



K O N I N K L I J K E N E D E R L A N D S E
A K A D E M I E V A N W E T E N S C H A P P E N

SESSION

IMPROVING REPRODUCIBILITY

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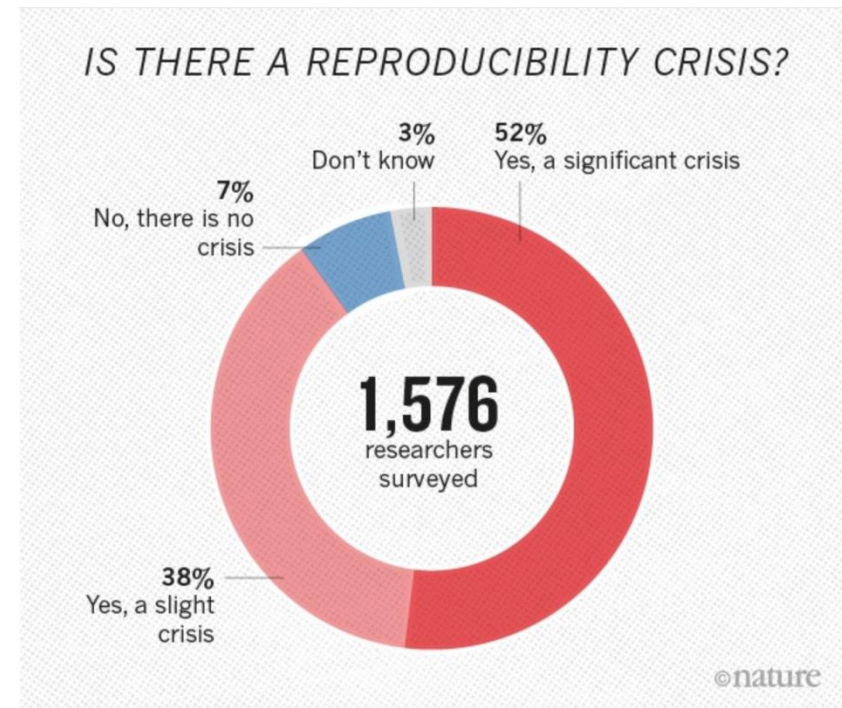
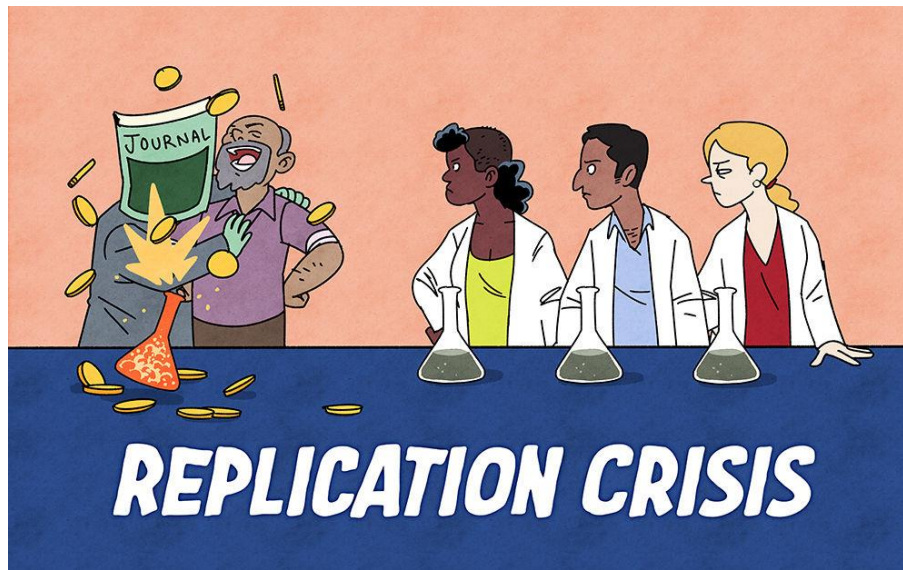
Scientific progress requires that results are reproducible

- No data across science ...
- Open Science Collaboration (psychology): 36%
- Bayer HealthCare: 25%
- Amgen: 11%
- High quality randomized clinical trials: 85%





The scientific community is concerned about the current degree of non-reproducibility of important research findings





Approaches to improving reproducibility: prevention

- **Improve study methods**
 - Researchers should strengthen quality control mechanisms through automation, guidelines, checklists, validation studies and internal replications.
 - Institutions should improve researchers' skills in rigorous study design, analysis and interpretation of results.
 - Institutions should provide independent methodological support and oversight on studies.
- **Improving study reporting**
 - Institutions and funders should require pre-registration of hypothesis-testing studies.
 - Journals should issue detailed guidelines and checklist for how to report study methods.
 - Institutions and journals should require storage of study data and methods in a repository.
- **Improve the organization and culture of research**
 - Journals should publish more studies with 'negative' results.
 - Funders should provide more long-term funding for researchers.
 - Institutions should reward researchers' peer review activities and efforts to improve rigorous study execution.



Approaches to improving reproducibility: replication

- A certain degree of non-reproducibility cannot be prevented
- Replication studies will therefore are thus necessary to:
 - assess to what extent results of an individual study can be reproduced
 - gain insight into and improve the functioning of science



Why, when and how to conduct replication studies?

- KNAW has installed a committee 'Replication studies' to advise on replication studies:
 - What replication studies are
 - Need for replication studies
 - Conditions for replication studies
 - Recommendations
- Report: October 2017