

ERROR CORRECTION

AS PART OF RESEARCH INTEGRITY PRACTICE:

INSIGHTS FROM A SURVEY

AMONG CHEMICAL RESEARCHERS

ENRIO 2023 CONGRESS ON RESEARCH INTEGRITY PRACTICE
7-8 SEP 2023, PARIS



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CONTEXT: WHAT IS CORRECTION?

- Correction is a good practice and a process of improvement

- > at school, a pedagogical approach
- > in sport, with video assistance
- > in software development, with updates to fix bugs
- > in financial markets, with change in prices
- > ...

- Correction is a valued positive behaviour

Correction draws on many virtues



Note: correction/correctional can be associated with punishment when used in relation to individuals (e.g., house of correction, correctional officer...).

CONTEXT: WHAT IS CORRECTION OF SCIENCE?

- **Correction of scientific record**

 - > erratum, corrigendum, addition, retraction

 - > **"disruptive intervention" (Dougherty, 2019)**

 - > visible process, sometimes long, not fully trustable (Bordignon, 2023)

- **Subtle processes**

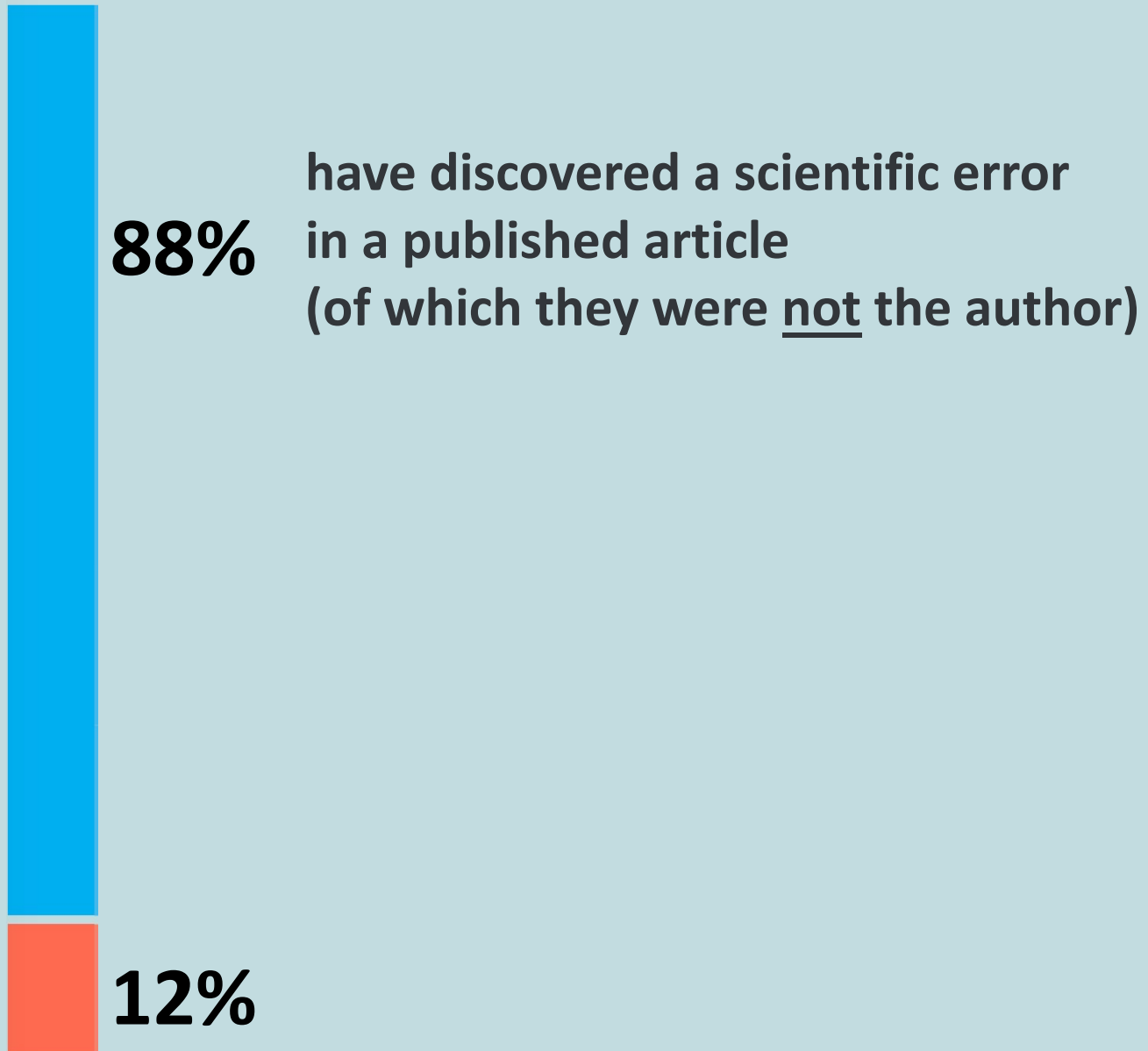
 - > incremental, less visible

What does that mean in terms of good practices?

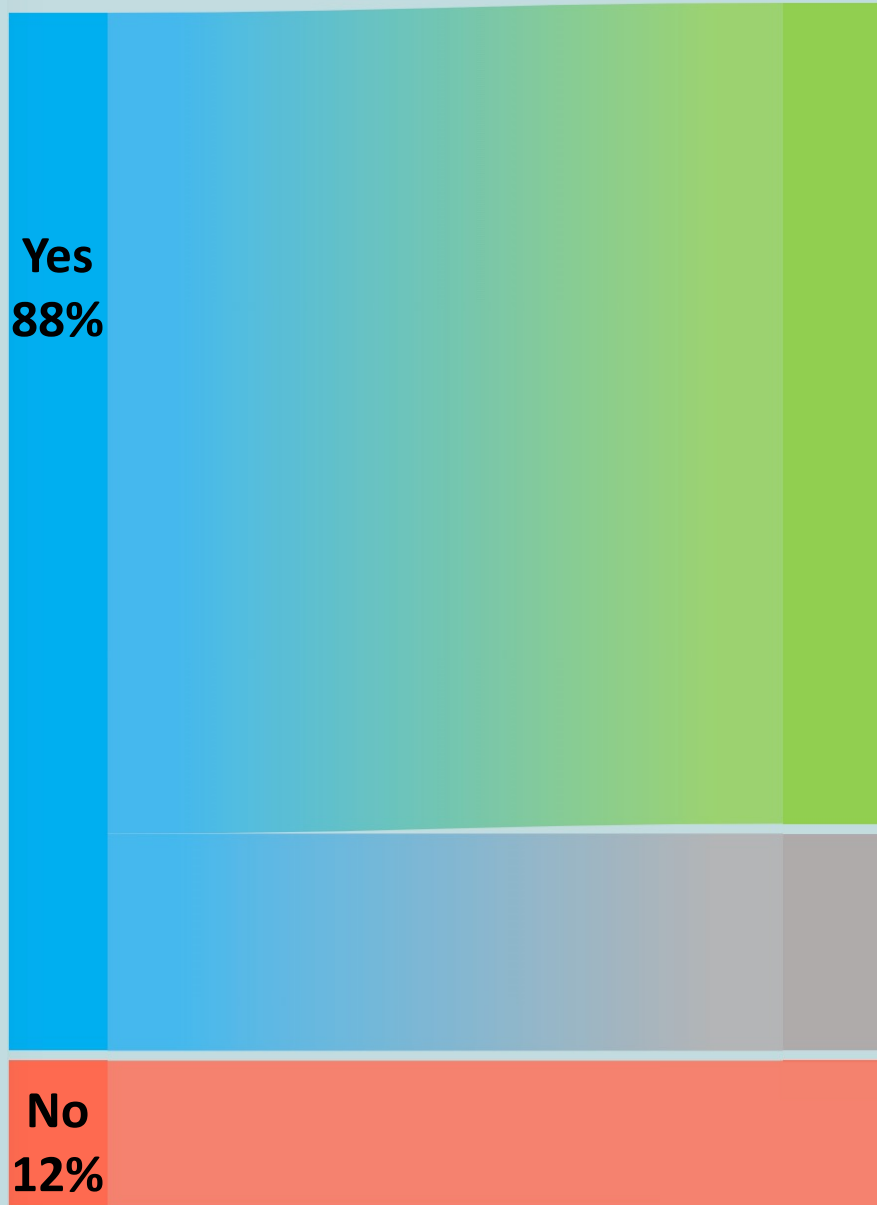
What are the best behaviours to foster to ensure correction of science?

A SURVEY OF CHEMISTS

- Chemists (i.e., those having published at least 2 publications in the last 3 years in one of the journals of the **American Chemical Society** and/or the **Royal Society of Chemistry**, retrieved online by an export from the Scopus database):
 - 50 011 mail addresses, 3 reminders
 - **977 answers** (i.e. having completed at least 67% of the survey)
 - 9 questions max, 75% answered in less than 6 minutes
 - **40% left at least one comment** (free text field)
- Limitations: sample bias, cultural differences, chemistry only
- Anonymous survey, no need for GDPR compliancy except for the collection of mail addresses
- Survey assessed by Univ Grenoble-Alpes & Maastricht Univ, survey registered at Univ Grenoble-Alpes, Qualtrics provided by Maastricht Univ, questions proofread by NanoBubbles' ethics rapporteur (YJ Erden)



Found an error
(not author)

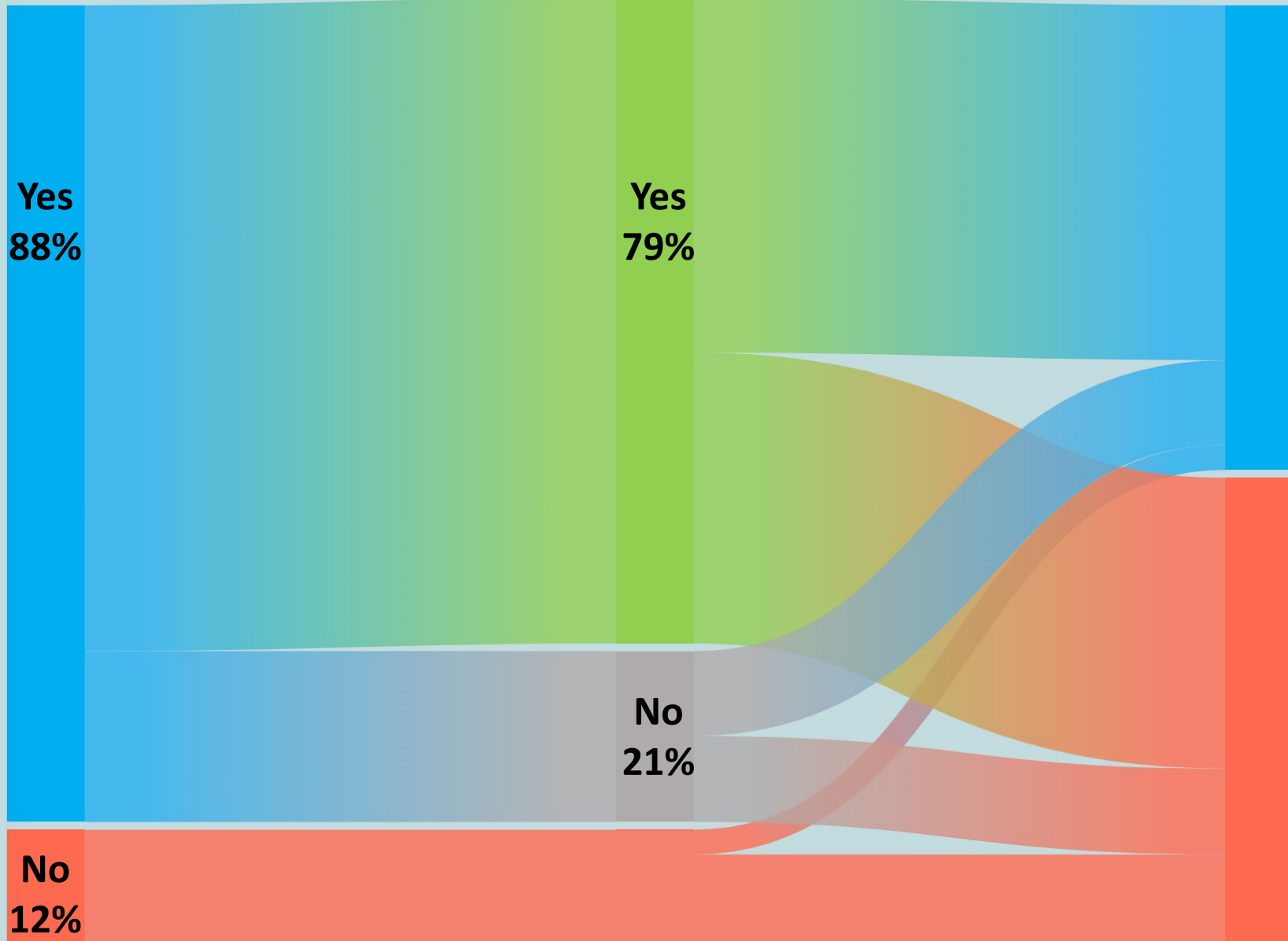


79% took action

21% did nothing

○ Found an error
(not author)

○ Took action
(not author)



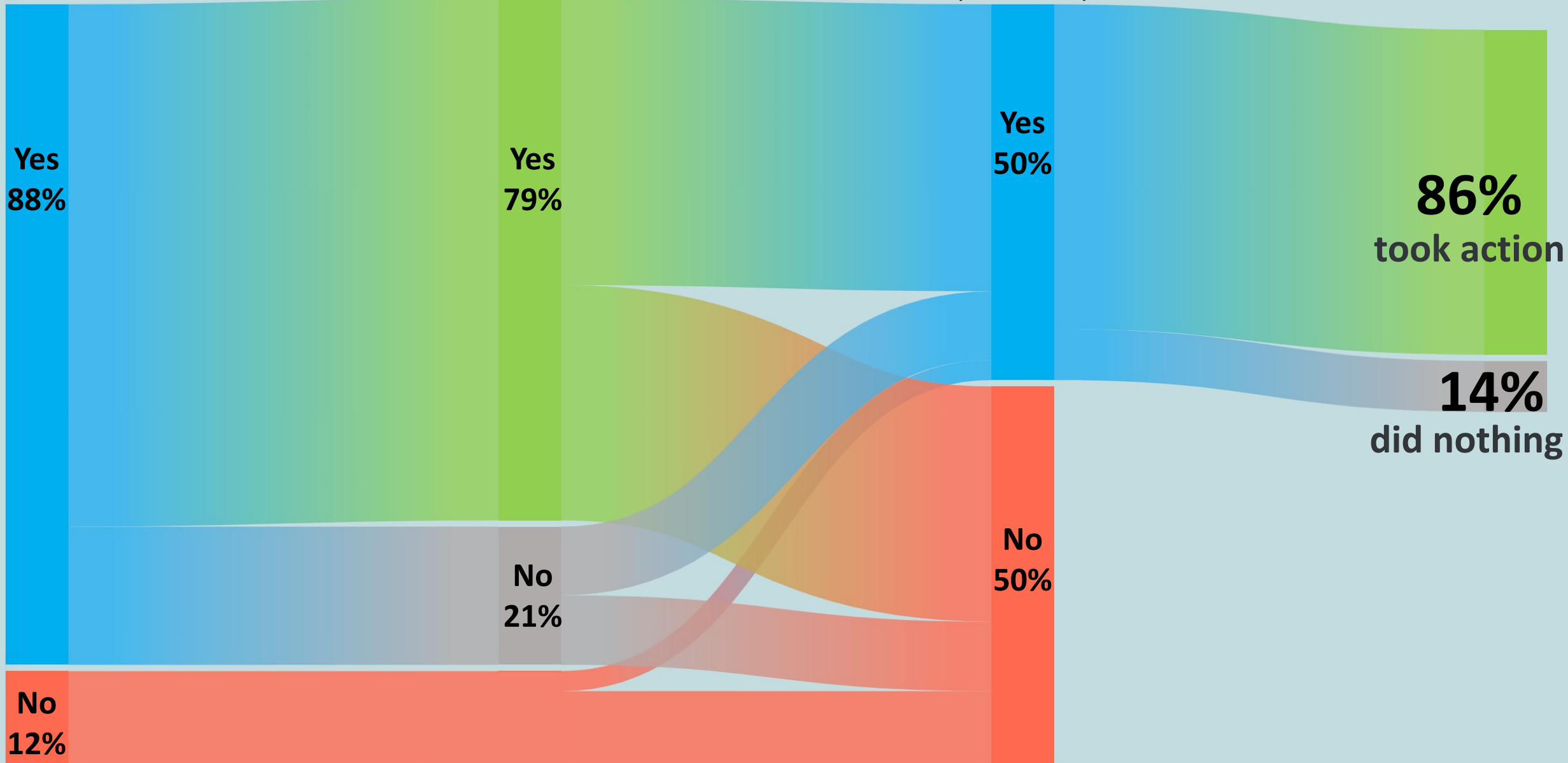
50% have discovered a scientific error in a paper they (co-)authored

50% have never discovered a scientific error in a paper they (co-)authored

⊙⊙
Found an error
(not author)

⊙⊙
Took action
(not author)

⊙
Found an error
(as author)

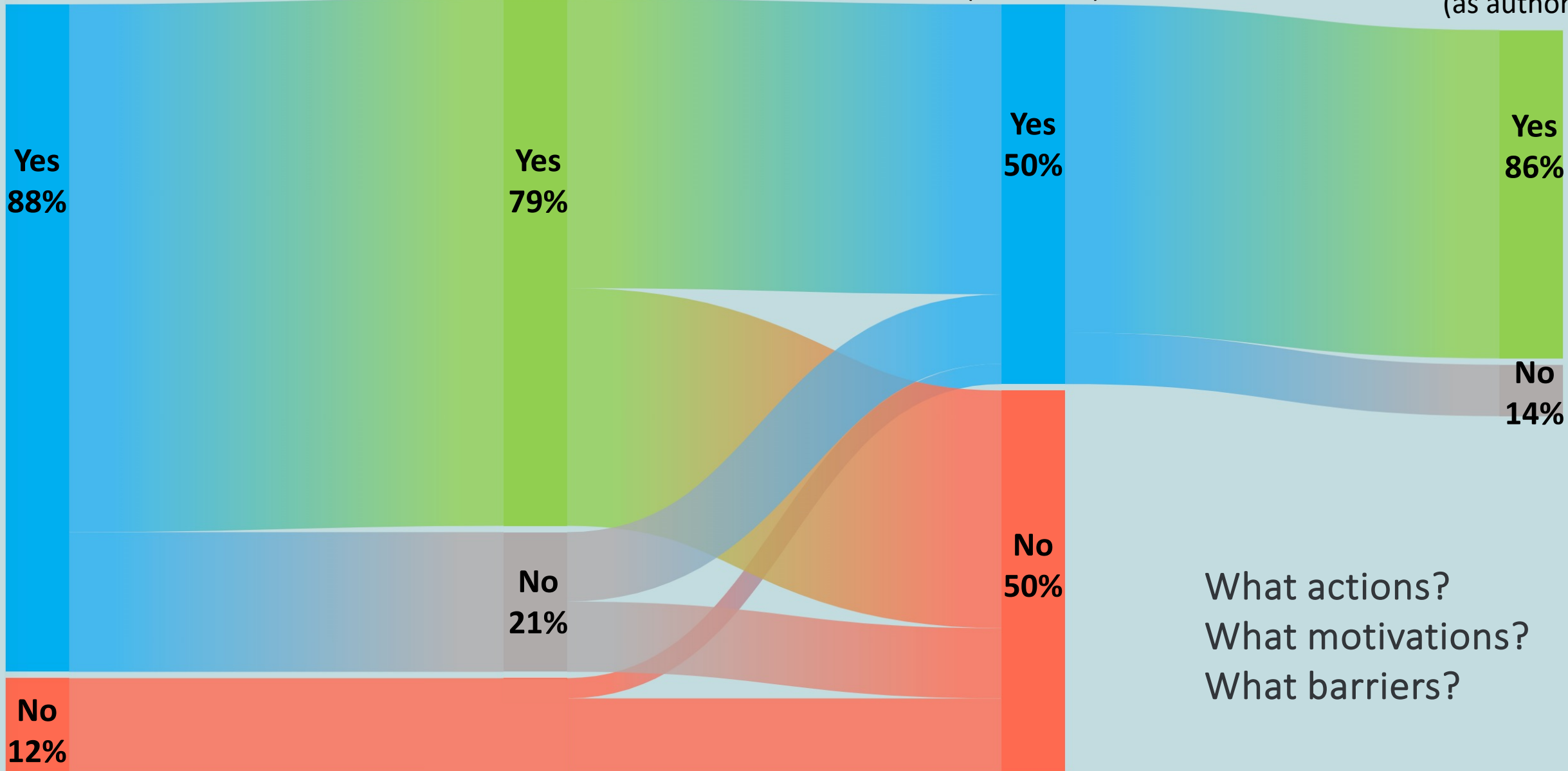


⊙⊙
Found an error
(not author)

⊙⊙
Took action
(not author)

⊙
Found an error
(as author)

⊙
Took action
(as author)



A WIDE RANGE OF ACTIONS

- Actions on the scientific record

- with publication of editorial notices (44% ϕ)
- but also with critical citations (33% ∞ vs 32% ϕ)
- not frequent but considered as correction of science: PubPeer comments (2%), Letter/Comment/Note (13%), replication projects (4%), formal refutation (4%)

- Private discussions between peers

- mainly when the error is in someone else's paper (42% ∞ vs 18% ϕ)
- but only 55% agree that this corrects science

- Discussions with students

- pedagogical opportunity
- instructive experience

MOTIVATIONS FOR TAKING ACTION

- **To err is human**

- "As a matter of principle, if there is an error, it should be corrected" (56% ∞ vs 82% ϕ)
- to limit the propagation of the error, for the good of the community

- **Concerns about the scientific consequences**

- to what extent it changes the conclusions of the paper ("*it depends*") (31% ∞ vs 12% ϕ)
- the failure to replicate (24% ∞)
- the propagation of the error is detrimental to one's own work (22% ∞ vs 14% ϕ)

BARRIERS TO CORRECTION

- **No scientific consequences**

→ the correction of the issue does not change the conclusions of the paper (47%○○ vs 82%Ⓟ)

- **Time**

→ lack of time

→ it takes too long (and there are too many errors...)

- **Editors**

→ during the peer-review process: comments ignored, poor review(er)s

→ after publication: editors reluctant to take actions

- **Social relationships**

→ hierarchy between peers ("big names, top scientists, too big to fall, powerful and connected individuals, PIs, senior positions" ...)

→ the fear to offend colleagues

→ ECR and role of the supervisors

→ "friendly" reviewers

- *Of course errors should be corrected (no resistance), but "it depends" on the type of errors ("minor, major, obvious...") and should be easy/quick*
- **No call for sanctions**
 - as long as errors are honest
 - making errors is part of the research process
 - but no incentive, even obstacles to correct
- **The Editor as the source of all evils**
 - many errors are spotted during peer-review
 - but reviewers' comments are often ignored
- A wide variety of actions are possible, but those **affecting the scientific record** are most often seen as better practices for correcting science.

HOW TO TURN GOOD INTENTIONS INTO PRACTICES?

- **Promote correction initiatives and present them as research integrity practices**

- > research integrity training courses
- > codes of conduct
- > in the media
- > research assessment: why not consider corrections as contributions to be listed on (narrative) CVs?



- **Focus on the record**

- > peer-review: why not dedicate a field in the templates for reports to indicate errors and how to correct them?
- > post-publication: raise awareness among researchers who have editorial responsibilities to make correction processes more flexible (show it is expected)

References:

Dougherty, M. V. (2019). Correcting the scholarly record for research integrity. *Monash Bioethics Review*, 37(1–2), 76–78. 10.1007/s40592-019-00093-x

Bordignon, F. (2023). *What does it mean to correct the scientific record? A case study of the JACS (2000-2023)*. STI 2023, Leiden. 10.55835/643e9f61c0a5d2717e40e59c

THANK YOU!

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École des Ponts
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LISIS

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