Knowledge, attitudes, practice, and environment.

Summary of ten years of studies of scientific integrity in Norway

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Acknowledgement

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PhD candidates at UiO

UiO : Faculty of Medicine
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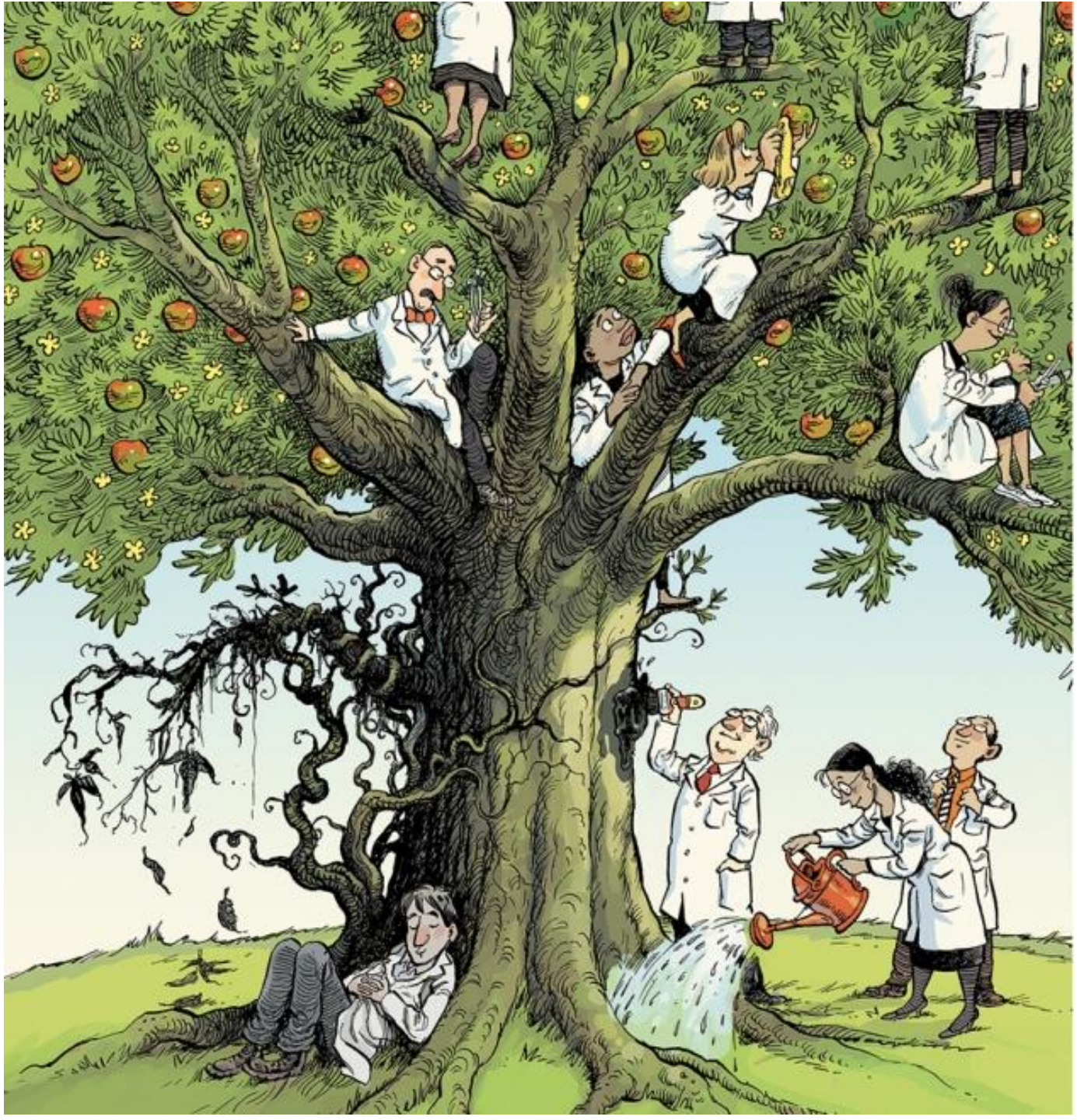
The ideal

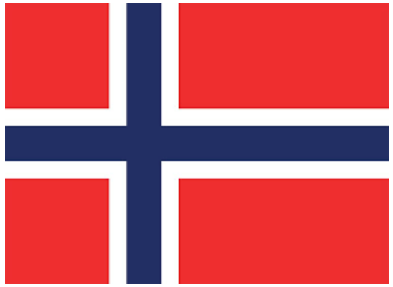


The real

Key elements of the studies

The survey consisted of four parts.

1. The first part, on **knowledge** and **practices**, was developed and first applied in Lund, Sweden (Nilstun, Lofmark, & Lundqvist, 2010).
2. The second part, on **attitudes** was developed in the USA (Kalichman & Friedman, 1992) and validated (Holm & Hofmann, 2017).
3. A third part was developed to investigate **environmental factors**.
4. **Background variables**



Use of various parts of the survey

- **Croatia** (Holm & Hofmann, 2018; Ljubenković, Borovečki, Ćurković, Hofmann, & Holm, 2021),
- **Denmark** (Hofmann et al., 2020; Jensen, Kyvik, Leth-Larsen, & Eriksen, 2018)
- **Sweden** (Nilstun, Lofmark, & Lundqvist, 2010)
- **South Afrika** (Beverly Kramer Submitted)
- **Norway** (Hofmann, 2016; Hofmann, Helgesson, Juth, & Holm, 2015; Hofmann & Holm, 2016; Hofmann et al., 2013),

Overview of the Studies

Year (publication)	2013	2015	2016	2017	2018	2019	2020	2022
Year (data)	2010	2014	2015	2010 2014 2015	2016, 2017	2018	2018 2019	2020
Place	Oslo, Bergen, Trondheim Tromsø	Oslo KI (S)	Oslo	Oslo, Bergen, Trondh. Tromsø KI	Oslo KI (S)		Oslo KI (S) SDU (DK)	Oslo
Knowledge	K	K	K	K	K	K	K	K
Attitudes	A	A	A	A	A	A	A	A
Practices	P	P	P	P	P	P	P	P
Experiences	X	X	X	X	X	X	X	X
Environment					E	E	E	E
Respondents cPhD PhDs	cPhD	cPhD	cPhD	cPhD	cPhD	PhDs 2016	cPhD	PhDs 2019
Study type	Survey	Survey	Survey	Validation study	Association study	Survey	Survey	Survey

Publications

- Hofmann B, Thoresen M, Holm S. Research Integrity Attitudes and Behaviors are Difficult to alter: Results from a ten Year Follow-up Study in Norway. Journal of Empirical Research on Human Research Ethics; 2023 Online:1-8
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- Hofmann, Bjørn, et al. "Research Integrity Among PhD Students at the Faculty of Medicine: A Comparison of Three Scandinavian Universities." Journal of Empirical Research on Human Research Ethics (2020): 1556264620929230. https://doi.org/10.1177/1556264620929230

Research Integrity Attitudes and Behaviors are Difficult to alter: Results from a ten Year Follow-up Study in Norway

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Abstract

Background: Research integrity has obtained much attention in research communities, but also in the general public. To improve research integrity is difficult as it involves complex systems of knowledge, attitudes, and practices. The objective of this study is to investigate the knowledge, attitudes, and practices of cohorts of PhD candidates at one faculty (of medicine) over time and compare this to finished PhDs of the same cohorts. *Material and method:* Researchers (n = 186) awarded the degree PhD at the Faculty of Medicine at the University of Oslo in 2019 were invited to answer a questionnaire about knowledge, attitudes and actions related to scientific dishonesty. 94 responded (50.5%). The results were compared with results among first-year PhD candidates who responded to the same questionnaire during 2010–20 (n = 536) and to those who finished PhDs in 2016 (n = 86). *Results:* For the years 2010–2020 1.1% of the PhD candidates report to have engaged in severe scientific misconduct (FFP) while 0.9% report to have presented results in a misleading way. 2.3% report that they know of persons at their department who have engaged in FFP the last 12 months. In total 1.5% report to have experienced pressure to engage in severe scientific misconduct (FFP) while 2.1% report to have experienced pressure to present results in a misleading way. On average 12.8% report to have been exposed to unethical pressure concerning inclusion or ordering of authors during the last 12 months, and 28.8% report to have knowledge about their department's written policies about research integrity. While some attitudes improve over the years, attitudes in general are not much changed from 2010–2020. None of the PhDs that received a PhD from the Faculty of Medicine at the University of Oslo in 2019 reported to have engaged in FFT or having experienced pressure to do so.1.1% experienced pressure to present results in other misleading ways, while 26.6% of respondents had experienced unethical pressure in relation to authorship during the course of the PhD fellowship. 4.3% knew about someone at their department who had presented results in a misleading manner. Some attitudes were not in line with traditional conceptions of research integrity, but most agreed that their research environment displayed research integrity. *Conclusion:* This long-term follow up study shows that few PhD-candidates report to engage in severe scientific misconduct, that they experience little pressure to do so, and with some exceptions, attitudes in in line with good research integrity. However, pressure in relation to authorship is relatively common. There is some improvement in research integrity from PhD candidates to recently finished PhDs, but in general research integrity is stable over time.

Respondents' characteristics

Question / Background information	PhD students Oslo 2010-20	PhD from Oslo 2016	PhD from Oslo 2019
Returned/distributed (n)	536/752	72/86	94/186
Response rate (%)	71.28	83.7	50.54
Undergraduate studies in Norway, n (%)	328 (57.9)	48 (66.7)	65 (69.1)
Doing Clinical / Basic / Other research (%)	55.7/29.6/14.6	43/15/12	50/30.9/19.1
Lectures or courses in science ethics as part of undergraduate studies (Yes/No/I do not remember) (%)	67.6/23.2/9.2	46/13/11	77.7/12.8/9.5

Trends from 2010 to 2020: **Practice**

- 1.1% report to have engaged in severe scientific misconduct (Falsification, Fabrication or Plagiarism, FFP)
- 0.9% report to have presented results in a misleading way

Trends from 2010 to 2020: **Experience**

- 1.5% of the PhD candidates report to have experienced pressure to engage in severe scientific misconduct (FFP)
- 2.1% report to have experienced pressure to present results in a misleading way
- 12.8% report to have been exposed to unethical pressure concerning inclusion or ordering of authors during the last 12 months

Trends from 2010 to 2020: **Knowledge**

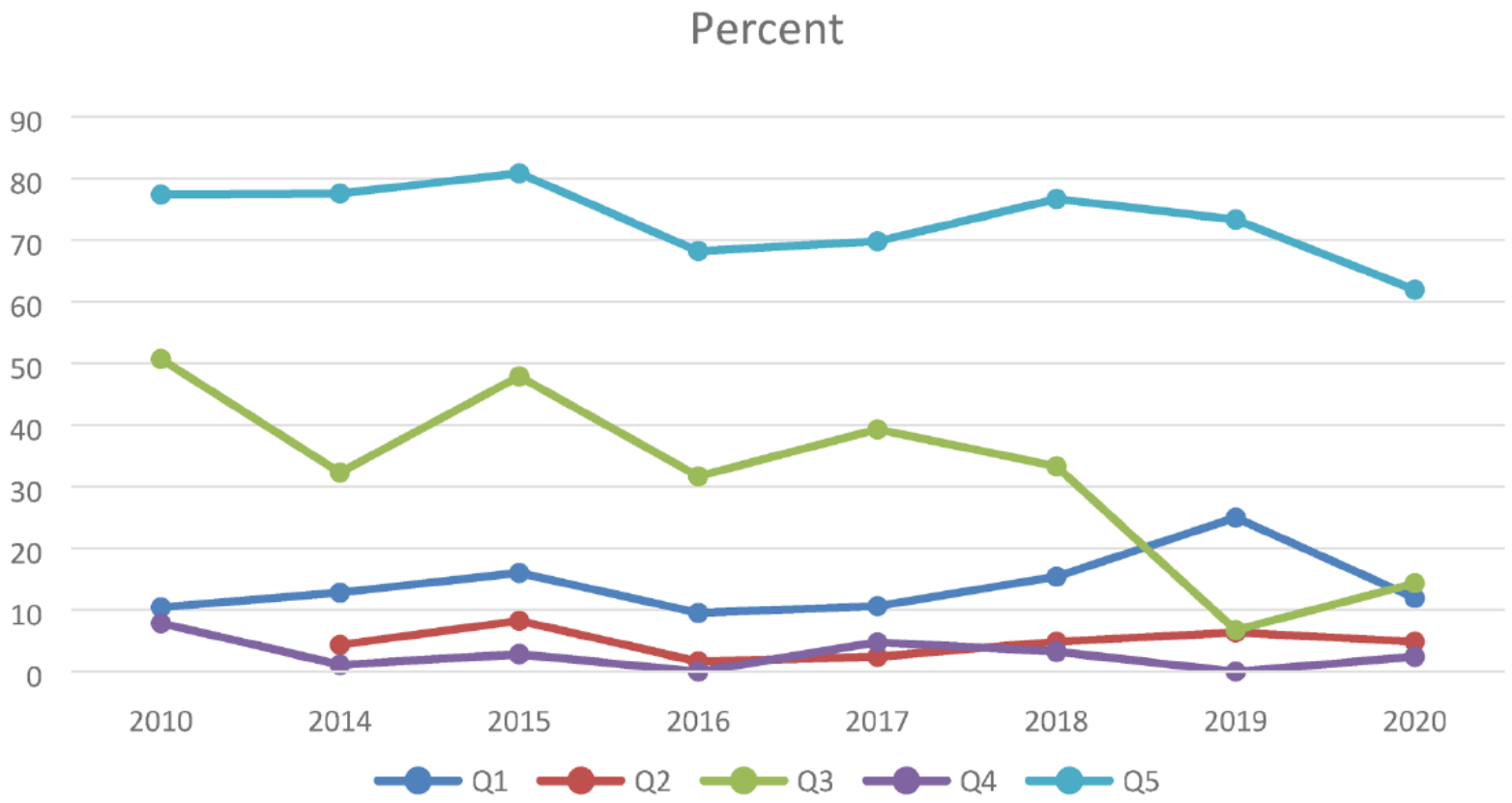
- 2.7% report that they know of persons at their department who have engaged in FFP the last 12 months.
- 28.8% report to have knowledge about their department's written policies about research integrity.

Finished PhDs versus research fellows: **Attitudes**

Question	PhD from Oslo 2019 N=94	PhD from Oslo 2016 N=71	First-year research fellow 2010-2020 N=526
It is never appropriate to report experimental data that have been created without actually having conducted the experiment.	4.56 (1.03)	4.65 (0.83)	4.60 (0.95)
It is never appropriate to alter experimental data to make an experiment look better than it actually was.	4.84 (0.55)	4.90 (0.38)*	4.76 (0.64)
It is never appropriate to try a variety of different methods of analysis until one is found that yields a result that is statistically significant.	4.15 (0.96)	4.32 (0.92)***	3.80 (1.04)
It is never appropriate to take credit for the words or writing of someone else.	4.85 (0.62)	4.78 (0.51)	4.66 (0.72)
It is never appropriate to take credit for the data generated by someone else.	4.71 (0.71)	4.83 (0.51)***	4.52 (0.84)
It is never appropriate to take credit for the ideas generated by someone else.	4.68 (0.71)	4.71 (0.59)**	4.48 (0.83)
If you were confident of your findings, it is acceptable to selectively omit contradictory results to expedite publication.	1.65 (1.00)	1.89 (1.29)	1.97 (1.24)
If you were confident of your findings, it is acceptable to falsify or fabricate data to expedite publication.	1.21 (0.84)	1.54 (1.34)	1.55 (1.25)
	Average attitudes (SD), Kalichmann-scores		

52.8% of the PhDs (2019) believed that one or more actions that go against generally accepted norms in research integrity were not wrong (for these 8 questions)

Trends



Q1 = exposed to unethical pressure concerning authorship the last 12 months

Q2 = know about anyone having presented results in misleading ways

Q3 = appropriate to try a variety of different methods of to obtain statistical significance

Q4 = appropriate to alter experimental data to make an experiment look better

Q5 = willing to report that misconduct by supervisor or principal investigator

PhDs' assessment of the integrity in their research environment (2019)

- 5.3% of the PhDs disagreed that their supervisor displayed research integrity (in their own research and in their relations to doctoral students).
- No PhDs thought that senior researchers did not promote research integrity.
- 10.6% agreed that research integrity was not promoted in the research group as a whole
- 12% reported that they did not know who to ask about research integrity questions.

Integrity of the **research environment**

PhD 2019. N=94.

Response categories Questions	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. My main supervisor displayed research integrity in his/her own research	2 (2.1%)	3 (3.2%)	2 (2.15)	23 (24.5%)	64 (68.1%)
2. My main supervisor displayed research integrity in his/her relations with doctoral students	3 (3.2%)	2 (2.1%)	1 (1.1%)	26 (27.7%)	62 (66.0%)
3. Senior researchers in the group where I did my doctoral study promoted research integrity	0	0	9 (9.6%)	31 (33.0%)	54 (57.4%)
4. Junior researchers in the group where I did my doctoral study promoted research integrity	0	1 (1.1%)	14 (14.9%)	26 (27.7%)	53 (56.4%)
5. Research integrity was not promoted in the research group (as a whole) where I did my doctoral studies[1]	42 (44.7%)	30 (31.9%)	12 (12.8%)	8 (8.5%)	2 (2.1%)
6. I knew who to ask if I had a research integrity question	1 (1.1%)	11 (11.7%)	14 (14.9%)	32 (34.0%)	36 (38.3%)

Summary

- The number of reported **instances of misconduct** is low and below what has been reported internationally (Fanelli, 2009; Xie et al., 2021).
- **Research integrity** has been quite **stable** amongst the PhD candidates at the Faculty of Medicine in Oslo in terms of their attitudes, practices, experiences, and knowledge about misconduct.
- The **attitudes** are in general in line with good research integrity, but for some issues they are not.
  - trying a variety of different methods of analysis until one is found that yields a result that is statistically significant
  - to selectively omit contradictory results to expedite publication if confident in the results
  - to be more truthfully report results in publications than in grant applications.
- There are some **improvements** from PhD candidates to finished PhDs.
- There is **little change** in the PhDs' assessment of the research integrity in their **environment** from 2016 to 2019.

Discussion

- It is difficult to improve research integrity.
- Science ethics education and research integrity training are important (necessary), but not sufficient for improving research integrity.
- Strong role models and local norms may undermine the effect of good research ethics teaching and integrity training.
- Therefore, educational efforts should not only be directed towards PhD candidates, but also towards supervisors, senior scientists, and research role models.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