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Article

Distrust in grant peer review—reasons and remedies

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Abstract

With the increasing reliance on competitive grants to fund research, we see a review system under pressure. While peer review has long been perceived as the cornerstone of self-governance in science, researchers have expressed distrust in the peer review procedures of funding agencies. This paper draws on literature pointing out ability, benevolence, and integrity as important for trustworthiness and explores the conditions under which researchers have confidence in grant review. Based on rich survey material, we find that researchers trust grant reviewers far less than they trust journal peer reviewers or their colleagues' ability to assess their research. Yet, scholars who have success with grant proposals or serve on grant review panels appear to have more trust in grant reviewers. We conclude that transparency and reviewers with field competencies are crucial for trust in grant review and discuss how this can be ensured.

Key words: research funding; peer review; factors affecting trust; grant applications; research quality; expertise.

1. Introduction

In the current research policy systems, funding agencies are essential in governing public research and allocating research resources. Universities rely on funding agencies to cover the costs of research projects, along with temporary and permanent staff. At the same time, success in obtaining grants is crucial for researchers to fund their research, academic prestige, and promotion, tenure, and further funding (Archer 2008; Laudel 2006; Sutherland 2017).

To identify successful proposals, funding agencies rely on peer reviewers, often employed at universities, thus regulating public funding for research with peer review as a buffer—or mediator—between politics and science (Chubin and Hackett 1990). Still, the evaluation of what constitutes research quality and a good proposal is far from straightforward. Research quality is a multifaceted concept (Langfeldt et al. 2020), and researchers often have different perceptions of what constitutes a good proposal; furthermore, evaluations of grant proposals are complex processes in which different epistemic perspectives and ways of understanding quality are negotiated (Lamont 2009). While the role of peers in grant review has long been viewed as a cornerstone in the autonomy and self-governances of science, researchers complain about assessments and often display distrust of the grant review process.

In recent decades, universities have become more reliant on external funding (Slaughter and Rhoades 2004), and there has been a vast increase in the number of research grant proposals reviewed by research funding organizations. This increased reliance on grant peer review increases some of the challenges in the review system. Funding agencies often need to handle higher numbers of proposals within flat budgets, while grant applicants face low success rates and are critical of review systems (Serrano 2018). While peers evaluating proposals may agree on the best proposals, differentiating within that category is more challenging. Thus, uncertainty rises when success rates decline below 10–20 per cent (Bornmann et al. 2008; Cole 1992: 83; Fang et al. 2016). Moreover, the growth in applications and the consequent review tasks generates reviewer fatigue. Funding agencies often struggle to find reviewers and report that finding experts with adequate expertise, sufficient time, and no conflicts of interest is difficult (Hayes and Hardcastle 2019).

These developments challenge the trust in the peer review system on which competitive research grants rely. Difficulties in obtaining relevant reviewer expertise, the rejection of high numbers of apparently fundable proposals, and reviewers who struggle to distinguish between top proposals—with random outcomes—all risk reducing trust in the performance of the grant review system. Still, few studies have examined researchers' trust in grant review or how trust in grant review compares with trust in other kinds of peer review or informal assessments by close colleagues. In the present study, we set out to explore *researchers' trust in grant peer review* and to compare that with their *trust in other types of evaluations* of their research. We thus study the conditions under which researchers have confidence in the assessments of their research and trust grant review, with the aim of understanding the possible implications of low success rates and reviewer fatigue.

To investigate these issues, we draw on studies of trust in science and peer review to identify factors generating trust in peer review, which are presented in the next section. We then analyse available survey data on scholars in selected fields in three northern European countries to further explore factors generating trust and distrust in peer review, as presented in Sections 3 and 4.

2. Exploring trust in peer review: previous studies and research questions

Trust is often referred to as the 'glue of society', as it keeps people together and makes things run more smoothly and flexibly. Trust is also a key component of a resilient research system. Indeed, it has been argued that in most fields of research, trust is 'more basic than empirical data or logical arguments' (Hardwig 1991: 694). The literature examining trust in general and trust in science more specifically points out three main factors regarding trustworthiness: ability, benevolence, and integrity (Hendriks et al. 2016; Hummels and Roosendaal 2001; Mayer et al. 1995). First, perceived expertise or the *ability* to perform a specific task has been identified as critical for trust (Mayer et al. 1995: 717). Notably, trust in this sense is not general but relates to perceived expertise and aptitude for a specific task or situation. Second, *integrity* in terms of perceived reliability and adherence to common values and principles, for example, are found to generate trust (Barber 1987: 127). Third, people tend to trust those whom they view as *benevolent*; that is, people who they understand want to be helpful to them. They may perceive someone to be benevolent due to some kind of attachment to the trustor, such as being members of the same (professional or private) group, or when the trustee appears to share the trustor's goals (Mayer et al. 1995: 719). In addition to the three factors of trustworthiness, there are variations in peoples' 'propensity to trust'. Hence, trust may vary by trustor characteristics and not just (perceived) trustee characteristics (Mayer et al. 1995: 714–6).

While these are general conditions for trust, they play a specific role in science and the review of scholarly research. As described by Polanyi (1962[2000]), science is a self-regulated community where methods, theories, and truth claims are continuously evaluated, with the members of that community having joint responsibilities for quality assurance. Furthermore, they rely on one another's expertise: 'scientific evaluations are exercised by a multitude of scientists, each of whom is competent to assess only a tiny fragment of current scientific work' (Polanyi 1962[2000]: 16). Knowledge claims are inherently uncertain, and consensus is limited, especially at the research frontier (Cole 1992), while the tension between conformity and originality is essential in guiding and motivating scientific work (Polanyi 1962[2000]). These characteristics of science make peer review one of its core institutions and give it a key role in 'detached scrutiny of beliefs'—that is, what Merton calls 'organised skepticism' (Merton 1973: 277)—and in rewarding both conformity and originality (Barlösius and Philipps 2022: 158). The uncertainty and complexity of science and the limited scope of individual expertise make trust vital in the production of scientific knowledge, and indeterminacy and divergent opinions make trust vital in peer review.

Regarding conditions for trust in peer review, the above points indicate that expertise in the specific field of review is crucial. One needs to know the state of the art and understand the theories and methods of a field to assess it. Hence, the perceived ability to review a grant proposal likely depends on a field match between applicants and reviewers. Expert assessments of complex matters for the allocation of critical resources also demand a high degree of discretion and integrity. In peer review, this may include general integrity in terms of honesty and ethical principles and compliance with the norms guiding the scientific community (such as the norms outlined in Merton 1973). Moreover, the organization of science into a variety of competing schools and groups may make perceived benevolence a critical factor for trust in peer review. It may depend on 'membership' in the same school of thought or intellectual paradigm or the same organization, scholarly network, or research group. Previous research indicates that authority in science is held to be based primarily on competence (Zuckerman and Merton 1973: 467) and that competence—as defined by the reviewed—is an essential factor for trust in peer review for academic publishing (Hattke et al. 2018). Notably, earlier studies indicate that most researchers are satisfied with the pre-publishing peer review process and believe that it improves their papers (Mulligan et al. 2013; Ross-Hellauer et al. 2017; Rowley and Sbaffi 2018).

The other factors in trustworthiness, benevolence and integrity, both relate to a key concern in grant peer review: potential bias. Empirical studies have found evaluations of proposals to be biased by favouring specific research topics and methods or that review outcomes are random (Cole et al. 1981; Guthrie et al. 2019; Travis and Collins 1991). Grant reviews have also been found to be prone to gender bias (Witteman et al. 2019), although other research failed to identify gender bias in funding processes (Beck and Halloin 2017; Sato et al. 2021). Moreover, track record and reputation may affect grant success, and a grant review experiment indicated that anonymized proposals can reduce bias that favours renowned universities and researchers (Bhattacharjee 2012). Some studies have also found that applicants with some affiliation to the reviewers are graded more highly than applicants without such reviewer connections (Sandström and Hällsten 2008; Wennerås and Wold 1997).

Moreover, success in prior grant competitions appears to increase possibilities for success in future grant competitions, in addition to being crucial for research careers (Laudel 2006; Madsen and Aagaard 2020). Grant peer review is thus a fundamental part of the research system; at the same time, low success rates and accumulative advantages (Merton 1988) may create a divide between granted and non-granted researchers and a higher level of distrust of the system among those who do not receive grants. Surveys of applicants to specific grant schemes demonstrate significant differences between funded and non-funded applicants in their confidence in reviewer competence and impartiality.[1] Moreover, if a positive outcome is taken as an indication of benevolent reviewers, all three trustworthiness factors appear to be correlated in grant review.

Another important issue is how familiarity with and integration into the review system can promote trust. Apart from success in grant funding competitions, performing such reviews oneself—and thus gaining insights into the different concerns and compromises that are inherent in that work—can help establish trust. Direct insider experiences with the kind of review in question may create more shared values and concerns with grant organizations and confidence in the benevolence and integrity of the system (see value-based trust in Hummels and Roosendaal 2001: 92–3). Previous research indicates that scholars who serve on grant review panels are less sceptical about grant review processes (Philipps 2022: 370).

The linkages between the three trustworthiness factors are illuminated when trying to understand different forms of

scholarly bias. Such bias may be *cognitive* in the sense that scholarly perceptions influence assessment, for example by favouring perspectives, theories, or methods that align with one's own. It may also be due to research *interests* so that individuals' assessments benefit their own research interests (Langfeldt 2004: 58). The latter may imply favouring one's own field, speciality, or perspective. It can even imply disfavouring research and proposals from one's own speciality and perspective to avoid helping competing research groups, whether local or global. In terms of the above factors for trustworthiness, the first kind of scholarly bias (cognitive) relates to benevolence and may be conducive to trust, at least for those with matching scholarly perspectives. The other kind of scholarly bias (interests) is in principle quite different, and allowing one's interests to affect a review may violate the ethical standards of peer review. Nonetheless, the two types of scholarly bias can involve the same type of reviewer behaviour and thus be challenging to distinguish when cognitive perspectives and research interests overlap. Promoting perspectives, theories, or methods compliant with one's own may be viewed as using scholarly discretion to help develop the field and fulfil one's mandate in conducting reviews. Hence, as long as assessments are beneficial for the reviewer's field and perspective, it may be hard to separate (perceived legitimate) cognitive bias from research interests not expected to interfere with assessments. Conversely, assessments that are not in favour of a given reviewer's field or perspective be may due to self-interest (not wanting to help one's competitors) or because the close expertise on the topic enables detecting flaws and thus being more critical (unconscious cognitive disfavouring). Either way, it may be difficult to empirically separate different types of scholarly bias in peer review, which complicates distinguishing between benevolence and integrity when studying factors in trustworthiness.

Furthermore, reviewers' benevolence and ability may be interconnected. One may trust experts in one's field to understand and assess research and to be well disposed (benevolent) towards that kind of scholarship. Likewise, one may distrust the ability of opponents within one's field to understand and assess one's research and even expect them not to want to promote it (not being benevolent). In other words, perceived benevolence and integrity may be directly linked, whether positively or negatively, to perceived ability. Consequently, for the study of trust in peer review, the three main trustworthiness factors identified in the literature appear relevant but may be difficult to distinguish.

The literature further indicates that trust is not equally distributed among different groups of researchers. First, notions of research quality may vary between academic disciplines and fields of research. Science is composed of relatively independent disciplines, each with its own way of conducting and organizing research, education, and collaboration with partners outside academe. Disciplines also arrange their own conferences and have their own publication traditions and channels (Becher 1989; Hammerfelt 2020; Whitley and Gläser 2007); they practise their own notions of research quality that constitute the basis for evaluating research (Lamont 2009; Langfeldt et al. 2020; Reymert 2020). Even with disciplines as an organizing element, scholars also collaborate with researchers outside their own discipline, and such interdisciplinary collaboration can vary widely between subject areas (Uddin et al. 2021). Some disciplines and fields may have more unified notions of quality or a wider group of actors perceived as able to evaluate research. We expect that scholars' perceptions of the ability of evaluators outside their field to evaluate their research depend on the discipline, in the sense that scholars who more frequently depend on and collaborate with scholars from other disciplines have more trust in those individuals' ability to evaluate their research. Second, as discussed earlier, trust may be related to application outcomes and reviewer experiences, implying that grant winners or insiders may have more positive perceptions of funding agencies and more trust in their reviewers. Third, the literature on gender bias in peer review may suggest that female scholars would be less inclined to trust grant review. While studies on gender differences regarding trust are both sparse and inconclusive, there is some evidence to suggest that men (in general) are more trusting of others' competencies (Schwieren and Sutter 2008), but these studies have no direct relevance for trust and gender in science.[2] Notably, our study includes research fields where a large majority of the researchers are men. This lack of gender balance may or may not affect trust. Finally, countries have different research funding landscapes, so grant review systems and the opportunities for scholars in different academic disciplines to secure external funding may vary between countries.

2.1 Research questions

Against this background, the present study explores the conditions under which researchers trust grant review. We do so by examining who researchers perceive as having the ability to assess their research and without distinguishing between trustworthiness based on expertise, integrity, and benevolence. Drawing on the literature discussed earlier, we expect scholars and reviewers with similar expertise to be more trusted and success and integration in the research system to lead to greater trust in grant peer review. The research questions (RQs) we explore are as follows:

(RQ1) Do researchers trust grant reviews more or less than other kinds of evaluations of their research?

(RQ2) What are the conditions under which researchers trust and distrust grant reviews?

Regarding RQ1, we expect scholars to have greater trust in their own research network and close colleagues than in scholars with whom they have less scholarly alignment. Accordingly, we expect that reviewers who are selected to match the particular research to be assessed will be more trusted than those selected for broader purposes. In short, we suggest that reviewers' match to the research field and their familiarity with the review object are critical factors in trust in peer review. Our first hypothesis (H1) is as follows: 'To evaluate the quality of their research, scholars have more trust in colleagues from their own specific field than in those with more general expertise.'

Under the expectation that those with similar expertise will be more trusted, we explore survey data on researchers' perceptions of grant reviewers' abilities to assess the quality of their research. Grant review practice can vary greatly depending on the kind of expertise involved. The procedures of the major funding agencies in the countries we survey typically include experts with more general expertise to compare multiple proposals rather than only experts selected to match a specific proposal (see Section 3). We contrast scholars' perceptions of grant reviewers with their perceptions of the abilities of (1) their own research networks and close colleagues, who

likely are closer scholarly matches and more familiar with the research than grant reviewers and hence may be perceived as both more able to assess it and more benevolent in outlook. We contrast that with (2) the review of papers submitted to journals—where match to and familiarity with the research under review may vary, but for our respondents was assumed to be better matched to the review topic than grant review because paper reviewers are selected specifically for a given paper, while grant reviewers and panels are usually appointed for a group of proposals (see Section 3). We also contrast (3) panels evaluating whole departments or units, which may have weaker scholarly matches with the individual researchers and groups under review as they are appointed to evaluate broad disciplinary fields and not the respondent's field in particular. Furthermore, as a kind of 'baseline ability', we also include (4) how respondents see their own ability to assess their research.

Concerning RQ2, we explore success and integration in the research system and the organization of research as conditions for trust in grant review. We expect 'insiders' to be more trusting. For instance, being a high performer and participating in grant review would generate trust in the grant review system. More generally, high academic standing and successful integration into the research system may lead to more trust in grant review. Differences relating to the organization of research and its social and epistemic integration may also affect trust in grant review. Researchers involved in collaborative research across fields rely on large teams and insights from multiple disciplines and thus may trust a broader range of reviewers because being more dependent on collaborative and integrated research may give more shared review norms and a higher general trust in peer assessments. As outlined in the next section, there are also expected field differences relating to dependency and the social and epistemic integration of a field. Notably, our study does not include the question of interdisciplinary grant proposals. Researchers who submit interdisciplinary proposals can experience disadvantages (Banal-Estañol et al. 2019) that may decrease trust in grant review. Hence, even when interested in the effect of reliance on multidisciplinary and collaborative research, we need to take possible adverse effects of lower success rates for multi- and interdisciplinary proposals into consideration.

Based on the available survey data, the following hypotheses are tested: (H2) scholars who have recently served on grant review panels have more trust in grant reviewers' abilities to evaluate their research compared to scholars who have not; (H3) scholars who have had their 'best research'[3] funded by national funding agencies—compared to scholars who have not—have more trust in the abilities of the national funding agencies' reviewers; (H4) scholars in broad collaborative contexts—compared to scholars with less reliance on teamwork and insights from multiple disciplines—have more trust in grant reviewers' abilities to evaluate their research.

3. Data and methods

We draw on rich survey material from 2018 on researchers' notions of research quality and the conditions for good research. These data include questions not previously analysed on researchers' views about who has the ability to evaluate the quality of their research. The data cover researchers in three academic disciplines—economics, cardiology, and physics—in Norway, Sweden, and the Netherlands.

3.1 Sample and response rate

To ensure that all participants were researchers active in one of the three disciplines, multistage sampling was applied. First, email addresses were collected from research organizations' webpages, covering research staff in all units/departments that in a bibliometric mapping appeared with a minimum number of articles in economics, cardiology, or physics (based on the Web of Science journal classification). Then, we identified additional respondents at the same organizations who had published in journals within the field. The former strategy represented 59 per cent of respondents; the latter the other 41 per cent of the respondents. We also asked the respondents about their research field and included only those who answered that they conducted physics, cardiology or cardiovascular, or economics research. Additionally, we added the respondents' 2011–7 bibliometric data from the Web of Science, including their publication and citation scores.

The survey had a response rate of 32.9 per cent, although there was variation across fields and countries. The highest response rate was in Norway (51.3 per cent), followed by Sweden (38.6 per cent) and the Netherlands (19.6 per cent). As to fields, the highest response rate was in physics (37.1 per cent), followed by economics (31.5 per cent) and cardiology (25.8 per cent).

To control for response biases, we conducted a response analysis by gender after first identifying the gender of the invited researchers who did not reply to the survey by first name with https://gender-api.com/. This operation identified the gender of 92.4 per cent of invited scholars. The response analysis further revealed that females were slightly more inclined to answer than males, which strengthens our assumption that we did not have unnormal biases in the response, even though only 22 per cent of our respondents were female researchers (Table 1).

3.2 Disciplines and country context

Our sample captures academic disciplines—cardiology, physics, and economics—with notably different collaborative dependencies and interdisciplinary practices. While cardiologists and physicists often engage in collaborative research across research specialities and academic disciplines, economists more often conduct research individually or collaborate with people from their own field (Hylmö 2018; Jones 2021; Truc et al. 2020). We thus expect economists to have less faith in scholars outside their field to evaluate their research. In addition to engaging in multidisciplinary research collaboration, cardiologists often work in hospitals with practitioners like doctors and nurses; indeed, many of them are practitioners themselves, with research lines linked to their medical practice. We thus expect cardiologists' collaboration with and reliance on a diverse set of colleagues to provide a basis for more trust in assessments from colleagues outside their specific field or discipline. Additionally, the three disciplines represent three different research traditions (medicine, natural sciences, and social sciences, Becher 1989) and thus serve as a control variable to strengthen the generalizability of the study.

Table 1. Descriptive statistics.

	Count	%	Total
Control variables			
Gender			
Female	304	22	1,378
Male	1,074	78	1,378
Academic position			
Assistant professor	441	29	1,546
Associate professor	384	25	1,546
Professor	465	30	1,546
Other	256	17	1,546
Country			
The Netherlands	366	24	1,549
Norway	421	27	1,549
Sweden	762	49	1,549
Independent variables			
Highly cited			
Having publications among the 10% most cited publications in the field	801	61	1,305
Grant proposal review experience			
Having served on one or more panels reviewing grant proposals	329	21	1,549
Only reviewed grant proposals remotely	381	21	1,549
No grant proposal review experience	902	58	1,549
Own funding success			
Own best research was funded by internal resources	418	27	1,549
Own best research was funded by national funding agencies	626	40	1,549
Dependency index[a] *(range = 0–3, mean = 0.81)*			
My research relies on a large research team	230	16	1,475
My research relies on teams located in multiple research organizations	554	37	1,491
My research relies on insights from many different disciplines	425	29	1,489
Academic discipline			
Cardiology	339	22	1,549
Economics	351	23	1,549
Physics	859	55	1,549

[a]Additive index based on 'yes' responses to these three survey statements about research reliance.

An important limitation in the data is that we cannot relate researchers' trust in grant review to specific grant programmes. Hence, we study general perceptions about the ability of reviewers, while not capturing how these perceptions are formed by specific grant programmes or review processes. The delimitation of the sample still enables a comprehensive analysis of the variation in trust. We study the three disciplines in three different countries; this enhances the sample size and breadth of the study. However, we do not include countries with widely different research contexts. Norway, Sweden, and the Netherlands are all northern European countries with relatively similar political, economic, and social contexts for research. While the research funding landscape does vary between them, they all have one major public research funding agency that covers all research areas: the Dutch Research Council (NWO), the Research Council of Norway (RCN), and the Swedish Research Council (VR). Grant review procedures may vary somewhat between funding programmes, but the standard procedures of these funding agencies all include expert reviews and panel deliberations of the merits of the proposals. At RCN and VR, expert reviewers are assigned to a group of proposals and first assess the proposals individually, before meeting to discuss them and agree on assessments. At NWO, (at least) two expert reviewers are assigned to each proposal (no one reviews more than one proposal), the applicant is invited to write a rebuttal to the review reports, and a selection committee then assesses the proposals, the review reports, and the rebuttals before advising the NWO on which proposals to fund.[4] Hence, NWO recruits expertise for individual proposals to a greater extent than RCN and VR. The recruitment of panel/committee members also differs in the sense that NWO committee members are Dutch scholars, while VR uses a mix of scholars from Sweden and other countries and RCN recruits all panel members from other countries. To account for differences, we include country as a control variable in the analyses.

3.3 Descriptive data of the independent and dependent variables

In the survey, we asked respondents about whether various groups had 'the ability to evaluate the quality' of their research: (1) the respondents themselves, (2) colleagues in their research group/unit, (3) their head of department/unit, (4) their scholarly networks outside their department, (5) reviewers of papers they had submitted to journals in their field, (6) reviewers of proposals to their main national funding source; (7) reviewers of their proposals to the European Research Council (ERC), and (8) reviewers of proposals to the European Union (EU)'s Horizon 2020 initiative. The answer options were on a five-point Likert-type scale: (1) *very low ability*, (2) *low ability*, (3), *medium ability*, (4), *high ability*, and (5) *very high ability*. They could also answer *not relevant/can't say*; those answers were not included in the regression analyses. To investigate how replies differed between various groups of researchers, we include multiple variables in the analysis: background variables (academic discipline, country, gender, and academic position), variables reflecting respondent success (having publications among the 10 per cent most cited publications, answering that their best research was funded by national funding agencies), and integration in the research system (having served on panels reviewing grant proposals). Descriptive statistics for these variables are presented in Table 1. To capture respondents' involvement in and reliance on multidisciplinary and collaborative research, we composed an additive 'dependency index' based on three survey questions. Descriptive statistics for the variables used to compose this index are also presented in Table 1.

3.4 Method

We examined the data with the R software package and applied multiple ordinary least squares (OLS) regression, with respondents' perceptions of who is able to evaluate the quality of their research as the dependent variables and the independent variables shown in Table 1. In addition, we controlled for the background variables of country, academic position, and gender in the regression models. We also considered including respondent age as a control variable. However, since age and position were strongly correlated (0.70) and including it did not significantly improve the models according to the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) tests (Table A.1), we excluded it from the models. Additionally, when trust in the reviewers of their proposals

to their main national funding source served as the dependent variable, we also controlled for the researchers' trust in colleagues, their head of department/unit, scholarly networks outside their department, and reviewers of papers (Table A.3).

We conducted regression analyses with all countries and fields as baseline categories, but in the results, we only show the models with the Netherlands and cardiology as the baselines. Cardiology was selected as a baseline because it was the category that was most deviant, while economics and physics were more similar. The Netherlands was selected as the baseline for similar reasons. The regression analyses with the other fields and countries as baseline categories validated our results. Finally, we applied variance inflation factor (VIF) tests to check for issues related to multicollinearity between variables (Lin 2008), but this was not an issue in our regression analyses.

4. Results

4.1 Far lower confidence in grant review

The survey indicates that researchers perceive the ability of reviewers in their main national funding source to be lower than the ability of reviewers for their field journals and than their colleagues' ability to assess their research. While 71 per cent perceived their colleagues to have high or very high ability to evaluate their research, and 64 per cent reported that journal reviewers had very high or high ability to evaluate their research, only 29 per cent indicated the same for reviewers at national funding sources. In fact, 19 per cent of the researchers reported that they perceived reviewers in grant panels to have very low or low ability to evaluate their research. It should be noted that 15 per cent of the respondents reported that the question about national funding sources was not relevant or could not say.

The respondents had similarly low confidence in ERC and Horizon 2020, where only 11–16 per cent of respondents felt that these actors had very high or high ability to evaluate their research. Notably, two-thirds of respondents said that they did not know the ability of the ERC or Horizon 2020 to evaluate their research or that it was not relevant, most likely because they had not applied for those grants. Among those who did give an opinion, more respondents commented that the ERC and Horizon had very high or high ability than very low or low ability (Fig. 1).

Given how familiarity with and match to the field of research vary between the categories shown in Fig. 1, these results support H1. Our respondents have greater trust in close colleagues, their own scholarly networks, and journal reviews in their own field than in grant review, which in the countries studied involve panels with broader and more general expertise, whereas journal reviewers are likely to be field experts.

4.2 Factors affecting trust in grant review

To investigate and explain the variance between groups of respondents, we conducted multiple linear regression analyses with trust in reviewers in grant panels and other actors' ability to evaluate the quality of their research as the dependent variable while controlling for relevant background variables. The significant results from the regression model with trust in national agency reviewers' abilities as the dependent variable are shown in Fig. 2, while Table A.2 displays the results from the full regression models with trust in grant review and other actors' ability as dependent variables. Table A.3 shows the results from the regression with trust in grant review as the dependent variable and trust in the other actors as independent variables.

The first key finding in these regression analyses is that insiders and more successful scholars expressed greater trust in grant reviewers than other scholars. Having their best research funded by national agencies (H3, implying success with grant proposals) increased scholars' perceptions of the ability of grant reviewers for national agencies to evaluate their research, as shown in Fig. 2. Similarly, when respondents' best research had been funded by internal resources (which could indicate less support for those research ideas from funding agencies), there was less trust in national grant panels. Success in terms of having top 10 per cent cited publications also appeared to have a positive effect on trust, but this effect was insignificant when controlled for the perceived ability of colleagues and other categories of reviewers (Table A.3).

We further observe that having served as a reviewer on one or more grant panels in the previous year also increased researchers' trust in grant proposal review, while remote reviews for funding agencies had no effect.[5] Hence, H2 is supported. Serving on panels gives more insight into the grant review system than serving as a remote reviewer, and in our data, only the former role had a significant effect on trust in grant review.

Another key finding is a strong correlation between trust in the ability of grant reviewers and trust in the ability of one's colleagues, head of department, networks outside the department, and journal reviewers (Table A.3).[6] We may interpret these correlations as reflecting a general propensity to trust others' ability to evaluate the quality of one's research. Hence, rather than being interpreted independently, the various categories may be seen as a single latent variable regarding trust in the evaluation of research quality. However, even though the perceived ability of different categories of reviewers and colleagues is correlated (Fig. A.1), the VIF test indicated that all the models had a generalized VIF below 1.5; we thus concluded that including the other trust variables (colleagues, head of department, networks outside the department, and journal reviewers) does not cause issues of statistical inference (Field et al. 2012). In addition, the perceived ability of the different kinds of actors varied (Fig. 1). Thus, one can argue that trust in the different types of actors concerns different review situations and should be understood as separate phenomena.

We also investigated whether conducting research that relied on multiple disciplines, large teams, or teams in multiple organizations affected trust in grant reviewers (dependency index, Table 1). The effect appears significant but not strong (the maximum increase in trust in grant reviewers was 0.73 units), and when controlled for trust in the ability of colleagues and journal reviewers, the effect was not significant (Table A.3). Hence for H4, we conclude that scholars in broad collaborative contexts tend to have greater trust in reviewers' abilities in general, but not specifically for grant review.

In the models, we also controlled for relevant background variables. For instance, we expected and found field differences. Cardiologists were more likely than economists and physicists to perceive grant reviewers as having a high ability

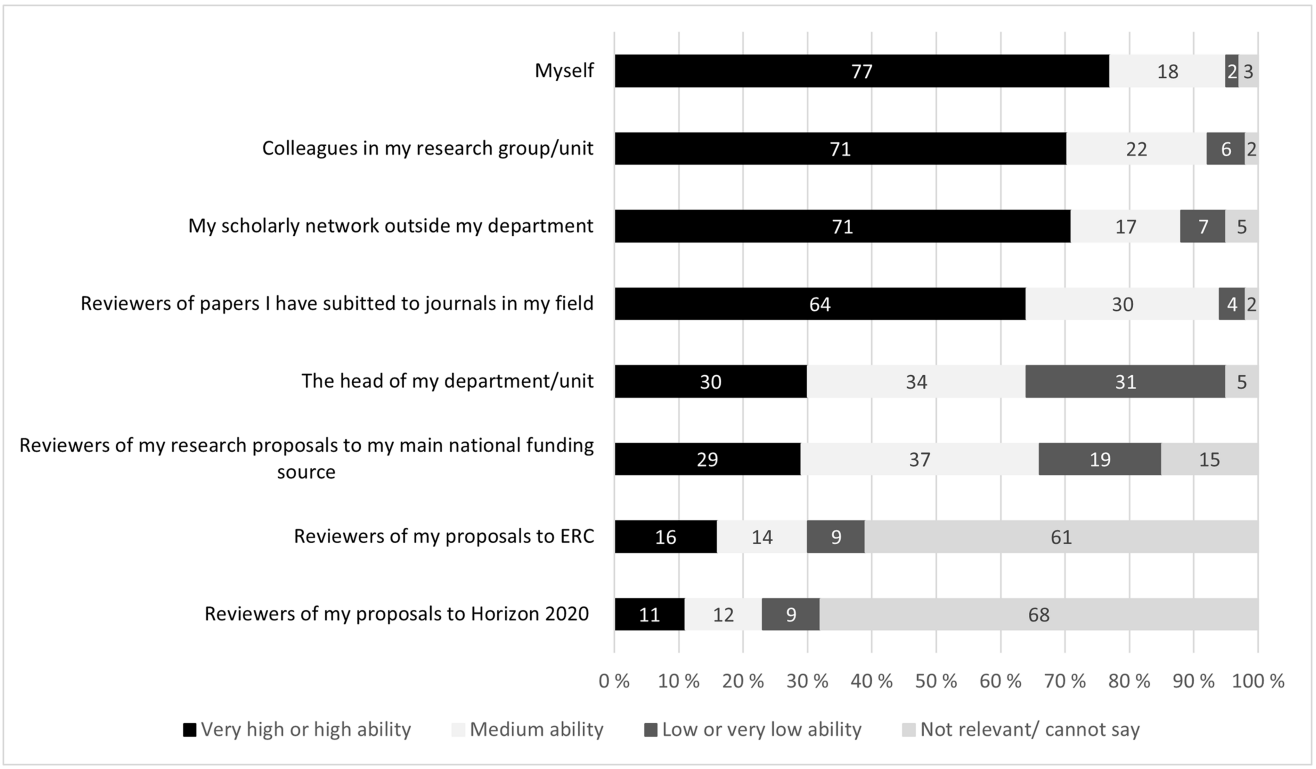

Figure 1. Respondents' perceptions of who is able to evaluate the quality of their research ($N = 1{,}366$–$1{,}401$).

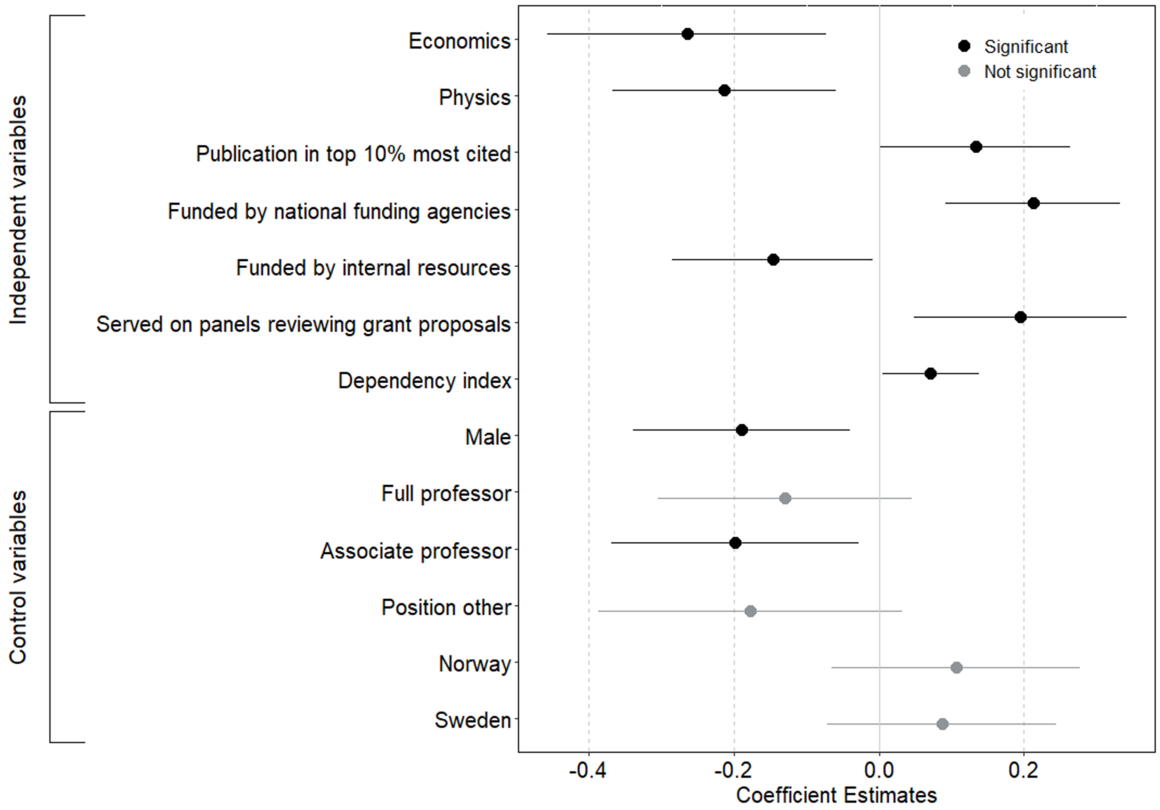

Figure 2. Factors affecting trust in grant review. Results from OLS regression with trust in reviewers regarding proposals to their main national funding source as the dependent variable. The baseline (vertical grey line) categories are cardiology, female, assistant professor, and the Netherlands. The coefficient estimates are shown for each independent and control variable, with positive effects to the right of the baseline and negative effects to the left. Significant effects are shown with black lines and non-significant with grey lines.

to evaluate their research (Fig. 2). By contrast, regarding journal review, we found economists more trusting of the ability of reviewers, which may relate to economics as a field organized around a journal hierarchy (Hylmö 2018). These results are displayed in Table A.2.

Moreover, we discovered some gender differences; female researchers appeared to have more trust in grant reviewers of their national funding sources than male researchers did. Still, there were no significant gender differences for the other categories of evaluators: thus, men and women appear to have similar perceptions of the abilities of their colleagues, department heads, journal reviewers, and ERC and Horizon 2020 reviewers (Table A.2). We did not find significant differences by country; Dutch, Swedish, and Norwegian scholars all appear to have similar perceptions of the abilities of their national funding sources' reviewers (Table A.2).

5. Discussion and conclusions

We set out to test four hypotheses, and they have largely been confirmed. We find that as to evaluating the quality of their research, scholars have the most trust in colleagues in their field (H1). Our respondents expressed far less trust in the abilities of funding agencies to assess their research than they do in their scholarly networks and close colleagues. We also find that trust varies with success and integration in the research system and with the organization of research. Scholars who have recently served on grant review panels have more trust in grant reviewers' abilities to evaluate their research (H2), scholars who have had their best research funded by national funding agencies have more trust in the abilities of those agencies' reviewers (H3), and scholars who work in broad collaborative contexts have more trust in reviewers' abilities to evaluate their research (H4).

In short, our analysis indicates that the field competence of the reviewers is of key importance for trusting peer review and that successful applicants to and insiders in the grant review arena are more trusting. We furthermore find some differences between academic disciplines and gender differences that are not straightforwardly explained and require further study. The gender differences are contrary to what might be expected. Despite research indicating that grant review is less favourable to women (Sato et al. 2021; Witteman et al. 2019) and that women may have less opportunities to be insiders in the three heavily male fields in our study, our female respondents expressed higher trust in their national funding agencies' reviews than did their male colleagues.

In terms of examining the reasons for distrust in grant peer review, we first note that in our survey, the respondents indicated that those reviewing their grant proposals were far less able to assess the quality of research than those reviewing the papers they submit to journals and than their research group members and external scholarly networks. These differences in researcher trust in various types of assessments point to matching expertise as the key factor for being judged as able to evaluate the quality of research. In short, there appears to be a lower expectation that grant reviewers match the expertise found in applicants' scholarly networks, and there is less trust in grant peer review than in peer review for journals. It may be difficult for funding agencies to obtain the level of expertise match that journals enjoy. Even if some funding programmes employ expert reviewers appointed uniquely for each proposal, the decisive assessments[7] are generally made by review panels which are assigned multiple proposals, some of which may match their expertise, others not. Hence, a consequence of the need to compare and prioritize proposals is that expertise match can vary widely between proposals. Reviewers of article manuscripts on the other hand are selected for specific manuscripts and may vary less. As explained in Section 3, assigning reviewers to only one proposal is common practice in the main Dutch funding agency, but that is not so with the Swedish and Norwegian funding agencies. Still, we do not find any significant country differences in trust in grant review abilities. This may be because the respondents may be thinking more about the abilities of the selection committees and panels that compare proposals and carry out the overall assessments than about the anonymous remote expert reviewers, or it may be that review practices vary within countries and within funding agencies so that we cannot expect clear country-level differences in grant review experiences. Another aspect regarding the different trust in grant and pre-publication review is that the former inherently involves more uncertainty than reviews for journals, in the sense that it can be harder to assess the future success of research plans than to assess a manuscript reporting research results. Research publishing also comes with more options than research grants; when facing rejection, it is easier to find a different journal than to secure an alternative funding source for one's research. Hence, there are multiple reasons for more dissatisfaction with and distrust of grant peer review than peer review for journals.

Second, we find certain key factors influencing trust in grant peer review. Researchers who have received grants from national funding agencies for what the scholars themselves consider their best research achievements judge the grant reviewers at their national funding agencies as more able to assess their research. This may be because successful applicants find fewer reasons to doubt the benevolence, integrity, and competence of the reviewers, all of which appear fundamental for trust (Hendriks et al. 2016; Mayer et al. 1995). It may also be that matching reviewer expertise generates success in grant competitions.[8] If reviewers matching the specific topic and perspectives of the reviewed research generate a higher chance of positive reviews and thus grant success, reviewer competence and grant success are entangled and difficult to separate. Notably, mainstream and popular topics, perspectives, and methods may more often experience a reviewer match, and scholars in less common, smaller, or less popular fields more often experience a lack of reviewer match. For example, one respondent who replied that reviewers in his national funding source had 'very low ability' to evaluate the quality of his research commented in the free text space as follows: 'My field is small and highly specialized and lacks representation in the funding sources.' Hence, while grant success generates trust in grant review and matching reviewer competence can impact grant success, the likelihood of matching competence and grant success may vary between (large and small) research topics and perspectives. Furthermore, we find that researchers with the top 10 per cent cited publications are more inclined to trust grant review, but when controlling for their trust in other categories of evaluation of their research, this effect is not significant. Hence, while success in national grant competitions appears to be a significant separate factor that generates trust in national grant sources, a

more general success indicator, such as heavily-cited publications, does not appear to be an independent factor affecting trust in the grant review of national grant sources. Still, it is challenging to distinguish between lack of success and lack of reviewer competence as reasons for distrust in grant review.

Third, there are notable differences between the three academic disciplines in our survey. Cardiologists were significantly more prone to trust the ability of reviewers working for their national funding source. The differences may relate to how the research (1) and the research funding (2) are organized. Concerning (1) the importance of differences in the organization of research, we find some support in our data that 'dependencies' on collaborative research affect trust in grant review. More specifically, we find that respondents who relied on multiple disciplines, large teams, and/or teams in multiple organizations had somewhat more trust in the reviewers at their national funding source and Horizon 2020, as well as the panels that had evaluated their departments. This indicates that researchers involved in large and broad scholarly collaborations perceive a wider range of experts as competent to evaluate their research and are more 'tolerant' in their definition of expertise. This may be because such collaboration increases the ability to assess research in multiple fields (through a better understanding of methods and perspectives in other fields) and/or because it generates more shared values and notions of quality across fields. Still, this does not in itself explain why cardiologists display more trust than physicists and economists in the ability of reviewers for their national funding source to evaluate the quality of their research.

Exploring (2) differences in how research funding is organized, we notice that all three countries in the survey have one or more funding sources dedicated to cardiovascular research, while there are no major funding sources dedicated specifically to either physics or economics.[9] Funding sources dedicated to specific research topics and scholarly communities may have better access to available expert reviewers and better capability of finding expertise that matches the proposals submitted and thus affect the competencies in the pool of reviewers and applicants' trust in their abilities. Hence, for cardiologists, having separate funding sources may be a positive factor for trusting both the ability and the benevolence of the reviewers. In these terms, the differences we find between the academic disciplines may simply indicate that funding agencies organize peer review with different degrees of competence match and in our case that cardiologists more seldom experience being assessed by incompetent reviewers.

The findings have direct relevance to debates over how to fund research and the effectiveness of grant peer review as a mediator between politics and science in today's research system. Many scholars appear to have far less confidence in grant peer review than they have in the review of papers they submit to journals. While matching reviewer expertise appears to be a critical factor for trust in grant review, distrust also appears to be partly linked to low success rates and a lack of transparency in grant competitions. Successful applicants and review system insiders more often trust the competence of the grant review system. Notably, our data show that those with their own experiences on grant review panels expressed higher trust in the reviews. This group probably has more insight into grant review procedures and considerations and may also feel that funding agencies share their values and concerns. To the extent that knowing the grant review system and being part of it generate trust, transparent grant review processes are an important way to battle distrust. Hence, closer involvement of the research community in grant reviews and help in selecting reviewers for individual proposals might be helpful in building trust.

Our analyses point to ensuring adequate reviewer competence and integrity as key to trust in grant review processes. In a situation with many review tasks and the constant threat—and frequent reality—of reviewer fatigue, recruiting adequate reviewer expertise is challenging. It is difficult to ensure the same level of reviewer expertise for all proposals while also guarding against conflicts of interest and, as noted earlier, particular attention needs to be paid to ensure adequate expertise for proposals in small and highly-specialized fields. How are funding agencies to find qualified reviewers who are 'sufficiently detached to judge disinterestedly and interested enough to judge sincerely' (Van der Meulen 1998: 406)? By asking applicants to indicate what specific research fields, topics, perspectives, and methods the reviewers should know and where such expertise can be found, funding organizations would have a better basis for selecting reviewers. This would both improve the chances of having qualified reviewers and counter reviewer fatigue: well-targeted reviewer requests are more likely to result in a positive response. Rebuttals from applicants may furthermore increase transparency and help modify the effects of inadequate reviews.

Still, low success rates are a persistent challenge in grant competitions. Funding budgets often imply that 80–90 per cent of proposals are rejected, and those who are rejected tend to blame the result on incompetent reviewers. At the upper end of the scale—who is ultimately selected among those given the highest grades by the reviewers—much may rely on the specific expertise represented in the review panel and how the selection process is organized. Hence, the selection of expertise becomes increasingly important for review process outcomes. Recent research indicates that most researchers are willing to accept grant review procedures that combine peer review with an element of randomization, but support for randomization alone is low (Philipps 2022). Shaw (2023) suggests that including a lottery as part of the selection process could increase trust in grant selection processes by removing some of the biases and deficiencies of peer review. Barlösius and Philipps (2022) emphasize the role of peer review in ensuring the autonomy of science and find that a lottery appears as a legitimate procedure for selecting grants in situations where peer review is indeterminate, i.e. where peers cannot easily conclude on the best proposal. Furthermore, our study raises the question of whether randomized selection would be seen as legitimate also by applicants in small fields or situations where experts without a conflict of interest cannot be found, as this could rule out biases.

Notably, our study corroborates previous findings that review system insiders are more trusting, and we add different delimitations of expertise—relating to different research practices and how research fields are organized—as a factor explaining different levels of trust in grant review. Hence, letting the research community assist in understanding those delimitations of expertise—for example, by allowing applicants to indicate fields and suggest reviewers, along with a rebuttal option—should enhance funding agencies' ability to recruit adequate expertise and support trust in grant review.

Furthermore, recognizing the limitations in distinguishing between proposals, it appears that peer review can be combined with randomized methods without compromising the legitimacy of the grant review process.

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Data availability

The data set for this study is available from the corresponding author upon reasonable request.

Notes

1. See, for example, Langfeldt and Borlaug (2016) and Vabø et al. (2012). Chubin and Hackett (1990: 65) demonstrate the association between funding success and views on bias in grant reviews.
2. There are indications that women in science are less trusted than their male colleagues (Rolin 2002), but studies of who is more trusting appear to be lacking.
3. 'Best research' as defined by the scholars themselves.
4. The review procedures are detailed on the following websites: https://www.vr.se/english/applying-for-funding/how-applications-are-assessed.html, https://www.forskningsradet.no/en/processing-grant-applications/processing-applications/processing-of-grant-applications/, and https://www.nwo.nl/en/apply-funding-how-does-it-work.
5. We have omitted serving as the remote reviewer from the final model, as this variable was insignificant and including it did not improve our model according to our AIC and BIC tests.
6. Trust in other reviewers' ability to evaluate respondents' research had a strong effect on the respondents' perceptions of the ability of grant reviewers to evaluate their research. For instance, increasing one unit of trust in journal reviewers increased trust in grant reviews by 0.368 units. This implies that perceiving the ability of journal reviewers to be very high, instead of very low, increased respondents' perceptions of the ability of grant reviewers by 1.84 units, which represents approximately the difference between, for example, medium ability and very high ability. Additionally, the explained variance of the models (R2) rose from 0.081 to 0.085–0.161, which implies that the respondents' perceptions of the ability of other categories of evaluators explain 8–16 per cent of the unexplained variance of trust in grant reviewers.
7. Some studies indicate that external reviews have a limited impact on a panel discussion (Hodgson 1995; Thorngate et al. 2002) and this appears to be one of the reasons why some funding agencies prefer to limit the use of external reviews.
8. Studies on such cognitive particularism in grant review provide conflicting results (Guthrie et al. 2018: 9), indicating that in some contexts, close reviewer expertise is an advantage, but that is not the case in other contexts. An interesting study of the effect of professional proximity indicates a clear relation between the degree of network proximity and favourable pre-publication reviews (Teplitskiy et al. 2018). We have not found similar systematic studies of the effect of network proximity/proximity to school of thought (rather than simply field of expertise) in the literature on bias in grant review, although the importance of intellectual proximity has been emphasized (Travis and Collins 1991).
9. Sweden has Hjärt-Lungfonden (www.hjart-lungfonden.se), and the Netherlands has the Dutch Heart Foundation (https://www.hartstichting.nl/wetenschappelijk-onderzoek); in Norway, cardiovascular research is a separate priority of Nasjonalforeningen for folkehelsen (nasjonalforeningen.no) and receives a large part of funding from regional health trusts (De regionale helseforetakene 2018: 48).

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Appendix

Table A.1. AIC and BIC results comparing models with and without age as a control variable.

Dependent variable	Age included	Number of parameters	AICc	Delta_AICc	BIC	Delta_BIC
Myself	No	15	2,237.5	0.0	2,310.9	0.0
	Yes	16	2,239.5	2.0	2,317.8	6.9
Colleagues in unit	No	15	2,594.6	0.0	2,668.4	0.0
	Yes	16	2,595.3	0.7	2,674.1	5.6
Department head	No	15	2,594.6	0.0	2,668.4	0.0
	Yes	16	2,595.3	0.7	2,674.1	5.6
External network	No	15	2,716.5	0.0	2,789.7	0.0
	Yes	16	2,716.5	0.0	2,794.6	4.9
Journals	No	15	2,387.5	0.0	2,461.4	0.0
	Yes	16	2,389.4	2.0	2,468.2	6.9
Reviewers of proposals to their main national funding source	No	15	2,435.3	0.0	2,507.1	0.0
	Yes	16	2,437.3	2.0	2,513.9	6.8
ERC reviewers	No	15	1,211.9	0.0	1,271.0	0.0
	Yes	16	1,214.0	2.2	1,277.0	6.0
Horizon reviewers	No	15	1,018.6	0.0	1,074.9	0.0
	Yes	16	1,018.9	0.3	1,078.9	4.0

Notes: 'Age included' refers to whether age is included in the model. 'Number of parameters' refers to the number of parameters in the model. The AICc/BIC columns show each model's score on the AIC/BIC. The Delta_AICc/Delta_BIC columns display the difference in the AICc score/BIC score between the models without and with the age variable included.

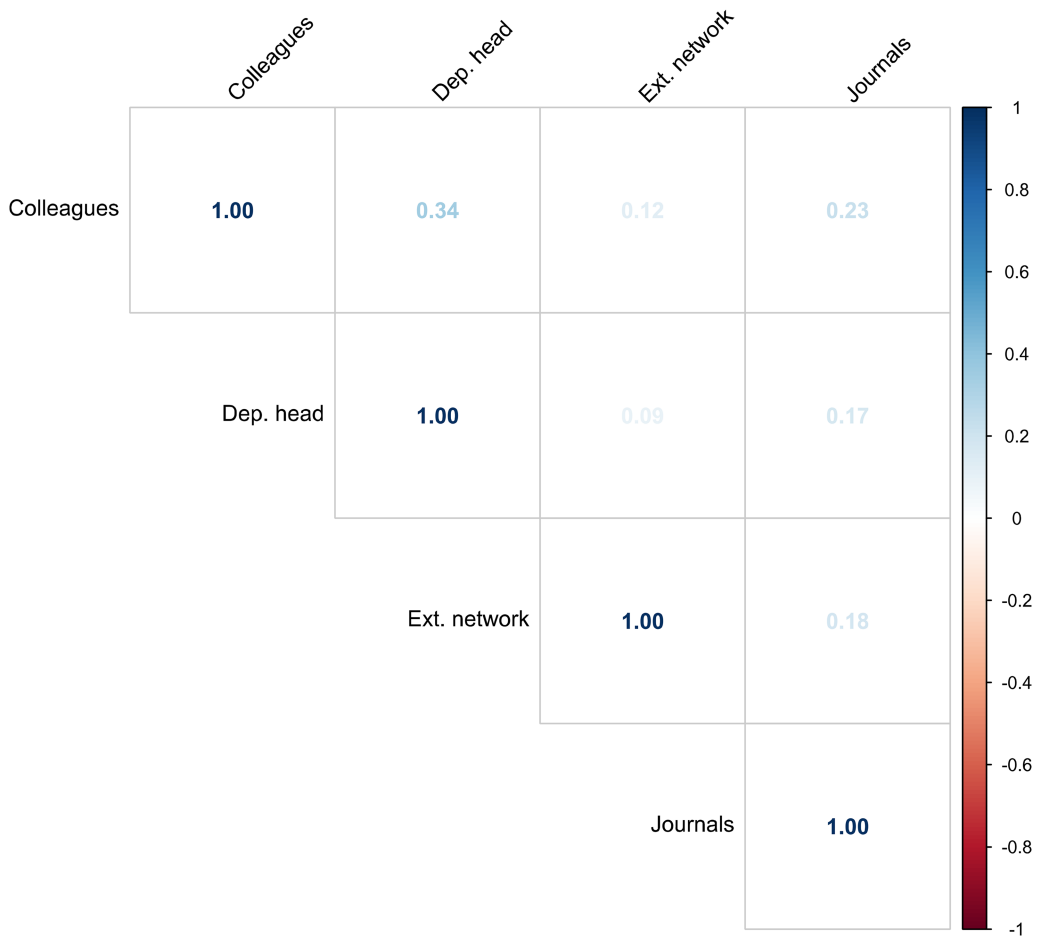

Figure A.1. A correlation between dependent variables (Pearson's correlation coefficient). Who has 'the ability to evaluate the quality' of respondent research? Colleagues in one's research group/unit, head of department/unit, scholarly network outside one's department, and reviewers of papers submitted to journals in one's field.

Table A.2. OLS regressions.

	Dependent variable: who is able to evaluate the quality of your research							
	Myself (1)	Colleaguesin unit (2)	Dept. head (3)	External scholars (4)	Journals (5)	Rev. nat. prop.[a] (6)	ERC (7)	Horizon 2020 (8)
Field: Economics	0.116	−0.071	−0.161	0.541***	0.252***	−0.265**	−0.130	−0.329
	(0.073)	(0.084)	(0.109)	(0.095)	(0.075)	(0.098)	(0.188)	(0.219)
Field: Physics	0.179**	0.063	−0.349***	0.258**	0.103	−0.214**	−0.049	−0.155
	(0.061)	(0.069)	(0.088)	(0.079)	(0.062)	(0.079)	(0.140)	(0.153)
Country: Norway	−0.056	−0.130	−0.209*	−0.040	0.272***	0.106	0.125	0.088
	(0.065)	(0.074)	(0.096)	(0.084)	(0.066)	(0.087)	(0.142)	(0.165)
Country: Sweden	−0.037	−0.043	−0.133	−0.135	−0.036	0.087	0.186	0.179
	(0.062)	(0.070)	(0.091)	(0.079)	(0.063)	(0.081)	(0.139)	(0.150)
Male	0.005	0.001	0.098	−0.009	−0.075	−0.190*	−0.242	−0.129
	(0.057)	(0.065)	(0.083)	(0.074)	(0.059)	(0.076)	(0.135)	(0.149)
Position: Associate	0.257***	−0.012	−0.252**	0.200*	−0.003	−0.199*	−0.008	−0.190
	(0.064)	(0.073)	(0.094)	(0.084)	(0.066)	(0.087)	(0.150)	(0.162)
Position: Professor	0.197**	−0.075	−0.539***	0.254**	0.028	−0.130	−0.007	−0.361*
	(0.067)	(0.076)	(0.098)	(0.086)	(0.068)	(0.089)	(0.149)	(0.161)
Position: Other	0.070	−0.036	−0.406***	0.112	0.022	−0.177	0.008	−0.383
	(0.078)	(0.088)	(0.114)	(0.100)	(0.079)	(0.107)	(0.189)	(0.217)
Having top 10% most cited publications	0.064	0.052	−0.018	0.190**	−0.015	0.133*	0.139	0.235
	(0.050)	(0.057)	(0.073)	(0.065)	(0.051)	(0.067)	(0.115)	(0.126)
Q16e—having served on one or more panels reviewing grant proposals	0.031	−0.036	−0.040	0.054	0.096	0.195**	0.223	0.289*
	(0.059)	(0.066)	(0.085)	(0.074)	(0.059)	(0.075)	(0.122)	(0.133)
Q13a—own best research was funded by internal resources	−0.018	0.091	0.092	0.008	0.024	−0.147*	−0.202	−0.213
	(0.053)	(0.060)	(0.077)	(0.069)	(0.054)	(0.071)	(0.124)	(0.141)
Q13b—own best research was funded by national funding agencies	0.076	0.089	−0.007	0.025	0.081	0.212***	0.046	−0.035
	(0.047)	(0.053)	(0.068)	(0.060)	(0.048)	(0.062)	(0.104)	(0.114)
Dependency index (Q6cde)	0.042	0.051	0.029	0.052	0.046	0.071*	0.095	0.171**
	(0.026)	(0.030)	(0.038)	(0.033)	(0.027)	(0.034)	(0.056)	(0.060)
Constant	3.713***	3.765***	3.510***	3.420***	3.523***	3.230***	3.144***	3.120***
	(0.096)	(0.111)	(0.142)	(0.127)	(0.099)	(0.132)	(0.237)	(0.249)
Observations	1,033	1,066	1,025	1,025	1,070	938	421	355
R^2	0.043	0.017	0.060	0.065	0.052	0.081	0.061	0.101
Adjusted R^2	0.031	0.005	0.048	0.053	0.040	0.068	0.031	0.067

Notes: The Netherlands, cardiology, female, and assistant professor are baseline categories. Dependent variables: who is able to evaluate the quality of your research? Independent variables: respondent characteristics (field, country, gender, position, review experience, funding, and citation performance, dependency on collaborative research/Q6cde). Values of the dependent variable in the regression model: 1) very low ability; 2) low ability; 3); medium ability; 4) high ability; 5) very high ability.

[a]Reviewers of proposals to their main national funding source.

*$P < 0.05$.

**$P < 0.01$.

***$P < 0.001$.

Table A.3. OLS regressions.

	Dependent variable: Who is able to evaluate the quality of your research			
	Reviewers of proposals to main national funding source			
	(1)	(2)	(3)	(4)
Field: Economics	−0.262**	−0.289**	−0.317**	−0.380***
	(0.097)	(0.100)	(0.101)	(0.095)
Field: Physics	−0.201*	−0.135	−0.222**	−0.248**
	(0.079)	(0.080)	(0.081)	(0.076)
Country: Norway	0.107	0.120	0.076	0.013
	(0.087)	(0.087)	(0.088)	(0.084)
Country: Sweden	0.087	0.115	0.108	0.103
	(0.080)	(0.081)	(0.081)	(0.078)
Male	−0.194*	−0.221**	−0.182*	−0.167*
	(0.076)	(0.076)	(0.078)	(0.073)
Position: Associate	−0.182*	−0.147	−0.194*	−0.195*
	(0.086)	(0.086)	(0.089)	(0.084)
Position: Professor	−0.121	−0.020	−0.140	−0.154
	(0.089)	(0.090)	(0.091)	(0.086)
Position: Other	−0.131	−0.077	−0.143	−0.188
	(0.106)	(0.109)	(0.109)	(0.103)
Having top 10% most cited publications	0.122	0.093	0.092	0.114
	(0.067)	(0.067)	(0.068)	(0.064)
Q16e—having served on one or more panels reviewing grant proposals	0.184*	0.209**	0.182*	0.176*
	(0.074)	(0.075)	(0.075)	(0.072)
Q13a—Own best research was funded by internal resources	−0.163*	−0.130	−0.152*	−0.159*
	(0.071)	(0.071)	(0.072)	(0.068)
Q13b—Own best research was funded by national funding agencies	0.195**	0.214***	0.197**	0.182**
	(0.061)	(0.061)	(0.062)	(0.059)
Dependency index (Q6cde)	0.066	0.067*	0.073*	0.056
	(0.034)	(0.034)	(0.034)	(0.033)
Q15b—Colleagues in my group/unit	0.156***			
	(0.036)			
Q15c—The head of my department/unit		0.195***		
		(0.029)		
Q15d—Scholarly network outside my department			0.101**	
			(0.033)	
Q15e—Reviewers of journals in my field				0.368***
				(0.039)
Constant	2.646***	2.582***	2.876***	1.953***
	(0.190)	(0.163)	(0.175)	(0.188)
Observations	917	887	896	927
R^2	0.098	0.127	0.085	0.161
Adjusted R^2	0.084	0.113	0.071	0.148

Notes: The Netherlands, cardiology, female, and assistant professor are baseline categories. Dependent variable: respondents' perceptions of the ability of reviewers of proposals to their main national funding source to review the quality of their research. Independent variables: respondent characteristics (field, country, gender, position, review experience, funding, and citation performance, dependency on collaborative research/Q6cde) and trust in other actors to assess their research (Q15b-e). Values of the dependent variable in the regression model: 1) very low ability; 2) low ability; 3); medium ability; 4) high ability; 5) very high ability.
*$P < 0.05$.
**$P < 0.01$.
***$P < 0.001$.