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EVERYONE IS EQUAL IN THE LOTTERY DRUM. MORE OPPORTUNITIES FOR RISKY RESEARCH, POSTDOCS AND FEMALE SCIENTISTS?

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ABSTRACT (ENGLISH)

The growing importance of third-party funding for research funding and for the evaluation of research performance has magnified well-known problems of peer review: risk-aversion reviewer overburden, the danger of bias and the Matthew effect ("To him who has shall be given"). The Volkswagen Foundation responded to these problems with its "Experiment!" funding initiative and has funded risky research questions for several years. In addition to peer review, lottery also played a decisive role in the unusual application and selection process. This article presents selected findings from accompanying research, highlighting the initiative's role in exploring new review procedures and creating a space for experimentation that could inspire other funders.

ABSTRACT (DEUTSCH)

Der große Stellenwert von Drittmitteln für die Forschungsfinanzierung und die Bewertung von Forschungsleistungen hat die bekannten Probleme des Peer Review noch einmal erhöht. Dazu gehören insbesondere die Neigung zu einer risikoaversen Begutachtung, die hohe Belastung von Gutachtenden durch aufwändige Verfahren sowie die Gefahren eines Bias und der Matthäus-Effekt („Wer hat, dem wird gegeben"). Die Volkswagen Stiftung hat mit ihrer Förderinitiative „Experiment!" auf diese Problemlagen reagiert und über

mehrere Jahre riskante Forschungsfragen gefördert. In dem ungewöhnlichen Antrags- und Auswahlverfahren spielt neben Peer Review auch das Los eine entscheidende Rolle. In diesem Beitrag werden ausgewählte Ergebnisse der Begleitforschung zur Förderinitiative vorgestellt, die einen wichtigen Beitrag zur Erprobung neuer Begutachtungsverfahren geleistet und einen Experimentierraum auch für andere Förderer geöffnet hat.

Keywords: Risky research, partially randomized selection process, peer review, research funding, bias,
Riskante Forschung, teilrandomisierte Auswahlverfahren, peer review, Forschungsförderung, Bias

1. THIRD PARTY FUNDING, THIRD PARTY FUNDING, THIRD PARTY FUNDING !?!

One of the most striking changes in research funding in almost all European science systems – including the German research funding system – over the past two decades is the greatly increased importance of third-party funding both for research funding and as a significant reputational feature for scientists and scientific institutions in evaluations, especially when the distribution of research funds is based on peer review. In a recently published article on the "costs" of third-party funding (Schweiger, Barnett, van den Besselar, 2024), reference is made not only to the "economic costs of competition" but also to the "epistemic costs of competition". Their data show "a negative correlation of 0.3 between efficiency and the degree of competitive funding, indicating that increasing the share of competitive funding tends to reduce the efficiency of the system: a decline of highly cited publications per additional investment in research" (ibid.). In addition, and this is particularly interesting in the context of our study is the "risk-averse" bias of peer review-based decisions in research funding, which can now also be documented in a study on the funding decisions of the European Research Council (Veugelers, Wang, Stephan, 2022)

In addition, the overloading of peer review has now become an internationally observable problem. In addition to the existing reviews, for example of proposals or applications for scholarships and prizes as well as of qualification theses and expert opinions in the context of appointment procedures, third-party funding applications for research projects, study programs, funding programs, research buildings and large-scale equipment as well as minor travel funds are also increasingly being reviewed. Expectations of the

reviewers' expertise have continued to grow. New topics such as transfer activities, infrastructures and governance and, last but not least, complex and time-consuming review processes such as those in the Excellence Initiative are being addressed.[1]

Despite all the pressures, peer review continues to be the foundation of scientific assessment. In peer review, the quality expectations and quality standards of the scientific communities are asserted, whose evaluations lend the decisive currency in science, namely reputation. As recognized and without alternative as the procedure is, studies have nevertheless long drawn attention to structural problems and pointed to a lack of agreement between reviewers (reliability) and validity as well as (among other things, gender-specific) bias and the Matthew effect (Neidhardt, 2016). In addition, in recent years in particular, peer review, which is largely discipline-oriented, has increasingly had to deal with inter- and transdisciplinary reviews of journal manuscripts and grant applications and develop criteria and (new) procedures for this (Simon & Knie, 2021).

This article examines how the Volkswagen Foundation's "Experiment!" funding initiative has responded to these problems of review processes, which are now widely discussed in the scientific community and how the funding recipients assess the initiative. Following a presentation of the "Experiment!" funding initiative and the methodological design of the accompanying research, selected problems are discussed: the risk-averse behavior of reviewers, the high burden on researchers due to the increased number of applications, the problem of bias and the Matthew effect in the review process and the topic of diversity. In particular, the question of whether postdocs and female scientists have better chances in the lottery procedure than in peer review is addressed here.

1 The German Council of Science and Humanities (2017) summarizes that "evaluations today are not only in demand for internal use in the scientific community in the sense of the classic functions of quality assurance and filtering (selection and construction), but also for other purposes, such as the orientation of research institutions and universities or their subunits." Ibid. p. 17.

2. FUNDING INITIATIVE "EXPERIMENT!": WHICH PROBLEMS SHOULD BE ADDRESSED?

When the Volkswagen Foundation launched a new funding initiative called "Experiment!" in 2012, the name of this funding line initially alluded to the nature of the topics and issues funded – and a few years later also to elements of the selection process. The aim of the "Experiment!" funding line was to support research projects that dealt with particularly risky and original research questions. Apart from the restriction that the applications should come from the natural sciences, engineering and life sciences, no content requirements or thematic priorities were set. Applicants were expected to already hold a doctorate and be employed at either a university or a non-university research institution in Germany. The people who were finally selected were given a grant of 120,000 euros for a maximum period of 18 months, which could be used flexibly for personnel or material costs.

The Volkswagen Foundation expressly intended to support risky research, which was understood to mean fundamentally new research projects with an uncertain outcome. Its aim was the "exploration of extremely daring research ideas that fundamentally challenge established knowledge, seek to establish unconventional hypotheses, methodologies or technologies or focus on completely new research directions."[2] Unexpected findings and even project failure were accepted as outcomes. Right from the start, all calls for proposals met with a very high level of interest. Of the total of 704 applications in the years 2013–2016, 67 projects were approved. The selection process was fundamentally changed in 2017: In addition to selection by a jury, roughly the same number of applicants were now selected by lot. Since then, the number of people receiving funding has almost doubled, but the number of applications has also continued to rise: In the so-called partially randomized procedure, 117 projects out of 2,748 applications were approved from 2017–2021.[3]

2 VolkswagenStiftung. cf. https://wwww.volkswagenstiftung.de/de/foerderung/foederangebot/experiment-auf-der-suche-nach-gewagten-forschungsideen-beendet, checked on 20.01.2025

3 Information by the Volkswagen Foundation, unpublished.

In addition to the focus on new and risky research ideas, the Volkswagen Foundation also broke new ground in the design of the application and selection process. Applicants were expected to submit a short, maximum three-page text explaining their idea. This idea had to be completely new, so applicants were not expected to have done any preliminary work or even published work by other scientists. In addition, the three-page outline should be completely anonymized. The jury members who later selected the funded projects therefore neither knew the personal data (age, gender, educational and career history, nationality, etc.) nor the scientific institutions in which the applicants had worked in the past or at the time of application. In addition to this proposal, applicants were asked to provide a self-assessment of their project, which was no more than one page in length. External expert opinions were not required. In this way, the above-mentioned risk of a possible bias, which could arise, for example, due to individual personal characteristics of the applicants, their affiliation to a particular institution or their familiarity with the respective scientific community of the jury members, was to be largely excluded. The numerous applications were first checked by the Volkswagen Foundation's office for minimum standards in terms of content and form before they were discussed in a jury meeting. The jury was made up of internationally recruited researchers and was rather small (eight to ten members) – not least in view of the broad range of subjects and topics in which applications were possible. The jury members were not recruited on the basis of their professional proximity to individual fields or in their capacity as specialists for specific issues, but as generalists for a broad spectrum of new and promising research ideas. The individual jury members remained anonymous, meaning that the application process was double-blind in order to prevent influence as far as possible.

Since the introduction of lottery elements in 2017, the selection process has become significantly more complex: the jury members now not only had the task of selecting the most convincing applications, but were also asked to decide whether the applications for projects that were not initially selected were of high quality and should therefore take part in a selection by lottery. From this pool of all positively assessed applications, further applications were drawn by lot for funding at the end of a jury meeting. Since 2017, around half of the funding recipients have been selected by peer review and half by drawing lots. The "Experiment!" selection process is therefore a partially randomized procedure.

Following the introduction of a lottery procedure in New Zealand (2013), the Volkswagen Foundation is one of the first funding institutions to use a

partially randomized procedure to select research projects. The weaknesses of peer review procedures have been criticized for many years, with peer review decisions on publications in scientific journals taking center stage alongside the selection of research proposals. However, it is only in recent years that lottery procedures have also been practiced. The number of funding organizations that have dared to implement these procedures is still manageable. In addition to the Volkswagen Foundation, these institutions include two organizations from New Zealand – the Health Research Council (HRC) and the Science for Technological Innovation (SfTI) – as well as the Swiss National Science Foundation (SNF) and the Austrian Science Fund (FWF). These first experiments with lottery procedures are being received and discussed with great interest in science research, with a particular focus on the questions of whether the various selection procedures are fairer, whether they increase the chances of unconventional research ideas being approved, how scientists assess a selection of their research proposals by lot and whether lottery procedures actually represent an alternative to peer review based on previous experience (Liu, 2020; Barlösius & Philipps, 2021; Osterloh & Frey, 2019; Philipps, 2022; Röbbecke & Simon, 2023; Roumbanis, 2019). In science policy, innovative selection procedures that could contribute to the further development of the review system are welcomed. For example, the German Council of Science and Humanities is in favor of random selection, if it is difficult to justify a decision in the case of heavily oversubscribed funding offers.

3. METHODS OF THE ACCOMPANYING RESEARCH

Some of the key results of the accompanying research[4] for the "Experiment!" funding line are presented below. On the one hand, it dealt with the question of whether, from the perspective of the funding initiative's recipients, it is possible to identify particularly risky research ideas. On the other hand, it aimed to gain insights into the sensible design of partially randomized procedures, their effects and thus also their future use in the scientific system. To this end, online surveys were conducted, for which all grantees from the first four funding rounds with jury decisions (2013 to 2016) were initially contacted in 2018.

4 The accompanying research (2018-2023) took place as part of a third-party funded project by the Volkswagen Foundation. In addition to the author, Martina Röbbecke (Evaconsult), Michael Ploder and Lisa Schön (Joanneum Research) were involved.

The grantees of the following three approval rounds with a partially randomized procedure (2017 to 2019) were contacted approximately one year after being accepted for funding and asked to complete the online questionnaire. A total of 165 people were contacted, 123 of whom took part in the online surveys.

This resulted in a response rate of 75 percent of those funded in the 2013–2019 approval years. The starting point for the design of the questionnaires were literature analyses, a review of the program documents and several exploratory discussions with researchers who had already received funding as part of "Experiment!". The finalized questionnaires were subjected to various pretests with the involvement of selected experts and then revised.

The sample was compiled from the data provided by the Volkswagen Foundation. The results of the online surveys were analyzed in descriptive form. The data were first cleaned and checked for consistency. The collected data were then analyzed for absolute and relative frequencies as well as for cross-correlations and differences based on defined characteristics.

In addition, 37 guided interviews were conducted with selected grantees in the initial phase of their project, including a further retrospective interview with 14 people towards the end of the funding period. They were asked about their understanding of risky research, their assessment of the application and selection process and the effects of the funding. The interviews focused on those researchers who had been selected and funded in the years 2017 to 2019. During the selection process, care was taken to ensure a balanced composition in terms of gender, lottery and jury decisions, postdocs and professors, as well as the subject groups of natural sciences, life sciences and engineering. Around 90 percent of the guideline-based interviews were transcribed and analyzed using qualitative content analysis methods (Mayring, 2015).

4. FUNDING RISKY RESEARCH

Scientific communities play an important role as guardians of (disciplinary) knowledge and quality standards. With regard to the breakthrough of new research ideas and questions – especially those that could mean a paradigm shift in a field of research – a tension is observed with the function of scientific communities (Kuhn 1976, Kuhn 1977).

With regard to this tension, one could see a structural dilemma in the fact that, on the one hand, the production of scientific knowledge is oriented towards

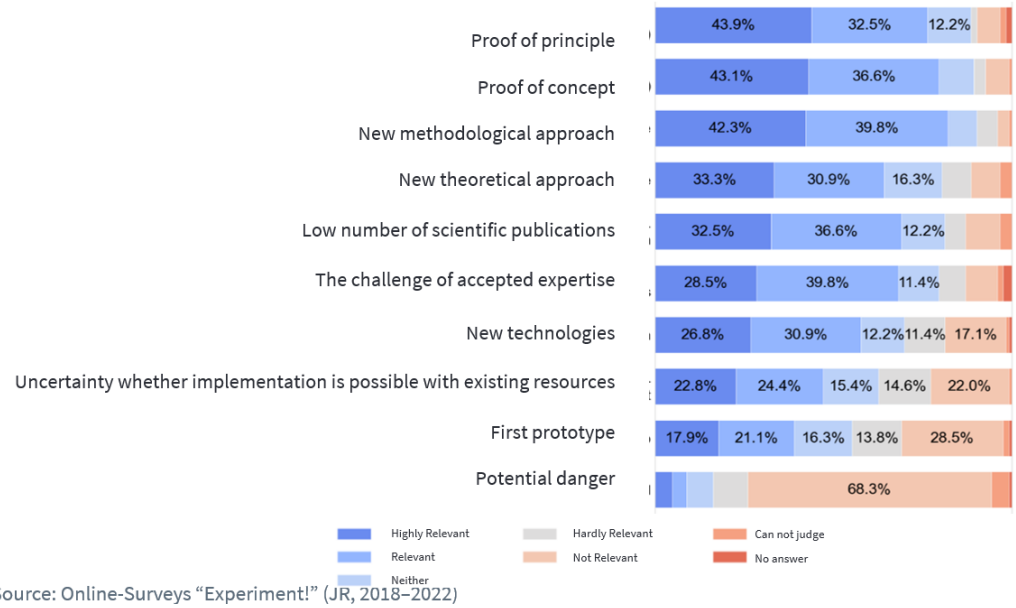
the “common sense” of knowledge, which is evaluated and assessed by peers, while, on the other hand, the production of knowledge is always dependent on “new”, “original” knowledge (Merton, 1968): “divergent thinking”, “the freedom to go off in different directions” and “rejecting the old solutions and striking out in some new direction” (Kuhn, 1977, p. 226; Kuhn, 1976) increase the chances of discovering new knowledge or understanding, which, however, must be included in the canon of recognized knowledge. In this respect, peer review as the highest evaluation authority is often accused of structural conservatism: What the peers do not know or know how to assess, especially if it even crosses disciplinary boundaries, often has a hard time gaining the necessary recognition. Kuhn points out that normal science often “suppresses fundamental innovations because these necessarily shake its basic positions” (Kuhn, 1976, p. 20), but that “the very nature of normal research guarantees that the new will not be suppressed for very long” (ibid.). Such an anomaly must first be recognized, above all by the paradigm behind it: “The more precise and comprehensive this paradigm is, the more sensitive it is as an indicator for anomalies and thus for a reason for a paradigm shift” (ibid., p. 77).

Recent sociology of science also assumes a tension between new, original knowledge, which can possibly lead to a paradigm shift, and research that sees itself primarily as a further development of the state of art, which cannot be easily resolved: “[The] strategic tension is repeatedly articulated as a dichotomy: in the sociology of science, as reliable ‘succession’ versus risky ‘subversion’ (Bourdieu, 1975) or ‘relevance’ versus ‘originality’ (Whitley, 2000); in the philosophy of science, as ‘conformity’ versus ‘dissent’ or ‘discipline’ versus ‘rebellion’ (Polanyi, 1969); and in the study of innovation, as ‘exploitation’ versus ‘exploration’” (March, 1991). Recent theoretical work supports this broad picture by highlighting the distinctive contributions (Weisberg and Muldoon, 2000) and rewards (Kleinberg and Oren, 2011) associated with traditional versus innovative strategies” (cited in Foster et al., 2015, p. 877).

This tension can affect research funding reviews in different ways. Various analyses on the question of the extent to which the proximity of applications to the reviewers’ research fields – including citing them – has a positive or negative effect on the evaluation (Bourdreau et al., 2016; Li, 2015) come to diametrically opposed conclusions. The findings on new, risky research questions in the funding applications are clear in relation to highly renowned medical funding programs in the USA: “Our second main finding is that more novel proposals are associated with lower evaluations” (Bourdreau et al., 2016, p. 2779).

FIGURE 1: CHARACTERISTICS OF THE FUNDED PROJECT

(relative frequencies per characteristic; Sample n = 123)



Source: Online-Surveys "Experiment!" (JR, 2018–2022)

It can be seen that a high proportion of respondents (over 80 percent) consider new methodological approaches to be particularly relevant for the project. The opportunity to try out new methods was also given high priority in the interviews. In addition, an initial proof of feasibility and an initial proof of principle are attributed high relevance.

According to the funding recipients, the funding initiative opens up the opportunity to actually try out something new that other research funding organizations or other funding programs would not give a chance: The applications would have to be "bent" there so that they succeed in the process.

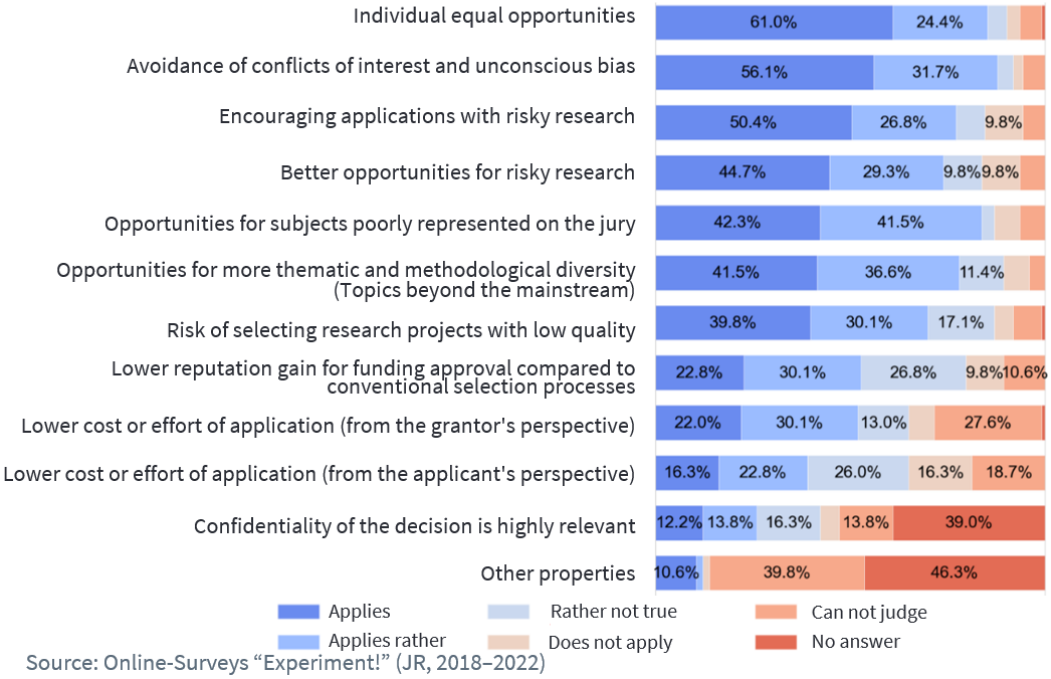
> *"… and that leads to … constructing projects in such a way that they always somehow have a safe component, … Yes, that the research applications do not necessarily correspond to the real intentions of the applicant, I believe. And that you always try to take advantage of the system, so to speak, but actually often apply for something that doesn't reflect the truth."*[5]
> *(Senior scientist at a non-university research institution, life sciences)*

5 Translation (ff.) by DS.

In addition to the anonymized selection process, the partially randomized procedure in particular increases the chance of getting unconventional and risky projects off the ground. However, the lottery procedure is not viewed unreservedly positively by the grantees themselves; the online survey shows a mixed picture (see Figure 2). On the one hand, many respondents agree with the assessment that lottery procedures help to avoid conflicts of interest (88%), promote equal opportunities for individuals (85%), encourage applications with risky research (77%) and offer better opportunities for risky research (74%). The fact that lottery procedures also offer opportunities for subjects that are poorly represented in the jury (84%) and for more thematic and methodological diversity (78%) is also rated positively. On the other hand, respondents were critical of the fact that selection by lot could result in a lower reputation gain (53%). More than two-thirds of respondents also fear that lottery procedures could lead to the selection of lower quality research projects (70%).

FIGURE 1: HOW IS LOTTERY ASSESSED?

(relative frequencies per characteristic; Sample n = 123)



Source: Online-Surveys "Experiment!" (JR, 2018–2022)

A mixed assessment of lottery procedures was also evident in the interviews. For the majority of interviewees, a positive assessment of lottery procedures clearly prevailed, not least in view of the weaknesses of peer review procedures. A lottery procedure is particularly suitable for researchers in an early career phase who are not yet well established in the scientific community:

"… I also think it's great that this is being established, in order to minimize the bias. It simply has the advantage that (…) – of course, if certain criteria are met – you have a certain chance of getting it. So that also reduces this bias with regard to the promotion of established professors to all opportunities (…) that contributes enormously."
(Professor at a university, life sciences)

However, some funding recipients regretted that lottery procedures do not allow for personal discussions with the jury members and that there is no expert feedback from the reviewers on the project applied for:

"Well, there is also the possibility that you were positively evaluated or (…) got the money through a lottery. (…) I would think it would be nice to find out afterwards. (…) Simply so that you can assess whether – whether the project would have had a chance under normal funding conditions (…) or simply whether the evaluations were quite poor and the lottery procedure then led to the goal. So when developing ideas, as a scientist you don't have that many opportunities to get feedback, honest feedback. (…) Accordingly, I think it would be good to get the evaluation, at least of the proposal."
(Professor at a university, life sciences)

At the same time, in the interviews, the funding recipients made it clear how possible quality deficiencies could be countered and under what conditions a lottery procedure could be applied. They highlighted two aspects in particular: The quality check of the applications received by the Volkswagen Foundation and the assessment by the jury – as practiced in the "Experiment!" funding initiative:

"Definitely positive. So, if it's done like this (.) well, the pure random element wouldn't be good, I don't think, because then you could write something and it would just (.) otherwise it would be pure lottery, but the way the VW Foundation has done it, i.e. pre-screening and then random, and then additionally a jury, so that you really (.) so this half/half, I thought that was very good, so on the one hand you can ensure that there are applications that are actually considered great by experts in the field, that they have a high probability of getting through, but on the other hand that there are applications that are perhaps considered too exotic by the panel of experts, that they also have another good chance. But then, of course, pre-screening is very important."
(Professor at a university, natural sciences)

Another advantage for the assessment of risky research is seen in the composition of the jury: a small international and interdisciplinary group that is responsible for three major scientific fields – life sciences, natural sciences and technical sciences. Against this background, the jury must focus on overarching questions such as whether the research project is both risky and feasible. In principle, reviewers are considered capable of assessing this.

> *"Yes, that can work. Because I think we are more or less trained to recognize whether an idea is innovative in principle." (Professor at a university, life sciences)*

In addition, another advantage of the special jury composition is seen in the reduced risk of jury members being too close to the applicants in terms of expertise in small or emerging research fields. This type of assessment and jury constellation can therefore also help to counteract bias.

5. SCIENTISTS UNDER PRESSURE WITH APPLICATIONS FOR THIRD-PARTY FUNDING: A LEAN SELECTION PROCESS

As already mentioned, scientists are increasingly under time pressure due to third-party funding applications. This is particularly problematic for postdocs with fixed-term contracts, as a follow-up contract can often only be realized by acquiring third-party funding. The increased financing of research through third-party funding is a worldwide phenomenon and in some cases the volume of third-party funding in other countries is significantly higher than in Germany. In 2012, for example, it was estimated for the Australian science system that researchers had to spend a total of 550 years preparing 3,723 third-party funding applications for the National Health and Medical Research Council (NHMRC), of which only 21 percent were funded. In 2013, the funding rate even fell to 17 percent (Herbert et al., 2014, p. 2). In their study, Herbert et al. also point out the negative effects for applicants in terms of family and health burdens, especially if an application can only be submitted once a year. In the meantime, other funding organizations such as the National Institute of Health in the USA, the Engineering and Physical Sciences Research Council in the UK and the Canadian Institutes of Health Research have made efforts to simplify the application and review process and thus reduce the effort involved (ibid.).

It is therefore not surprising that the application and selection process for the "Experiment!" funding line was predominantly rated very positively by the funding recipients (see Figure 3). The highest level of approval was given to the effort involved in submitting an application, with 89 percent of respondents saying they were very satisfied, and 10 percent satisfied. The comprehensibility of the funding guidelines was also rated positively (83% very satisfied, 17% satisfied). It was also emphasized in the interviews that the time required for the short application was pleasingly low. In this context, numerous interviewees referred to proposals submitted to other funding organizations and in particular to proposals submitted to the German Research Foundation (DFG), which require considerably more time to prepare. On the one hand, it is difficult to combine the time-consuming preparation of research proposals with other tasks in research, teaching and self-administration:

> *"I think the nice thing about the experiment proposal was that it wasn't a 20-page proposal. And I mean, of course research funding also has to be competitive, but sometimes that also leads to a huge waste of resources, at least that's my feeling … So I think I'm quite well funded, but I only have a certain funding quota, … that doesn't always work for me either and so it takes three, four, five applications before one is approved, and then they can only be recycled to a limited extent. In this respect, I thought this aspect of the experiment was excellent, that the cost-benefit ratio made sense, so to speak."*
> *(Professor at a university, life sciences)*

On the other hand, it was emphasized in the discussions that short applications that focus on the research idea are much better suited to funding risky research than those application formats in which the chosen methodology, the expected result and the required time frame, including milestones, must already be set out in detail:

> *"And what is also very pleasant about this concept is that you don't write a 50- to 100-page application, but the idea and the risk of the idea count, and in this respect the description of the idea is in the foreground … which is really very difficult to fulfil in many project applications, especially if you want to do something innovative like this."*
> *(Professor at a university, life sciences)*

Other interviewees emphasized more strongly that in other funding procedures, preliminary work must also be presented, and publications must be proven when submitting an application. This is not only difficult in the case of a completely new research idea, but also means that not only the research project, but also the respective person in their academic environment is assessed:

> *"... yes, I often have the feeling, well, how should I put it, that the person submitting the proposal is also assessed. And in my eyes, for example at the DFG ... if I don't have ten great papers, I think I'll have problems getting the project through."*
> *(Professor at a university of applied sciences, engineering sciences)*

In addition to the well-known advantages of a lean application procedure – such as limited time expenditure – many grantees also emphasized that such a procedure is particularly appropriate for risky research ideas.

6. BIAS AND MATTHEW EFFECT: ANONYMIZATION OF APPLICANTS AND LOTTERY PROCEDURE

As mentioned above, research on peer review addresses, among other things, the problem of bias in the assessment of research proposals where the applicants have not been anonymized, which is the norm in research funding. In particular, a gender-specific bias has been proven in studies.[6] Another phenomenon in this context is the Matthew effect, a term coined by the sociologist of science Merton (1968) with regard to the citation frequency of scientific publications, in which he pointed out that successes (for example in research funding) can be explained by previous successes and less by current achievements. The reference to previous successes is particularly evident in research funding applications in the publication lists and other achievements

6 Cf. Wenneras & Wold, 1997; Kaatz et al., 2015. In a text analysis, Kaatz et al. evaluate the responses of funded and non-funded scientists from the renowned R01 program of the National Institutes of Health: Gender stereotypes lead evaluators to give a woman greater praise than a man for the same performance ... Paradoxically, gender stereotypes also lead reviewers to require more proof of ability from a woman than a man prior to confirming her competence, and greater proof to confirm men's incompetence in male-typed domains. This may also explain why men's versus women's proposals were funded despite more negative critiques" (ibid. S. 73/74).

such as third-party funding in competitive procedures, which enjoy a high reputation in most scientific systems. These applicants therefore have an advantage when it comes to application approval.[7]

In the online survey, the anonymization of applications was overwhelmingly welcomed – 73% were very satisfied and 8% satisfied (see Figure 3). The high level of approval for completely anonymized research proposals also underlines the fact that the associated waiver of the possibility of submitting further publications or expert reports is by no means seen as a disadvantage by the funding recipients. The anonymization of the applications – i.e., the double-blind procedure – had the additional important effect from the perspective of the grantees that it was primarily the project that had to be convincing and not the publication lists of the applicants.

> *"… one positive thing (is) … that it is assessed independently of the CV, and so it has a little less bias towards the establishment and various established (…) structures within the academic system …. I think it's very good that this is done, because it's really only the idea that counts in the end." (Junior professor at a university, life sciences)*

It can therefore be assumed that the anonymization of applicants contributes to greater diversity. Specifically, another element of "Experiment!", the lottery procedure, shows that effects on diversity with regard to age, career stage and gender ratio can be recognized and can therefore counteract a possible bias in the review process. For this purpose, the cohort was compared whose projects in the first four years of the "Experiment!" funding line (2013 to 2016) were selected exclusively by the jury with the funding cohort from 2017 onwards, in which the partially randomized procedure was introduced.

A combined analysis of the age and gender of the grantees is revealing. The absolute number of eight women who were funded between 2013 and 2016 is very small (see Table 1). Nevertheless, the comparison shows that the proportion of women has increased since 2017, in particular the participation of established female researchers (over 50 years of age) and young female postdocs (under 35 years of age) has increased. Overall, the proportion of funded persons under the age of 39 has increased in the partially randomized procedure. The proportion of younger women has risen from around 13% to around 37% and the proportion of younger men has risen from around 33% to around 54%.

7 In a study on the evaluation of the Excellence Initiative, it became clear that the CVs of the Principal Investigators played a decisive role in the evaluation of the Cluster of Excellence applications (Möller et al., 2012).

FIGURE 3: AGE AND GENDER RATIO BEFORE AND AFTER THE INTRODUCTION OF THE PARTIALLY RANDOMIZED PROCEDURE

Cohorts 2013 - 2016					
	Over 50 Years	40 - 49 Years	35 - 39 Years	Under 35 Years	No Information
Female (n = 8)	0,0 %	62,5 %	12,5 %	0,0 %	25,0 %
Male (n = 40)	27,5 %	32,5 %	27,5 %	5,0 %	7,5 %
Cohorts 2017 - 2019					
	Over 50 Years	40 – 49 Years	35 - 39 Years	Under 35 Years	No Information
Female (n = 19)	21,1 %	26,3 %	10,5 %	26,3 %	15,8 %
Male (n = 56)	17,9 %	21,4 %	39,3 %	14,3 %	7,1 %

Relative frequencies within gender

Source: Online-Surveys„Experiment!“ (JR, 2018-2022)

Furthermore, the introduction of the partially randomized procedure has led to a slight change in the career stages of those funded. The proportion of researchers who hold a professorship has remained almost the same (reduction from around 40% to around 39%), while the proportion of researchers in early career phases (postdocs and junior professorships) has increased slightly (from around 42% to around 47%).

Even if the case numbers are relatively small, it can therefore be concluded that the partially randomized procedure does result in shifts in favour of younger female scientists. Randomized procedures therefore have a certain potential to counteract an age and gender bias.

7. MORE EXPERIMENTS!

The experiment “Experiment” has shown that partially randomized procedures are widely accepted, particularly with regard to risky research and that they also have a positive effect on those receiving funding: Postdocs and scientists are more strongly represented than in the peer review process. These results are significant in view of the high importance of third-party funding, which will not decrease significantly in the foreseeable future.

With “Experiment!”, the Volkswagen Foundation has made an important contribution to the introduction and trialing of new selection procedures, thus opening up a space for experimentation for other funding bodies as well. There

is no doubt that the high recognition of the Volkswagen Foundation in the scientific community has also contributed to the willingness of the scientific community to deal more intensively with the limits of peer review and new selection formats. The funding organizations have become more courageous: For example, after a pilot phase, the SNF in Switzerland has now offered the option of a lottery procedure for all funding programs, and the British Academy is using partially randomized selection for smaller funding projects (up to £10,000) in the social sciences and humanities. The Danish Novo Nordisk Foundation is also experimenting with this and with the anonymization of applications in some funding lines.

In general, a certain openness towards new funding formats, which may also contain experimental elements, can be observed in European research funding systems. This is supported above all by the fact that a variety of formats and orientations of research funding is conducive to fairer participation opportunities for applicants, as this means that deficits of one funding format can be compensated for by others (such as problems of peer review through partially randomized procedures). In addition, there are increasing signs that, in research evaluations among other things, a concept of quality that understands excellent research primarily as research whose quality can be measured by the number of publications in international refereed journals is being relativized and that different dimensions of quality can come into play (cf. Watermeyer et al., 2018; Muhonen et al., 2020) This trend is also related to the greater consideration of the social impact of research as well as interdisciplinary and transdisciplinary research, which represent a further reason for more diversity and experimentation in research funding.

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