Scientific Ethics

Modified by Emmanuel and Collin
from presentation of Doug Wallace
Dalhousie University

Outline

- What is scientific ethics
- Examples of common misconduct
- Known rates of misconduct
- Where are you likely to enter dangerous waters?
- Strategies for avoiding the misconduct mire
- Publications for more information
- Results and discussion from the ethics survey

Scientific Ethics

The application of fundamental ethical/ moral principles to the conduct of scientific research.

Ask these questions:

- What is wrong (unethical)?
- What is right (ethical)?
- Does intention matter?

Distinguish:

- Major misconduct (fraud, abuse, dangerous conduct)
- Minor misconduct (questionable practice)

Common Scientific Misconduct

- Misconduct occurs along a spectrum and thus the line between major and minor is very grey
- The spectrum of misconduct means that it is likely not too uncommon
- “Questionable” actions are difficult to judge or avoid
- Reflection, vigilance and self-awareness are essential

Types of Major Misconduct

- Academic Misconduct
  - Cheating
  - Plagiarism
  - CV fabrication
  - Taking credit for ideas from others;
  - “Borrowing” ideas (v. difficult to define / prove)
  - Rejecting proposals or papers of competitors

Types of Major Misconduct

- Scholarly Misconduct
  - Plagiarism (copying others without acknowledgement)
  - Self-plagiarism (publishing the same work multiple times)
  - Ghost-writing (writing for others)
  - Poor citation of relevant work by others
  - Suppression of others' work
  - Exaggeration of significance or quality of work

Types of Major Misconduct

- Research Misconduct
  - Dangerous/ damaging research practices
  - Poor scientific method
  - Ignoring some data without justification
  - Altering data *slightly*
  - Fabrication of data or results
  - Not reporting poor results (different from non-result)

Types of Major Misconduct

- Financial Misconduct
  - Inappropriate use of research dollars (e.g., personal travel, double dipping)
  - Using funds from one project to fund unrelated work
  - Obtaining funds for same research from undisclosed multiple sources
- Others?

How often does misconduct occur?

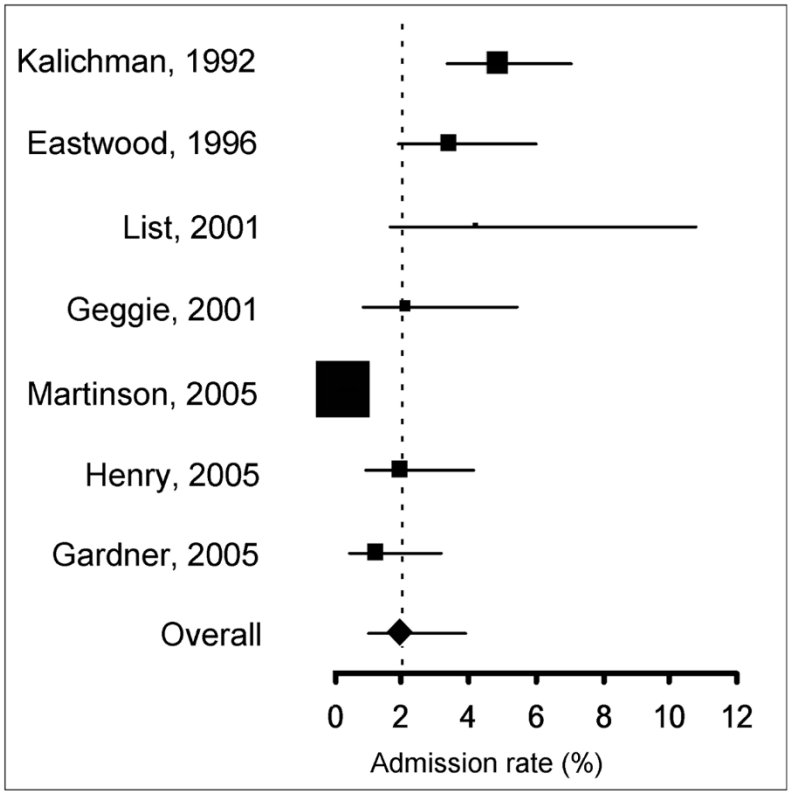
Table 1 | Percentage of scientists who say that they engaged in the behaviour listed within the previous three years ($n = 3,247$)

Top ten behaviours	All	Mid-career	Early-career
1. Falsifying or 'cooking' research data	0.3	0.2	0.5
2. Ignoring major aspects of human-subject requirements	0.3	0.3	0.4
3. Not properly disclosing involvement in firms whose products are based on one's own research	0.3	0.4	0.3
4. Relationships with students, research subjects or clients that may be interpreted as questionable	1.4	1.3	1.4
5. Using another's ideas without obtaining permission or giving due credit	1.4	1.7	1.0
6. Unauthorized use of confidential information in connection with one's own research	1.7	2.4	0.8 ***
7. Failing to present data that contradict one's own previous research	6.0	6.5	5.3
8. Circumventing certain minor aspects of human-subject requirements	7.6	9.0	6.0 **
9. Overlooking others' use of flawed data or questionable interpretation of data	12.5	12.2	12.8
10. Changing the design, methodology or results of a study in response to pressure from a funding source	15.5	20.6	9.5 ***
Other behaviours			
11. Publishing the same data or results in two or more publications	4.7	5.9	3.4 **
12. Inappropriately assigning authorship credit	10.0	12.3	7.4 ***
13. Withholding details of methodology or results in papers or proposals	10.8	12.4	8.9 **
14. Using inadequate or inappropriate research designs	13.5	14.6	12.2
15. Dropping observations or data points from analyses based on a gut feeling that they were inaccurate	15.3	14.3	16.5
16. Inadequate record keeping related to research projects	27.5	27.7	27.3

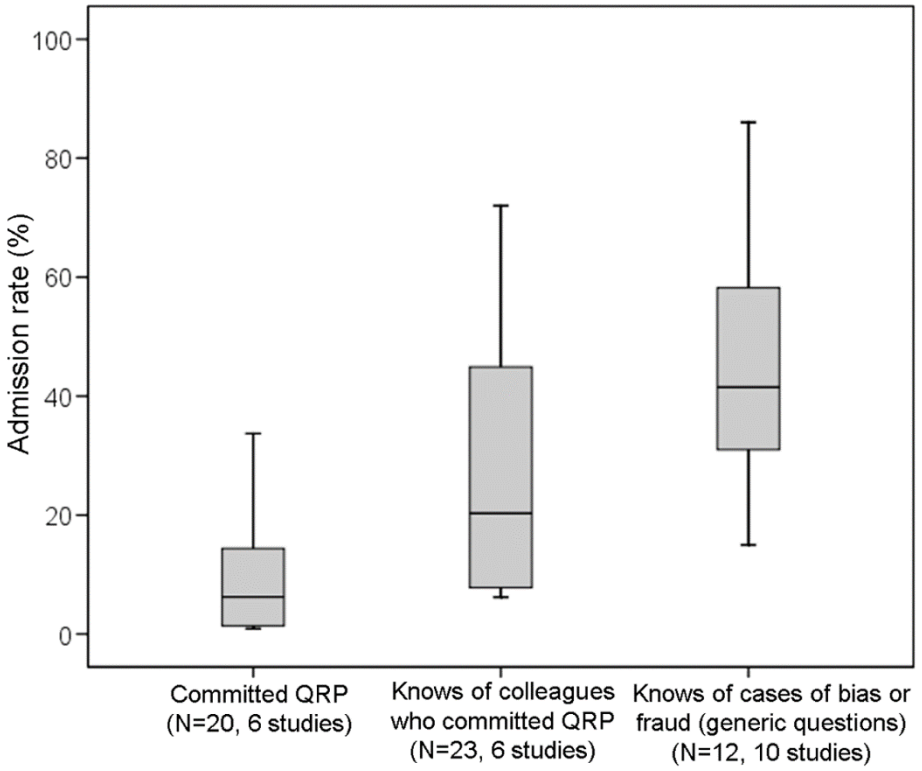
Note: significance of χ^2 tests of differences between mid- and early-career scientists are noted by ** ($P < 0.01$) and *** ($P < 0.001$).

From Martinson et al., "Scientists behaving badly", Nature, 2005

Questionable Research Practices



Self-admission to fabrication, falsification, modification of data to improve outcome (Non-self reports: 14%)



Knowledge of Questionable Research Practices

Fanelli, How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data, PLOS one, 2009

Common sources of and strategies to avoid Misconduct

- Data
  - Outliers
    - Show all data
    - Justify non-use
    - Maintain transparency
  - Statistical fits
  - Certify “good” results with same rigor as “poor” results
  - Report what doesn’t work
  - Acknowledgement for using others’ data (data bases, online sources, publications)

Common sources of and strategies to avoid Misconduct

- Record Keeping
  - Maintaining the integrity of your data
  - Maintaining the integrity of your ideas
  - Maintaining the integrity of other's ideas
    - Remember where you heard it
    - Document where you heard it

Common sources of and strategies to avoid Misconduct

- Conflict of interest
  - What to review
  - What not to review
  - Acknowledge any semblance of conflict
  - Acknowledge agenda or motivation for participation
  - Transparency

Common sources of and strategies to avoid Misconduct

- Power Structure
  - Use of power position to determine outcomes
    - Advisor forces addition of co-author
    - Advisor uses financial support to control student
    - Senior colleague usurps project
    - Senior colleague diminishes contribution
  - Acknowledge personal relationships
    - Between scientists and funding agencies
    - Within departments
    - Within lab groups

Common sources of and strategies to avoid Misconduct

- Authorship “Rules”
  - first authorship
  - co-authorship
  - authorship order
  - Acknowledgments
  - Err on the side of generosity (in both offering and accepting co-authorship)

Authorship Rules according to L&O:
The specific contribution for each author should be indicated in the cover letter that accompanies the submission. Every person listed as an author should have:

- contributed substantially to the study's conception, data acquisition, or analysis;
- contributed substantially to drafting the manuscript; and
- approved the final submitted manuscript.

Authorship Rules according to Commission on Professional Self Regulation in Science (http://www.dfg.de)

The so-called *honorary* authorship is not justified and should appear in footnotes or acknowledgements. This includes:

- Obtained research funds
- Contributed to important but not vital material
- Trained author in methods used in publication
- Involved in collection and/or assembly of data
- Directing institute or working unit where publication originates

Some Reasons for Misconduct

- Ignorance
- Dishonesty
- Mental illness
- Ambition
- Pressure / stress
- Competition
- Unreasonable management
- Poor reward structures
- Unreasonable regulation

Honesty, Accountability and Trust: Fostering Research Integrity in Canada

DEFINING RESEARCH INTEGRITY

The Panel defined *research integrity* as the coherent and consistent application of values and principles essential to encouraging and achieving excellence in the search for, and dissemination of, knowledge. These values include **honesty**, **fairness**, **trust**, **accountability**, and **openness**.

Honesty	Being straightforward, and free of fraud and deception
Fairness	Being impartial and using sound judgment free of prejudice or favouritism
Trust	Being reliable, as a person or institution, through character and action
Accountability	Being responsible and answerable for one's actions
Openness	Being transparent in process and practice, as characterized by visibility or accessibility of information

Expert Panel on Research Integrity, 2010

A Universal Ethical Code for Scientists? (from the UK)

Rigour

Rigour, honesty and integrity

- Act with skill and care in all scientific work. Maintain up to date skills and assist their development in others.
- Take steps to prevent corrupt practices and professional misconduct. Declare conflicts of interest.
- Be alert to the ways in which research derives from and affects the work of other people, and respect the rights and reputations of others.

Respect

Respect for life, the law and the public good

- Ensure that your work is lawful and justified.
- Minimise and justify any adverse effect your work may have on people, animals and the natural environment.

Responsibility

Responsible communication: listening and informing

- Seek to discuss the issues that science raises for society. Listen to the aspirations and concerns of others.
- Do not knowingly mislead, or allow others to be misled, about scientific matters. Present and review scientific evidence, theory or interpretation honestly and accurately.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/283157/universal-ethical-code-scientists.pdf

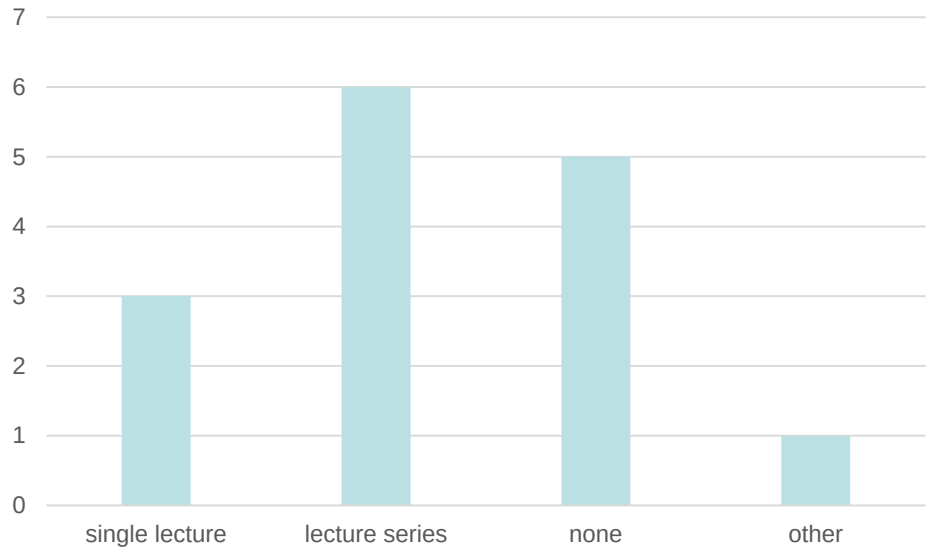
What sort of training or teaching about scientific ethics did you receive at University?

a: a single lecture or seminar;

b: a lecture or seminar series;

c: none;

d: other



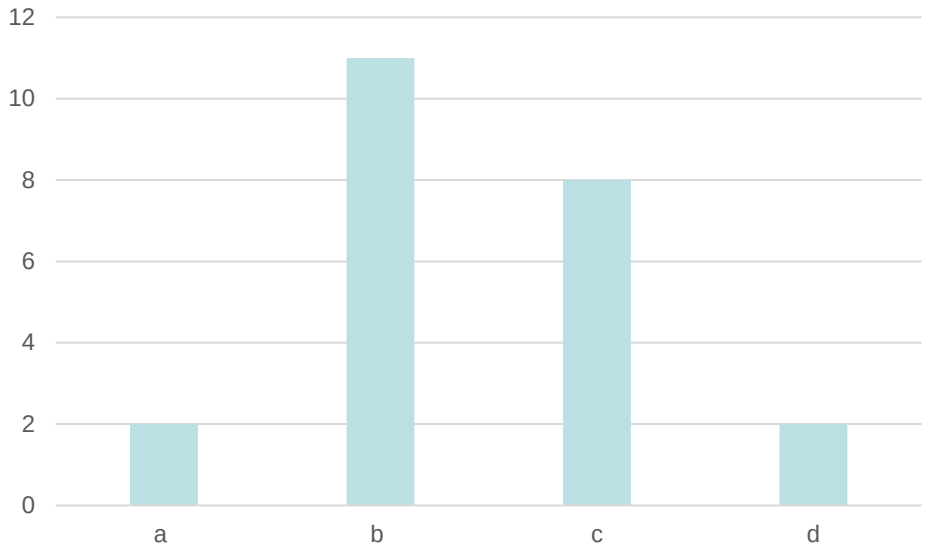
2. You are collecting experimental / observational data. On what basis would you reject (not consider) an observation?

a.: statistical deviation from a mean value or a regression line;

b: statistical deviation and an explanation for why the observation is an outlier;

c: the observed quantity is physically / theoretically impossible;

d: the result is inconsistent with accepted models of the process being studied.

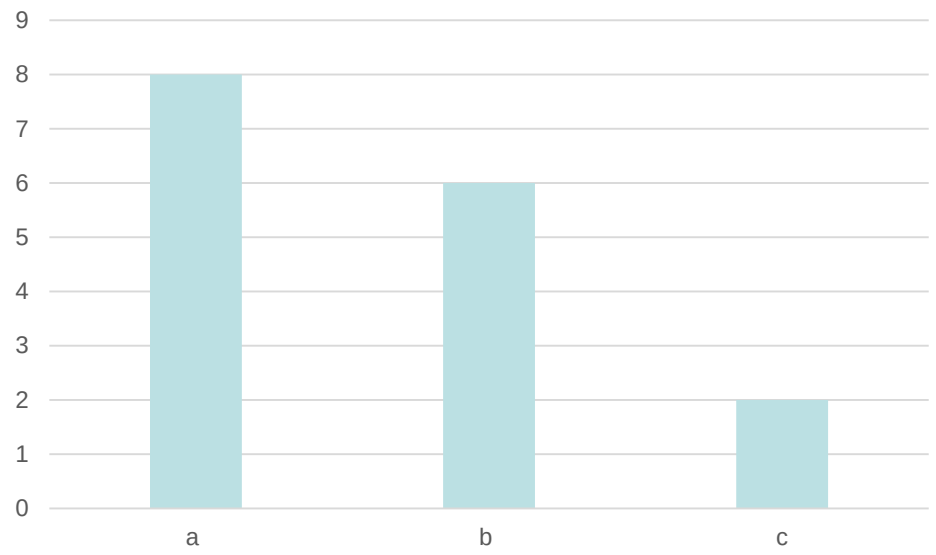


3. Have you experienced a situation where data (or model results) were rejected or manipulated on questionable grounds?

a: Yes;

b: No;

c: Maybe



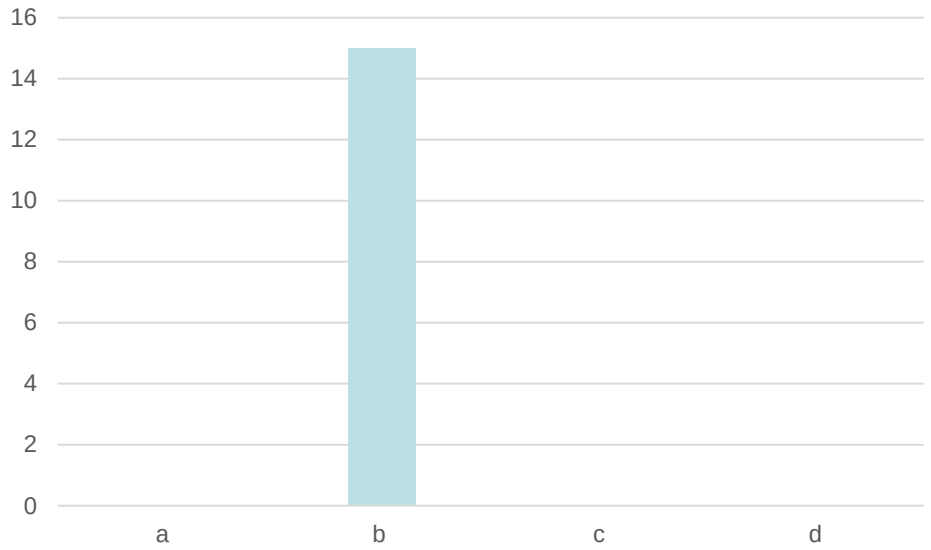
4. You invited a colleague, with whom you have previously worked and exchanged ideas, to be a co-author on a paper you are writing. When the paper is nearly ready for submission you have still received no comments or criticism from your colleague. You suspect that your colleague has not read the paper carefully. What should you do?

a: remove the co-author's name from the paper and submit;

b: request critical reading and comments within a specified time-period;

c: submit and keep the colleague as a co-author, without comments, because you invited him/her to participate and worked together;

d: other (please specify)



5. Which of the following should always, *under all circumstances*, be included as co-author(s) on a paper you are submitting:

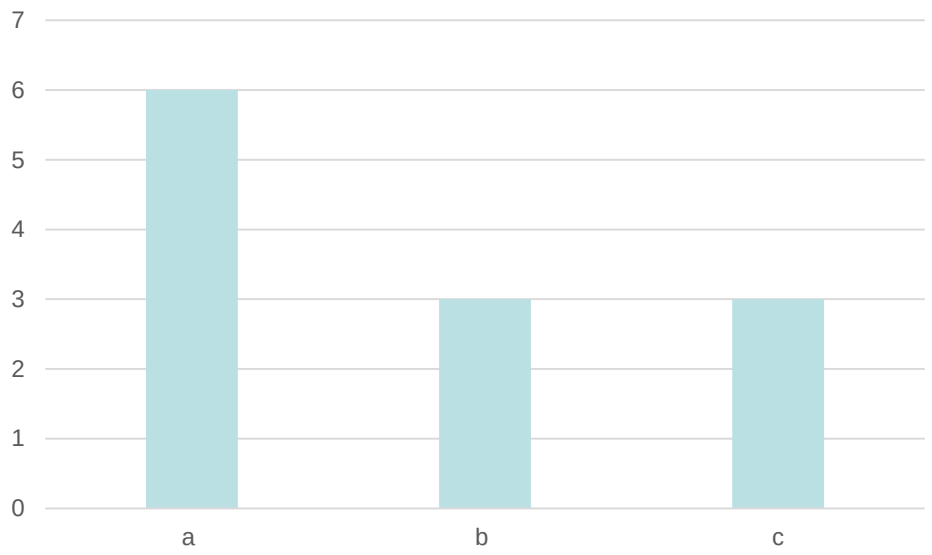
a: your PhD supervisor (if you are a PhD student);

b: the grant holder whose project paid for the research;

c: the technicians who collected supporting data;

d: the Chief Scientist of a cruise/expedition or Head of the laboratory where the research was conducted;

e: none of the above



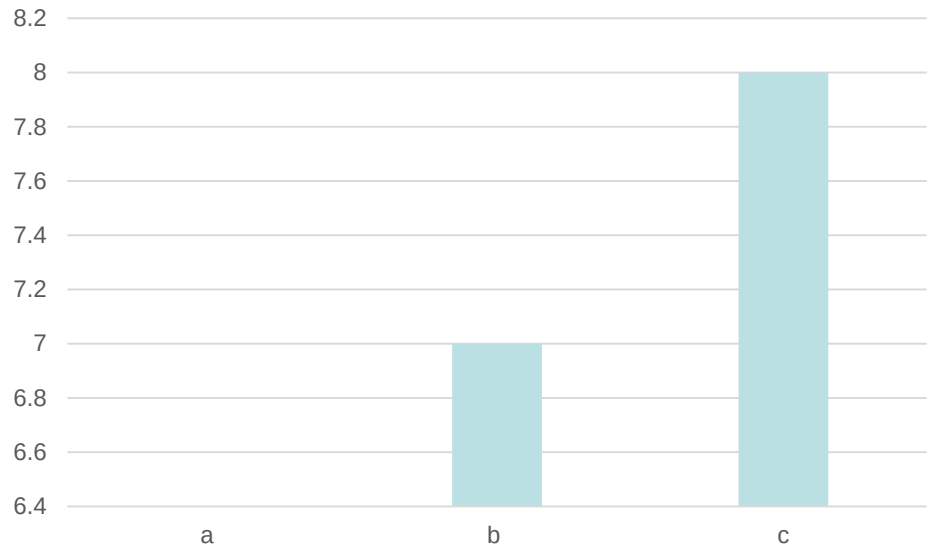
6. You have made a potentially important discovery and your PhD supervisor or boss says that he should be lead author on the paper in order to ensure that it is published quickly in a good journal. What should you do?

a: accept the suggestion because the PhD supervisor / boss has more experience to write a better, more convincing paper;

b: insist that you should be lead author;

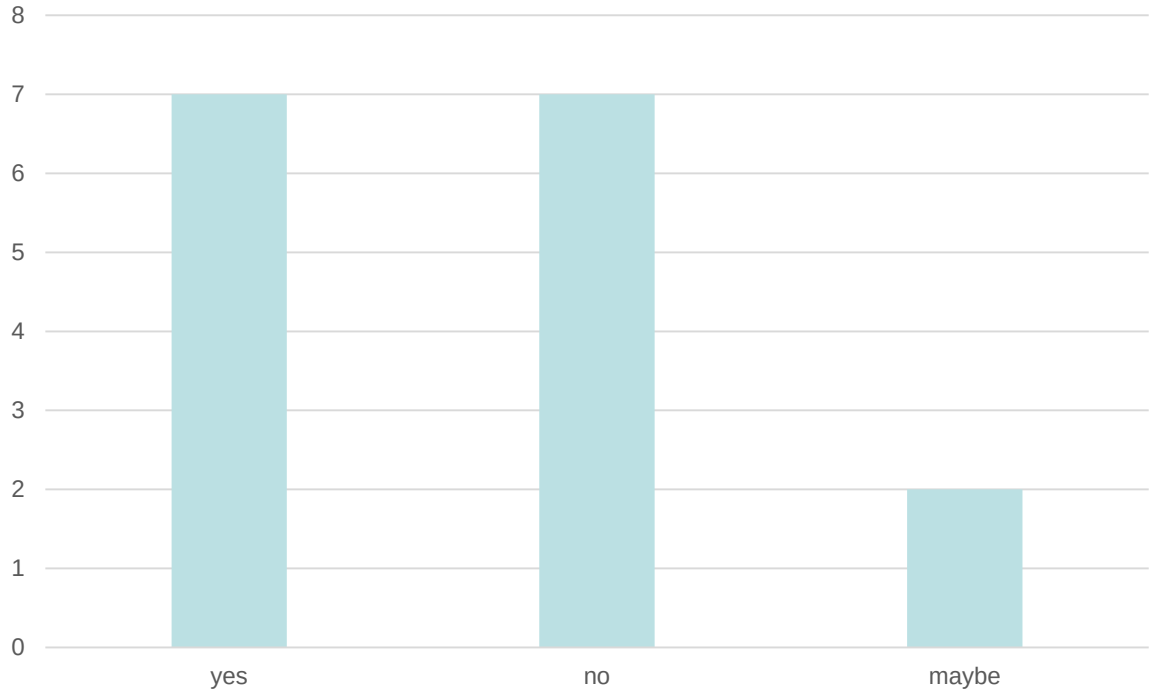
c: request the opportunity to write a 1st draft in an agreed-upon amount of time;

d other (please specify)



7. Have you experienced a situation, or are you aware of a situation, where a paper was submitted with authors' names included, that had not read or commented on the manuscript? Or where the authorship order was inappropriate?

a: Yes;
b: No;
c: Maybe



8. You are asked to review a paper or proposal, the title of which suggests it is on exactly the same topic as you are working on yourself, and on which you are close to publishing. What should you do?

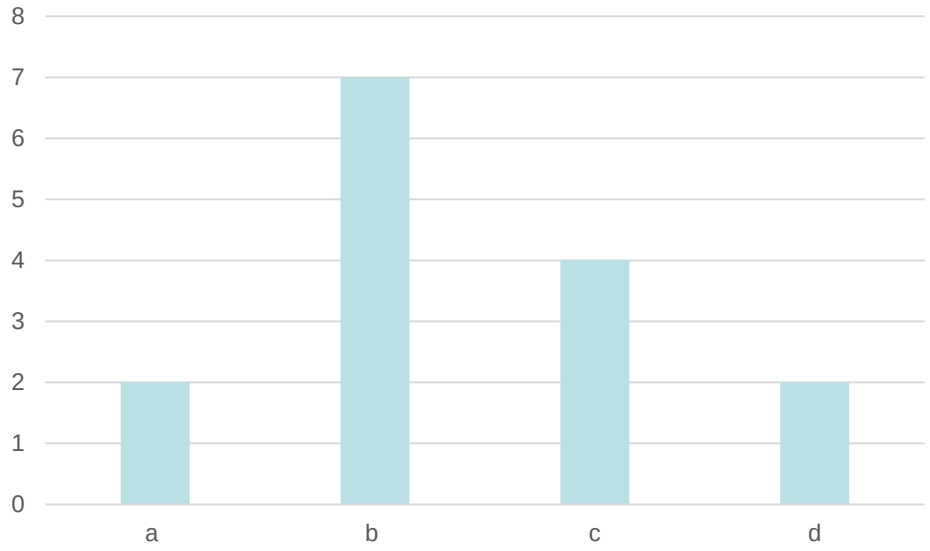
a: Agree to review, because you are well-qualified to judge the quality of the research;

b: read the proposal/ paper in order to decide whether you can give it a fair and objective review;

c: decline to accept the paper / proposal for review and do not read it.;

d: review the paper/proposal and contact the group to suggest a collaboration;

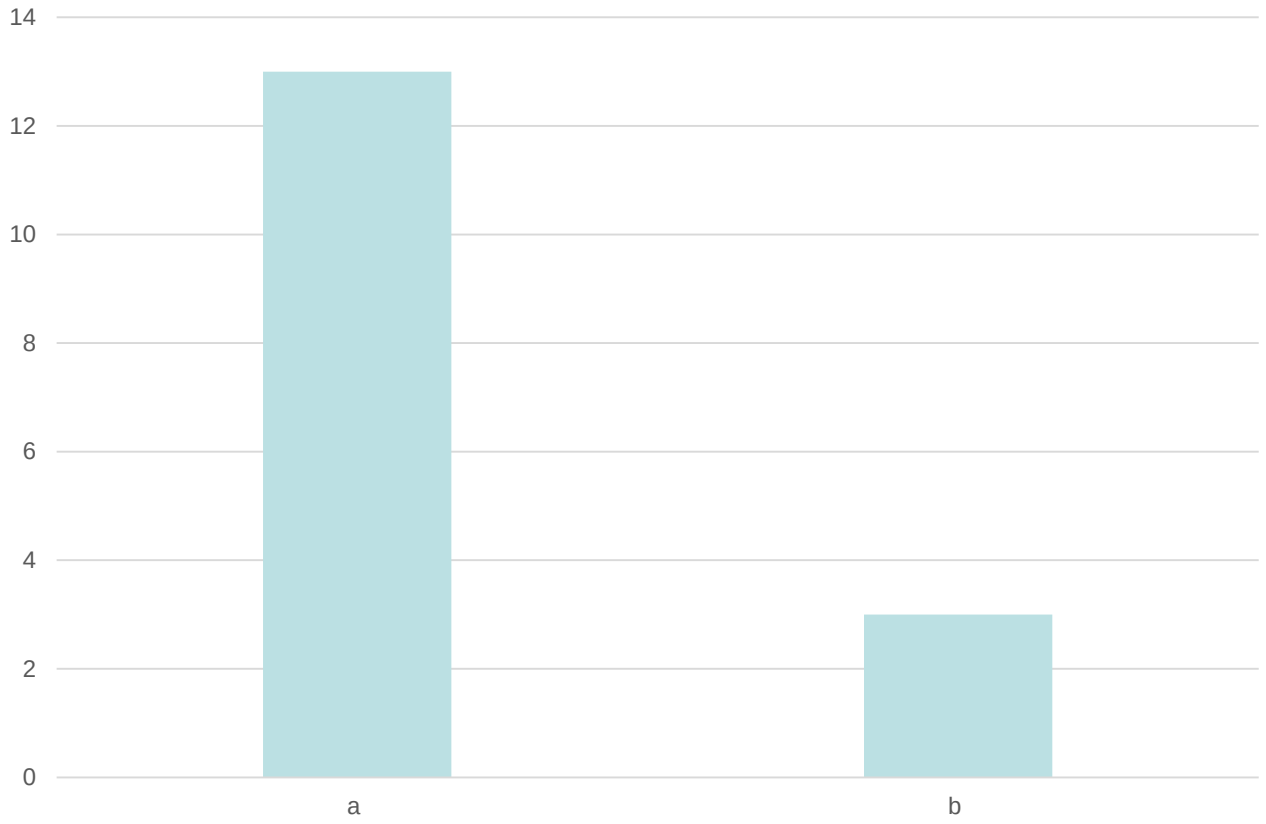
e: other (please specify)



9. You review a paper by a senior, influential colleague. You think the paper is very poor and should be rejected or needs very major revisions / correction. How do you submit your review?

a: anonymously;

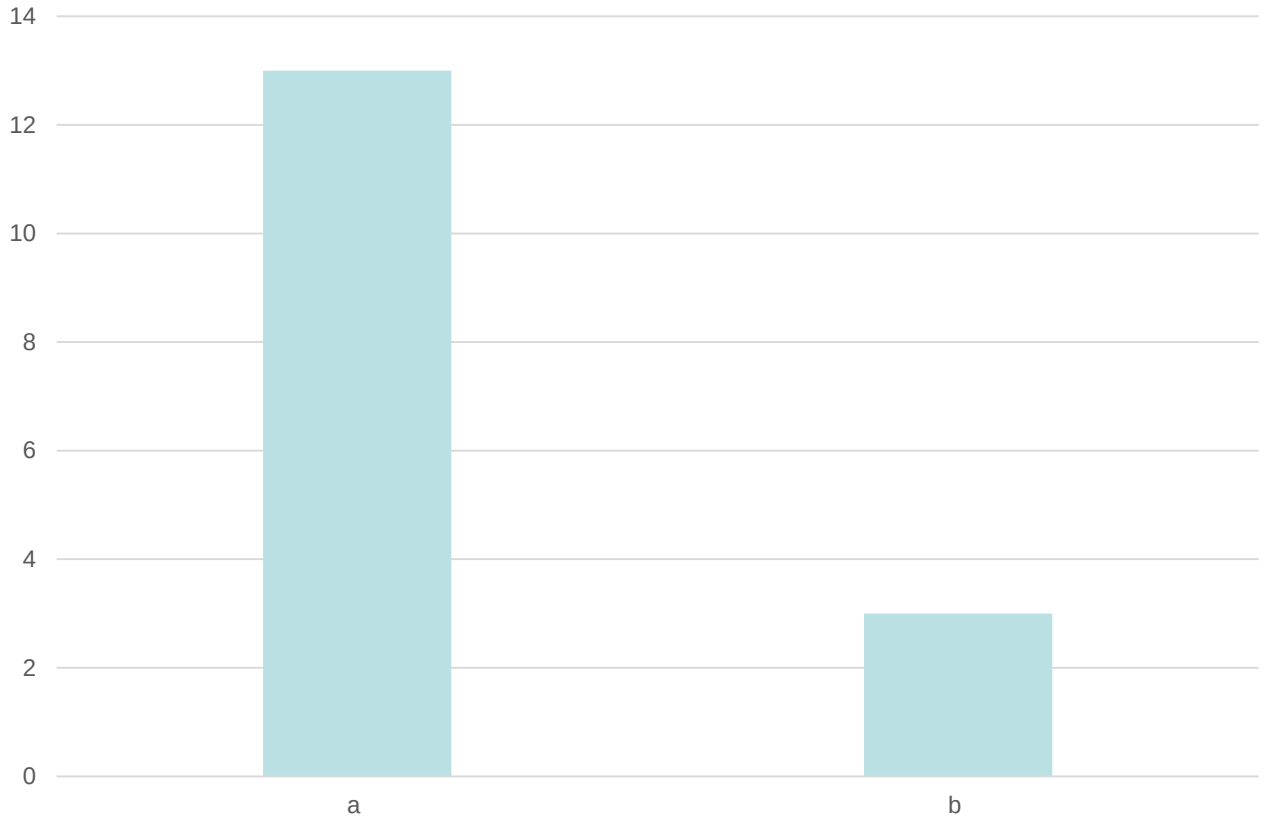
b: with disclosure of your full name?



10. You review a paper by a senior, influential colleague. You think the paper is an excellent piece of work and you even make some useful and constructive suggestions for improvement and clarification. How do you submit your review?

a: anonymously;

b: with disclosure of your full name?



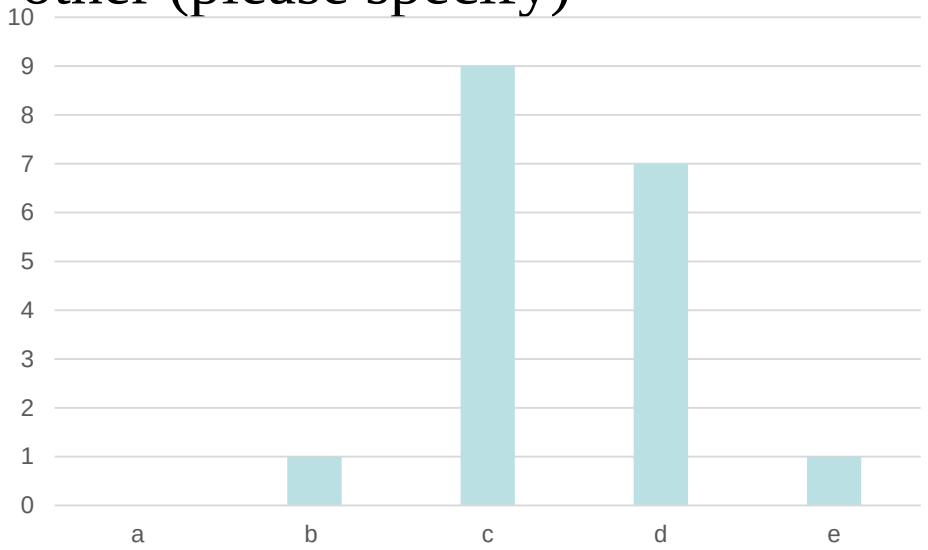
11. You have collected results that contradict earlier published work of your supervisor or of an influential colleague. You believe the earlier work was either flawed, incorrect or misinterpreted. What do you do?

a: cite the earlier work, but without commenting on the possible reasons for the contradictory findings;

b: do not cite the earlier work;

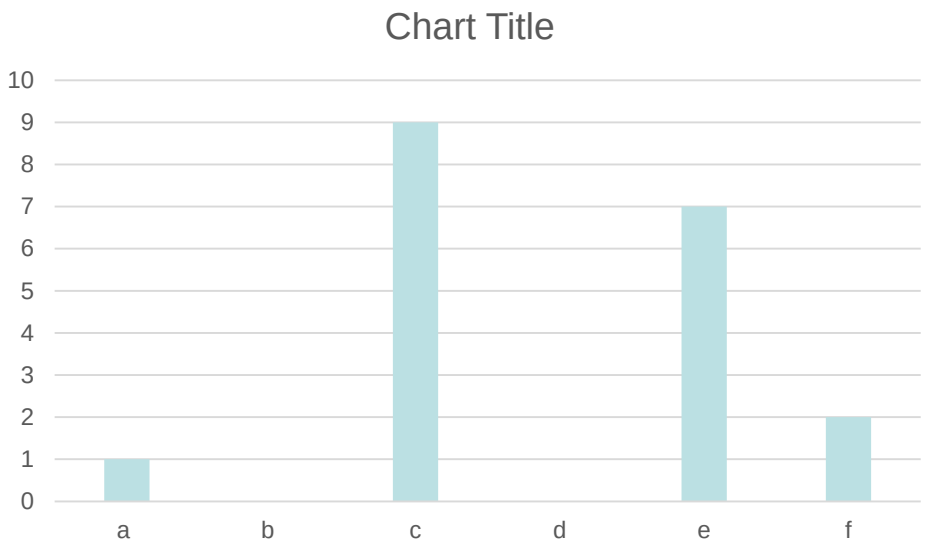
c: present a rationale for why both sets of findings could possibly be consistent with each other;

d: present your criticism of the earlier published work in your manuscript; e: other (please specify)



12. You are working on a jointly-authored paper with another PhD student who you suspect has manipulated his/her data in order to make results more convincing. Do you:

a) withdraw from the manuscript claiming that you are too busy;
b) continue and attempt to write the manuscript so that the questionable data have less influence on the conclusions;
c) confront your suspicions with your co-author and demand an explanation, but do not inform anyone else;
d) inform his/her supervisor and let him/ her deal with it;
e) discuss your suspicions with your co-author and his/her supervisor;
f) other (explain).



13. What, in your opinion, is the most serious form of scientific misconduct?

Data manipulation to suit objectives x 13 (removal of data, addition of fake data).

Lack of disclosure of flaws/deviation from published methodology.

No discussion with co-authors.

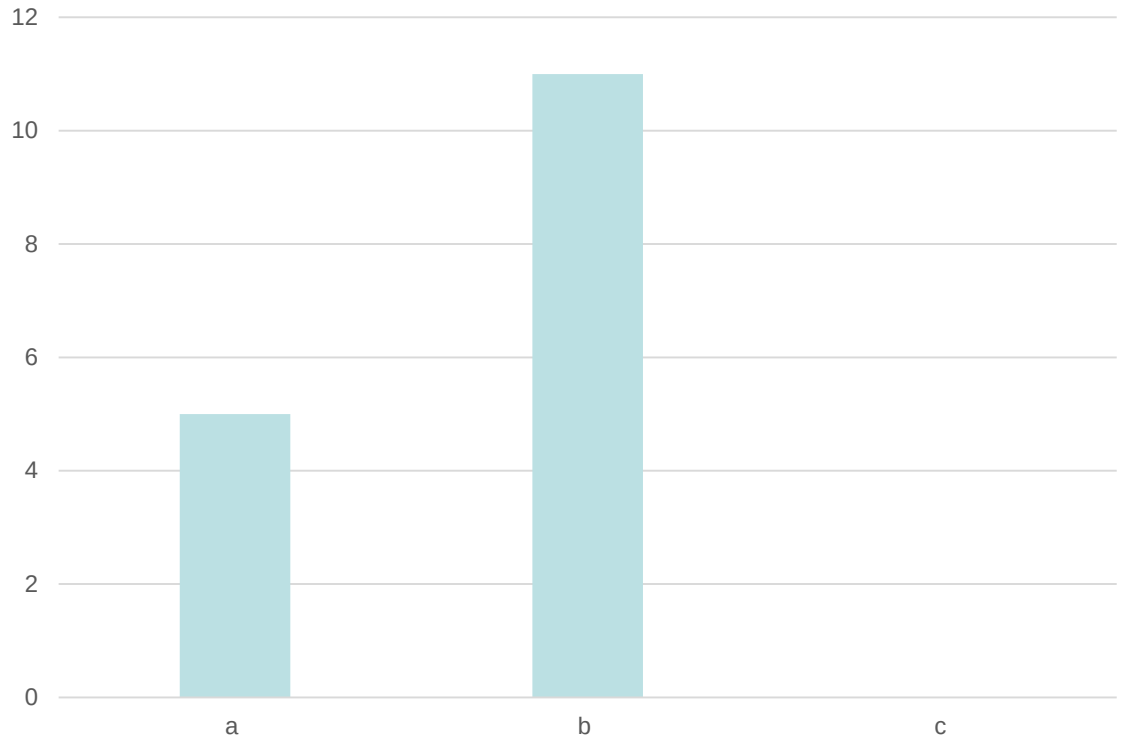
Plagiarism

14. Have you had any direct exposure to, or knowledge of serious misconduct by others?

a: Yes;

b: No;

c: Maybe / suspect



15. What factors (psychological; work conditions; training; etc.) may contribute to an individual engaging in scientific misconduct?

Ambition to produce publishable results x 6 (thinking your peers expect perfect results)
All of the above x 4
Psychological, Stress, imposter syndrome x 3
Tenure x 2

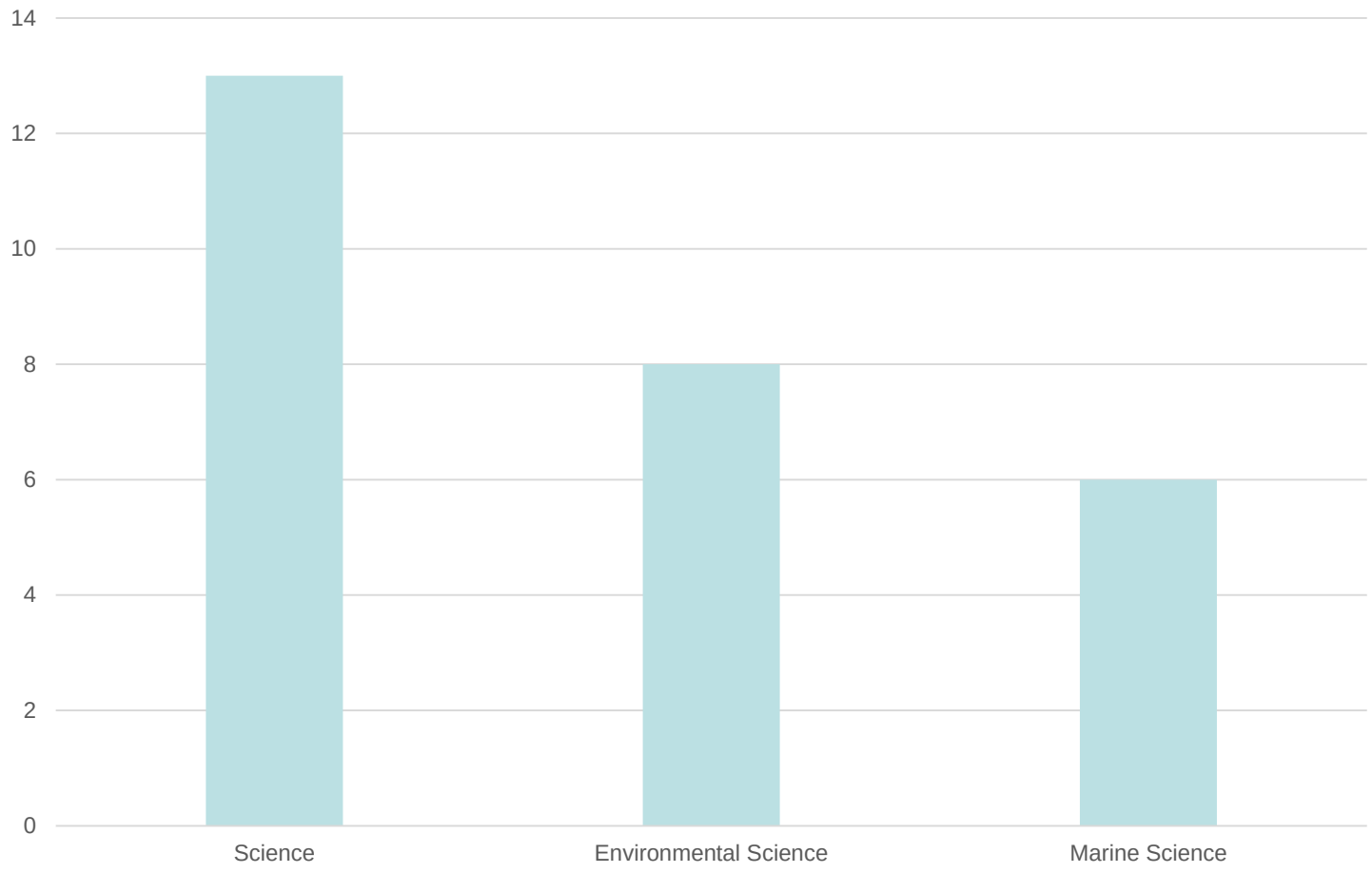
Pressure to do well.
Lack of validation data.
Poor data from expensive grants
Peer pressure
Unawareness
money issues

16: Do you think scientific misconduct is a serious issue in

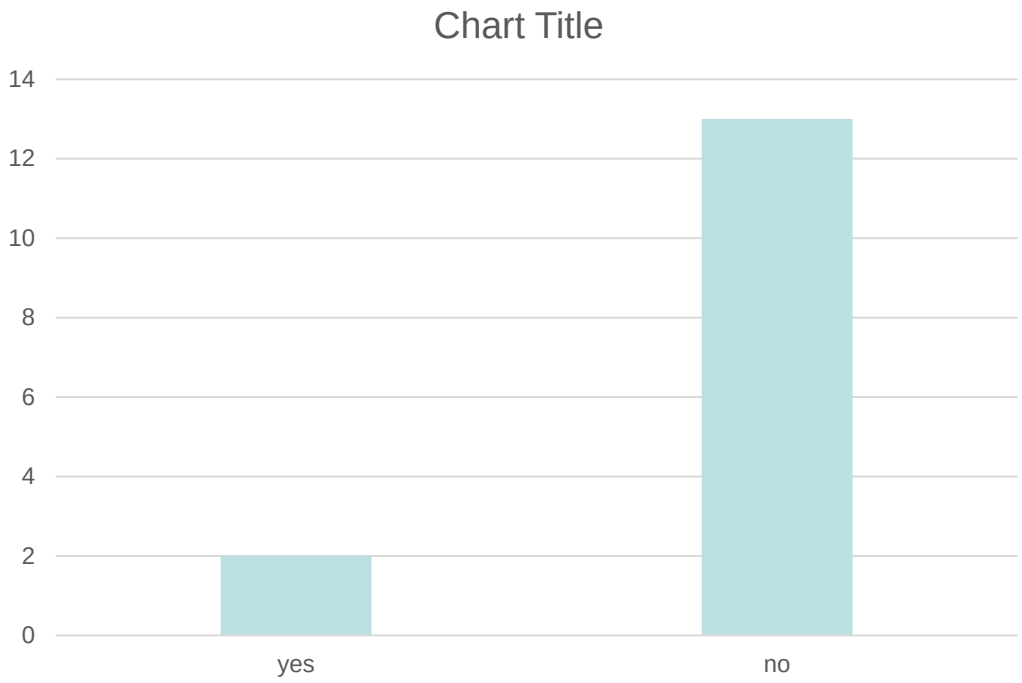
a) science generally (Y/N);

b) b) environmental sciences (Y/N) ;

c) c) marine sciences, specifically (Y/N).



17: And now for a big, difficult issue. President Trump decides to withdraw US support for the Paris Agreement to limit climate change. Levels of climate change that are projected to be “dangerous” seem inevitable. A group of atmospheric scientists propose to move “outside” with geoengineering research on Solar Radiation Management (SRM) involving a mesoscale (1000 km) injection of small particles of calcite into the stratosphere. President Trump expresses interest in SRM as providing a “climate insurance policy for America”.
In your opinion, is this type of research “ethical”?
a) Yes; b) No.




AT&T M-Cell 6:43 AM
Search
The oeerfect shirt for this man, LOL! No offense meant to anyone...just personal views...
Write a comment...
Post