The relationship of questionable research practices and how researchers perceive their working conditions

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Research questions (Danish sample only)

1. What are factors relating to context, conditions and incentives that might be associated with QRP behaviours?
2. Role of the institutions’ culture, leadership, training and rewards system?
3. Publishing environment – does it encourage (e.g. overselling, hyping) or protect against QRPs (peer review, replication materials, pre-registration etc)?
4. Psychological pressures – who feels them and how are they related to QRP behaviour (publishing, grant capture etc)?
5. How does this vary by scientific field?

We asked respondents about these...
## Example working condition questions

### Statements concerning the research conditions, 2 of 3

Please indicate the extent to which you agree or disagree with the following statements, as they relate to your particular context and conditions.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
<th>Unable to answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>The peer review and editorial processes determining publication decisions encourage me to oversell my results.</td>
<td></td>
<td></td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The peer review and editorial processes determining publication decisions provide a sufficient safeguard against questionable research practices within my field.</td>
<td></td>
<td></td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Questionable research practices are rewarded in the leading publication outlets within my field.</td>
<td></td>
<td></td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The most prestigious publication outlets in my field are also those that publish research with the highest standard of integrity.</td>
<td></td>
<td></td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

[« Previous question  Save and proceed »]
In general, to what extent do you trust the findings in recent literature?

- Natural and technical sciences: Pr trust = 0.9
- Medical and health sciences: Pr trust = 0.8
- Social Sciences: Pr trust = 0.9
- Arts & humanities: Pr trust = 0.9
Local culture by field

Rewards at my department encourage me to do most rigorous research possible

Leadership at my department role models for RI

The most prominent researchers at my department are role models for RI

Peer culture within my department is a safeguard against QRP
Publishing by field

Peer review and editorial provide sufficient safeguard against QRP

The most prestigious outlets in my field have highest standard of integrity

Peer review and editorial encourage me to oversell my results

QRP are rewarded in the leading publication outlets within my field
Personal pressure by field

I feel strong pressure to attract external funding

When applying for funding I feel pressure to oversell impact

I feel pressure to publish in a prestigious outlet

Bibliometric indicators are important for my career
### Standardised factor loadings (ML estimation)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Local culture</th>
<th>Personal pressure</th>
<th>Publishing culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership at my department role models for RI.</td>
<td>0.91</td>
<td>0.02</td>
<td>-0.13</td>
</tr>
<tr>
<td>Most prominent researchers at my department are role models for RI.</td>
<td>0.75</td>
<td>0.03</td>
<td>0.05</td>
</tr>
<tr>
<td>Rewards at my department encourage most rigorous research.</td>
<td>0.69</td>
<td>-0.03</td>
<td>0.00</td>
</tr>
<tr>
<td>Peer culture within my department is a safeguard against QRP.</td>
<td>0.57</td>
<td>-0.06</td>
<td>0.14</td>
</tr>
<tr>
<td>I feel pressure to publish in a prestigious outlet.</td>
<td>0.04</td>
<td>0.66</td>
<td>0.04</td>
</tr>
<tr>
<td>I feel strong pressure to attract external funding.</td>
<td>-0.06</td>
<td>0.63</td>
<td>0.04</td>
</tr>
<tr>
<td>Bibliometric indicators are important for my career.</td>
<td>0.04</td>
<td>0.62</td>
<td>0.04</td>
</tr>
<tr>
<td>When applying for funding I feel pressure to oversell impact.</td>
<td>-0.10</td>
<td>0.54</td>
<td>-0.15</td>
</tr>
<tr>
<td>QRP are rewarded in the leading publication outlets within my field</td>
<td>-0.03</td>
<td>-0.01</td>
<td>0.69</td>
</tr>
<tr>
<td>Peer review and editorial provide sufficient safeguard against QRP</td>
<td>0.03</td>
<td>0.03</td>
<td>0.59</td>
</tr>
<tr>
<td>The most prestigious outlets in my field have highest standard of RI</td>
<td>0.07</td>
<td>0.10</td>
<td>0.57</td>
</tr>
<tr>
<td>Peer review and editorial encourage me to oversell my results</td>
<td>-0.03</td>
<td>-0.27</td>
<td>0.39</td>
</tr>
<tr>
<td><strong>Variance explained</strong></td>
<td>22%</td>
<td>14%</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Scale reliability (Cronbach’s alpha)</strong></td>
<td>.82</td>
<td>.70</td>
<td>.63</td>
</tr>
</tbody>
</table>
Factor analysis details

- Perceptions of local culture and publishing culture moderately correlated (around .35). Shared confidence in both to some degree?
- Personal pressure largely unrelated to perceptions of culture (individual differences)
- 3-factor structure holds approximately in all fields (configural invariance)
- Some variation in factor loadings
Mean perceptions (factors) by field

- **Local culture**
- **Publishing culture**
- **Personal pressure**

**Natural and technical sciences**

**Social science**

**Medical and health sciences**

**Arts and humanities**

Scale: 1 to 7
Predicting personal pressure

Main Field [Base: natural science]
- Arts & humanities
- Medical and health sciences
- Social Sciences

Gender [Base: female]
- Male
- Non-binary

Position [Base: tenured]
- Non-tenured
- Clinical

Time since PhD [Base: 0-5 years]
- 6-15 years
- More than 15 years

RI training? [Base: none]
- Undergraduate
- PhD
- After PhD

Familiar w/code of conduct? [Base: No]
- Somewhat familiar
- Familiar

Unstandardised coefficients (dep var on 1-7 scale)
Predicting local culture

Main Field [Base: natural science]
- Arts & humanities
- Medical and health sciences
- Social Sciences

Gender [Base: female]
- Male
- Non-binary

Position [Base: tenured]
- Non-tenured
- Clinical

Time since PhD [Base: 0-5 years]
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- Undergraduate
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Familiar w/code of conduct? [Base: No]
- Somewhat familiar
- Familiar

Unstandardised coefficients (dep var on 1-7 scale)
Predicting publishing culture

- **Main Field** [Base: natural science]
  - Arts & humanities
  - Medical and health sciences
  - Social Sciences

- **Gender** [Base: female]
  - Male
  - Non-binary

- **Position** [Base: tenured]
  - Non-tenured
  - Clinical

- **Time since PhD** [Base: 0-5 years]
  - 6-15 years
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  - Undergraduate
  - PhD
  - After PhD

- **Familiar w/code of conduct?** [Base: No]
  - Somewhat familiar
  - Familiar

Unstandardised coefficients (dep var on 1-7 scale)
Predicting % of QRPs reported

Main Field [Base: natural science]
- Arts & humanities
- Medical and health sciences
- Social Sciences

Gender [Base: female]
- Male
- Non-binary

Position [Base: tenured]
- Non-tenured
- Clinical

Time since PhD [Base: 0-5 years]
- 6-15 years
- More than 15 years

RI training? [Base: none]
- Undergraduate
- PhD
- After PhD

Familiar w/code of conduct? [Base: No]
- Somewhat familiar
- Familiar
- Personal pressure (z-score)
- Local culture (z-score)
- Publishing culture (z-score)

Note: QRP score is percentage of QRPs that respondent reports ever doing out of 9 offered.
Predicted QRPs by working conditions and main field

Predictive Margins of main_field_r with 95% CIs

- Personal pressure (zscore)
  - Arts & humanities
  - Medical and health sciences
  - Natural and technical sciences
  - Social Sciences

- Local culture (zscore)
  - Arts & humanities
  - Medical and health sciences
  - Natural and technical sciences
  - Social Sciences

- Publishing culture (zscore)
  - Arts & humanities
  - Medical and health sciences
  - Natural and technical sciences
  - Social Sciences
Provisional conclusions

- High trust in research findings across all fields
- Non-trivial levels of QRPCs amongst Danish academics
- Substantial commonality of perceptions of research context and environment across fields – with some differences:
  - Natural scientists feel most pressure; humanities researchers, men and more experienced researchers feel a bit less pressure.
  - Humanities more confidence in publishing culture to encourage RI
  - More pressure associated with a slightly higher reported QRPCs
  - Confidence in publishing and department and local leadership associated with fewer reported QRPCs
This work is supported by the PRINT project (Practices, Perceptions, and Patterns of Research Integrity) funded by the Danish Agency for Science and Higher Education (Ministry of Higher Education and Science) under grant No 6183-00001B.