The Priority Rule, Replicability and Scientific Novelty

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Gefördert durch DFG Deutsche Forschungsgemeinschaft

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Funded via GRK 2073

Introduction

WHAT? **The priority rule driven competition** among scientists and the rise of a **"publish or perish"** culture seem to be significant factors in the so-called **replication / reproducibility crisis**. The crisis as well as a lack of replication studies called into question the ability of science to self-correct and produce **trustworthy** results, which seemingly negatively affects the **advancement** of science.

HOW? Interdisciplinary approach - combining **social epistemology** and **cultural evolutionary theory** to undertake philosophical research highly informed by empirical findings.

WHY? The importance of research on these issues is especially evident in **the contemporary world**, where global challenges require fast, innovative and efficient approaches and solutions and at the same time enormous scientific scrutiny is demanded from the scientific community in a partly science-hostile environment rife with political constraints, distrust and "alternative facts".

The Priority Rule

What is the role of the priority rule in the reproducibility crisis?

The **first** researcher / research group to produce **novel** findings (and present it in some formal way, usually publication), will get all or most of the associated **credit** [1, 2, 3]

(e. g., prestige, recognition, academic positions / jobs, promotions, grants, awards...)

encourages novel research

discourages replication studies

Scientific Novelty

Researchers are **incentivized** to produce novel findings since these are valued more / easier to publish / bring more credit.

The priority rule + incentive system encourage risk-taking, original thinking, creativity, novel lines of research, diversity, division of cognitive labor...

→ can lead to scientific breakthroughs

→ **beneficial** to society & for the advancement / progress of science

VS

Replicability

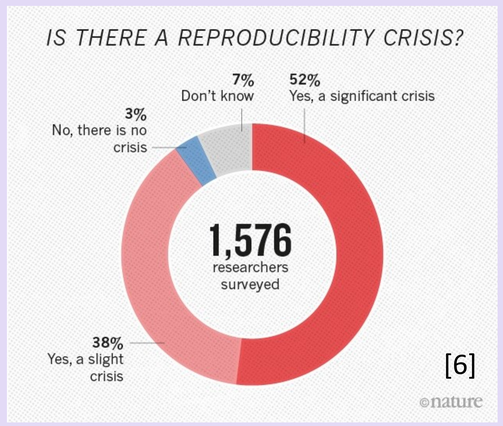
Researchers are **not incentivized** to do replication studies since these are valued less / harder to publish / bring less credit.

The priority rule + incentive system create harmful competition, discourage scientific rigor and continuous testing through replication and reproduction studies.

→ can result in shoddy science

→ **detrimental** to society & for the advancement / progress of science

Reproducibility crisis



= methodological crisis; worry that the published results of many studies are flawed since plenty of them have not been verified by replication or reproduction (e. g., psychology [4], medicine [5], other fields [6])

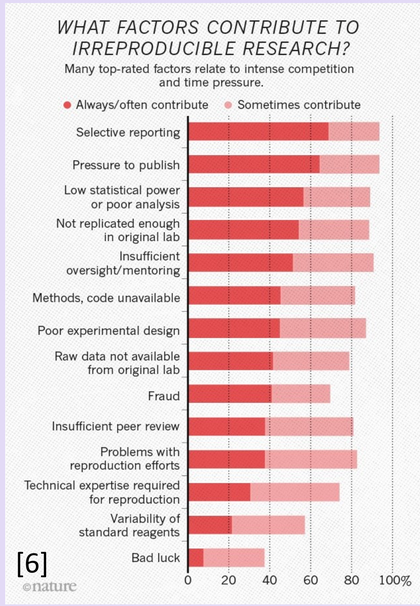
RECEIVED MODEL

In a research environment: competition for prestige and resources among researchers; to gain prestige, one needs to frequently publish own work

→ **pressure to publish** ("publish or perish" culture) → "quick and dirty" research → unreplicable results

FLAWS OF THE MODEL

- there are other means of gaining prestige
- there are other mechanisms of scientific error correction
- the model overstresses quantity over quality of publications
- failure to explain why questionable research practices do not seem to be prevalent



- the crisis indicates the existence of non-credible research
- the lack of replication studies compromises the ability of science to self-correct [7]
- trusted discoveries are the base of scientific advancement
- erroneous / unreplicable findings are being used as a base of other research = systematic problem

SOCIAL EPISTEMOLOGY

Trustworthiness

Does the reproducibility crisis undermine the trustworthiness of science?

My thesis:

Scientists are social beings organized in social institutions and governed by social norms within their scientific environment.

→ system of trust, enhanced by reward / punishment mechanisms

→ various mechanisms of error correction (e. g., peer review)

→ long process from publication to theory

→ publications as a form of communication among researchers

→ important / extraordinary claims will be tested

CULTURAL EVOLUTION

Advancement

Does the reproducibility crisis undermine the advancement of science?

My thesis:

Science is a case of cumulative cultural evolution.

→ cultural ratchet; irreversible process

→ errors are an integral part of science

→ reproducibility crisis, retractions, etc. = indicators that science functions properly

→ science as exploration - dead ends and setbacks are to be expected = learning opportunity

Reproducibility crisis is not a threat to epistemological part of science. However, it is partially an ethical problem (e. g., fraudulent behaviors).

Future work

The role of cooperation in the reproducibility crisis

The necessity of collaboration + high rate of team production in contemporary science seem to marginalize competitive drive.

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KEYWORDS

the priority rule
replicability
scientific novelty
reproducibility crisis
competition
cooperation
social epistemology
cultural evolution
advancement of science
trustworthiness of science
scientific error