

# Swinburne Open Science Task Force Survey (2019)

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## Overview

We conducted a survey in September 2019 to examine people's current use of open science practices, to examine their perceptions of these practices, and to examine their perceived barriers to adopting these practices. Across the university, 239 started the survey, although not all respondents completed all questions; thus, we report the sample size for each question. This document presents an overview of their responses.

## Demographics

In terms of respondents' demographic information, we did not collect information about gender or age to provide more anonymity to our respondents. We did, however, ask about their Academic Level/Type and their Discipline (based on 2-digit and 4-digit Field of Research [FOR] codes).

## Academic Levels

Of the 142 respondents who provided details about their Academic Level, 32% were PhD students, 16% were Professors, and 12% were Senior Lecturers. The breakdown of the rest of the academic levels for the rest of the respondents are in the table below.

Table 1: Academic Levels of Respondents (n = 142)

| Academic Levels        | Frequency | Percentage |
|------------------------|-----------|------------|
| Professor              | 23        | 16         |
| Associate Professor    | 10        | 7          |
| Senior Lecturer        | 17        | 12         |
| Senior Research Fellow | 1         | 1          |
| Lecturer               | 14        | 10         |
| Research Fellow        | 9         | 6          |
| Postdoc                | 11        | 8          |
| PhD Student            | 45        | 32         |
| Masters Student        | 7         | 5          |
| Research Assistant     | 2         | 1          |
| Other                  | 3         | 2          |

## Disciplines

In terms of Field of Research Codes, 138 respondents classified themselves as belonging to one of the two-digit FOR codes from 01 to 20, one person indicated “Other”, and 100 respondents did not specify their FOR code. We did not have any responses from researchers in Earth Sciences (04), Agricultural and Veterinary Sciences (07), History and Archeology (21), and Philosophy and Religious Studies (22).

%%% I RECKON I’LL MOVE THIS TO AN APPENDIX %%%

Table 2: Reported Two-Digit Field of Research Codes for Respondents (n = 239)

| FOR Code | Field of Research Division                 | Frequency | Percentage |
|----------|--|-----------|------------|
| 1        | Mathematical Sciences                      | 2         | 1          |
| 2        | Physical Sciences                          | 14        | 6          |
| 3        | Chemical Sciences                          | 4         | 2          |
| 5        | Environmental Sciences                     | 2         | 1          |
| 6        | Biological Sciences                        | 5         | 2          |
| 8        | Information and Computing Sciences         | 4         | 2          |
| 9        | Engineering                                | 17        | 7          |
| 10       | Technology                                 | 3         | 1          |
| 11       | Medical and Health Sciences                | 13        | 5          |
| 12       | Built Environment and Design               | 6         | 3          |
| 13       | Education                                  | 2         | 1          |
| 14       | Economics                                  | 2         | 1          |
| 15       | Commerce, Management, Tourism and Services | 7         | 3          |
| 16       | Studies in Human Society                   | 4         | 2          |
| 17       | Psychology and Cognitive Sciences          | 45        | 19         |
| 18       | Law and Legal Studies                      | 2         | 1          |
| 19       | Studies in Creative Arts and Writing       | 2         | 1          |
| 20       | Language, Communication and Culture        | 4         | 2          |
| 99       | Other                                      | 1         | 0          |
| NA       | Not Specified                              | 100       | 42         |

For ease of interpretation and to reduce the identifiability of the respondents, for the FOR divisions with a small number of respondents (less than 10), we combined similar divisions into disciplinary groups. Specifically, the new discipline grouping of Arts, Social Sciences, and Humanities (ASSH) included Education (FOR = 13, n = 2); Studies in Human Society (FOR = 16, n = 4); Studies in Creative Arts and Writing (FOR = 19, n = 2); and Language, Communication and Culture (FOR = 20, n = 4). The new discipline grouping of Business & Law included Economics (FOR = 14, n = 2); Commerce, Management, Tourism and Services (FOR = 15, n = 7), and Law and Legal Studies (FOR = 18, n = 2). The new discipline grouping of Technology & Computer Sciences included Information and Computing Sciences (FOR = 8, n = 4), and Technology (FOR = 10, n = 3). We allocated Built Environment and Design (FOR = 12, n = 6) to the “Other” category.

We retained the FOR divisions of Engineering (FOR = 9, n = 17); Medical and Health Sciences (FOR = 11, n = 13); Physical Sciences (FOR = 2, n = 14); and Psychology and Cognitive Sciences (FOR = 17, n = 45) as their own discipline groupings. The breakdown for the number of respondents according to discipline groupings is displayed in the next table.

I AM SURE YOU WILL ALL AGREE THAT WE DON’T NEED THESE TWO PARAGRAPHS IN THE MAIN TEXT, BUT LEAVING IT FOR NOW TO MAKE SURE WE UNDERSTAND HOW EVERYTHING WAS GROUPED TOGETHER. :)

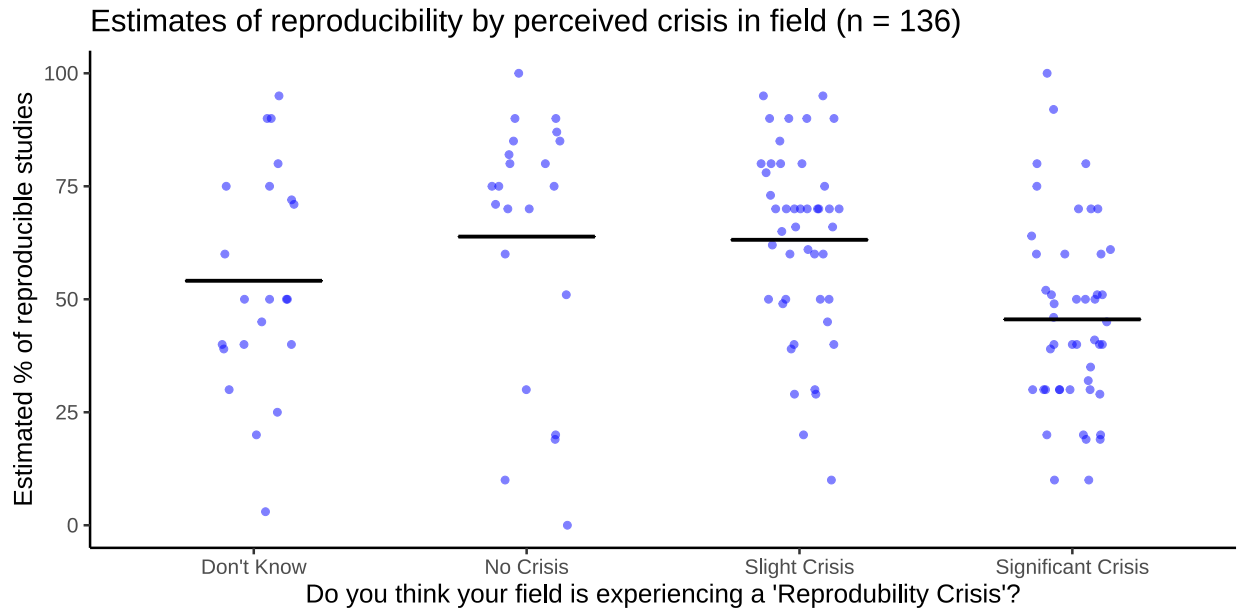
Table 3: Discipline Groupings of Respondents (n = 239)

| Disciplines                        | Frequency | Percentage |
|------------------------------------|-----------|------------|
| Math, Chem, Enviro, & Bio Sciences | 13        | 5          |
| Physical Sciences                  | 14        | 6          |
| Tech & Comp Sciences               | 7         | 3          |
| Engineering                        | 17        | 7          |
| Medical & Health Sciences          | 13        | 5          |
| ASSH                               | 12        | 5          |
| Business & Law                     | 11        | 5          |
| Psyc & Cog Sciences                | 45        | 19         |
| Other                              | 7         | 3          |
| Not Specified                      | 100       | 42         |

## Estimates of Reproducibility by Perceived Crisis

Participants were asked if they believed their field is experiencing a “reproducibility crisis”. Of the 138 respondents who answered this question, 17% indicated that they didn’t know if there was a crisis, 16% indicated there was no crisis, 33% indicated that there was a slight crisis, and 35% that there was a significant reproducibility crisis in their field.

Participants were also asked to estimate the percentage of research publications their field that are reproducible. In the figure below, we plotted participants’ reproducibility estimates according to their responses to the perceived crisis in their field. The black bar is the mean estimate of reproducibility perceived crisis.



# Experience with Open Science Practices

## Overall Experience with Open Science Practices

Before we asked participants about their experience with open science practices, we explained that the practices enveloped by the umbrella term of “open science” were study preregistration, open materials and/or code, open data, pre-publication archiving, and open access publishing.

The figure below shows participants’ experience with open science practices in general. Of the 207 participants who answered this question, 51 (25%) reported that they were unaware of open science practices; 75 (36%) reported that they were aware of open science practices, but had not used them; 69 (33%) reported that they had some experience with open science practices; and only 12 (6%) reported that they had extensive experience with open science practices.

Table 4: Overall Experience with Open Science Practices (n = 207)

| Reported Experience | Frequency | Percentage |
|---------------------|-----------|------------|
| Unaware             | 51        | 25         |
| Aware, But Not Used | 75        | 36         |
| Some                | 69        | 33         |
| Extensive           | 12        | 6          |

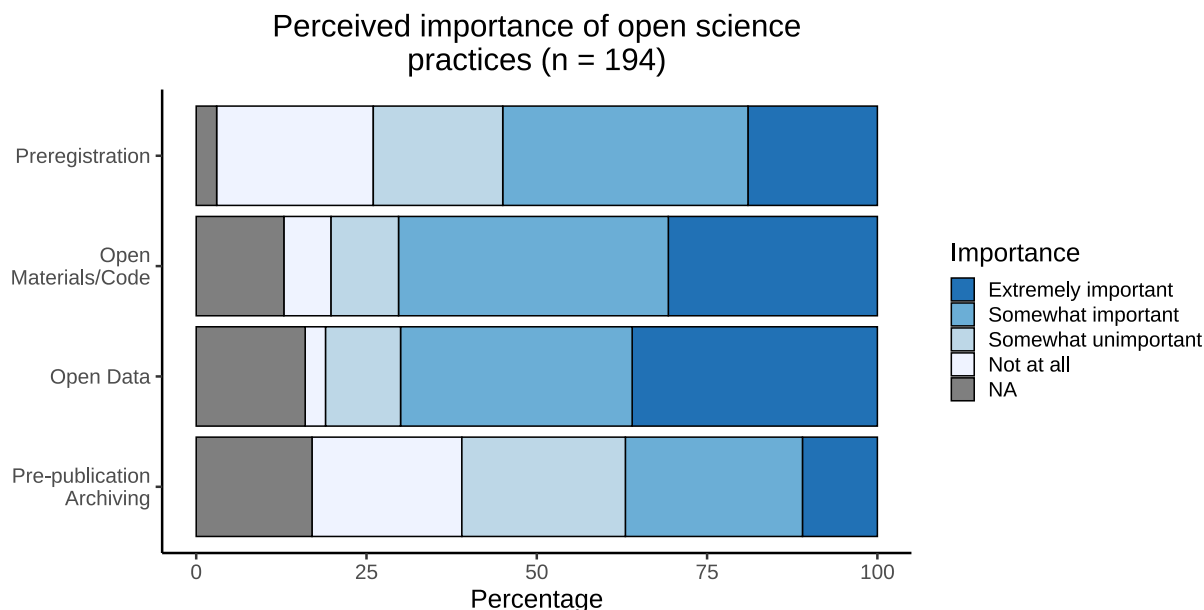
## Overall Perceived Importance and Reported Experience

Throughout the survey, respondents separately rated the perceived importance for their field of the four main open science practices, and they also reported their own experience with those practices. Specifically, we asked them about preregistering their studies in advance of data collection, making their study material and/or code openly available, making their data openly available, and making their work available on pre-publication archives.

### Importance of Practices

This figure includes the data from respondents who answered at least one of these questions. The figure demonstrates that our respondents believed that open materials, code, and data were the most important practices for their own fields and that pre-publication archiving was the least important. Whereas, nearly 75% indicated that open materials/code and open data were important (either extremely important or somewhat important), only 36% indicated that pre-publication archiving was important.

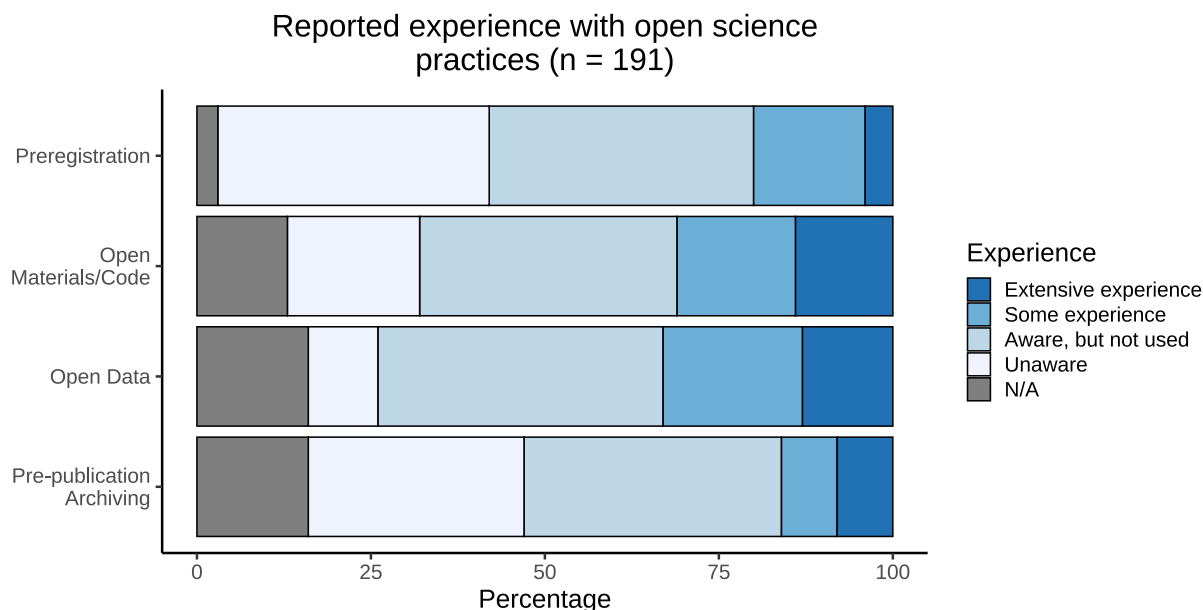
More information about their use of and concerns about these various practices are reported in the “**Experience with different types of open science practices**” section.



### Experience with Practices

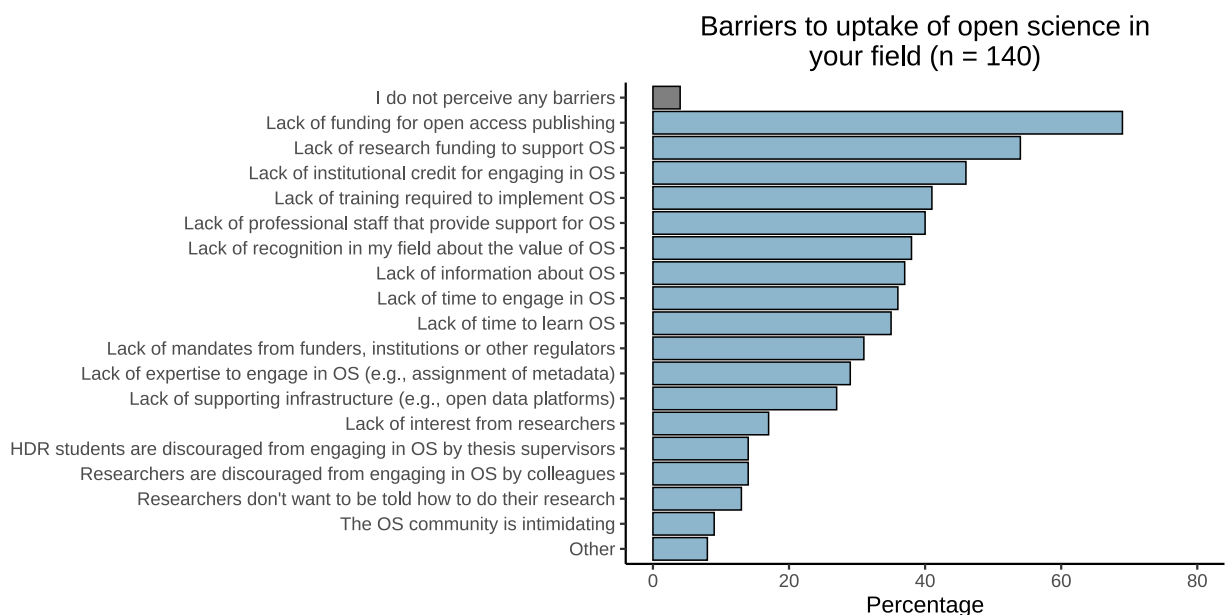
This figure shows respondents' experience with preregistering their studies in advance of data collection, making their study material and/or code openly available, making their data openly available, and making their work available on pre-publication archives. This figure includes the data from respondents who answered at least one of these questions. The figure demonstrates that our respondents had very little experience with any of these open science practices. Respondents had the most experience with open materials/code and open data, but even with those practices, the most common response (37% for materials/code and 41% for data) was that they were aware of the practice, but had not personally used it. With regard to preregistration, respondents were largely unaware of the practice (39%) or were aware, but had not used it (38%). Only 16% of respondents reported any experience with pre-publication archiving.

More information about their use of and concerns about these various practices are reported in the **“Experience with different types of open science practices”** section.



## Barriers to Open Science Practices

We provided the respondents with a list of possible barriers to the uptake of scientific practices. We asked them to endorse any statement that they agree is a barrier in their field. The graph below shows the percentage of the 140 respondents who selected each response.



## Experience with different types of open science practices

Next, we break down the results according to their experience with specific types of open science practices.

## Study Preregistration

We defined study preregistration for our participants as: “Documenting and submitting to a journal or public repository one’s research questions, methodological design, and analysis plan prior to analysing the data. This time-stamped document is made openly available by the time the research is published so that any deviation from the original research plan is visible to the scientific community.”

### Perceived Importance of Preregistration

We first asked participants how important preregistration of studies is for their field. Of the 195 participants who answered this question, a small percentage (4%) indicated that researchers in their discipline do not conduct research studies. As such, we excluded them from this analysis. Of the remaining 188 respondents, 37 (20%) indicated that preregistration was extremely important for their field; 69 (37%) indicated that it was somewhat important; 37 (20%) indicated that preregistration was somewhat unimportant; and 45 (24%) indicated that it was not at all important for their field.

Table 5: Perceived Importance of Preregistration (n = 188)

| Perceived Importance | Frequency | Percentage |
|----------------------|-----------|------------|
| Not at all           | 45        | 24         |
| Somewhat unimportant | 37        | 20         |
| Somewhat important   | 69        | 37         |
| Extremely important  | 37        | 20         |

### Experience with Study Preregistration

We then asked respondents about their own experience with study preregistration. Of the 185 participants who answered this question, 74 (40%) were unaware of study preregistration; 72 (39%) were aware of study preregistration, but had not used it; 31 (17%) had some experience with it, but did not regularly preregister their studies; and 8 (4%) regularly preregister their studies.

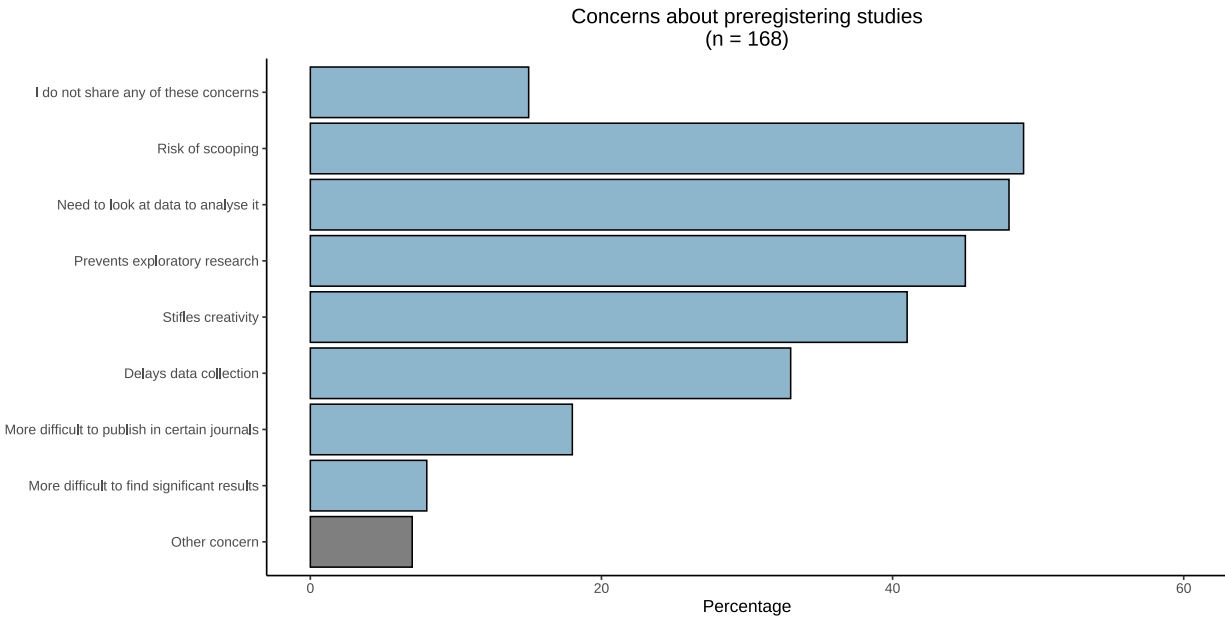
Table 6: Experience with Study Preregistration (n = 185)

| Reported Experience | Frequency | Percentage |
|---------------------|-----------|------------|
| Unaware             | 74        | 40         |
| Aware, But Not Used | 72        | 39         |
| Some Experience     | 31        | 17         |
| Regular Use         | 8         | 4          |

### Concerns about Preregistration

We also asked respondents if they have any concerns about preregistering their studies. After asking respondents to share their concerns in a free text format, we then provided a list of possible concerns that researchers could have about preregistering their studies.

Respondents were able to select as many concerns as they liked. Of the 168 respondents who answered this question, 25 (15%) reported that they do not share any of the listed concerns. The following figure presents, of those who answered this question, the percentage who selected each of the concerns.



## Open Materials and/or Code

The next section of the survey related to the use of open materials and/or code. For our purposes, we explained that open materials and/or code referred to researcher- created resources used while collecting or analyzing data (e.g., survey questions, video stimuli, vignettes, algorithms, coding schemes, analytic code, etc.) that are made openly available to the research community.

### Perceived Importance of Open Materials and/or Code

We first asked participants how important they thought it was for their field to make materials and/or code openly available. Of the 174 participants who answered this question, a small percentage (3%) indicated that researchers in their discipline do not use materials and/or code. As such, we excluded them from this analysis. Of the remaining 169 respondents, 36% indicated that open materials and/or code were extremely important for their field; 46% indicated that they were somewhat important; 11% indicated that they were somewhat unimportant; and 8% indicated that open materials and/or code were not at all important for their field.

Table 7: Perceived Importance of Open Materials and/or Code (n = 169)

| Perceived Importance | Frequency | Percentage |
|----------------------|-----------|------------|
| Not at all           | 13        | 8          |
| Somewhat unimportant | 19        | 11         |
| Somewhat important   | 77        | 46         |
| Extremely important  | 60        | 36         |

### Experience with Open Materials and/or Code

The following section shows how many people have experience with open code and/or materials. Of the 167 participants who answered this question, 71 (43%) reported that, until now, they hadn't heard of open



materials and/or code; 37 (22%) were aware of open materials and/or code, but had not used it in their own research; 32 (19%) had some experience with open materials and/or code, but do not use them regularly; and 27 (16%) regularly use open materials and/or code.

Table 8: Experience with Open Materials and/or Code (n = 167)

| Reported Experience | Frequency | Percentage |
|---------------------|-----------|------------|
| Unaware             | 37        | 22         |
| Aware, But Not Used | 71        | 43         |
| Some Use            | 32        | 19         |
| Regular Use         | 27        | 16         |

### Use of Open Materials and/or Code

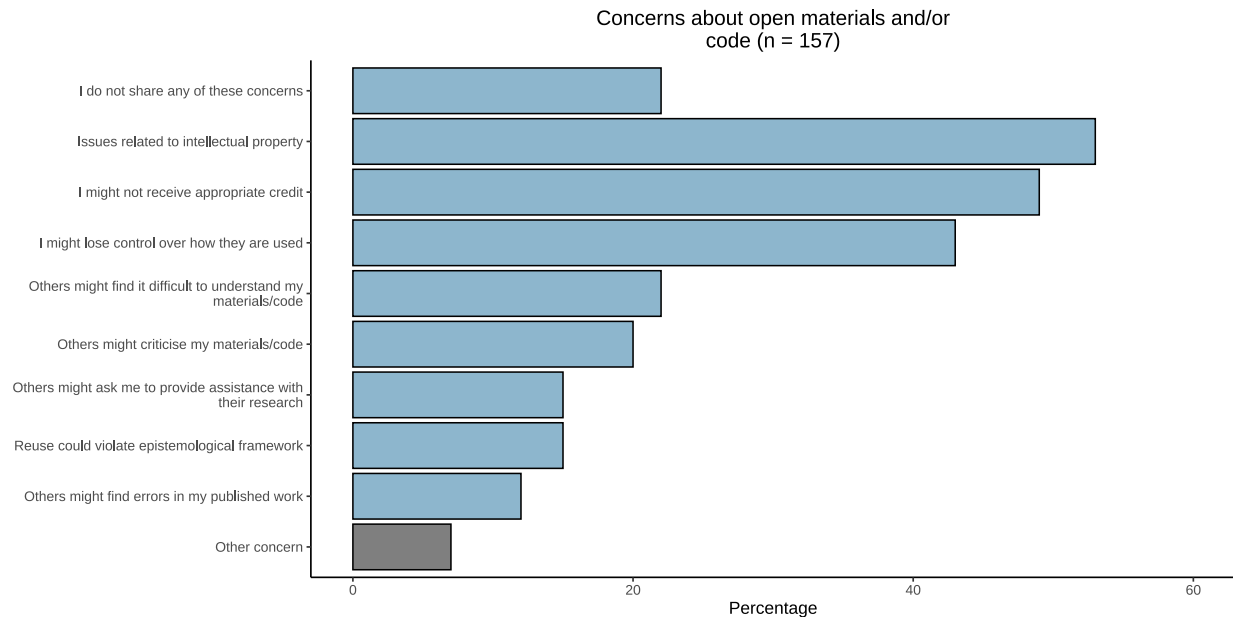
For those participants who reported that they use open materials and/or code (that is, those who reported some use or regular use), we asked them for more information about how they have used open materials and/or code in previous work. Respondents were allowed to select as many uses as applied. Of these 59 researchers, the most popular response (71%) was that they used other researchers' open materials and/or code in their own research. Few researchers reported using open materials and/or code when peer reviewing other researchers' work (14%).

Table 9: Reported Use of Open Materials and/or Code (n = 59)

| Reported Use   | Frequency | Percentage |
|--|-----------|------------|
| I have used other researchers' open materials and/or code in my research                 | 42        | 71         |
| I have made my materials and/or code openly available                                    | 37        | 63         |
| I have used open materials and/or code when reading other researchers' work              | 22        | 37         |
| I have used other researchers' open materials and/or code when peer reviewing their work | 8         | 14         |
| Other use  | 2         | 3          |

### Concerns about Open Materials and/or Code

We also asked respondents if they have any concerns about making their research materials and/or code open. After asking respondents to share their concerns in a free text format, we provided a list of possible concerns that researchers could have about sharing their materials and/or code. Respondents were able to select as many concerns as they liked. A total of 157 respondents answered this question. Of those who responded to this question, 35 (22%) reported that they do not share any of the listed concerns. The following figure presents, of those who answered this question, the percentage who selected each of the concerns.



## Open Data

The next section of the survey related to the use of open data. For our purposes, we explained that open data can be defined as “online, free of cost, accessible data that can be used, reused and distributed provided that the data source is attributed and shared alike.” [FIND SOURCE FROM SURVEY]

### Perceived Importance of Open Data

We first asked participants how important they thought it was for their field that data from published research are openly available. Of the 166 participants who answered this question, a small number 4 (2%) indicated that research publications in my field are not based on data. As such, we excluded them from this analysis. Of the remaining 162 respondents, 69 (43%) indicated that open data were extremely important for their field; 66 (41%) indicated that they were somewhat important; 21 (13%) indicated that they were somewhat unimportant; and 6 (4%) indicated that open data were not at all important for their field.

Table 10: Perceived Importance of Open Data (n = 162)

| Perceived Importance | Frequency | Percentage |
|----------------------|-----------|------------|
| Not at all           | 6         | 4          |
| Somewhat unimportant | 21        | 13         |
| Somewhat important   | 66        | 41         |
| Extremely important  | 69        | 43         |

### Experience with Open Data

We also asked participants about their experience with open data. Of the 160 participants who answered this question, 20 (12%) indicated that until now, they were unaware of open data; 78 (49%) indicated that they were aware of open data, but had not used it in their research; 38 (24%) indicated that they had some experience with open data, but did not use them regularly; and 24 (15%) indicated that they regularly use open data.

Table 11: Experience with Open Data (n = 160)

| Reported Experience | Frequency | Percentage |
|---------------------|-----------|------------|
| Unaware             | 20        | 12         |
| Aware, But Not Used | 78        | 49         |
| Some Use            | 38        | 24         |
| Regular Use         | 24        | 15         |

### Use of Open Data

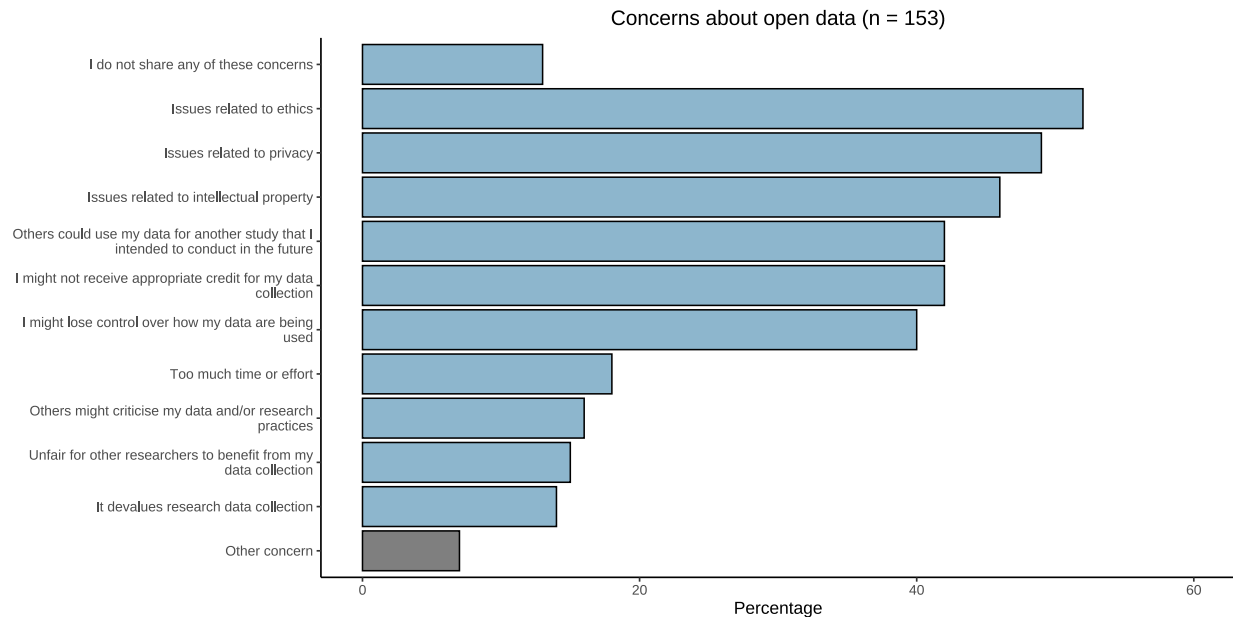
For those participants who reported that they use open data (that is, those who reported some use or regular use), we asked them for more information about how they have used open data in previous work. Respondents were allowed to select as many uses as applied. Of these 62 researchers, the most popular response (81%) was that they used open data from other sources in their own research. Few researchers reported using open data when peer reviewing other researchers' work (13%).

Table 12: Reported Use of Open Data (n = 62)

| Reported Use  | Frequency | Percentage |
|---|-----------|------------|
| I have used open data from other sources (e.g., researchers, government, etc.) in my research | 50        | 81         |
| I have made my research data open   | 30        | 48         |
| I have used open data when reading other researchers' work                                    | 21        | 34         |
| I have used open data when peer reviewing other researchers' work                             | 8         | 13         |
| Other use   | 1         | 2          |

### Concerns about Open Data

We also asked respondents if they have any concerns about making their data open. After asking respondents to share their concerns in a free text format, we provided a list of possible concerns that researchers could have about sharing their data. Respondents were able to select as many concerns as they liked. A total of 153 respondents answered this question. Of those who responded, 20 (13%) reported that they do not share any of the listed concerns. The following figure presents, of those who answered this question, the percentage who selected each of the concerns.



## Pre-publication Archiving

The next section of the survey related to the use of pre-publication archiving. For our purposes, we explained that pre-publication archiving is also known as preprint archiving, and refers to making a manuscript openly available before it undergoes peer review in an academic journal or other outlet. Generally, this is achieved by uploading the manuscript to an archive such as arXiv (physics, maths), bioRxiv (biology), SocArxiv (sociology), etc.

### Perceived Importance of Pre-publication Archiving

We first asked participants how important they thought pre-publication archiving was for their field. Of the 161 participants who answered this question 22 (14%) indicated that pre-publication archiving was extremely important for their field; 51 (32%) indicated that it was somewhat important; 46 (29%) indicated that it was somewhat unimportant; and 42 (26%) indicated that pre-publication archiving was not at all important for their field.

Table 13: Perceived Importance of Pre-publication Archiving (n = 161)

| Perceived Importance | Frequency | Percentage |
|----------------------|-----------|------------|
| Not at all           | 42        | 26         |
| Somewhat unimportant | 46        | 29         |
| Somewhat important   | 51        | 32         |
| Extremely important  | 22        | 14         |

### Experience with Pre-publication Archiving

We also asked participants about their experience with pre-publication archiving. Of the 161 participants who answered this question, 60 (37%) indicated that until now, they were unaware of pre-publication archiving; 71 (44%) indicated that they were aware of pre-publication archiving, but had not used it; 15 (9%) indicated that they had some experience with pre-publication archiving; and 15 (9%) indicated that they have extensive experience with pre-publication archiving.

Table 14: Experience with Pre-publication Archiving&lt;br&gt; (n = 161)

| Reported Experience  | Frequency | Percentage |
|----------------------|-----------|------------|
| Unaware              | 60        | 37         |
| Aware, But Not Used  | 71        | 44         |
| Some Experience      | 15        | 9          |
| Extensive Experience | 15        | 9          |

### Use of Pre-publication Archiving

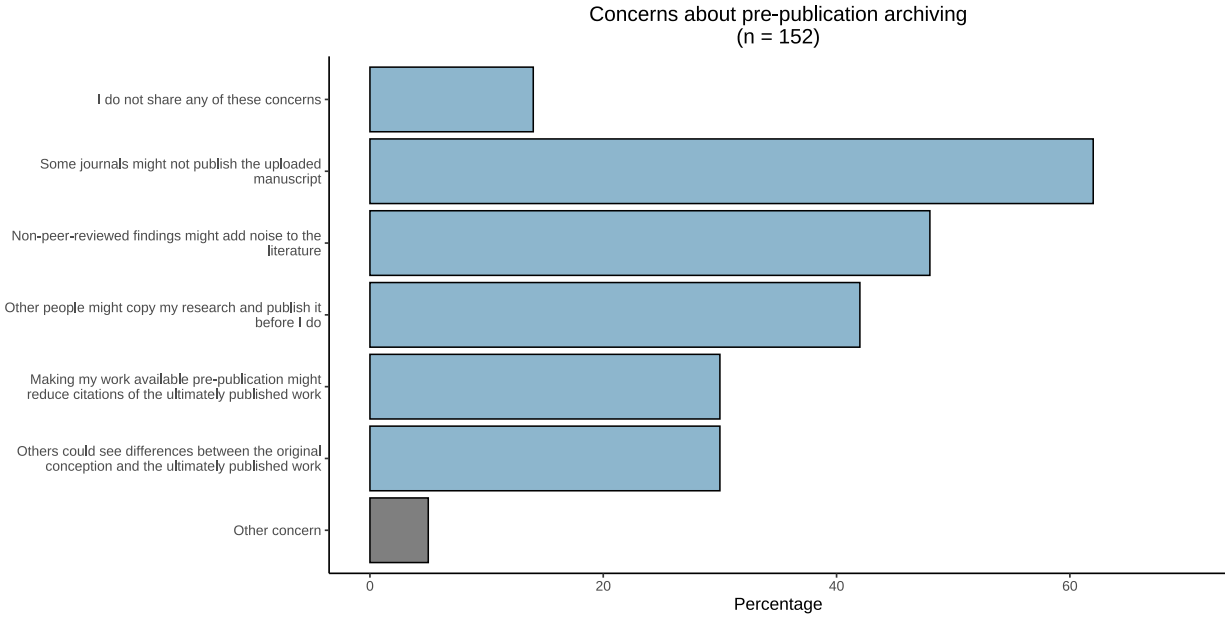
For those participants who reported that they use pre-publication archiving (that is, those who reported some experience or extensive experience), we asked them for more information about how they have used these archives. Respondents were allowed to select as many uses as applied. Of these 30 researchers, the most popular response (87%) was that they read an article from, searched, or browsed a pre-publication archive. That is, they used other people's work posted to pre-publication archives for their own purposes. The next most common use by these researchers is to upload their own work to a pre-publication archive before submitting it to a journal (77%).

Table 15: Reported Use of Pre-publication Archiving (n = 30)

| Reported Use   | Frequency | Percentage |
|--|-----------|------------|
| I have read an article from, searched, or browsed a pre-publication archive              | 26        | 87         |
| I have uploaded a manuscript to a pre-publication archive before submission to a journal | 23        | 77         |
| I have cited a manuscript from a pre-publication archive                                 | 20        | 67         |
| Other use  | 2         | 7          |

### Concerns about Pre-publication Archiving

We asked all respondents if they have any concerns about uploading a manuscript to a pre-publication archive before submitting it for peer review. After asking respondents to share their concerns in a free text format, we provided a list of possible concerns that researchers could have about engaging in this practice. Respondents were able to select as many concerns as they liked. A total of 152 respondents answered this question. Of those who responded, 22 (14%) reported that they do not share any of the listed concerns. The following figure presents, of those who answered this question, the percentage who selected each of the concerns.



# Open Access Publishing

The next section of the survey addressed Open Access publishing. We first explained the two different kinds of open access publishing: (1) paying an open access fee to make the final version of your published article open access, and (2) deposit the final accepted version of your manuscript (peer-reviewed but not journal-formatted) in an open access repository (e.g., Swinburne Research Bank or bioRxiv).

## Proportion of Publications that are Open Access

We asked participants to indicate approximately what proportion of their publications from the last 5 years are open access. Of the 157 participants who answered this question, the most common responses were that some (52; 33%) or none (45; 29%) of their publications were open access. A small proportion (21; 13%) indicated that they did not know what proportion were open access. The following table provides the breakdown of responses.

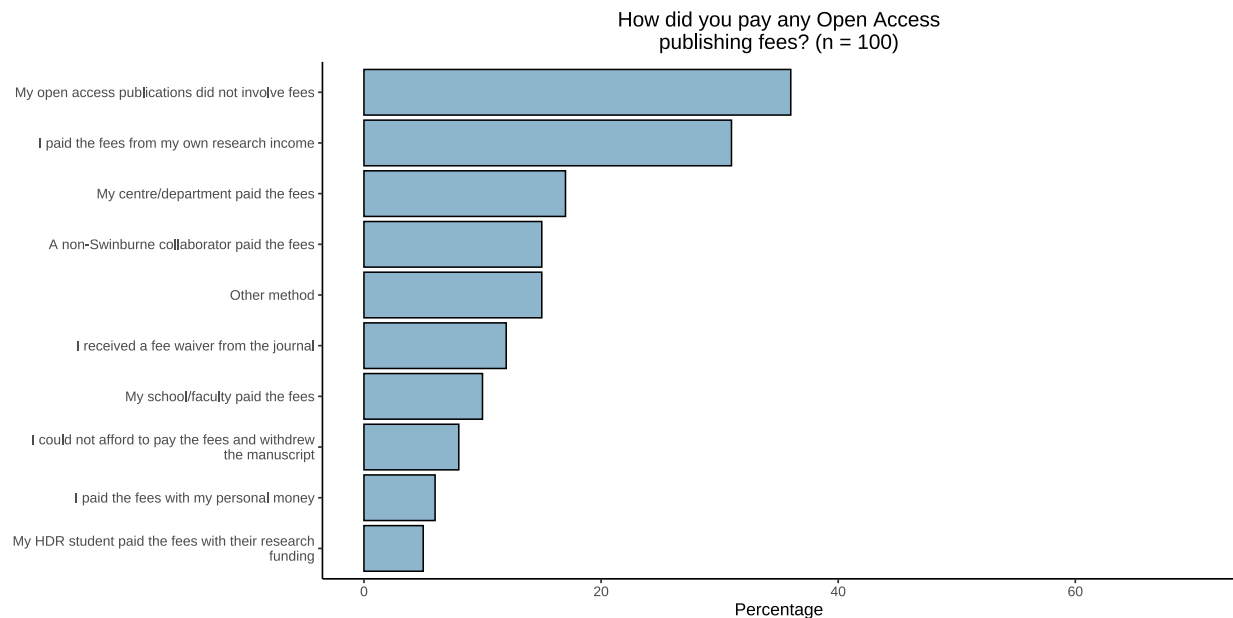
Table 16: Proportion of Publications that are Open Access (n = 157)

| Response     | Frequency | Percentage |
|--------------|-----------|------------|
| I don't know | 21        | 13         |
| None         | 45        | 29         |
| Some         | 52        | 33         |
| Half         | 12        | 8          |
| Most         | 17        | 11         |
| All          | 10        | 6          |

## Open Access Fees

We asked all respondents, except those who said that none of their publications in the last 5 years were open access, how they paid for article processing charges that many journals charge for open access publishing. We provided a list of possible payment approaches and respondents were able to select as many concerns as

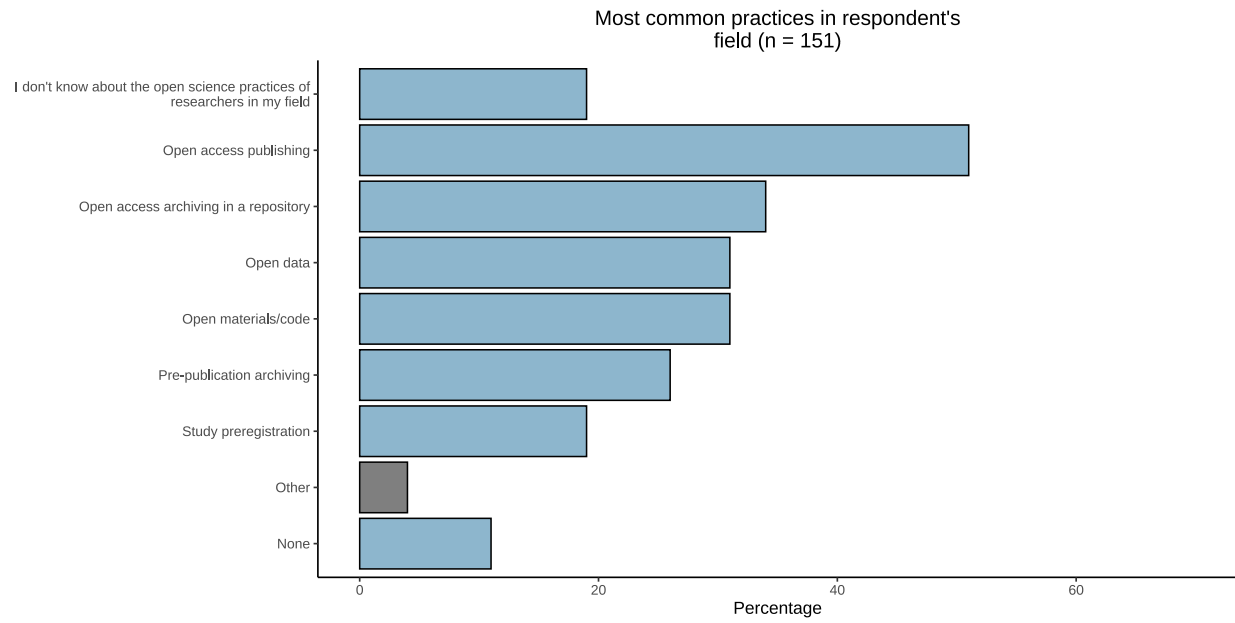
they liked. A total of 100 respondents answered this question. The following table presents, of those who answered this question, the percentage who used each of the different payment approaches.



## Additional Open Science Issues

### Most Common Open Science Practices in Their Field

We asked respondents which of the following open science practices (if any) were commonly used in their field. They could tick all that applied. The graph below represents the percentage of the 151 respondents who selected each response. Given that information about some of these open science practices are publicly available and often associated with the published product (e.g., the final paper regularly includes links to repository storing data, materials, and/or code, as well as a link to the preregistration, if relevant), it is surprising that nearly a fifth of respondents indicated that they did not know about the open science practices of researchers in their field.



**The End**