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Why research integrity matters

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Why research integrity matters

Lex Bouter

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Introduction

Dear colleagues and friends, and all who show an interest in today's topic by attending in the audience or online, welcome to this academic ceremony.

Looking back, 2013 was when I made one of the best decisions of my professional life. During my sabbatical, after serving my university for seven years as its rector, I decided to return to the primary process of research and education, and to focus on the interplay between methodology and integrity. At first, this didn't appear to be such a good choice after all. I was rather underwhelmed by the scholarly literature on my newly chosen topic. In fact, after less than a month of exploring these publications, I thought I had read everything that was available.

Nick Steneck

Nils Axelsen

My next move was to visit Nick Steneck and Nils Axelsen, who are important pioneers of research integrity in North America and Scandinavia, respectively. They both generously shared their knowledge and wisdom, and started me on my professional journey in this new field. It has turned out to be a highly rewarding adventure during which I have learned a lot. In the next 35 minutes, I will argue that research integrity matters and explain why that is the case. I will also provide an overview of what drives research integrity and suggest ways of improving it.

How to trust a scientist

Jeroen de Ridder[i]

Replication and trustworthiness

Rik Peels[a] and Lex Bouter[b]

Trust is essential for scholarly work. When scholars cannot trust each other, collaboration and building on earlier findings becomes impossible. The same holds true for research-based interventions designed to benefit the individual, society or the natural environment. Trust needs to be earned by being trustworthy. When can we trust a scholar? Jeroen de Ridder argues that

this is the case if the claims they make are backed up by evidence gathered in accordance with prevailing methodological standards[1]. This not easy to judge, but a basic condition is full transparency about the methods of a study and the data obtained. Only then can research projects be checked by others.

Together with Rik Peels, I produced an overview of the factors on which the trustworthiness of research findings depends[2].
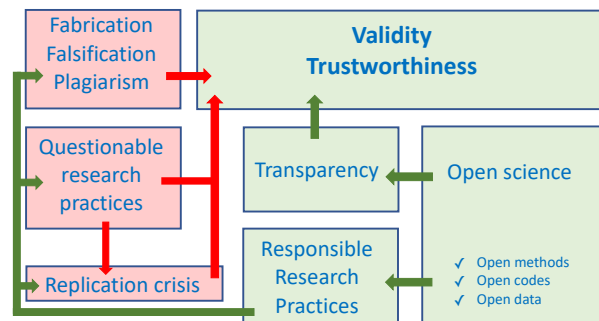
Trustworthiness of research findings depends on:

- the **prior probability** of the findings
- **study size** and the **methodological quality**
- number of **replications** that were performed
- **consistency** of the findings
- what is at **stake**

In addition to the prior probability of the findings, study size and methodological quality, we argue that successful replication is almost always essential. One of the biggest academic disillusions of the last decade is that when studies are repeated, on average their findings will only be the same in half of the instances[3]. It is therefore very tricky to trust a study that hasn't been successfully replicated at least once[4]. Furthermore, whether or not we can trust a study depends on what is at stake. When the consequences of getting it wrong have a greater impact, a study needs to meet stricter criteria to be trustworthy.

At this point, allow me to sketch how research integrity differs from two other related topics. For me, research integrity concerns behaviours that threaten the validity or the trustworthiness of research findings[5]. The standards of research integrity are typically spelled out in codes of conduct. Research ethics concerns the ethical considerations of resear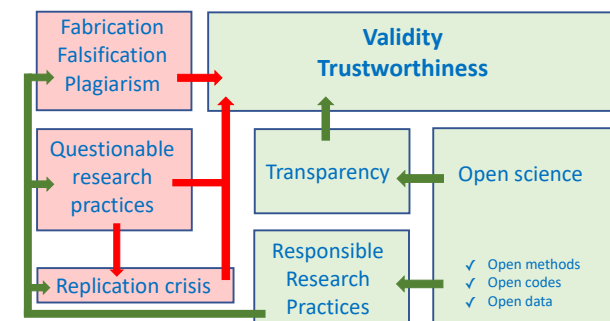ch involving humans and animals. It's about what a researcher is and is not allowed to do to research subjects. This is often laid down in laws and regulations. Responsible research and innovation focuses on the potential benefits and harms of research for humanity and the natural environment. This is largely a matter of societal debate, the outcomes of which can result in laws and regulations. As the slide suggests, these three concepts overlap to some extent.

For most of us, the first thing we associate with research integrity is research misconduct. In other words, the three 'mortal sins' of fabrication, falsification and plagiarism – FFP for short. Dramatic cases of research misconduct often serve as wake-up calls. It's clear that research misconduct seriously harms the validity and trustworthiness of research. However, a lack of research integrity can also consist of minor misbehaviours. These are rather euphemistically labelled as questionable research practices – QRPs for short. Examples are selective reporting, p-hacking and HARK-ing – which means hypothesising after the results of a study are known.

The king in this cartoon understands that concept well: he fires off his arrows first and it's up to his servant to make sure that he always hits the bull's-eye. HARK-ing is the essence of exploratory research, but is not permitted in hypothesis-testing research. With a bit of creativity, a plausible explanation can be formulated for almost any chance finding that looks promising. My main message today is that we need to be strict with ourselves and with our colleagues when we engage in hypothesis-testing research. Arguably, QRPs at the aggregate level do much more harm than FFP. This is because QRPs turn out to be alarmingly common. I will illustrate this with findings from the Netherlands' National Survey on Research Integrity. But before I do that, let's go back to the previous slide for a moment.

As I already mentioned, when a study is repeated, on average findings will only be the same in half of the cases. This is known as the 'replication crisis'. Gradually the causes of this crisis have become clear, and they have been found to overlap with what research integrity scholars have labelled 'questionable research practices'. See the red arrows in the figure. The last decade has also brought us the wonderful innovations of open science. In particular, open methods, open codes and open data arguably increase the transparency and accountability of research[6]. Further downstream – as the green arrows in the figure show – these responsible research practices will help to solve the replication crisis, decrease the occurrence of QRPs, and maybe even FFP as well. The ultimate consequence of this is that both the validity and trustworthiness of research will increase when open science practices are implemented on a large scale.

National Survey on Research Integrity

Gowri Gopalakrishna

www.nsri.nl

@SurveyIntegrity

Prevalence and drivers of research misbehaviours

In the National Survey on Research Integrity, Gowri Gopalakrishna invited all academic scholars in the Netherlands to report how often they engaged in fabrication, falsification and questionable research practices[7].

Most prevalent (5/11) QRPs (score 5,6,7)	Prevalence (%)
Not submitting or resubmitting a valid **negative publication**	17.5
Insufficient mentioning of study **flaws and limitations** in publications	17.0
Insufficiently **supervised or mentored** junior co-workers	15.0
Insufficient attention to **equipment, skills or expertise**	14.7
Inadequate **notes** of research proces	14.5

Eleven QRPs were assessed on a 7-point scale, ranging from never to always and referring to the last three years. The prevalence figures on this slide refer to respondents who scored 5, 6 or 7 on that scale. As you can see, selective reporting and poor supervision, as well as giving insufficient attention to study flaws, equipment and taking notes on the research process, all have a self-reported prevalence between 15% and 18%.

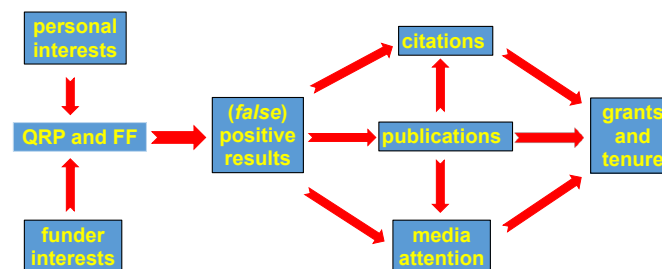| QRP/FF	Prevalence (%)
Any Frequent QRP (at least 1/11 QRPs with a score of 5,6,7)	**51.3**
Fabrication (making up data or results)	**4.3**
Falsification (manipulating research materials, data or results)	**4.2**

National Survey on **Research Integrity**

More than half of our respondents reported having engaged frequently in at least one of the eleven QRPs included in the survey. This makes it clear that QRPs are indeed alarmingly common. Maybe even more shocking is that more than 4% admitted to having engaged in data fabrication at least once during the last three years. Four percent also confessed to having engaged in data falsification. To put it mildly: there seems to be plenty of room for improvement.

What is good for the *validity* of and the *trust* in research is not always good for your academic career

To be able to improve the situation, we need to understand why scholars do these things. It is hard to imagine anyone embarking on an academic career with the ambition of committing fraud or engaging in questionable research practices. Scholars usually want to conduct good-quality research and to make a difference with their work. I have come to believe that the core dilemma for academic scholars is that what is good for the validity of and trust in research is not always good for their career.

How things can go wrong

Research can either support or reject its core hypothesis. This is usually talked about in terms of positive or negative findings. Positive findings are easier to get published in prestigious journals, are cited more often, and also gain more media attention. This increases the likelihood of obtaining grants and tenure. QRPs, fabrication and falsification are great tools for obtaining positive findings, which are then of course false positive findings. Negative findings are so unpopular that they are often not reported at all. This selective reporting leads to a strong dominance of positive findings in scholarly literature. This brings a bias to the body of knowledge, leads to premature implementation and is the main driver of the replication crisis. Personal interests and funder interests can lead to QRPs, even when researchers are not aware of it. Many of us want to believe that our pet hypothesis is true, and we tend to ignore the evidence against it. We might also be inclined to please our funders, in the hope that they will continue to fund our work. That can, for instance, lead to subtle flaws in the study design, to selective reporting, and to putting a spin on how findings are reported. In some cases, the funders of research have been known to take a more aggressive approach, even to the point of demanding that conclusions are changed.

As I said before: to prevent these things, we should be strict with ourselves and our colleagues. By adopting open science practices, research becomes transparent and accountable. We need to trust each other, but also to be able to verify whether that trust is justified.

Functioning of moral compass depends on:

- **Individual factors**:
  virtuousness of the individual
- **Institutional factors**:
  research climate in the lab
- **Systemic factors**:
  adequate incentives

Researchers use their own moral compass to navigate the dilemmas in their work. The quality of this compass depends largely on how virtuous the researcher is. But there are also strong external influences. The research climate in a particular lab or department can strongly influence research integrity. The same is true for the – sometimes perverse – incentives within the academic system. This comes with a personal responsibility: individual researchers must do everything they can to improve the research climate and to remove perverse incentives. Early career researchers in particular are often leading the efforts to change research culture and practice[8].

Other important stakeholders in research integrity are research institutes, scholarly journals and funding agencies[9,10]. When these stakeholders act in concert, interventions aimed at promoting responsible research practices will arguably be more effective. To me, the most important avenues of improvement are the adoption of open science practices and maintaining a clear focus on research integrity in the assessment of researchers. I'll come to that in a minute.

In the National Survey, we also studied drivers of research integrity. On the slide, you can see the findings for five of the twelve scales we used. The arrows indicate the association between the scale score at issue and the outcome specified above the column. Besides QRPs and fabrication or falsification, we also looked at associations with responsible research practices[11]. The green arrows indicate associations with higher research integrity, while the red arrows indicate associations with lower research integrity. We found that a stronger belief in the ability of reviewers to detect fabrication or falsification was associated with a lower prevalence. Respondents who reported the strongest support for the research integrity standards were less inclined to engage in QRPs and fabrication or falsification. They also reported more responsible research practices. Our findings support the idea that there are two forms of supervision. Supervision for survival consists of guidance on how to use QRPs with a view to obtaining positive results and advancing your career as an academic scholar. As might be expected, this is associated with a higher prevalence of QRPs. Responsible mentoring, on the other hand, helps the mentee do the right thing. This is associated with less engagement in QRPs and more engagement in responsible research practices. A higher score for perceived publication pressure is associated with a higher prevalence of QRPs and a lower prevalence of responsible research practices.

Explanatory Factors	QRP	FF	RRP
Likelihood of detection by reviewers		⬇	
Support of research integrity norms	⬇	⬇	⬆
Supervision for survival	⬆		
Responsible supervision	⬇		⬆
Publication pressure	⬆		⬇

National Survey on **Research Integrity**

Research integrity: nine ways to move from talk to walk

What can research institutes do?

The EU-funded Standard Operation Procedures for Research Integrity consortium – SOPs4RI for short – have outlined nine topics which research institutes need to act upon to foster research integrity[12]. We argue that research institutions need a comprehensive research integrity promotion plan that covers all nine of these topics. The plan should also specify how policies will be implemented, maintained and evaluated.

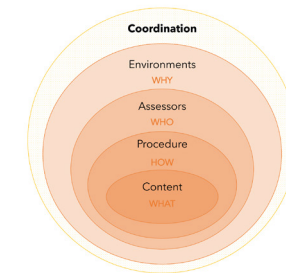| Research environment | Ensure fair assessment procedures and prevent hypercompetition and excessive publication pressure. |
Supervision and mentoring	Create clear guidelines for PhD supervision (such as on meeting frequency); set up skills training and mentoring.
Integrity training	Establish training and confidential counselling for all researchers.
Ethics structures	Establish review procedures that accommodate different types of research and disciplines.
Integrity breaches	Formalize procedures that protect both whistle-blowers and those accused of misconduct.
Data practices and management	Provide training, incentives and infrastructure to curate and share data according to FAIR principles.
Research collaboration	Establish sound rules for transparent working with industry and international partners.
Declaration of interests	State conflicts (financial and personal) in research, review and other professional activities.
Publication and communication	Respect guidelines for authorship and ensure openness and clarity in public engagement.

www.sops4ri.eu

@sops4ri

These are the nine consensus topics that the SOPs4RI consortium has identified. Together, they closely match both the European and Netherlands Codes of Conduct for Research Integrity. An example of the actions that can be taken is provided on the slide for each topic. Policies to improve research integrity must be co-created locally[13]. Researchers and support staff need to be involved in analysing the problem, as well as in devising and implementing solutions. On its website, the SOPs4RI consortium has a toolbox that contains more than 100 practical guidelines. These can be used to design and adapt institutional research integrity policies.

Research assessments should recognize responsible research practices
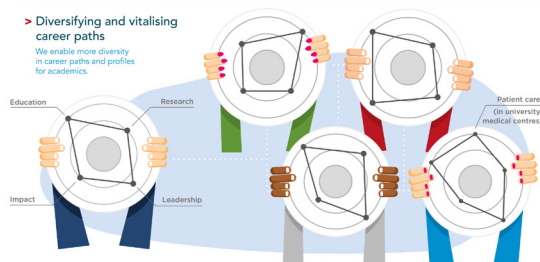Narrative review of a lively debate and promising developments

Noémie Aubert Bonn[1] and Lex Bouter[2]

Careers in research are determined by assessments for grants, promotion and tenure. When carrying out these assessments, it's important to use criteria which reflect behaviours that safeguard and strengthen research integrity. Sadly, that is not always the case and when this focus is lacking, assessment criteria can become perverse incentives. For instance, this can happen when the focus is on the number of publications and citations, including the Impact Factor and the Hirsch Index. In recent years, the San Francisco Declaration[14], the Leiden Manifesto[15] and the Hong Kong Principles[16] have been launched: all three urge the use of better assessment criteria – the first and most important one being engagement in open science practices. Other behaviours that should be valued are being a good reviewer, a good supervisor, a good teacher, a constructive team member and an effective communicator. There are currently a wealth of initiatives that explore ways to improve researcher assessment. Noémie Aubert Bonn has summarized them in a narrative review[17]. She presents them for the five dimensions of researcher assessment depicted on the slide. Recently, the reform of researcher assessment has gained substantial traction in a number of countries. Happily, the Netherlands is one of them[18,19].

Room for everyone's talent
towards a new balance in the recognition and rewards of academics

> Diversifying and vitalising career paths
We enable more diversity in career paths and profiles for academics.

Under the motto 'room for everyone's talent', our national programme places an emphasis on diversity among scholars and on the importance of collaboration. The programme is broadly supported by funders and research institutes. That doesn't mean that there are no remaining issues. For instance, it appears to be very difficult to apply assessment criteria consistently when looking at narrative CVs.

Superb supervision: A pilot study on training supervisors to convey responsible research practices onto their PhD candidates

Tamarinde Haven, Lex Bouter, Louise Mennen & Joeri Tijdink

One of the most difficult tasks academic scholars have is supervising junior colleagues, for instance PhD students. For many early career researchers, supervisors are the most important role models. Amazingly, very little training for this responsible task is provided and no 'licence to supervise' is required. In an interesting attempt to change this, Tamarinde Haven has developed a course called 'Superb Supervision'[20]. This course combines a focus on the soft skills of supervision with training in responsible research practices. The pilot was very positively evaluated and the course is now being mainstreamed on our campus.
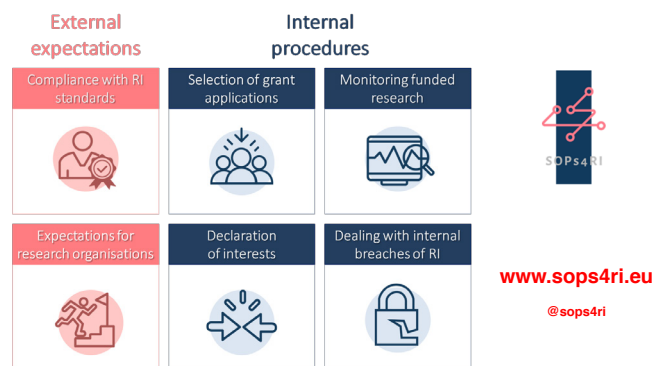
Research integrity governance modes

Krishma Labib

	Market	Hierarchy	Network
Drivers	Incentives	Formal authority	Trust and solidarity
Climate	Competition	Bureaucracy	Cooperation

Research institutes can govern research integrity in three ways: through markets, hierarchies or networks. Markets rely on incentives and competition. When out of balance, this leads to perverse incentives, to a high perceived publication pressure and to hyper-competition. Hierarchies are based on rules and bureaucracy. The potential downsides are a 'tick-box' mentality and low levels of perceived organizational justice. Governing through networks entails mutual trust and cooperation. The downside of this approach is that consensus might not be reached and adequate actions will be postponed. In a recent preprint, Krishma Labib elegantly argues that a carefully designed combination of these three modes of governance works best[21]. In essence, adequate rules and incentives are indispensable, but should be supported by the institutional network of researchers. Only then can bureaucracy and competition be limited to areas that really optimize research integrity.

External expectations — Internal procedures

Compliance with RI standards | Selection of grant applications | Monitoring funded research

Expectations for research organisations | Declaration of interests | Dealing with internal breaches of RI

SOPs4RI

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What can funding agencies do?

Funding agencies are enormously important for fostering research integrity. They have a lot of influence because all scholars need funding for their research. Funders can change practices quickly, as some did when they made open data and open access publication mandatory. The SOPs4RI consortium recommends that funding agencies should also develop a research integrity promotion plan[22]. On this slide, you can see that we have identified six topics that should be covered by the plan. Two of these concern external expectations for researchers and research institutions that accept grants. The other four topics concern the internal procedures of the funding agency at issue. Obviously, the way funding applications are assessed and the way in which decisions about awarding grants are made contain many research integrity pitfalls. Identifying and handling potential conflicts of interest among reviewers and committee members is one of them. Funding agencies also need sound procedures for dealing with allegations of misconduct. The fourth topic we identified is the monitoring of funded research, which still seems to be a relatively neglected area for many funding agencies. Funding agencies also have a toolbox available to them which currently contains 25 guidelines.

Competition for research funding is fierce. Often less than 10 percent, and sometimes even less than 5 percent, of the applications can be granted. Many applications that deserve to be granted have to be rejected for budgetary reasons. There is convincing evidence that committees are not able to rank eligible applications reliably. The difference between success and failure is often less than 0.1 – and sometimes less than 0.01 – on a 5-point scale. This leads applicants to feel both discouraged and angry. Recently, Serge Horbach, Joeri Tijdink and I published a plea to introduce a lottery in the allocation of research grants[23]. The idea is simple: once the applications which are not good enough to be granted have been weeded out, a lottery is held to decide which proposals will be financed. More sophisticated versions of this idea have also been proposed[24]. We believe that a lottery-based approach would be less demotivating for applicants, as not receiving funding would simply mean they were unlucky in the draw as opposed to implying that the proposal was not good enough. Applicants could even add this to their CV. We argue in our commentary that a lottery would make grant allocation fairer, more efficient and more diverse.

With the same author team, we recently published a plea for open grant applications[25]. We argue that funding agencies need to adopt open science principles in their own work too, and should openly share applications, review reports, funding decisions and evaluations of the execution of granted projects. We are convinced that a transparent grant allocation process will improve the quality of review reports and granting decisions. Open applications also enable research on funding practices and will lead to greater trust in the funding allocation process. An obvious objection to our proposal is that applicants might be afraid of being scooped. In our view, the problem of good ideas going to waste outweighs any concerns about the ideas of rejected proposals being hijacked. Furthermore, an open system means that applicants can always prove priority over other researchers who use their ideas without giving them proper credit.

Partial lottery can make grant allocation more fair, more efficient, and more diverse
Serge P. J. M. Horbach [1,*], Joeri K. Tijdink [2,3] and Lex M. Bouter [3,4]

Research funders should be more transparent: a plea for open applications
Serge P. J. M. Horbach, Joeri K. Tijdink and Lex M. Bouter

Journals' instructions to authors: A cross-sectional study across scientific disciplines

Mario Maličkí[1,2]*, IJsbrand Jan Aalbersberg[3], Lex Bouter[4,5], Gerben ter Riet[1,2]

Systematic review and meta-analyses of studies analysing instructions to authors from 1987 to 2017

Mario Maličkí [1,2,7], Ana Jeronćić [3,7], IJsbrand Jan Aalbersberg [4], Lex Bouter [5,6] & Gerben ter Riet [1,2]

What can journals do?

Scholarly journals also have a role to play in fostering research integrity. Journals are influential during and after the publication phase. Their main role is quality control. Journals are the guardians of the validity and trustworthiness of the published body of knowledge. Journals can also influence earlier phases of a study by demanding open methods and open data. Researchers can then anticipate this when designing and carrying out their study. Mario Maličkí investigated whether journals' instructions to authors mention items that improve transparency[26,27]. Of the 19 items studied, only two were mentioned by more than half of the journals, while five were discussed by less than 10 percent.

What can journals do?

1. Adopt the Transparency and Openness Promotion Guidelines

Citation Standards Describes citation of data	Data Transparency Describes availability and sharing of data
Analytical Methods Transparency Describes analytical code accessibility	Research Materials Transparency Describes research materials accessibility
Design and Analysis Transparency Sets standards for research design disclosures	Preregistration of Studies Specification of study details before data collection
Preregistration of Analysis Plans Specification of analytical details before data collection	Replication Encourages publication of replication studies

2.
3. Perform relevant quality checks
4. Retract quickly when indicated
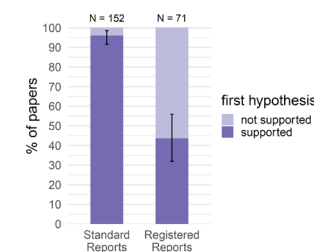5. Enable Registered Reports

A number of these items feature in the Transparency and Openness Promotion Guidelines, which are currently adopted by over 5000 scholarly journals[28]. On the slide, you can see the eight standards included in the TOP guidelines. One of them is preregistration, which means that the study protocol first needs to be written and uploaded in a repository before data collection can start[29]. Only then can later checks ascertain whether the study was performed, analysed and reported according to plan. Changes may of course be necessary after data collection has begun, but they always come with the suspicion of being data-driven. Only when a study is preregistered can QRPs such as selective reporting, p-hacking and HARK-ing be reliably identified.

Journals have other ways of fostering research integrity. I believe that having open peer review is one of them. Reviewing is an important duty for scholars and one for which they deserve credit, but at the same time they need to be accountable. Review reports are part of a scholarly debate, and should be openly accessible to all interested parties. Open peer review is likely to be more balanced and fairer as well. Editorial offices should screen manuscripts for plagiarism, image manipulation, statistical errors and references to retracted publications. Adequate software is increasingly becoming available for these checks[30]. Unfortunately, editorial offices and reviewers cannot prevent all seriously flawed or fraudulent papers from being published. Journals therefore ought to implement a policy of rapid retraction when this is indicated. Sadly, journals have a poor track record on retraction. If it happens at all, it is often years after the initial concerns were raised[31].

An Excess of Positive Results: Comparing the Standard Psychology Literature With Registered Reports

Anne M. Scheel, Mitchell R. M. J. Schijen, and Daniël Lakens

Let me end this section on the role of journals with the exciting innovation of registered reports[32]. The idea is simple: when the grant has been awarded and the study is about to start, you first write the introduction and methods sections of the envisioned later publication. These are submitted and sent out for peer review. The reviewers and the editor will then judge the relevance and methodological soundness of the study. The point is that they will not be distracted by the findings, because the data collection has not even started. When the manuscript is accepted for publication, the only later check is whether the study was performed as described in the method section and whether the results are reported and discussed adequately. This publication format completely eliminates publication bias, as Anne Scheel has convincingly shown by comparing registered reports to similar regular publications: less than 45 percent of registered reports had positive conclusions, compared to over 95 percent of the matched regular publications[33]. And there is an important bonus: in registered reports, review comments can actually improve the design of the study, which is not the case for the standard work flow[34].

Final remarks

These are my views to date on why research integrity matters and how it can be fostered. While these views are based on the available evidence, it is worth remembering that little to no research has been carried out on many of these issues. We clearly need more research on research integrity[35].

These funding programmes have really made a difference and I'm grateful for the opportunities they have offered. But the job is by no means finished and I sincerely hope that the current momentum can be maintained and that, in years to come, research integrity policies will increasingly be based on a thorough and comprehensive body of research.

Acknowledgements

I would like to thank the executive boards of the Vrije Universiteit and the Amsterdam University Medical Centers for three decades of trust and support.

I cannot even dream of naming and thanking all the students and colleagues from whom I have learned so much. It was wonderful to have so many teachers! Thank you very much!

I'm also very grateful to the many gifted and kind colleagues I had the privilege of working with, first in epidemiology and more recently in research integrity. In that second category, some have been mentioned in the course of this lecture. They also represent many others whom I am unable to mention by name in the time available.

In recent years, I have very much enjoyed my collaboration with René van Woudenberg, Rik Peels and Jeroen de Ridder in the Department of Philosophy.

While organizing three world conferences, I met many amazing colleagues in the international community of research integrity. I am delighted that Sabine Kleinert and Maura Hiney are able to be with us here today.

My profound thanks to the nine presenters and the chair of today's fascinating symposium. For those of you who missed it: the videos will become available shortly.

Today's events would not have been possible without the kind practical support of Dorien van der Schot, Patricia de Waal, Floor Annevelink, Ellis Verkerk and Joeri Tijdink.

Looking back, my academic career may look coherent but along the way I only had a vague idea of where I was heading. I would like to thank the people who showed me the way when I came to the crucial crossroads on my academic route. Arie van Boxtel gave me my first real job. Paul Knipschild taught me academic scepticism. Hans Valkenburg showed me how to lead a research institute. Ed van der Veen was my guide at crucial points during my first two decades on this campus. When I decided to become a scholar of research integrity, Gerrit van der Wal, André Knottnerus, Henk Smid and Eduard Klasen offered invaluable support, each in his own way. Some colleagues with whom I had already worked as an epidemiologist in the past, joined me in my new interest in research integrity. In this category, I would like to mention and thank Gerben ter Riet, Maurice Zeegers, Guy Widdershoven and David Moher.

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Marcel Ooms	Agnes Jager	Marieke Snijder	Tamarinde Haven
Nico de Neeling	Jeroen Borghouts	Evert Verhagen	
Peter Grootenhuis	Ellen Tromp	Bianca Schalk	*Krishma Labib*
Frank Jelles	Wija Oortwijn	Annemieke van der Waal	*Tom van Drimmelen*
Coen van Bennekom	Hanneke van der Lee	Esther Steultjens	*Iris Lechner*
Onno Omta	Femmie de Vegt	Sandra Bot	*Melissa Rethlefsen*
Joke Mooij	Ingrid Snels	Leo Roorda	*Caitlin Bakker*
Pieter-Jan Beks	Jan Hoving	Ton Kuijpers	*Jaisson Cenci*
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Ferdinand van der Does	Saakje Mulder	Beveley Shea	
Wilco Graafmans	Ellen Roelofsen	Geeske Peeters	
Gert Brønfort	Annette Gerritsen	Wieneke Mokkink	
Gerlof Valk	Ingeborg Korthals-de Bos	Eric Manheimer	
Daniëlle van der Windt	Jeanette Gerritsen		
Ellen Hoogeveen	Annemarie Becker		
Johannes Ruige	Annemieke Spijkerman		
Saskia van Es	Vianda Stel		
Hannie Comijs	Natasja van Schoor		

I will refrain from reading you the names of my former and current PhD students, all of whom were – and are – great to work with and have kept me on my toes by posing many different challenges. Supervising them was the most difficult, most responsible and most rewarding academic task I have ever fulfilled. It never became routine.

Finally, I would like to offer my deepest thanks to my life companion for almost four decades: Mayke. In the acknowledgements of my PhD thesis and my two inaugural lectures, I praised her indestructible sunny disposition. That attitude and her caring support have guided me more than she realizes. I hope to benefit from it for many years to come.

I have said.

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Brief biography

Lex Bouter was born in Rotterdam in 1956. After obtaining an MSc degree in Medical Biology at Utrecht University in 1982, he lectured at teacher training colleges in Tilburg and Utrecht. In 1984, he joined Maastricht University, where he trained as an epidemiologist and obtained his PhD. In 1988, he published a textbook on epidemiology of which the eighth Dutch edition and the second English edition will be published soon.

In 1992, Bouter took up a tenured position as Professor of Epidemiology and became Scientific Director of the EMGO+ Institute for Health and Care Research at the VU University Medical Center in Amsterdam (1992-2006). He was Editor (1996-2002) and Editor-in-Chief (2002-2006) of the Cochrane Collaboration Back Review Group.

From 2001 to 2006, he also headed one of the six divisions at the VU University Medical Center. He was president of the Netherlands Epidemiological Society (1996-1997), a member of the Health Council of the Netherlands (2001-2013), vice-chair and chief methodologist of the Dutch Central Committee on Research involving Human Subjects (2001-2013), chair of the programme committee of the Innovative Medical Devices Initiative (2009-2018), chair of the Netherlands Organisation for Health Research and Development's Committee for Health Research on Disasters: COVID-19 (since 2021) and chair of the Dutch Research Council's programme committee for Replication Studies (since 2016).

From 2006 to 2013, he was Rector Magnificus of Vrije Universiteit Amsterdam. In this position, he focused on the formation of interdisciplinary research institutes. As rector, Bouter argued the case for focusing on the societal impact of research and became interested in the dilemmas surrounding research integrity.

In 2014, his tenured professorship was changed from Epidemiology to Methodology and Integrity. He is currently involved in teaching and research in relation to responsible research practices. In 2017, Bouter was appointed a member of the Council for Medical Research of the Royal Netherlands Academy of Arts and Sciences. In 2017, he organized the 5th World Conference on Research Integrity in Amsterdam and became chair of the World Conferences on Research Integrity Foundation. Lex Bouter is the author or co-author of 735 scientific publications in the Web of Science, which have been cited more than 74,000 times leading to an h-index of 131. He has supervised 77 and currently is supervising 6 PhD students, 17 of whom have been appointed professor to date.

Full CV: https://bit.ly/3bsnmNI
List of publications: https://bit.ly/3zAlRom