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Partial lottery can make grant allocation more fair, more efficient, and more diverse

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Abstract

We call on research funding organisations to experiment with different models for integrating partial randomisation into their grant allocation processes as well as to assess the feasibility, the potential implications, and the perceptions of such models. Traditional models of grant allocation have usually been based on peer review to rank applications and allocate grants. These models have been shown to suffer from various shortcomings. In particular, we believe that partial randomisation holds the potential of being more fair, more efficient, and more diverse. In addition, it may lead to more responsible research practices. We outline a proposal for such a grant allocation process and sketch various arguments in favour of it. We also address potential counterarguments and conclude that partial randomisation in grant allocation holds the potential to lead to many benefits and therefore warrants further experimentation and implementation.

Key words: partial randomisation; lottery; research funding; responsible research practices.

Funding decisions are at the core of science and its regulation. Who gets the money to do research largely determines the path along which science and academic careers progress. However, deciding which grant applications, research teams, or individuals are most worthy of funding is not an easy task. Traditionally, funding organisations use a competitive model based on peer review to rank applications and allocate grants. Many applications that qualify for funding have to be rejected. The decreasing success rates and the resulting increased pressure on applicants, reviewers, and grant committee members alike made clear that the current system suffers from various drawbacks. These include, but are not limited to, being biased, unreliable, resource demanding, and inefficient (e.g. [Gildenhuys 2020](#); [Guthrie et al. 2017](#); [Roumbanis 2020](#)). It has also been shown that traditional grant decisions favour applications from established researchers and institutions and rarely award out-of-the box ideas and replication studies ([Bol et al. 2018](#); [Guthrie et al. 2019](#); [Luukkonen 2012](#)). In addition, the demonstrated low levels of inter- and intra-reviewer agreement cast doubt on the system's ability to reliably and consistently select the best applications ([Mayo et al. 2006](#); [Pier et al. 2018](#)). We therefore propose an alternative system based on randomisation as a complement to peer review. We subsequently outline the benefits of such a system and address potential counterarguments against it.

1. The proposal

To address this issue, we argue that a system of partial randomisation in grant allocation should be more widely

experimented with. Even though the uptake of randomisation in research funding is still in its infancy, some initial experiments have been performed (e.g. [Bendisoli et al. 2021](#); [Liu et al. 2020](#)). Along the lines of these experiments, we propose a system in which an initial round of peer review is performed to identify applications that qualify for funding. This serves to distinguish the chaff from the wheat. Based on the peer reviewer scores, all applications that do not meet the criteria for quality, relevance, or feasibility and are hence unworthy of funding should be rejected. Similarly, a small fraction of applications that are, more or less unanimously, considered to be top-class research should be immediately granted. The remaining applications, which all qualify for funding, should enter a lottery system in which applications are selected at random. The operationalisation of the criteria and the cut-off points, i.e. the share of applications that can be immediately funded or should be excluded from the lottery, should be specified a priori and be closely aligned with the funding programme's aims and characteristics. Proposals for introducing partial lotteries to grant funding schemes are not new, with discussions starting already several decades ago ([Greenberg 1998](#); [Avin 2019](#)). By now, several pilots of the use of lottery in grant allocation have been run, including by the VW Foundation, The Swiss National Science Foundation ([Bendisoli et al. 2021](#)), and The Health Research Council of New Zealand ([Liu et al. 2020](#)). We also propose to share the results of all steps of the process. This transparency can help researchers who were not selected for funding during the lottery but had an application that qualified for funding to add to this to their curriculum vitae. On a psychological level, this may support them because the core message

and perceptions of such models. In order to further increase efficiency, one could imagine including a first step in which from eligible concise pre-applications, lottery selects a limited number of applicants that are allowed to submit a full proposal. Subsequently, these full proposals are peer-reviewed. When there turn out to be more applications worthy of funding than the available budget allows, a second lottery can decide which applications will be granted. Such an approach will lower burdens substantially for applicants, reviewers, and selection committees. Regarding potential consequences of diverse lottery models, we are particularly interested in how it affects the extent to which researchers adhere to responsible research practices. Previous studies have indicated that researchers believe funding organisations' selection processes to strongly influence responsible conduct of research (Sørensen et al. 2021). The introduction of partial lottery models constitutes an excellent framework to study this and we applaud the funding agencies that study their own application processes to improve their methods.

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References

- Avin, S. (2019) 'Mavericks and lotteries', *Studies in History and Philosophy of Science Part A*, 76: 13–23.
- Bendiscioli, S., Firpo, T., Bravo-Biosca, A., et al. (2021) The Experimental Research Funder's Handbook (Rori Working Paper No.6). <https://rori.figshare.com/articles/report/The_experimental_research_funder_s_handbook_RoRI_Working_Paper_No_6_/17102426>.
- Bol, T., de Vaan, M., and van de Rijt, A. (2018) 'The Matthew Effect in Science Funding', *Proceedings of the National Academy of Sciences*, 115: 4887–90.
- Brezis, E. S. and Birukou, A. (2020) 'Arbitrariness in the Peer Review Process', *Scientometrics*, 123: 393–411.
- Cole, S., Cole, J. R., and Simon, G. A. (1981) 'Chance and Consensus in Peer Review', *Science*, 214: 881–6.
- Gildenhuis, P. (2020) 'Lotteries Make Science Fairer', *Journal of Responsible Innovation*, 7: S30–S43.
- Gopalakrishna, G., ter Riet, G., Vink, G., et al. (2022) 'Prevalence of Questionable Research Practices, Research Misconduct and Their Potential Explanatory Factors: A Survey among Academic Researchers in the Netherlands', *PLoS One*, 17: e0263023.
- Guthrie, S., Ghiga, I., and Wooding, S. (2017) 'What Do We Know about Grant Peer Review in the Health Sciences?' *F1000Res*, 6: 1335.
- Guthrie, S., Rincon, D. R., McInroy, G., et al. (2019) 'Measuring Bias, Burden and Conservatism in Research Funding Processes', *F1000Research*, 8: 851.
- Greenberg, D. S. (1998) 'Chance and grants', *The Lancet*, 351: 686.
- Haven, T. L., Bouter, L. M., Smulders, Y. M., et al. (2019) 'Perceived Publication Pressure in Amsterdam: Survey of All Disciplinary Fields and Academic Ranks', *PLoS One*, 14: e0217931.
- Liu, M., Choy, V., Clarke, P., et al. (2020) 'The Acceptability of Using a Lottery to Allocate Research Funding: A Survey of Applicants', *Research Integrity and Peer Review*, 5: 3.
- Luukkonen, T. (2012) 'Conservatism and Risk-taking in Peer Review: Emerging ERC Practices', *Research Evaluation*, 21: 48–60.
- Manske, P. R. (1997) 'A Review of Peer Review', *The Journal of Hand Surgery*, 22: 767–71.
- Mayo, N. E., Brophy, J., Goldberg, M. S., et al. (2006) 'Peering at Peer Review Revealed High Degree of Chance Associated with Funding of Grant Applications', *Journal of Clinical Epidemiology*, 59: 842–8.
- Merton, R. K. (1988) 'The Matthew Effect in Science, II: Cumulative Advantage and the Symbolism of Intellectual Property', *Isis*, 79: 606–23.
- Philipps, A. (2021) 'Research Funding Randomly Allocated? A Survey of Scientists' Views on Peer Review and Lottery', *Science & Public Policy*, scab084.
- Pier, E. L., Brauer, M., Filut, A., et al. (2018) 'Low Agreement among Reviewers Evaluating the Same NIH Grant Applications', *Proceedings of the National Academy of Sciences*, 115: 2952–7.
- Reinhart, M. and Schendzielorz, C. (2020) 'The Lottery in Babylon—On the Role of Chance in Scientific Success', *Journal of Responsible Innovation*, 7: S25–9.
- Roumbanis, L. (2020) 'Two Dogmas of Peer-reviewism', *Journal of Responsible Innovation*, 7: S129–33.
- Sørensen, M. P., Ravn, T., Marušić, A., et al. (2021) 'Strengthening Research Integrity: Which Topic Areas Should Organisations Focus On?' *Humanities and Social Sciences Communications*, 8: 198.
- Vindin, H. (2020) 'Grant Lottery: Don't Stall Ideas and Careers', *Nature*, 577: 472.