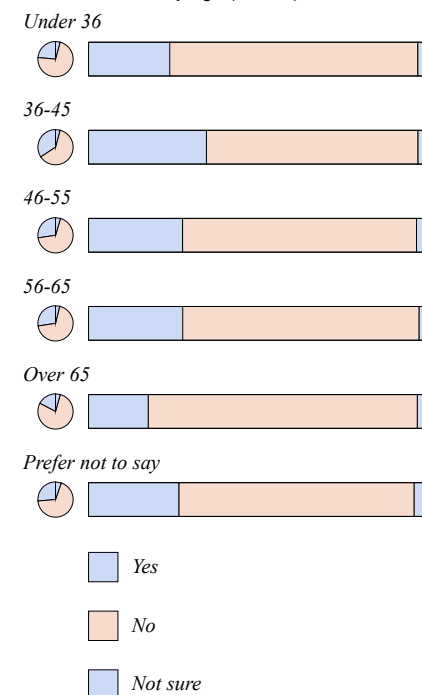
## Variation by demographic factors:

- \* Discipline: most likely to have been previously submitted elsewhere in Clinical; least likely in Arts & Humanities
- \* Age: more likely in mid-career (36–45)
- \* Region: small effect, more likely in Asia
- \* Others factors do not show statistically significant variations

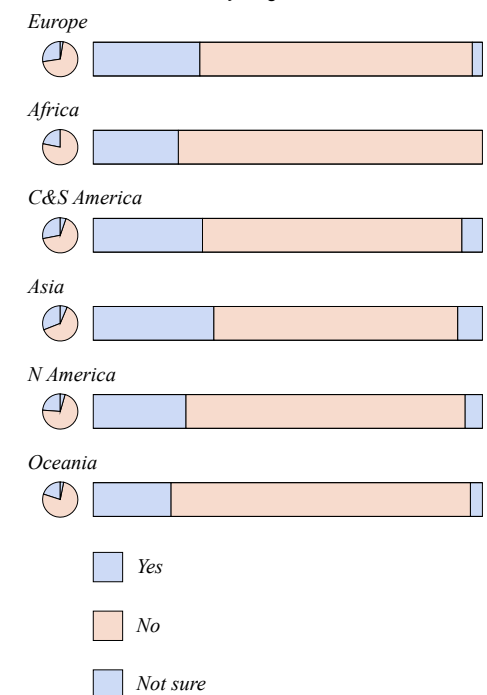
Had your last published article previously been submitted by Discipline (Recode of p1)



Had your last published article previously been submitted by Age (recode)



Had your last published article previously been submitted by Region

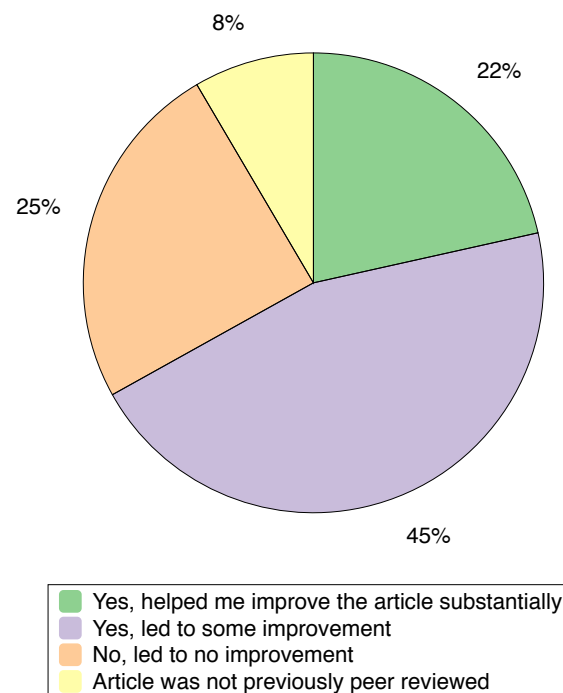


# Peer review history of last published paper /2

Although multiple rounds of reviewing are sometimes seen as wasteful of reviewers' time, 67% of respondents said that review at a journal prior to the one that accepted it had led to some or to substantial improvement (and this rises to 73%, if the 8% that said their article was not previously peer reviewed are excluded (presumably these were rejected without peer review))

“After two rejections at other journals, the prior reviews helped me reposition the results in a way that made the overall article more interesting and impactful (researcher in Economics, University or College, USA, 36–45) ”

**Did peer review at prior journal help improve the article?**

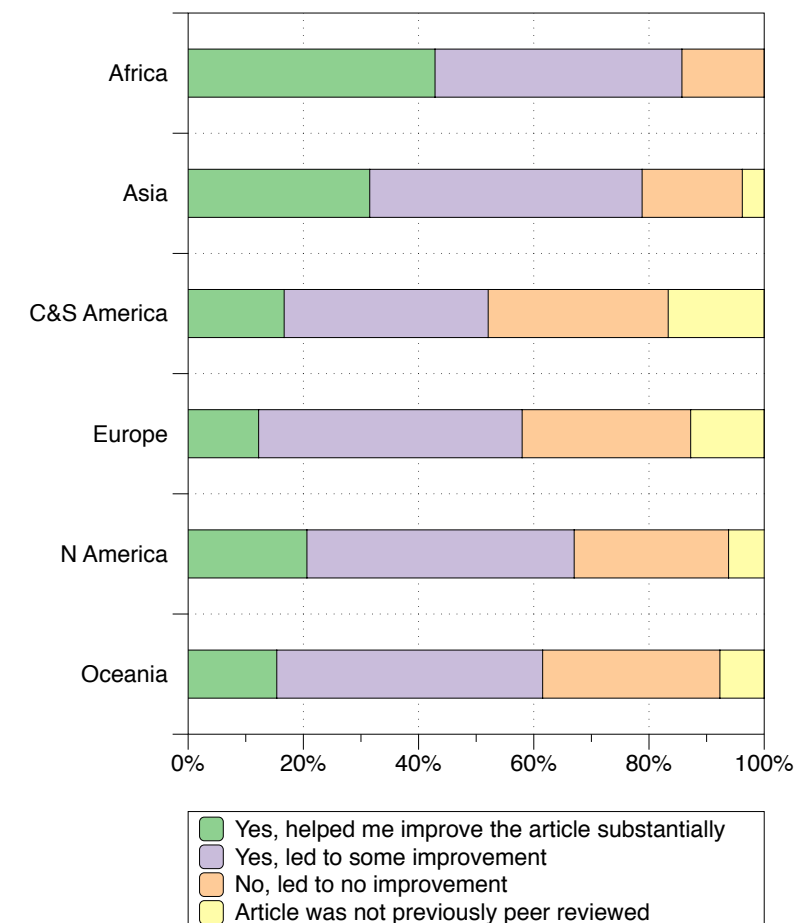


## Comparison with 2009/2007:

- \* neither survey asked this question specifically about the benefits of review during prior submissions
- \* 2009 asked respondents if that had to revise the paper (91% did), and of those, 91% agreed that the review process improved the quality of the paper

## Variation by demographic factors:

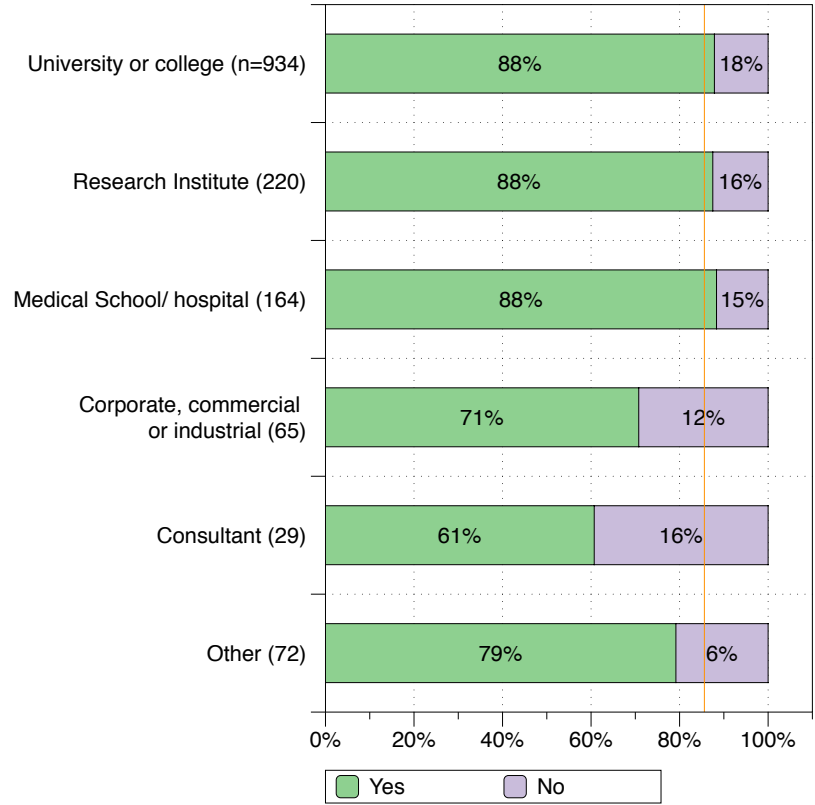
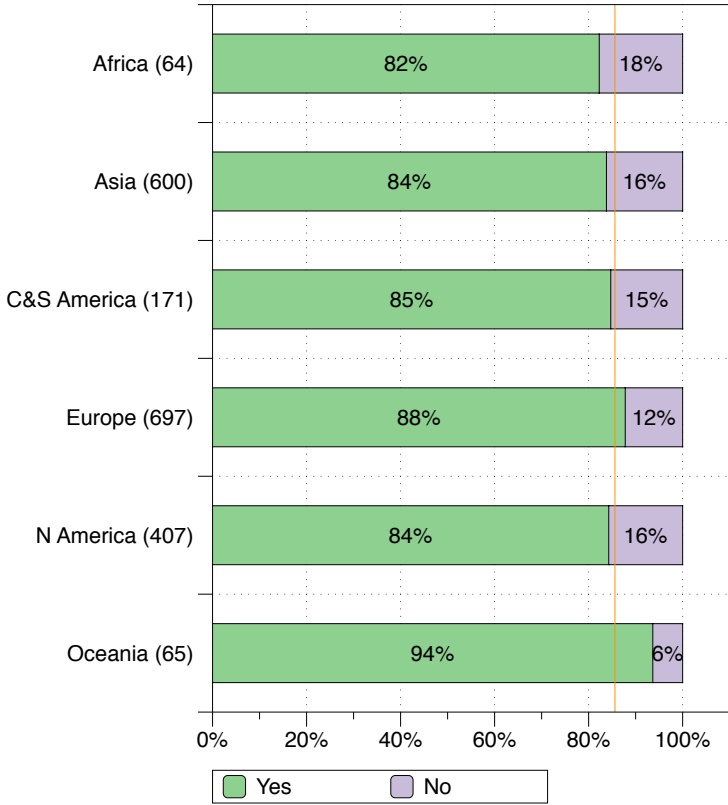
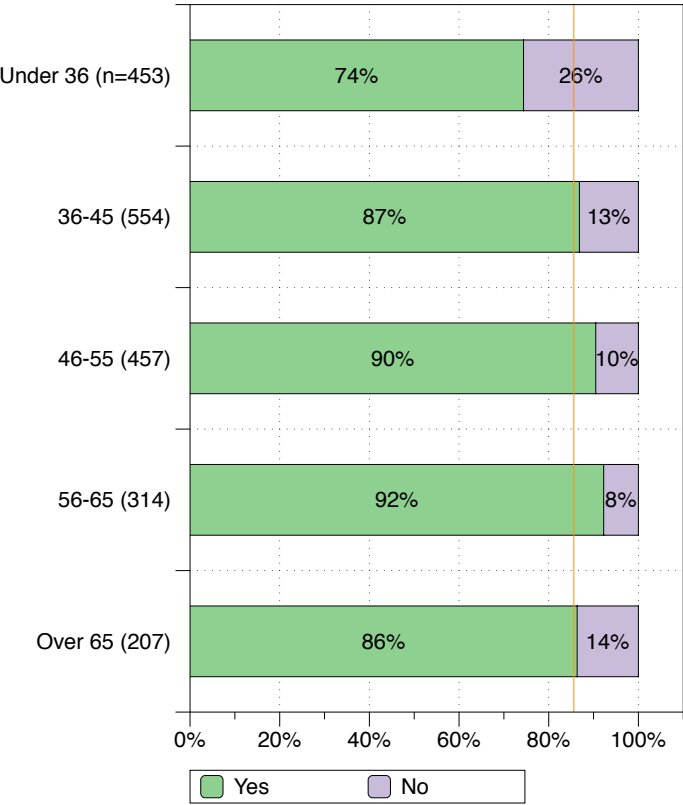
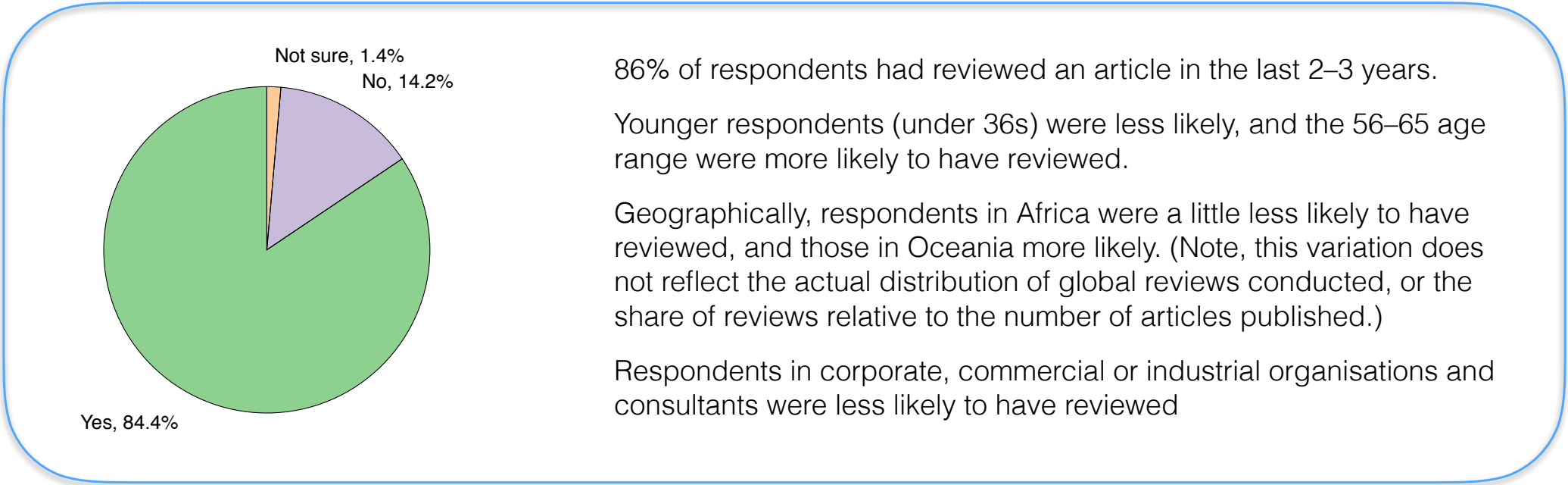
- \* By region: prior peer review was valued substantially more by respondents from Africa and Asia than other regions
- \* No significant variations by the other factors



Q: Do you believe that the peer review process that occurred on the journal/s, prior to the one it was accepted, helped you improve the article?  
(pr6 Base: those saying their paper had been previously rejected; n=544)

# Reviewers' experience of peer review

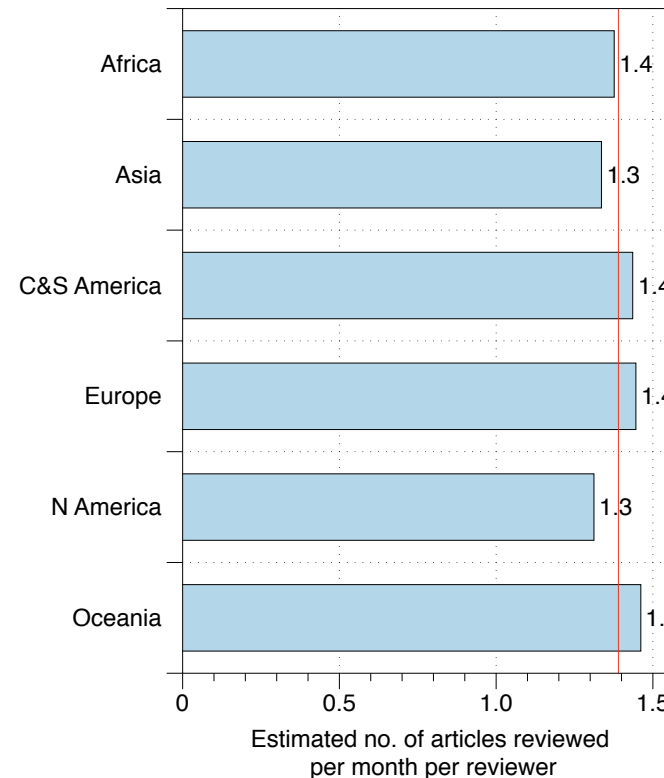
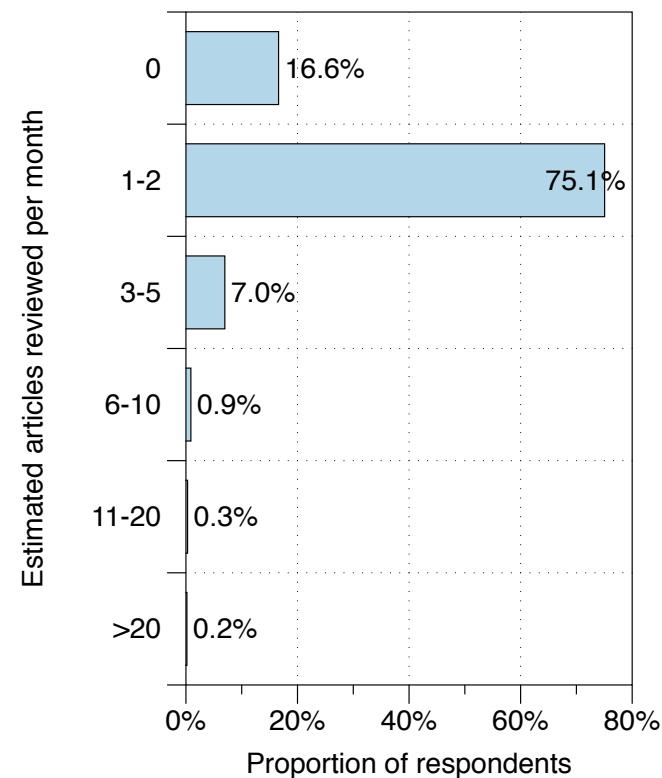
# Proportion who report reviewing an article in last 3 years



Q:Thinking of the last 2-3 years, have you reviewed a research article? (pr5 Base: All; n=2004)

# Reported number of articles reviewed

The average (modal) number of articles reviewed per month was 1–2. The data is not comparable to 2007 because it was collected using a different question (number reviewed in previous 12 months)



## Variation by Region:

- \* There is little difference among the Regions in the reported number of reviews conducted per month per reviewer
- \* We know from separate data (e.g., an analysis of Elsevier data) that US researchers conduct disproportionately more of their global share of reviews relative to the US share of global papers, while China (and to a lesser extent, India, Korea and Japan) do less. The same source shows that this is not because of lower willingness to review when asked – Chinese authors had the highest likelihood to accept an invitation to review
- \* The PRC2015 data suggests that reviewers from all regions that do engage with the review process are roughly as productive as those from other regions. So the gap observed in the Elsevier data with respect to China and other Asian countries is likely to be due to the fact that fewer researchers are available, are asked to engage, or are deemed qualified to engage in the peer review process. This is consistent with the rapid increase in authorship in these regions.

## 2007 results (number in 12 months)

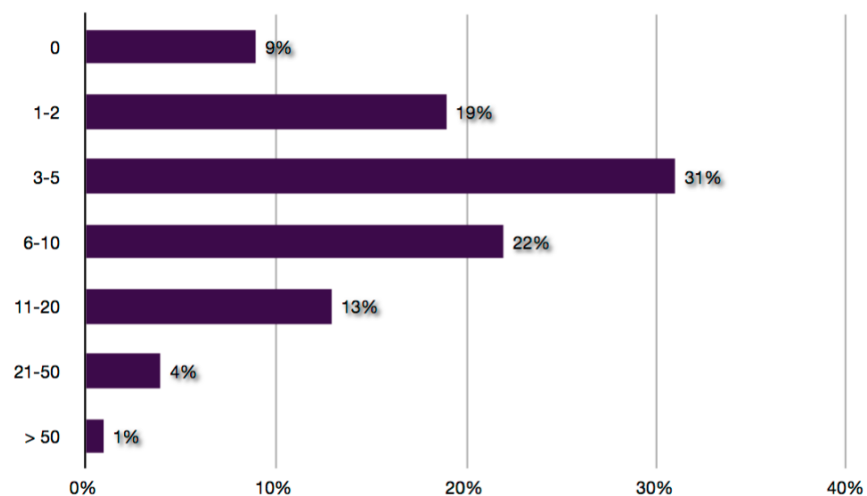


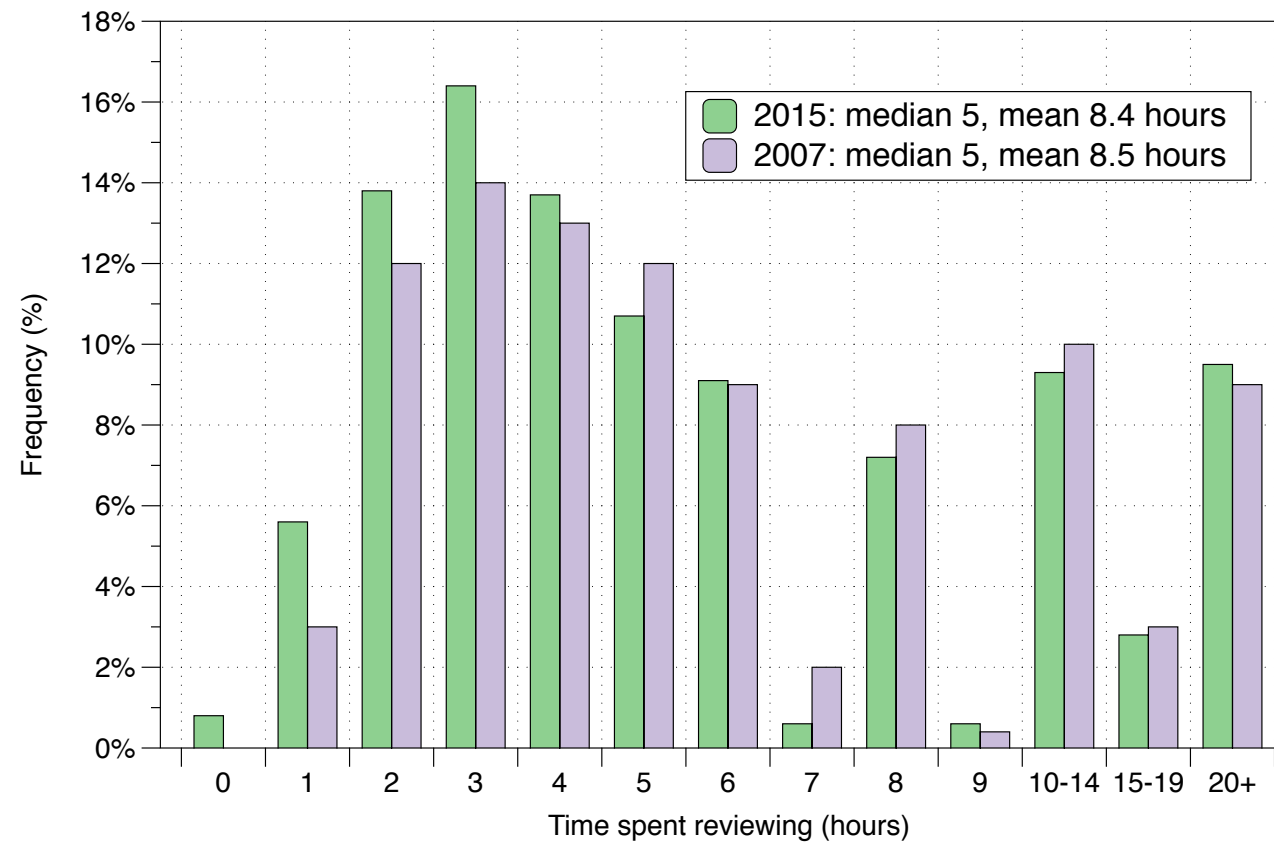
Figure 17: Number of papers reviewed in last 12 months (n = 2408)

Q: How many articles would you estimate that you review in a month? (pr7 Base: those answering Yes to previous question (pr5); n=1692).

Estimated means calculated using “0” = 0.5, “1-2” = 1.5, “3-5” = 4, etc., “>20” = 24. The non-zero value of 0.5 was used for “0” responses in the light of the 2007 data showing a significant fraction of respondents reporting less than 1 review per month

# Time spent reviewing

Reviewers spent a median 5 hours per article (mean 8.4 hours). This was unchanged from 2007



Note on averages: the median probably gives the best estimate of the typical time spent reviewing, though there is a wide spread of times taken.

The arithmetic mean is strongly affected by a small number extreme values – for instance, if the 2% of responses (35) greater than 50 hours are excluded, the mean falls to 7.1 hours. Incidentally, these extreme values are not confined to particular subject areas – all disciplines have such responses.

Alternatively, we can say that 71% of respondents reported times under 8 hours, and for these the mean time was 3.8 hours



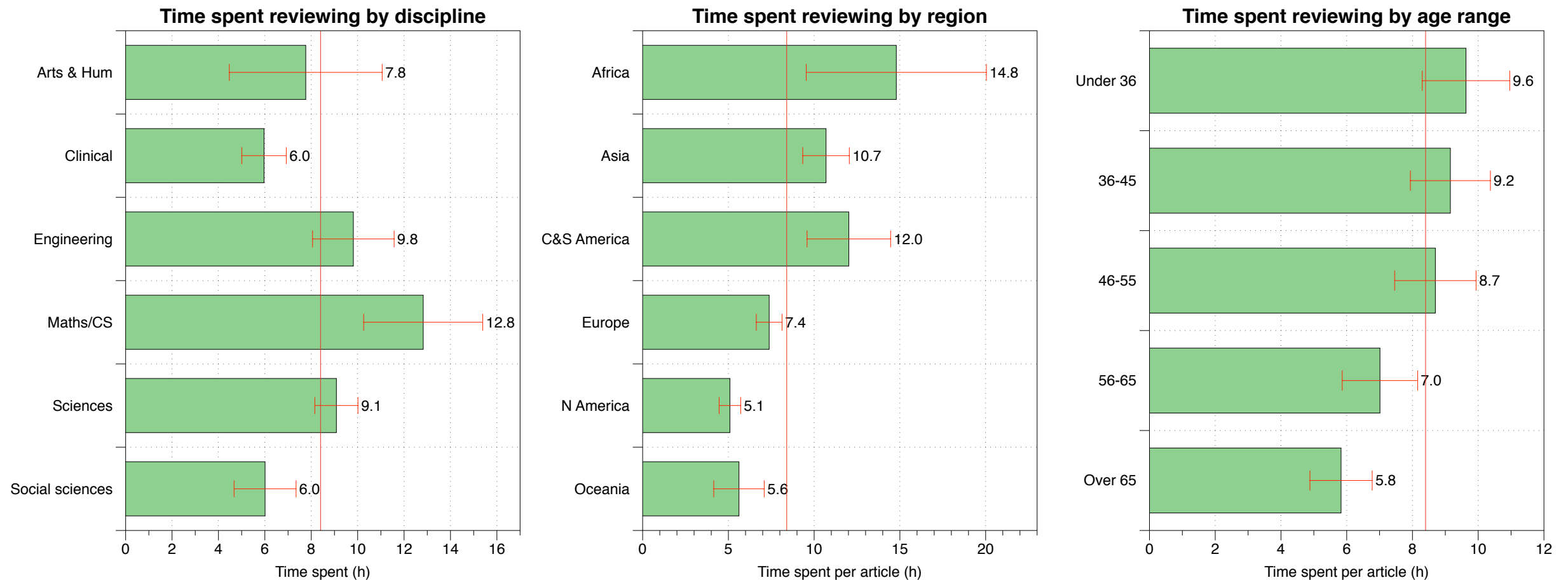
# Time spent reviewing, by demographics

Reviewers in Maths/Computer sciences spend the longest on reviews; those in Clinical and Social sciences the least time per review. This is unsurprising: papers in maths are often much longer than in other disciplines, and the type of review expected is qualitatively different, involving more work

There is a steady reduction in time spent per review as age of reviewer increases.

Similarly, reviewers in Europe, Oceania and N America spend less time per review than those in Asia, C&S America and Africa

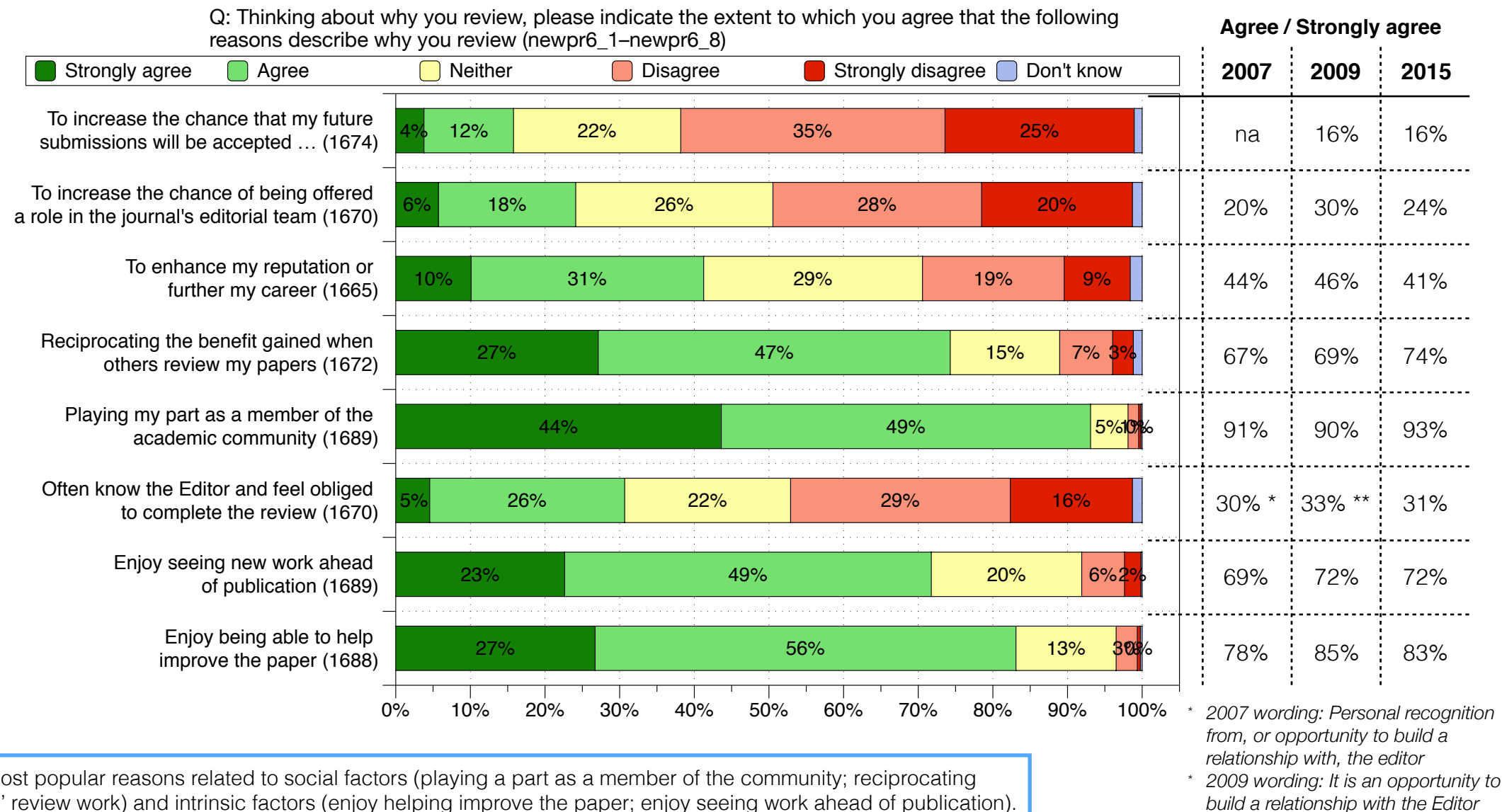
These last two differences are likely to be attributable at least in part of the effects of experience, though other factors may also be important (e.g. older researchers may have more other demands on their time; language barriers for Asian reviewers)



Q: Thinking about the last article that you reviewed how much time did you spend reviewing the article? (q144 Base: those responding to pr7 giving an estimated number of articles reviewed per month; n=1692) Means in hours; note different scales. Error bars show 95% confidence levels

# Reasons for reviewing

The most cited reasons for reviewing were unchanged from 2007: “playing my part as a member of the academic community”, “enjoy being able to help improve the paper”, and “reciprocating the benefit gained when others review my papers”.



The most popular reasons related to social factors (playing a part as a member of the community; reciprocating others' review work) and intrinsic factors (enjoy helping improve the paper; enjoy seeing work ahead of publication).

Instrumental or self-interested reasons were much less cited (increase chance of future acceptances; increase chance of place on editorial board; enhance reputation or further career)

The personal influence of the Editor is only a minor factor on average: only 5% strongly agreed this was a reason. (But it is likely that a large proportion of researchers are not inside Editors' personal networks, and thus not able to take advantage of this option, so this is not really comparable with the other factors)

Scores and rankings were not materially different from 2007/2009

(Base: those responding to pr7 giving an estimated number of articles reviewed per month; n=1665–1689)

## A selection of the 372 responses

- “ A professor gave it to me as s/he wouldn't have time to review it properly. (Computer Sciences / IT, 26-35, Brazil)
- “ I have developed expertise in a specific area and can give a more comprehensive review of papers in that same area (Medicine and Allied Health, 46-55, USA)
- “ Recommend[ed] to editor by another reviewer who was busy (Electrical / Electronic Engineering, 26-35, USA)
- “ network with other researchers (Earth and Planetary Sciences, Over 65, USA)
- “ Increase my knowledge about the topic. (Electrical / Electronic Engineering, 36-45, Brazil)
- “ I feel that as an epidemiologist I might have a small part in critically examining works associated with my specialty with a non-biased view. (Medicine and Allied Health, 46-55, USA)
- “ To make sure the information presented in areas for which I have and expertise are fairly reported. (Environmental Sciences, Over 65, USA)
- “ Improve my own writing from reviewing experience (Computer Sciences / IT, 36-45, Malaysia)
- “ To help maintain/increase that journals' reputation. journal's (Physics, Over 65, Australia)
- “ Enjoy getting ideas what other scientist are doing in their research areas (Biological Sciences, 36-45, Serbia and Montenegro)
- “ keeps me updated on newer advances (Medicine and Allied Health, Over 65, Pakistan)
- “ Maintain the standard and eliminate erroneous articles (Physics, 36-45, New Zealand)
- “ keep abreast of the research in my area of interest (Electrical / Electronic Engineering, 46-55, Malaysia)
- “ a good way for being updated with literature and other research, also a good way for educating students on how to critically evaluate a paper (Psychology, 46-55, United Kingdom)
- “ keep quality in academic journals high (Engineering and Technology, 26-35, Germany)
- “ Review as many papers as I submit to help making the system work (Chemistry, 26-35, Singapore)
- “ To learn from conducting review (Biochemistry, Genetics, and Molecular Biology, 56-65, Taiwan)
- “ Know the author and want to help improve the manuscript (Chemical Engineering, 36-45, Estonia)
- “ To improve my knowledge and reviewing ability which may ultimately help in improving my own writing (Immunology and Microbiology, 56-65, India)
- “ Responsibility to subject and its rigour and legacy (Engineering and Technology, 56-65, United Kingdom)
- “ active involvement contributes to referee's knowledge (Medicine and Allied Health, Over 65, Netherlands)
- “ increase the journal impact factor (Environmental Sciences, 46-55, Kuwait)
- “ referee activity is often asked in CV templates and therefore it is good to have such experience (Biochemistry, Genetics, and Molecular Biology, 36-45, Finland)
- “ paying back my debt to my reviewers (None of the above, Over 65, Israel)
- “ reviewing learn us how to better write papers (Biochemistry, Genetics, and Molecular Biology, 36-45, Poland)

A selection of the 694 responses. Base: those **agreeing** that “To enhance my reputation or further my career” was a motivation for their reviewing (n=698)

- “Being perceived as a good member of my academic community (Social Science, 26-35, USA)
- “Shows playing a part in your field on a voluntary basis which is positively seen (Biochemistry, Genetics, and Molecular Biology, 36-45, USA)
- “Being a referee at a prestigious journal evidences recognition from that journal and also from the academic community as a whole. (Agriculture, 46-55, Brazil)
- “Critical reading of a manuscript is a good exercise and training for research, teaching, and your record as reviewer is kept and can be used. (Biological Sciences, 36-45, USA)
- “Reviewing papers helps me to become a better writer myself. Reviewing papers gives me a sense of community with my fellow researchers, which I think stimulates my research activities (Agriculture, 56-65, USA)
- “Exposure to new and interesting questions and analyses. Sharpen my critical thinking skills. Broaden my knowledge of the literature. (Biological Sciences, 26-35, Canada)
- “In general, most academic institutions expect faculty to be involved in peer review as part of their "service" to the academic community. (Medicine and Allied Health, 36-45, Canada)
- “Critical thinking about data and presentation of concepts (Immunology and Microbiology, 36-45, USA)
- “Prior to promotion, the review process made me more visible to the professional community, increasing invitations for events such as NIH review committees, invited presentations, etc. (Psychology, 56-65, USA)
- “Birds eye view of new work. Reviewing makes you known to editors who may be external reviewers for a tenure and promotion application. (Social Science, 46-55, USA)
- “Important credential on CV (Biological Sciences, 36-45, Canada)
- “Editorial and review activity is expected as one professional activity expected for promotion in an academic setting. (Psychology, 56-65, USA)
- “Being involved as a peer reviewer is a way of getting to know editors and other established members of the academic community. And, being selected as a peer reviewer is something you do as service to your professional community. (Computer Sciences / IT, 26-35, USA)
- “Makes me a reliable and known member of the community. If I perform my reviewing duties well, I become regarded as a reliable resource and as someone who is good to work with, enhancing the likelihood that I will be seriously considered when future joint research projects are possible. (Electrical / Electronic Engineering, 36-45, USA)
- “CV builder and shows interest in academic medicine. (Medicine and Allied Health, 26-35, USA)
- “Reviewing is an expectation for me to receive tenure and promotion. (Social Science, 26-35, USA)
- “It helps in knowledge enhancement and helping to provide new directions for students about the current trend and happenings in the area of research. (Computer Sciences / IT, 36-45, India)
- “Reputation, as a reviewer of some high quality journal means you are identified by others and maybe helpful to further career. (Computer Sciences / IT, 26-35, China)
- “It is a metric on some research evaluation exercises. (Business/ Finance, 46-55, New Zealand)
- “Reviewing improved my skills in understanding scientific questions of different kinds. (Neuroscience, 56-65, Germany)



A selection of the 471 responses. Base: those **disagreeing** that “To enhance my reputation or further my career” was a motivation for their reviewing (n=471)

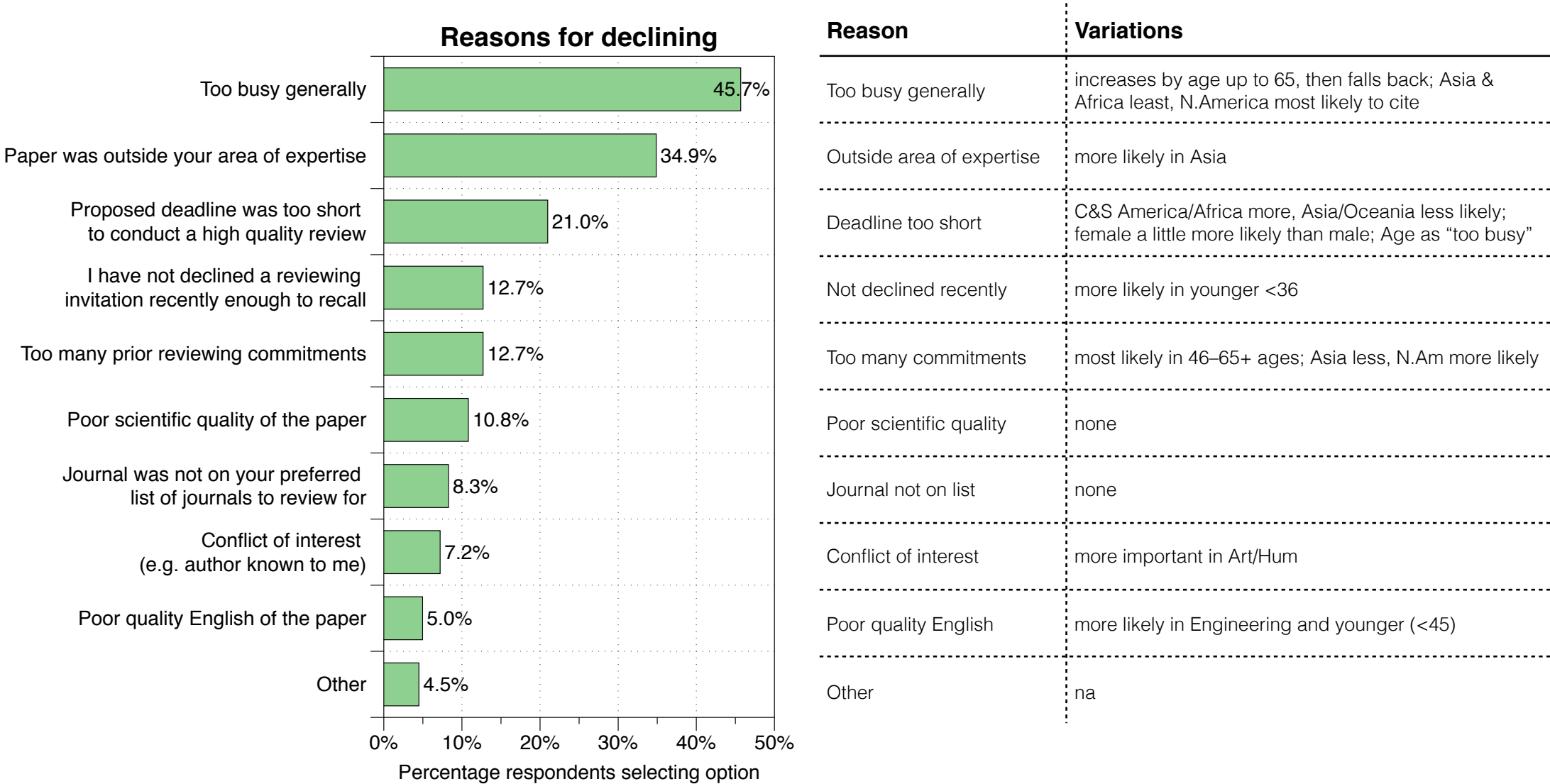
- “Mostly I see "enhancing" my career as my responsibility, not a journal's. (Social Science, 46-55, Canada)
- “list of reviewers should be published in each issue, but not linked to specific paper. (Computer Sciences / IT, 46-55, New Zealand)
- “I don't think it helps one's career much at all because in the tenure system, it is considered service, which isn't rewarded by the institution. (Social Science, 46-55, USA)
- “It should not enhance my further career. It is volunteer work which I gladly do when I have the time. (Social Science, 36-45, Austria)
- “Departments should reward service in this area. (Business/ Finance, 36-45, USA)
- “Other than gaining experience reviewing manuscripts and applying the lessons of how to communicate effectively, I don't think much is gained that enhances your career. (Biochemistry, Genetics, and Molecular Biology, 26-35, USA)
- “I answered, "Strongly disagree" to this because I don't think it does or should (Medicine and Allied Health, 46-55, USA)
- “If it was counted toward decisions of promotion, tenure, or raises. (Engineering and Technology, Over 65, USA)
- “Recognition of "most helpful reviewers" by a journal. Something that doesn't tie a reviewer to an individual paper, but rewards the efforts of the reviewer. (Medicine and Allied Health, 36-45, USA)
- “benefits from being a reviewer are currently not existing: - might be something which could be included in scores of grant applications (Immunology and Microbiology, 26-35, USA)
- “If reviewers were named and acknowledged by the journal, and reviewing papers be regarded as part of a scientist's output. If only this was the case!.. (Biological Sciences, 36-45, USA)
- “Give credits for reviewing, waive publication charges (Biological Sciences, 36-45, Australia)
- “It might conceivably help if there was some way of publicly tallying up the total number of reviews any reviewer undertakes. (Social Science, 46-55, Australia)
- “Some way of pay would help of letting the boss/institute know the role of a scientist in peer-review. (Biological Sciences, 46-55, Netherlands)
- “ Give reviewers a chance to claim which journals they have refereed for in grant/job applications (Physics, 46-55, Sweden)
- “I don't think reviewing should be to enhance a career, it is for science not for our own career that we do this (Chemistry, 46-55, Belgium)
- “maybe authors can evaluate how useful the referee's report was and a cumulative score of each referee can be made available to the referee for their promotion applications. (Computer Sciences / IT, 46-55, Australia)
- “I don't think this can help. Only publication and grant records matter in my university. Nothing else. (Arts and Humanities, 36-45, Hong Kong)
- “As long as reviews are double blind, few people know that I have reviewed anything. If at all, maybe certificates could be provided that document that one was active as a reviewer. However, to be really beneficial and to prevent misuse, they should indicate whether the review was well done. And who should judge that? (Computer Sciences / IT, 36-45, Germany)
- “Making public name and comments (Medicine and Allied Health, Over 65, Portugal)



# Reasons for declining to review

The most common reason (46% of respondents) for declining to review was being too busy generally (rather than being over-burdened with reviewing specifically: only 13% said they declined because they had too many prior reviewing commitments)

The next most common reason (35%) was the paper being outside their area of expertise. This suggests editorial offices are not doing a very good job at matching manuscripts to reviewers, either because of inherent difficulties in the task (new tools should help here, such as integration of bibliographic databases with peer review management systems), or because they are taking insufficient care or lack access to good matching tools).



Q: Thinking of the last time you declined an invitation to review, what were the main reasons for you to decline? Select up to three responses  
 (newpr9\_1–newpr9\_XX Base: those responding to pr5 saying that they had reviewed an article in the last 2–3 years; n=1692, i.e. 86% of all respondents)



# Reasons for declining to review, by Discipline

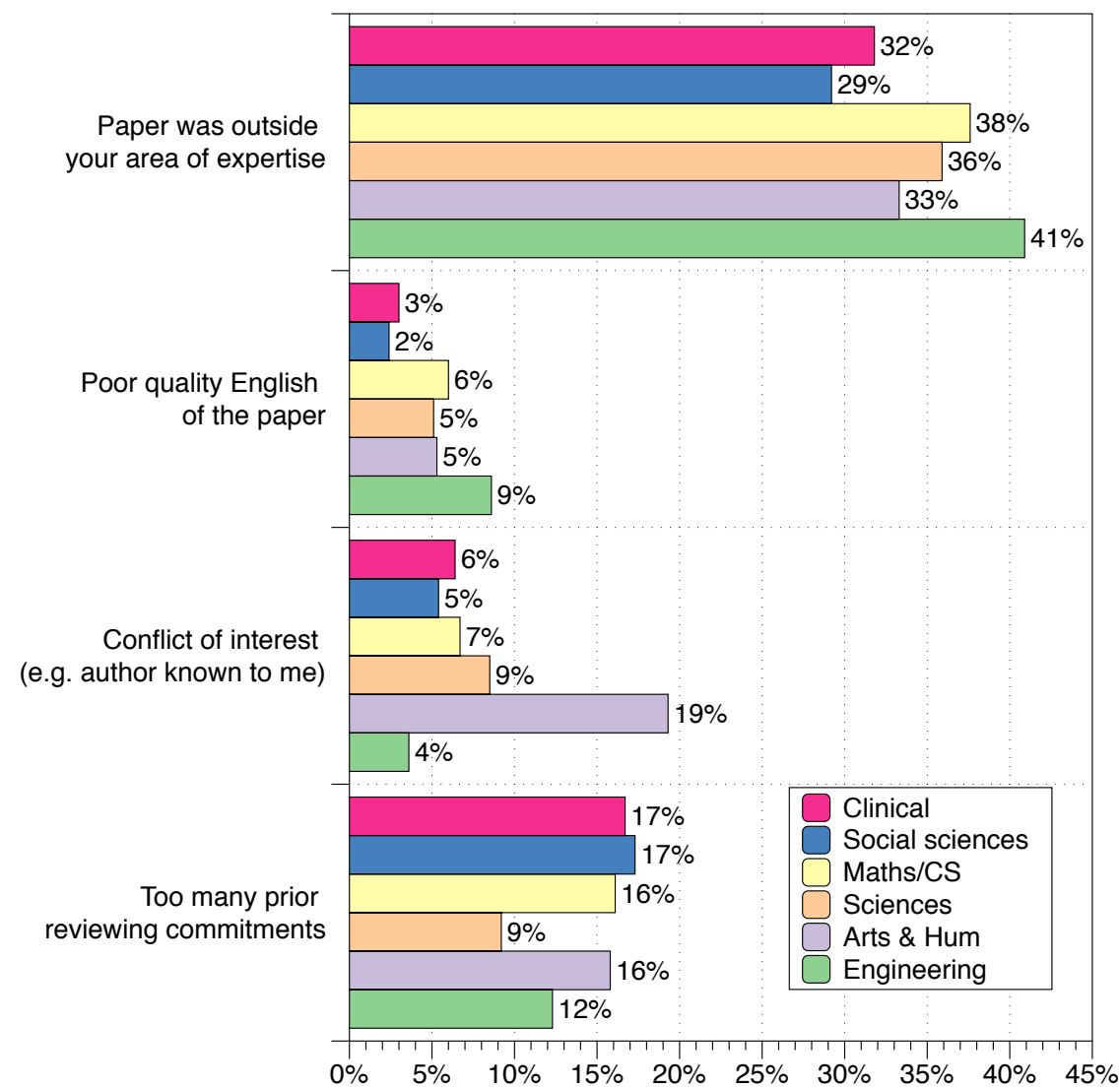
Reviewers in Engineering were more likely to decline because the paper was outside their area of interest; those in Social sciences were less likely

Poor quality English as a reason to decline was more common in Engineering, though still under 10%

Conflict of interest is substantially more important in Arts & humanities than other disciplines

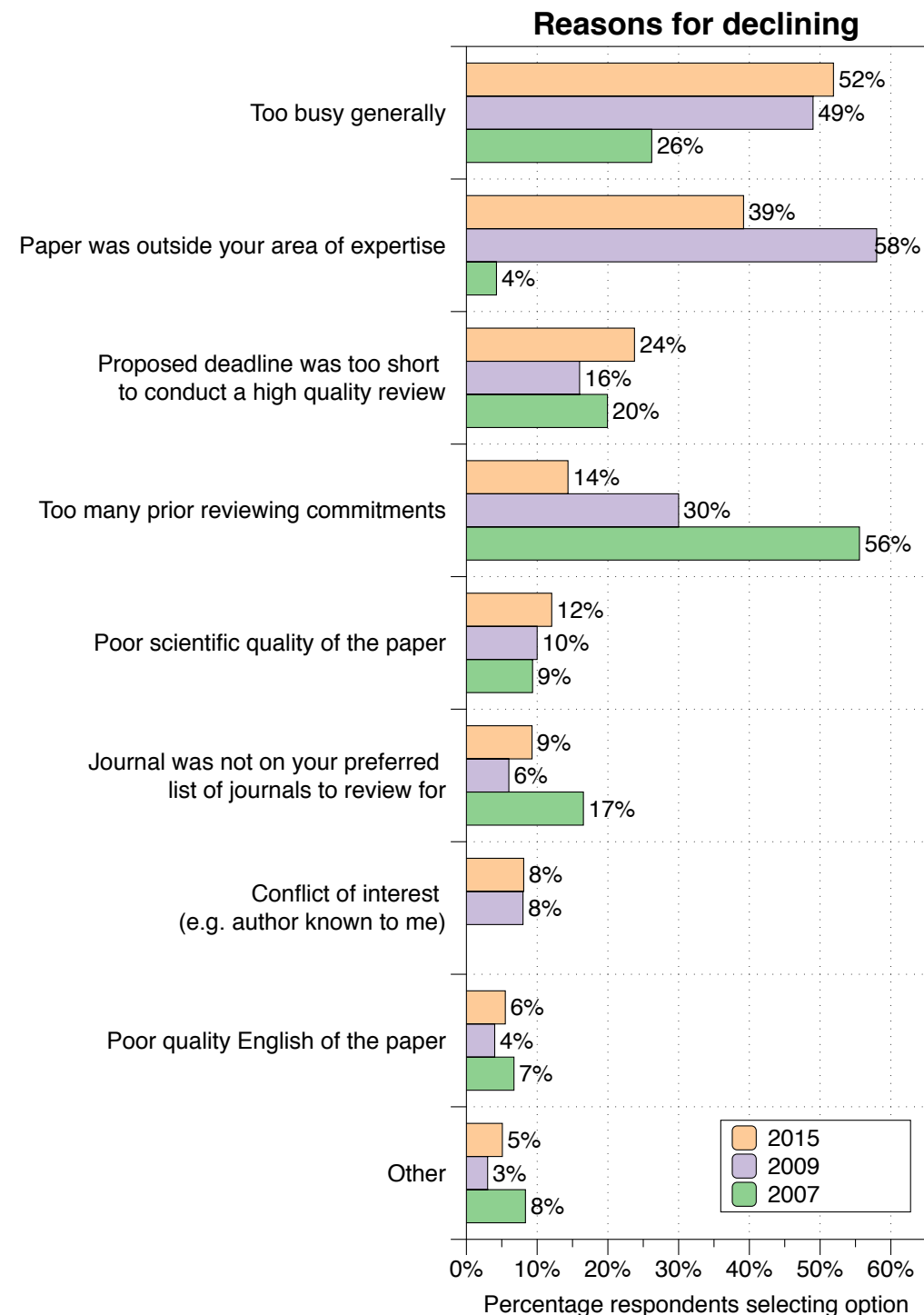
Too many prior reviewing commitments was least frequently cited in Sciences; most frequent in Clinical and Social sciences.

(The other statements did not show variation by discipline)



Q: Thinking of the last time you declined an invitation to review, what were the main reasons for you to decline? Select up to three responses (newpr9\_1–newpr9\_XX Base: those responding to pr7 giving an estimated number of articles reviewed per month; n=1692)

# Reasons for declining to review – comparison with previous surveys



Although the wording used in 2007/2009 was mostly identical or very similar, there are difficulties in comparing across the surveys because the questions were presented to different subsets of respondents in each case. In the graphic, the bases for calculation of percentages has been adjusted to make more comparable with 2009 (see footnote for details).

With that important caveat, it appears that:

- reviewers being sent papers outside their area of interest has fallen since 2009 (when it was the most frequently given reason for declining), but remains much higher than in 2007
- having too many prior reviewing commitments dropped steadily as a reasons for declining from 2007 (56% of respondents) to 2015 (14%), while being “too busy generally” increased

Q: Thinking of the last time you declined an invitation to review, what were the main reasons for you to decline? Select up to three responses (newpr9\_1–newpr9\_XX Base: those that said (pr5) they had reviewed in last 2-3 and did not also say they had not declined a reviewing invitation recently enough to recall (newpr9\_10); n=1477). Base for 2009 was those who had reviewed at least once in last 12 months and had also declined an invitation to review in the last 12 months. Reported percentages for 2007 have been recalculated to remove those that had not recently declined from the base, to make more comparable with 2009

## A selection of the 75 responses

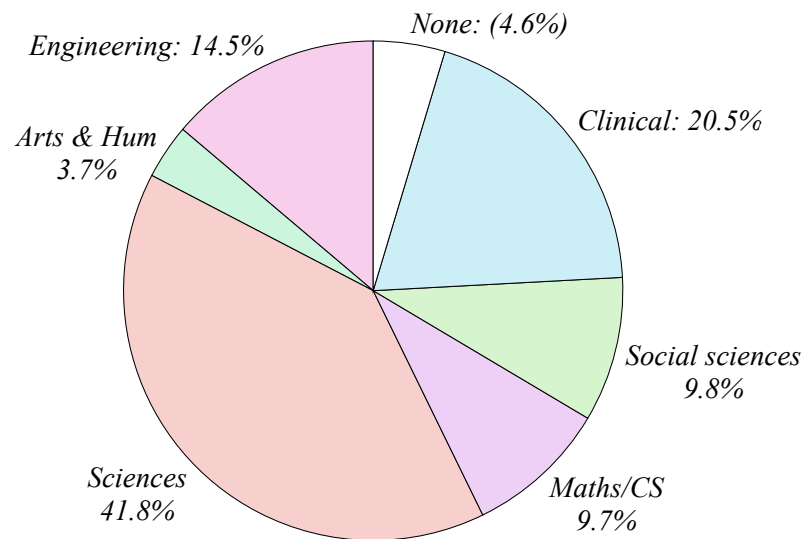
- “Journal had previously published a paper that I recommended rejecting (conclusions were invalid), so I no longer trust they take my reviews seriously (None of the above, 46-55, Belgium)
- “I had a deadline for my MS and could not take on any additional work (Arts and Humanities, 26-35, USA)
- “Journal has low impact factor (Environmental Sciences, 26-35, Brazil)
- “Turn around time was too short (Psychology, Over 65, USA)
- “Journal had asked me for 4 reviews within a 2 month period (Social Science, 46-55, USA)
- “papers financial by dental companies (Biological Sciences, 46-55, Brazil)
- “Journal subscription policy is unacceptable (too expensive) (Environmental Sciences, 36-45, Germany)
- “Did not see the paper before I could make my decision. (Engineering and Technology, 26-35, Czech Republic)
- “lack of payment (Electrical / Electronic Engineering, 26-35, Iran (Islamic Republic of))
- “previous editorial misconduct at journal (Computer Sciences / IT, 26-35, New Zealand)
- “complicated procedure (Chemical Engineering, Over 65, Germany)
- “I had a soo bad experience on the review process on one of my paper that I did not want to serve the journal (Engineering and Technology, 36-45, France)
- “I feel the publishers are profiting from my donation of time. I think there are better time donations to be made. (Environmental Sciences, 26-35, United Kingdom)
- “Too many invitations to review in a month (Chemistry, 26-35, Spain)
- “The journal accept fees from the authors but pay nothing to the reviewer (Business/Finance, 36-45, Saudi Arabia)
- “Actually, I knew something about the topic, but proposed a colleague who knows it much better. (Computer Sciences / IT, 46-55, Czech Republic)
- “Previous experience reviewing for journal was not positive. (Biological Sciences, 46-55, USA)
- “very time consuming review process of that specific journal (Psychology, 26-35, Austria)

# Demographics

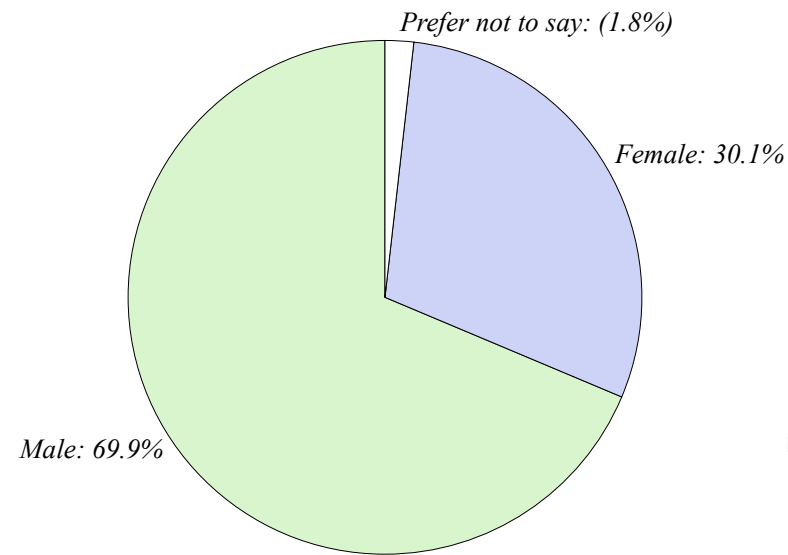


# Demographics

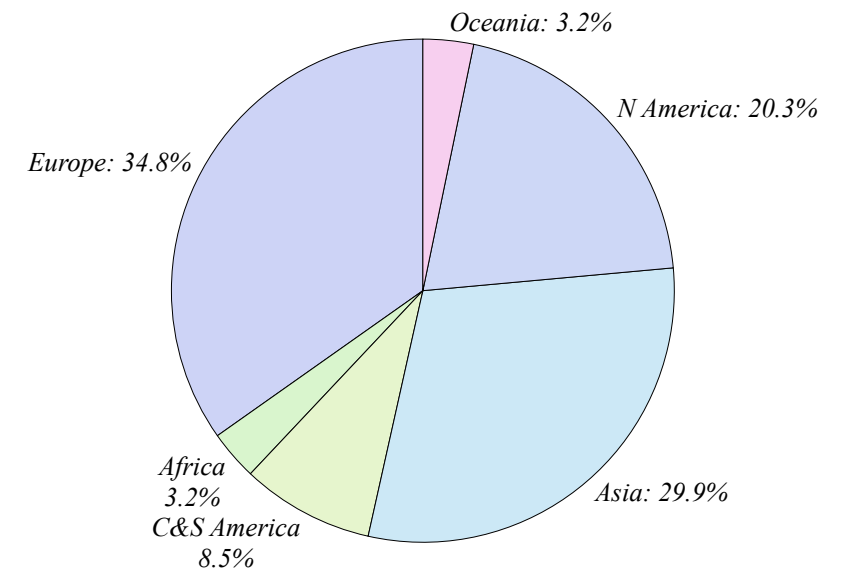
**Discipline**



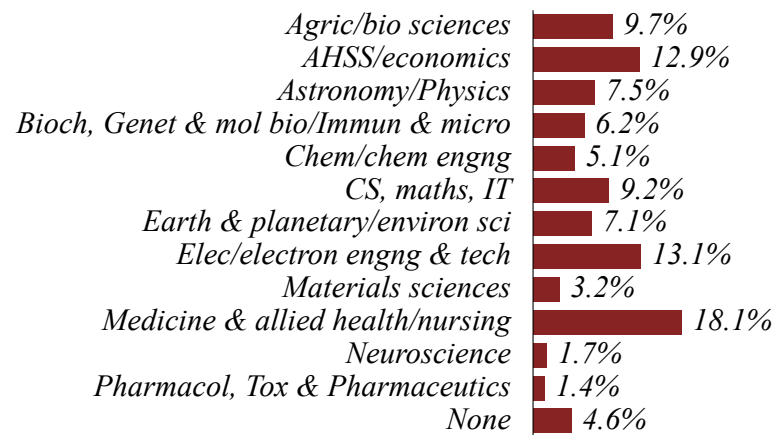
**Gender**



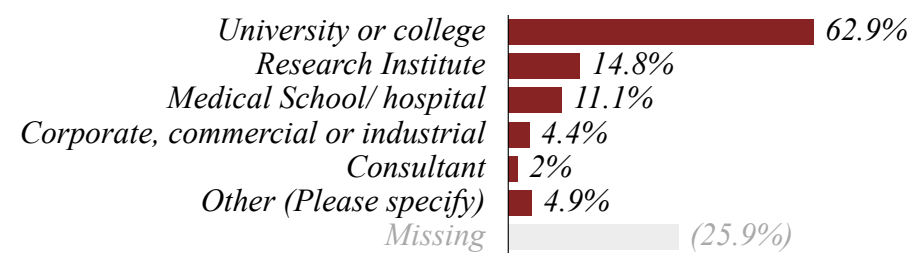
**Region**



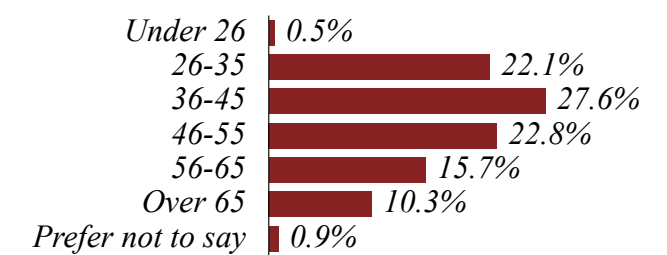
**Subjects (recode)**



**What type of organization do you work for?**



**Age**



Base: All ; n=2004

**Regions:** the recorded Countries were coded to Regions using standard definitions of continental regions given on Wikipedia. For transcontinental countries (mostly on Europe/Asia border inc. Middle East) we followed what we believed to be the more common usage (the numbers of respondents from these countries was small, so different assignments would have made little differences to results).

We also tried grouping into G20 countries and Others, but this was not useful, i.e. there were few differences between these two groups (probably because the G20 includes too wide a range of countries).

**Age:** data was collected with “Under 26” and “26–35” categories. There were, however, only 11 respondents in the former categories, so I combined these two categories as “Under 36” in the breakdowns

**Subjects and Disciplines:** the data was collected in 24 “subject disciplines”. I combined these in a variety of ways:

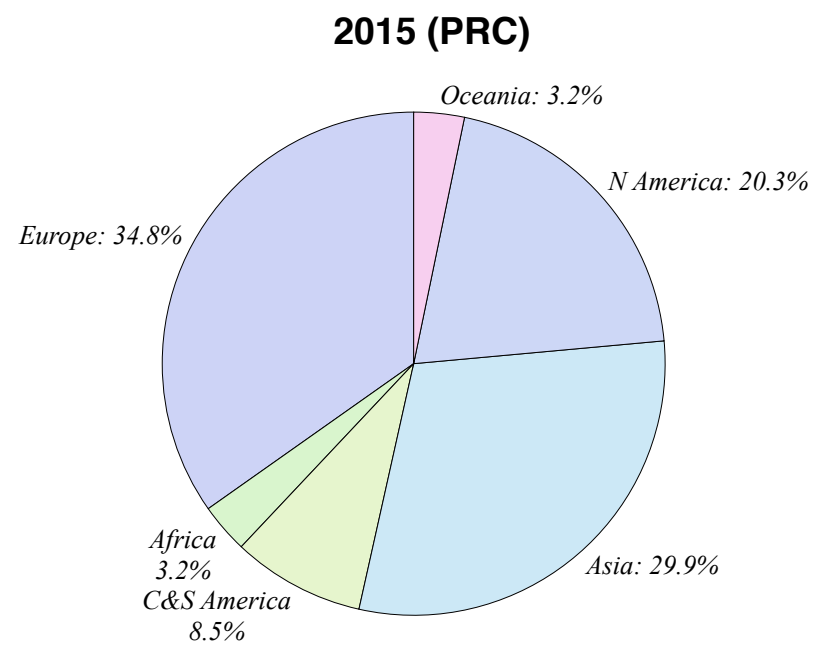
- \* “Subjects” – to match the list of 12 subjects used in the analysis of the 2009 SaS survey. (Two of these resulted in very small subsets: Neuroscience (34), Pharmacy, Tox & Pharmaceuticals (28))
- \* “Disciplines” – Arts & Humanities, Clinical, Engineering, Maths/CS, Sciences, Social sciences
- \* “Broad disciplinary group” – STM, AHSS

## Mapping of “Subject disciplines” to “Disciplines”

Input value	Input value label	Output value (integer)	Output value label
1	Agriculture	3	Sciences
2	Arts and Humanities	2	Arts & Hum
3	Astronomy	3	Sciences
4	Biochemistry, Gene...	3	Sciences
5	Biological Sciences	3	Sciences
6	Chemical Engineering	1	Engineering
7	Chemistry	3	Sciences
8	Computer Sciences...	4	Maths/CS
9	Earth and Planetary...	3	Sciences
10	Economics	5	Social sciences
11	Electrical / Electroni...	1	Engineering
12	Engineering and Te...	1	Engineering
13	Environmental Scie...	3	Sciences
14	Immunology and Mi...	3	Sciences
15	Materials Science	3	Sciences
16	Mathematics	4	Maths/CS
17	Medicine and Allied...	6	Clinical
18	Neuroscience	3	Sciences
19	Nursing	6	Clinical
20	Pharmacology, Toxi...	6	Clinical
21	Physics	3	Sciences
22	Psychology	6	Clinical
23	Social Science	5	Social sciences
24	Business/Finance	5	Social sciences
99	None of the above	99	None

## Mapping of “Subject disciplines” to “Subjects”

Input value	Input value label	Output value (integer)	Output value label
1	Agriculture	1	Agric/bio sciences
2	Arts and Humanities	2	AHSS/economics
3	Astronomy	3	Astronomy/Physics
4	Biochemistry, Gene...	4	Bioch, Genet & mol...
5	Biological Sciences	1	Agric/bio sciences
6	Chemical Engineering	5	Chem/chem engng
7	Chemistry	5	Chem/chem engng
8	Computer Sciences...	6	CS, maths, IT
9	Earth and Planetary...	7	Earth & planetary/e...
10	Economics	2	AHSS/economics
11	Electrical / Electroni...	8	Elec/electron engn...
12	Engineering and Te...	8	Elec/electron engn...
13	Environmental Scie...	7	Earth & planetary/e...
14	Immunology and Mi...	4	Bioch, Genet & mol...
15	Materials Science	9	Materials sciences
16	Mathematics	6	CS, maths, IT
17	Medicine and Allied...	10	Medicine & allied h...
18	Neuroscience	11	Neuroscience
19	Nursing	10	Medicine & allied h...
20	Pharmacology, Toxi...	12	Pharmacol, Tox & P...
21	Physics	3	Astronomy/Physics
22	Psychology	10	Medicine & allied h...
23	Social Science	2	AHSS/economics
24	Business/Finance	2	AHSS/economics
99	None of the above	99	None

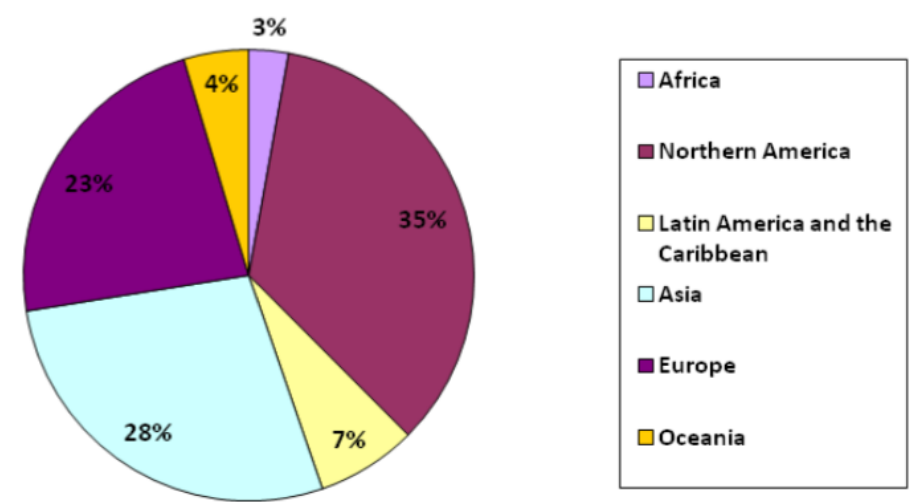


**Comparison with 2007/2009 and universe** (represented by Scopus database):

- N America (20%) was a smaller proportion of respondents than in 2007 (38%) or 2009 (35%), but good match to Scopus distribution (20% vs 21%)
- Conversely, Europe (35%) was a larger proportion than 2007 and 2009 (both 23%), but a good match to Scopus (both 35%)
- Asia was under-represented against Scopus (30% vs 35%)

Region	2007		2009		2015	
	PRC2007	Scopus	SaS2009	Scopus	PRC2015	Scopus (2014)
N America	38%	26%	35%	24%	20%	21%
Europe	23%	39%	23%	38%	35%	35%
Asia (inc M East)	25%	28%	28%	31%	30%	35%
Others	14%	7%	14%	7%	15%	9%

**2009 (Sense About Science)**



**2007 (PRC)**

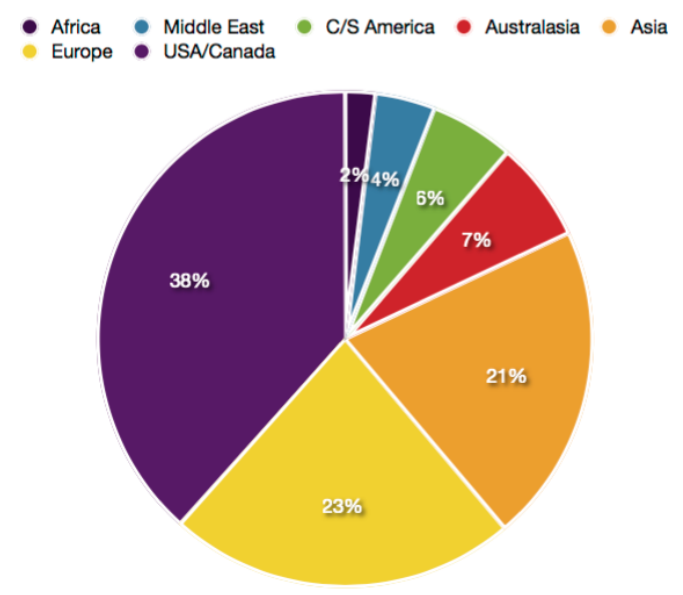
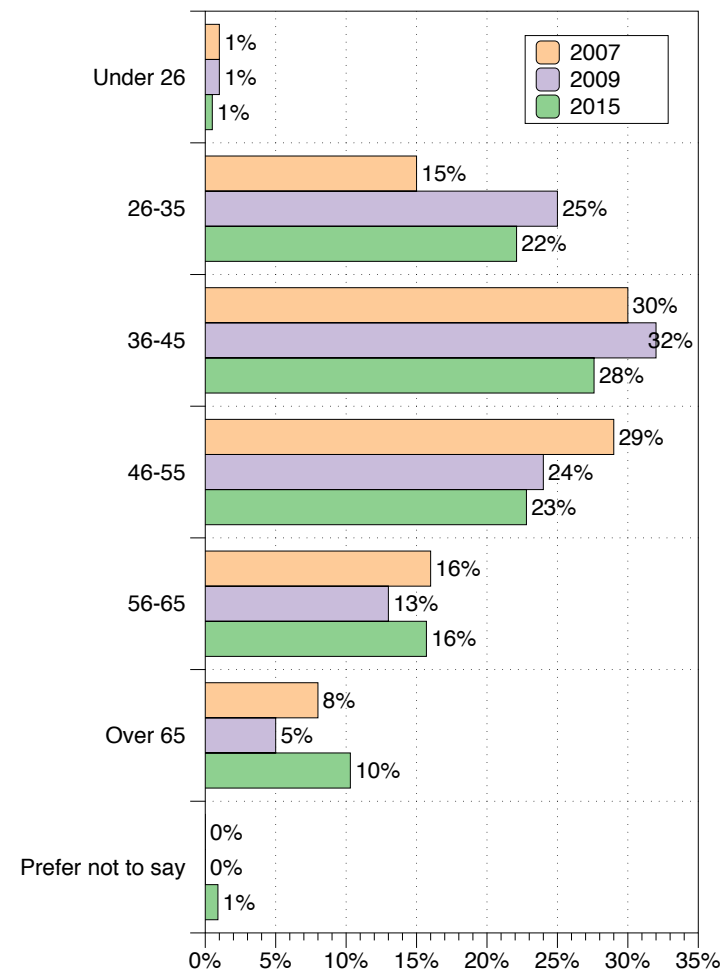
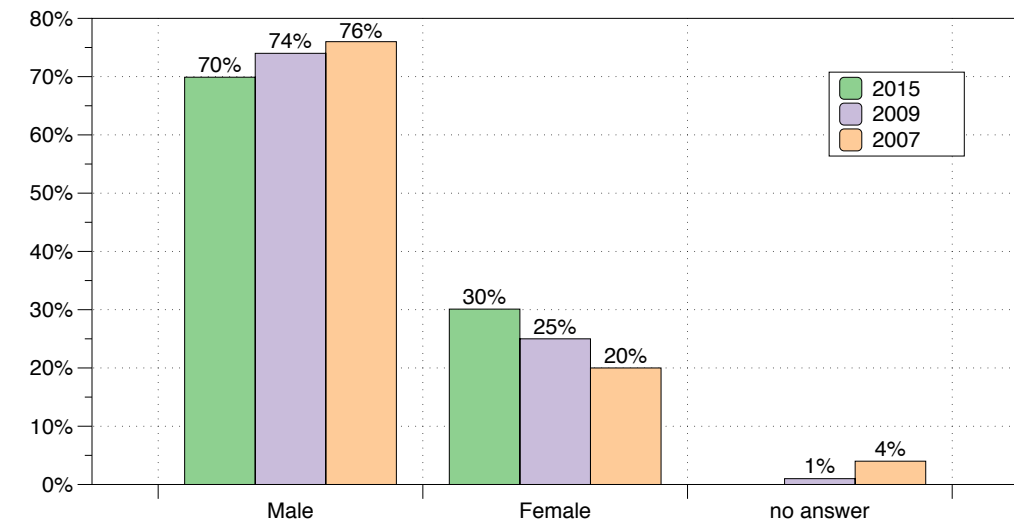


Figure 35: Distribution of respondents by region (n = 3040)



## Comparison with 2007/2009 – Age:

- \* similar profile to 2009
- \* compared to 2007, 2015 has more early-career researchers (under 36), but fewer mid-career (36–55)
- \* estimated means are similar: 2015 - 46, 2009 - 44, 2007 - 47
- \* modal value the same for each (36-45)



## Comparison with 2007/2009 – Gender:

- \* female proportion is higher, at 30% compared to 25% in 2009 and 20% in 2007

Economist (2013) How science goes wrong. *Economist*, 19 Oct 2013 <http://www.economist.com/news/leaders/21588069-scientific-research-has-changed-world-now-it-needs-change-itself-how-science-goes-wrong>

Nicholas D et al. (2015) Peer review: still king in the digital age, *Learned Publishing*, 28:15–21 doi:10.1087/20150104

Pulverer, B (2010) Transparency showcases strength of peer review. *Nature* **468**, 29-31 (4 November 2010) doi:10.1038/468029a

Sense About Science (2009) *Peer Review Survey 2009: Full Report*. <http://www.senseaboutscience.org/pages/peer-review-survey-2009.html>

Taylor & Francis (2015) *Peer review in 2015: A global view*. <http://authorservices.taylorandfrancis.com/peer-review-in-2015/>

Ware, M & Monkman, M (2008) *Peer review in scholarly journals: Perspective of the scholarly community—an international study* (Publishing Research Consortium 2008) <http://publishingresearchconsortium.com/index.php/112-prc-projects/research-reports/peer-review-in-scholarly-journals-research-report/142-peer-review-in-scholarly-journals-perspective-of-the-scholarly-community-an-international-study>

Warne, V (2016) Rewarding reviewers – sense or sensibility? A Wiley study explained *Learned Publishing* 29, 1 doi:10.1002/leap.1002



# Appendix: Methodology and Questionnaire

The survey was intended to deliver both a snapshot of current opinions and attitudes and also a comparison with the earlier studies discussed in the Introduction. To achieve this, the overall methodology, sources and questionnaire design were kept as similar as possible to these studies. In particular, the wording of questions repeated from earlier studies was kept identical where appropriate (in some cases there was variation between the 2007 and 2009 surveys, and some changes were introduced in 2015 where it was felt the wording or questionnaire routing would be improved).

The fieldwork was conducted by Elsevier's research team on behalf of the PRC between September and December 2015.

Email invitations were sent to 75,395 researchers (excluding bounce-backs) randomly selected from the Scopus author database of over 3.2 million authors (those with emails) who had published in the period 2012–2014.

A total of 2004 completed responses was received, giving a response rate of 2.7%. This is rather lower than in 2007 (7.7% response rate). This sample size implies a confidence interval (error margin) of  $\pm 2.2\%$  at a 95% confidence level for questions posed to the full sample. This error margin of course increases for questions asked of smaller subsets of the respondent. Where error bars are shown in the report, these show the 95% confidence interval. Readers should bear in mind that other sources of errors may be larger and more important than this sampling error: for instance, the group of researchers that respond to electronic surveys may be different in various ways from the population as a whole.

Verbatim (free text) responses have not been systematically coded and analysed in this report. Instead, a selection of the responses are presented to enrich the reader's understanding of the statistical findings. In the main, we have tried to reflect the quantitative result to which the statements relate in the selection; that is, the choice statements should be consistent with the overall views of the whole sample. Where respondents are divided, therefore, we have illustrated this with comments from each side. It is important when reading these selections not to take any particular comment out of context.

Demographic data were collected for geography (by country), age range, gender, subject interest, and type of organisation. We analysed the survey findings against these factors, and have highlighted statistically significant variations. (Statistical significance was determined using a test appropriate to the data in question (t-test, ANOVA, or chi-squared), with a threshold of  $p < 0.05$  (or better, in most cases).) In general we have commented on only the statistically significant differences that also appear large enough to be meaningful.

Intro - Intro

Thank you for agreeing to take the time to complete this survey, which is about the attitudes of researchers to peer review and scholarly publishing more generally. It should take no longer than 8-12 minutes of your time. Your results will be kept anonymous.

This study is being conducted on behalf of a major publisher whose identity will be revealed at the end of the study.

Many thanks.

Click on the 'next' button to begin

S1

To begin with, please indicate approximately how many articles have you published in peer reviewed journals so far in your career?

- ☐ 1
- ☐ 2-5
- ☐ 6-15
- ☐ 16-25
- ☐ 26-50
- ☐ 51-75
- ☐ 76-100
- ☐ 101-200
- ☐ Over 200
- ☐ None

CONDITION

f('S1')=='98'

true

Question ()

false

STOP

Screened –

Thank you for your assistance. Unfortunately you have indicated that you have published no peer-reviewed papers, we are unable to make use of your responses. Thank you for your time.

END

Condition f('S1')=='98'

Q1 - Satisfaction with PR

Overall, how satisfied are you with the peer review system used by scholarly journals?

- ☐ Very Satisfied
- ☐ Satisfied
- ☐ Neither satisfied nor dissatisfied
- ☐ Dissatisfied
- ☐ Very Dissatisfied
- ☐ Don't know

q2a - Statements - set 1

To better understand your attitudes towards research and scholarly publishing, please indicate how much you agree or disagree with the following statements.

Please select one response per row

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know
Peer review						
The current peer review system is the best we can achieve	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peer review is holding back scientific communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scholarly communication is greatly helped by peer review of published journal papers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peer review in journals needs a complete overhaul	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peer review is unsustainable because there are too few willing reviewers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Without peer review there is no control in scientific communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Researchers can have confidence in the academic rigor of published articles because of the peer review process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Q2d - Reason Disagree

You indicated that you disagree with the statement "I(QHIDDISAGREE1)".

What is the main reason why you disagree?

Please write your response in the box below

Q2c - Reason Agree

You indicated that you agree with the statement "I(QHIDAGREE1)". What is the main reason why you agree?

Please write your response in the box below

PR\_purpose - Purpose of peer review

There are some differences on what individuals believe peer review should do, and how well it meets these objectives.

To what extent do you agree or disagree that ...

Please select two answers per row; one answer for the "SHOULD BE" column, and one answer for the "CURRENTLY DOES" column

	PR1 - ... the following objectives SHOULD BE the purpose of peer review						PR2 - ... peer review CURRENTLY DOES the following?					
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know
That it selects the best manuscripts for the journal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determines the originality of the manuscript (i.e. novel and new)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improves the quality of the published paper	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ensures previous work is acknowledged	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determines the importance of findings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Detects plagiarism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Detects fraud (i.e. results that are falsified)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PR3 - Other purposes of PR

What other objectives, if any, should be the purpose of peer review?

PR\_types

There are different types of peer review, each type has the potential to impact behaviour and outcomes.

How likely is it that you would SUBMIT to and REVIEW for a journal using the following forms of assessment.

Please select two answers per row; one answer for the "SUBMIT" column, and one answer for the "REVIEW" column

	PR9 - How likely is it that you would SUBMIT a research article to a journal that conducted the following form of assessment:						PR10 - How likely is it that you would REVIEW or ASSESS a research article for a journal that conducted the following form of assessment:					
	Very likely	Likely	Neither likely nor unlikely	Unlikely	Very unlikely	Don't know/ unsure	Very likely	Likely	Neither likely nor unlikely	Unlikely	Very unlikely	Don't know/ unsure
Article is peer reviewed and the reviewers' identities are not revealed (traditional anonymous peer review)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Article is peer reviewed and both the authors' and reviewers' identities are not revealed to one another (double blind peer review)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Article is peer reviewed and the reviewers' identities are made known to the author	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Article is peer reviewed and the names of the reviewers are posted alongside the published article	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Article is peer reviewed and the reviewer reports and names are posted alongside the published article	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Article is assessed and rated post-publication by readers, as well as being reviewed prior to publication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Article is assessed and rated post-publication by readers, but NOT reviewed prior to publication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PRaNew

In this next section we are going to ask you some questions about the last peer-reviewed paper that you had accepted for publication.

Thinking about your most recently published article. Please rate how beneficial the peer review process was to improving your article:

	0 - not at all beneficial	1	2	3	4	5	6	7	8	9	10 - Very beneficial
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PRaNew07

What is the main reason why you give a score of ^f('PRaNew\_1')^?

PRaNew810

What is the main reason why you give a score of ^f('PRaNew\_1')^, how did peer review help you, what was the impact on your research?

PR4a - Whether last accepted article was submitted to another journal

Had your last published article previously been submitted to another journal?

- ☐ Yes
- ☐ No
- ☐ Not sure

PR4 - No times submitted last paper

To how many journals had your last published article being submitted before it was accepted?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10 or more journals
- ☐ Don't know

PR6 - Previous PR improve paper

Do you believe that the peer review process that occurred on the journal/s, prior to the one it was accepted, helped you improve the article?

- ☐ Yes, helped me improve the article substantially
- ☐ Yes, led to some improvement
- ☐ No, led to no improvement
- ☐ Article was not previously peer reviewed
- ☐ Don't know

PR5

In this section we consider your role as a reviewer (sometimes called a referee).

Thinking of the last 2-3 years, have you reviewed a research article?

- ☐ Yes
- ☐ No
- ☐ Not sure

NewPR6 -

Thinking about why you review, please indicate the extent to which you agree that the following reasons describe why you review.

Please select one response per row

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know
Playing my part as a member of the academic community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enjoy seeing new work ahead of publication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reciprocating the benefit gained when others review my papers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enjoy being able to help improve the paper	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To enhance my reputation or further my career	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To increase the chance of being offered a role in the journal's editorial team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To increase the chance that my future submissions will be accepted on the journal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Often know the Editor and feel obliged to complete the review	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other_____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PR6a

How does reviewing 'enhance or further your career' – can you give specific examples of how it has helped?



PR6b

How could reviewing 'enhance or further your career' – can you give specific examples of what could be done to help?

PR7

How many articles would you estimate that you review in a month?

- ☐ 0
- ☐ 1-2
- ☐ 3-5
- ☐ 6-10
- ☐ 11-20
- ☐ >20

q144

Thinking about the last article that you reviewed how much time did you spend reviewing the article?

Hours

Minutes

NewPR9

Thinking of the last time you declined an invitation to review, what were the main reasons for you to decline:

(Select up to a maximum of three reasons)

- ☐ Too busy generally
- ☐ Too many prior reviewing commitments
- ☐ Paper was outside your area of expertise
- ☐ Paper was outside your area of expertise
- ☐ Proposed deadline was too short to conduct a high quality review
- ☐ Conflict of interest (e.g. author known to me)
- ☐ Journal was not on your preferred list of journals to review for
- ☐ Poor scientific quality of the paper
- ☐ Poor quality English of the paper
- ☐ I have not declined a reviewing invitation recently enough to recall
- ☐ Other\_\_\_\_\_

P1 -

We are almost there, just a few questions to help us profile respondents. Firstly, what subject discipline do you specialize in?

- ☐ Agriculture

☐ Arts and Humanities

☐ Astronomy

☐ Biochemistry, Genetics, and Molecular Biology

☐ Biological Sciences

☐ Chemical Engineering

☐ Chemistry

☐ Computer Sciences / IT

☐ Earth and Planetary Sciences

☐ Economics

☐ Electrical / Electronic Engineering

☐ Engineering and Technology

☐ Environmental Sciences
- ☐ Immunology and Microbiology

☐ Materials Science

☐ Mathematics

☐ Medicine and Allied Health

☐ Neuroscience

☐ Nursing

☐ Pharmacology, Toxicology and Pharmaceuticals

☐ Physics

☐ Psychology

☐ Social Science

☐ Business/Finance

☐ None of the above

NewP2 -

Which one of the following fields of medicine / allied health are you mainly involved in?

- ☐ Allergy, Asthma & Immunology

☐ Anesthesiology & Pain Management

☐ Cardiology

☐ Critical Care

☐ Dentistry

☐ Dermatology

☐ Emergency Medicine

☐ Endocrinology & Metabolism

☐ General / Family Medicine

☐ Gastroenterology

☐ Geriatric Medicine

☐ Hematology

☐ Imaging technology

☐ Infectious Disease

☐ Internal Medicine

☐ Laser Vision Surgery

☐ Medical Genetics

☐ Nephrology

☐ Neurology

☐ Neurosurgery

☐ Obstetrics & Gynecology

☐ Occupational & Environmental Medicine

☐ Oncology
- ☐ Ophthalmology

☐ Orthopedic Surgery

☐ Otorhinolaryngology

☐ Osteopathy

☐ Pathology

☐ Pediatrics

☐ Physical Medicine & Rehabilitation

☐ Physical Therapy

☐ Plastic Surgery

☐ Preventive Medicine

☐ Proctology

☐ Psychiatry

☐ Pulmonary Medicine

☐ Radiology (including Radiology Technicians)

☐ Rheumatology

☐ Sports Medicine

☐ Surgery, General

☐ Thoracic Surgery

☐ Urology

☐ Veterinary Medicine

☐ Other\_\_\_\_\_

☐ Other Specialties\_\_\_\_\_

P3 - Organization

What type of organization do you work for?

- ☐ University or college
- ☐ Research Institute
- ☐ Medical School/ hospital
- ☐ Corporate, commercial or industrial
- ☐ Consultant
- ☐ Other (Please specify)\_\_\_\_\_

**P4 - Position**

What is your position within your organization?

- ☐ Head of Department/ Senior Management
- ☐ Senior Researcher/ Middle Management
- ☐ Researcher/ Staff Member
- ☐ Other (please specify)\_\_\_\_\_

**P5 - Main role**

What is your MAIN role within your organization?

- ☐ Research and/or development
- ☐ Teaching
- ☐ R&D and teaching equally
- ☐ Management/Administration
- ☐ Practitioner (clinical)
- ☐ Practitioner (engineering/technology)
- ☐ Advisory/Consultancy
- ☐ Other (please specify)\_\_\_\_\_

**P7 - Gender**

Which gender are you?

- ☐ Male
- ☐ Female
- ☐ Prefer not to say

**NewP8 - Age**

Please indicate your age group:

- ☐ Under 26
- ☐ 26-35

- ☐ 36-45
- ☐ 46-55
- ☐ 56-65
- ☐ Over 65
- ☐ Prefer not to say

**P9 - Country**

In which country are you based?

Analysis and report by:

Mark Ware, Mark Ware Consulting Ltd, Bristol, England

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