Best Practices for Ethical Conduct of Misinformation Research: A Scoping Review and Critical Commentary

Abstract

Misinformation can have noxious impacts on cognition, fostering formation of false beliefs, retroactively distorting memory for events, and influencing reasoning and decision making even after it has been credibly corrected. Researchers investigating the impacts of real-world misinformation are therefore faced with an ethical issue: they must consider the immediate and longer-term consequences of exposing participants to false claims. In this paper, we first present an overview of the ethical risks associated with real-world misinformation. We then report results from a scoping review of ethical practices in misinformation research. We investigated (1) the extent to which researchers report the details of their ethical practices, including issues of informed consent and debriefing, and (2) the specific steps that researchers report taking to protect participants from the consequences of misinformation exposure. We found that fewer than 30% of misinformation papers report any debriefing at all, and almost no authors assessed the effectiveness of their debriefing procedure. Building on the findings from this review, we evaluate the balance of risk versus reward currently operating in this field, and propose a set of guidelines for best practice. Our ultimate goal is to allow researchers the freedom to investigate questions of considerable scientific and societal impact, while meeting their ethical obligations to participants.

Keywords

Misinformation; fake news; ethics; debriefing; open science

Word count: 7,493

Best Practices for Ethical Conduct of Misinformation Research: A Scoping Review and Critical Commentary

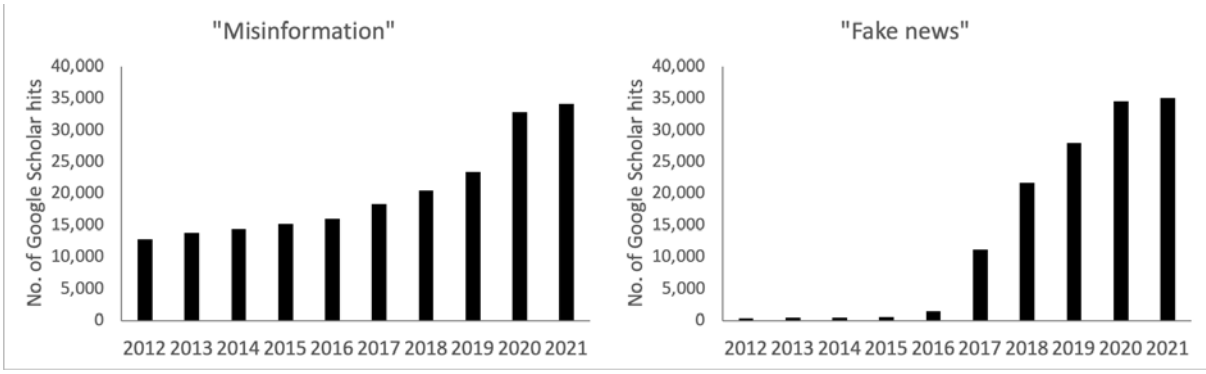
Psychologists have been studying the phenomenon of misinformation for decades. The term was introduced to the memory literature by Loftus's seminal work demonstrating the effect of leading questions on witnesses' recollections of an accident (e.g., Loftus & Palmer, 1974); since then, extensive work has assessed the impact of various kinds of post-event misinformation on memory, including in judicial contexts (see Zaragoza et al., 2007 for a review). Other work has focused on the cognitive impacts of misinformation after it has been corrected, and its impact on the formation of false beliefs more generally (see Ecker et al., 2022; Pennycook & Rand, 2021). Here, a distinction is often made between *misinformation* and *disinformation*, where *misinformation* is any information that is false or misleading, while *disinformation* carries the additional connotation of intentional dissemination (Wardle & Derakhshan, 2018). Another term that has come into common usage since the 2016 US Presidential election is "fake news". This term has taken on a range of meanings within political discourse, but in a research context it can be defined as "fabricated information that mimics news media content in form but not in organizational process or intent" (Lazer et al., 2018, p. 1094).

Figure 1 provides a rough illustration of the growth of misinformation and fake news research over the last decade, and demonstrates that this research area has flourished in recnt years. A Google Scholar search for the terms "fake news" and "COVID-19" resulted in more than 34,000 hits by June 2022, an outcome likely associated with the pandemic-associated "infodemic" (Zarocostas, 2020). This increase in misinformation research brings with it an obligation to ensure that research is conducted ethically, and that potential harm to participants is minimised. The present paper focuses on the ethical issues of misinformation

research. Other issues—including methodological ones—are discussed elsewhere (e.g., Ecker et al., 2022).

Figure 1

Google Scholar Hits for Search Terms "Misinformation" and "Fake News" Over the Last Decade



The Role of Debriefing

Psychological investigations of misinformation typically require participants to be experimentally exposed to misinformation so that researchers can examine its effects on beliefs, memories, attitudes, or behaviours (Pennycook & Rand, 2021). This is necessary to understand the impact of misinformation in the real world, but it also presents some ethical dilemmas, including the possibility that exposure to misinformation might have unintended consequences for the participant's real-world attitudes or behaviours—for example, by influencing their voting choices or healthcare decisions. In order to avoid these negative consequences, it is recommended that a debriefing is provided, during which the misinformation is retracted and the true purpose of the experiment explained (Miller et al., 2008).

In general terms, as summarized by Tesch (1977), there are at least three functions of post-experimental debriefing. First, where participation may have harmful impacts (e.g., due

to deception, induction of a negative state, or exposure to false information), debriefing is essential from an *ethical* standpoint to attempt to undo the harm caused (i.e., to "dehoax" participants; Brody et al., 2000; Lederman, 1992). Indeed, researchers have the ethical obligation to do no lasting harm (Stewart, 1992), and the APA Ethical Principles of Psychologists and Code of Conduct ask that researchers "take reasonable steps to correct any misconceptions that participants may have" (APA, 2017). A secondary function of debriefing is to inform and *educate* participants, especially if they are undergraduate psychology students (Brody et al., 2000; Lederman, 1992; McShane et al., 2015). A third function of debriefing—often viewed as less important—is *methodological* (Sharpe & Faye, 2009). Specifically, debriefing can be used to obtain insight into whether or not participants engaged with the experiment as assumed, and to assess the effectiveness of the debriefing intervention itself (Lederman, 1992). In this paper, we primarily focus on the ethical function of debriefing.

Whether debriefing procedures, as they are currently employed, achieve this function is unclear. As Tesch (1977) already noted, an underlying assumption behind dehoaxing-via-debrief is that debriefing can achieve "magical undoing". However, as hinted at earlier, research has shown that false information can continue to influence people's thinking even after clear corrections (so-called continued influence effects; see Ecker et al., 2022 for a review), and that experimentally-induced false memories often persist after debriefing (e.g., Otgaar et al., 2013). Miketta and Friese (2019) found that manipulations aiming to change participants' views of themselves had long-term impacts (two weeks post-study), and that debriefing was only partially effective at reducing experimentally induced misperceptions. Although Murphy et al. (2020) reported no negative long-term effects six months post-exposure to false news stories, more research is needed to fully understand the potential long-

term impacts of both misinformation exposure and debriefing, and how best to design effective debriefs (Sharpe & Faye, 2009).

Risks also differ depending on misinformation domain and characteristics. Where the research question allows it, the most obvious way to circumvent ethical issues with misinformation exposure is to create fictional materials or—if use of real-world materials is necessary—choose topics with low risk of harm rather than high-risk topics such as vaccination (e.g., see Tay et al., 2021). Real-world sources can also increase the risk that participants will continue believing misinformation post-debrief if they trust the misinformation source and distrust the correction source (Ecker & Antonio, 2021). Particular care should also be taken when dealing with highly-shareable misinformation because of the risks of contagion if it is disseminated more widely by participants (Murayama et al., 2021).

At the same time, exposing participants to real-world misinformation is sometimes inevitable, particularly if we want to better understand the cognitive processing of misinformation and its potential impacts, and optimize the design of countermeasures. We also should not overstate the risks to participants from misinformation exposure given the unclear link between (one-off) misinformation exposure and actual behaviours (Greene & Murphy, 2021; de Saint Laurent et al., 2021; MacFarlane et al., 2021; but also see Loomba et al., 2021; Tay et al., 2021) and the fact that participants are likely exposed to misleading content via the media quite frequently without necessarily accepting such content as true (Wagner & Boczkowski, 2019).

Nevertheless, as a matter of principle, researchers exposing participants to real-world misinformation are well-advised to use the debriefing tool to reduce any potentially lingering misconceptions. To achieve this, debriefing needs to do more than just generically point out that misinformation exposure has occurred. Misra (1992) found that only an explicit and specific debriefing—but not a conventional, generic debriefing—was effective at reducing

belief in false information provided during an experiment (also see Greenspan & Loftus, 2021; McFarland et al., 2007). Even if the experiment already includes retraction(s) as part of the procedure, multiple retractions are more effective than just one (Ecker et al., 2011; Sanderson et al., 2022), and the debriefing can provide an opportunity for a second retraction. Refutations that provide explanatory detail are more effective than terse retractions that merely label a piece of misinformation as false (e.g., Ecker et al., 2020). Thus, a debriefing should refute the misinformation by explaining why it is false, and by putting some emphasis on the relevant facts.

To engage with the corrections more deeply, participants can be asked questions about them (e.g., how surprised they are to learn that a piece of information provided was false; Marsh et al., 2003). Where there is potential harm from being misinformed (e.g., misinformation on climate change or vaccines), post-debriefing testing is recommended to ascertain that participants have engaged with and understood the corrections provided either within the experimental paradigm or the debriefing (Barchard & Williams, 2008).[1] In cases where there is any deception (e.g., leading participants to believe some false information is true), researchers should give consideration to obtaining additional consent for data use post-debriefing (Barchard & Williams, 2008). Although this can lead to selection bias, it has been argued that the ethical obligations to participants outweigh this risk (Miller et al., 2008).

Researchers may also use the debriefing tool to explain the experiment and justify any potentially harmful manipulations it involves. To prevent participants developing negative views of researchers and science more generally—a damage to the common good (Hendriks et al., 2016; also see Hertwig & Ortmann, 2008)—misinformation scholars should place more emphasis on justifying real-world misinformation exposure by explaining the benefits that

[1] For an example application, see MacFarlane et al., 2021; their debriefing materials are available at https://osf.io/p89bm/.

come from such research (Stewart, 1992).[2] Debriefing may even be a way of inoculating participants against future real-world misinformation (Murphy et al., 2020; also see Lewandowsky & van der Linden, 2021).

Conduct and Reporting of Ethical Practices in Misinformation Research

Having outlined the features that post-experimental debriefs should include, we now turn to the question of how often debriefing is in fact employed. The development of online survey tools and recruitment platforms has meant that large participant samples can now be obtained easily and quickly (Peer et al., 2017). Coupled with the rise of research into misinformation, more participants are likely being exposed to misinformation via research than ever before. Much of this information has the potential to be harmful; consider, for example, the many studies that have investigated misinformation about COVID-19 vaccines (e.g., de Saint Laurent et al., 2021; Greene & Murphy, 2021; Kreps et al., 2021; Kricorian et al., 2021). Debriefing procedures are typically employed following traditional lab-based investigations (Sharpe & Faye, 2009), but it is not clear whether these procedures have made the leap to survey-based research, which is often non-experimental and conducted by non-psychologists. It bears repeating that ethical practices should be applied to any study exposing participants to misinformation, regardless of whether it is experimental in design—both because it is an opportunity to provide accurate information and because simply mentioning false claims in a study conducted by a reputable university without a subsequent retraction could implicitly lend legitimacy to those claims in the eyes of participants. It is therefore imperative to establish the frequency with which researchers employ ethical procedures (including debriefing) and report those procedures in their papers. Previous evidence suggests that debriefing is often employed without being reported, and if a paper

[2] As a side note, this also highlights that information sheets should already indicate that participants may be exposed to misleading information, where appropriate (see Miller at al., 2008).

mentions debriefing, it often does so only in passing (Miller et al., 2008; Sharpe & Faye, 2009). This has the potential to undermine the message that appropriate debriefing is an ethical requirement, and might affect the practices of novice researchers. Furthermore, failing to disclose these practices may risk the integrity of the field, and expose misinformation researchers to challenges to their integrity.

This issue parallels more general conversations around transparency in the reporting and conduct of research (Nosek et al., 2022). The so-called “replication crisis” and subsequent open-science revolution in psychology have demonstrated clear benefits of transparency in the conduct and reporting of research (McKiernan et al., 2016). This transparency also has benefits for ethical practices, by helping clarify exactly what was presented to participants. Preregistrations, for instance, routinely report the criteria that will be used to exclude participants, including if participants decline to provide post-debriefing consent. Similarly, openly sharing materials showcases not only what type of deception has been employed, but under what circumstances the researchers deemed it necessary to include a warning or debriefing. In other words, open-science practices can help set ethical standards and make it easier for newcomers to follow them. Whether engaging in open-science practices does in fact lead to more explicit reporting of ethical issues is, however, an open question.

To address these questions, we report a systematic scoping review of research published between 2016 and 2021 that involved exposing participants to misinformation. Scoping reviews are a relatively new approach to identifying and mapping the research literature (Arksey & O'Malley, 2005). Like traditional systematic reviews, they involve an a-priori review protocol and a systematic searching and screening process. However, whereas systematic reviews aim to answer a specific question (e.g., whether a given treatment has a causal effect), a scoping review has a broader focus, aiming to identify the types of evidence

available in a given field, describe the methods used, or identify knowledge gaps (Munn et al., 2018). Here, we employed this approach to characterise the use of ethical and open-science practices in misinformation research.

Method

We searched the Web of Science, Scopus, and PsycINFO electronic databases on July 30th 2021. The search included all articles with the words *misinformation, disinformation, fake news, false news,* or *fabricated news* in the title, abstract, or keywords and was limited to articles published in English since 2016 (see supplemental materials for the exact syntax). The search yielded 5699 unique records that were then uploaded to Covidence (http://www.covidence.org/), commercially-available software for the management of systematic reviews. All abstracts were independently screened by two reviewers, and either included or excluded in the review on the basis of the criteria listed below. Initial agreement between reviewers was very good (Cohen's $\kappa = 0.79$), and conflicts were resolved by a third reviewer. The full texts of papers that passed the abstract-screening stage were then evaluated by two reviewers, who made a final decision regarding inclusion or exclusion. Agreement was again very good (Cohen's $\kappa = 0.70$), with conflicts resolved by discussion[3]. The search strategy, inclusion criteria, and extraction templates were preregistered (https://osf.io/d5hrj?view_only=4a864f4dc5ac4c0e8c390b7495d8f942). Figure 2 illustrates the screening process.

Inclusion Criteria

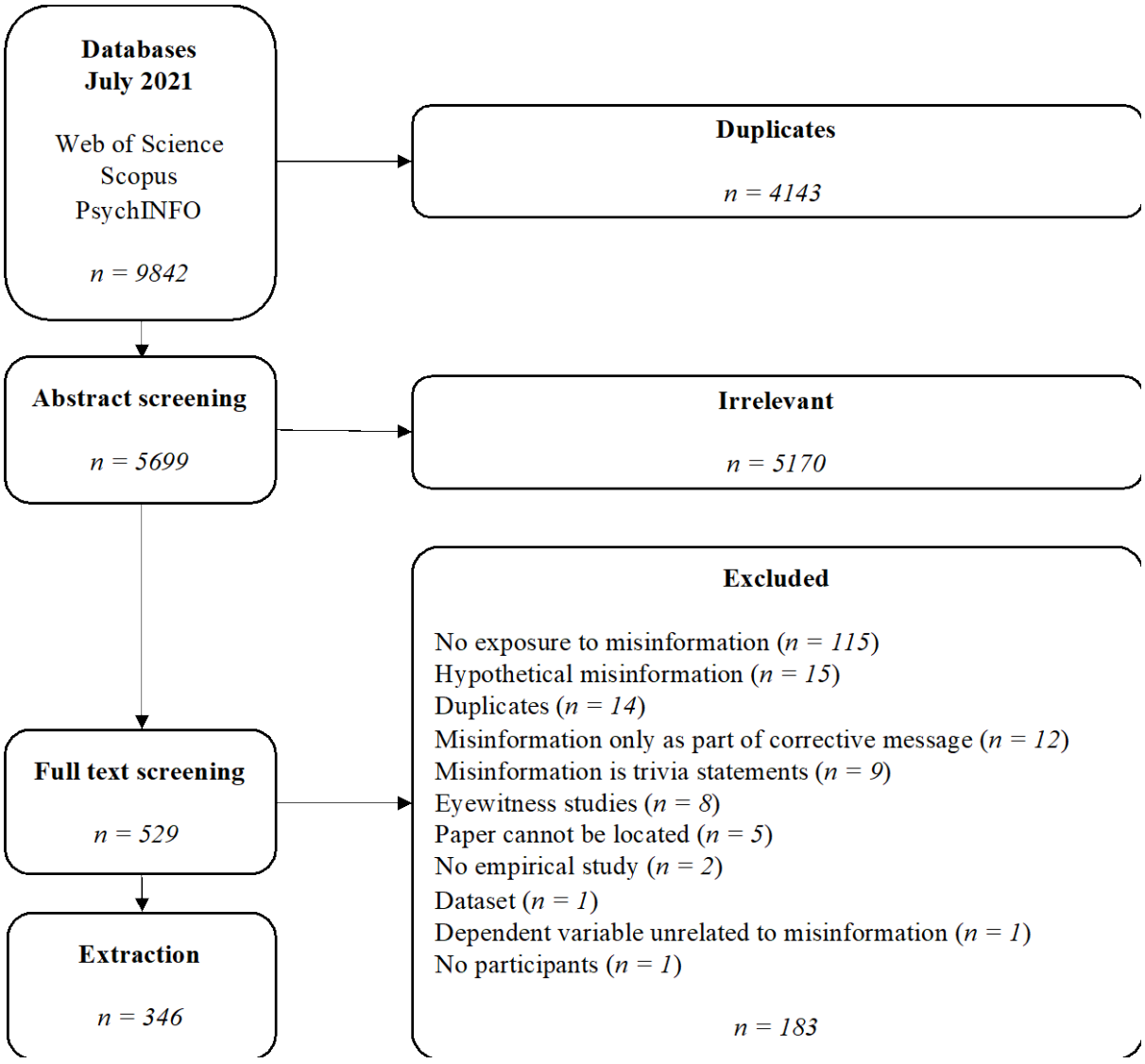
Our principal concern was with misinformation that could have real-world consequences. Eligible articles therefore included at least one study involving fake news or misinformation that could affect real-world beliefs. Studies of eyewitness memory were

[3] The preregistration specified that a third reviewer would resolve conflicts; however, this was not possible due to a temporarily reduced team.

therefore excluded, as were studies incorporating hypothetical misinformation that was not presented as being true or with no potential consequences for real-world beliefs or behaviours. For example, studies in which participants were asked to imagine that a company or individual had made misleading claims were not included. Following the abstract screening stage, the protocol was adapted to include misinformation as it would be shared on social media (e.g., studies using misleading tweets).

Figure 2

Scoping Review Screening Flow Chart



While we originally planned to focus only on experimental research, the screening revealed that distinguishing between experiments, surveys, and intervention-based research was difficult. To avoid arbitrary decisions, we decided to drop this requirement and include all empirical articles that met the other inclusion criteria. Opinion pieces, commentaries, systematic reviews, or observational studies were excluded.

Finally, eligible studies had to assess participant responses to misinformation (e.g., perceived accuracy, sharing intentions, etc.) as the main outcome. This was both to ensure that misinformation was indeed a central part of each study, and because the present review is part of a wider project looking at the types of outcomes measured in misinformation research. In total, 346 articles met our inclusion criteria.

Extraction

For each paper, the following information was extracted:

- *General information*. Title, journal, publication year, and contact details of the corresponding author
- *Ethical practices*.
    - Was the information that participants received about study topic and aims detailed in the paper?
    - Were participants warned about misinformation exposure (e.g., in the information sheet)?
    - Were participants debriefed about the misinformation presented? If yes:
        - Was there a general disclaimer or a specific debunking?
        - Were participants asked for consent again following the debriefing?
        - Was the effectiveness of the debriefing measured?
- *Open-science practices*. Were any of the following practices reported or present in the paper?

  - Preregistration
  - Detailed misinformation items (full list of items presented in their original format)
  - Full study protocol (including consent form and debriefing, if any)
  - Open-access data
- *Information sharing*. Did the authors use any of the following?
  - Supplemental materials
  - Online repository (e.g., OSF)

In the case of articles reporting multiple studies, we coded for the presence of these elements in the paper as a whole; thus, if one or more studies reported the element in question, the paper was classified as including that element.

Contacting Authors

Because details of ethical practices used were missing for the majority of papers, all corresponding authors were invited to answer the same questions, either via email or a survey (available at https://osf.io/756nv/?view_only=712e902800944febb16e389a4ea8eefd). The first section of the survey asked authors about open-science practices (preregistration, open data, sharing materials, sharing the full protocol including consent form and debriefing if applicable). For each practice, we provided examples and asked authors to specify what they had shared. Authors were also invited to report any other open-science practices implemented. In the second section, authors were asked about ethical practices (declared research topic at the beginning of the study, presence of a misinformation-exposure warning, presence and format of a debriefing, measure of debriefing efficacy, post-debriefing consent). Again, participants were asked about other practices they wished to report.

Results

Information Reported in Papers

Primary results from the scoping review are presented in Table 1; raw data are available at https://osf.io/756nv/?view_only=712e902800944febb16e389a4ea8eefd. The proportion of papers reporting specific ethical practices was rather low. Just 14.25% reported that the topic of the study was presented in the information sheet, and less than 1% provided a misinformation warning. However, these figures are not surprising given the requirement for minor deception in most misinformation research. More surprising is the low frequency of debriefing procedures, with fewer than 30% of papers reporting any debriefing at all. Similarly, only a minority of studies applied open-science practices; 17.95% reported preregistration, and 28% provided open access to data.

Psychology Versus Non-Psychology Papers

While these results may appear unsatisfactory, one important factor to note is that much misinformation research is conducted outside of psychology, which for historical reasons has specific expectations around ethical practices (e.g., APA, 2017) that may not be as clearly laid out in other fields. Psychology has also been central to the replication crisis, and consequently has been a strong driver of open-science practices (Nosek et al., 2022). We therefore investigated differences between psychology and non-psychology papers. To this end, we classified papers based on the journal's disciplinary category in Web of Science and Scopus, with priority given to the WoS classification. Papers were classified as 'psychology' if they were published in a journal identified as "Psychology/Psychiatry".[4] Other categories were medicine and health, social sciences, communication, and other; see supplement for a detailed breakdown. Psychology accounted for 24% of all included papers.

[4] Papers in *Psi Chi Journal of Psychological Researc*h and *Psicológica* were not listed as Psychology/Psychiatry but were still classified as psychology based on the journal titles.

Table 1

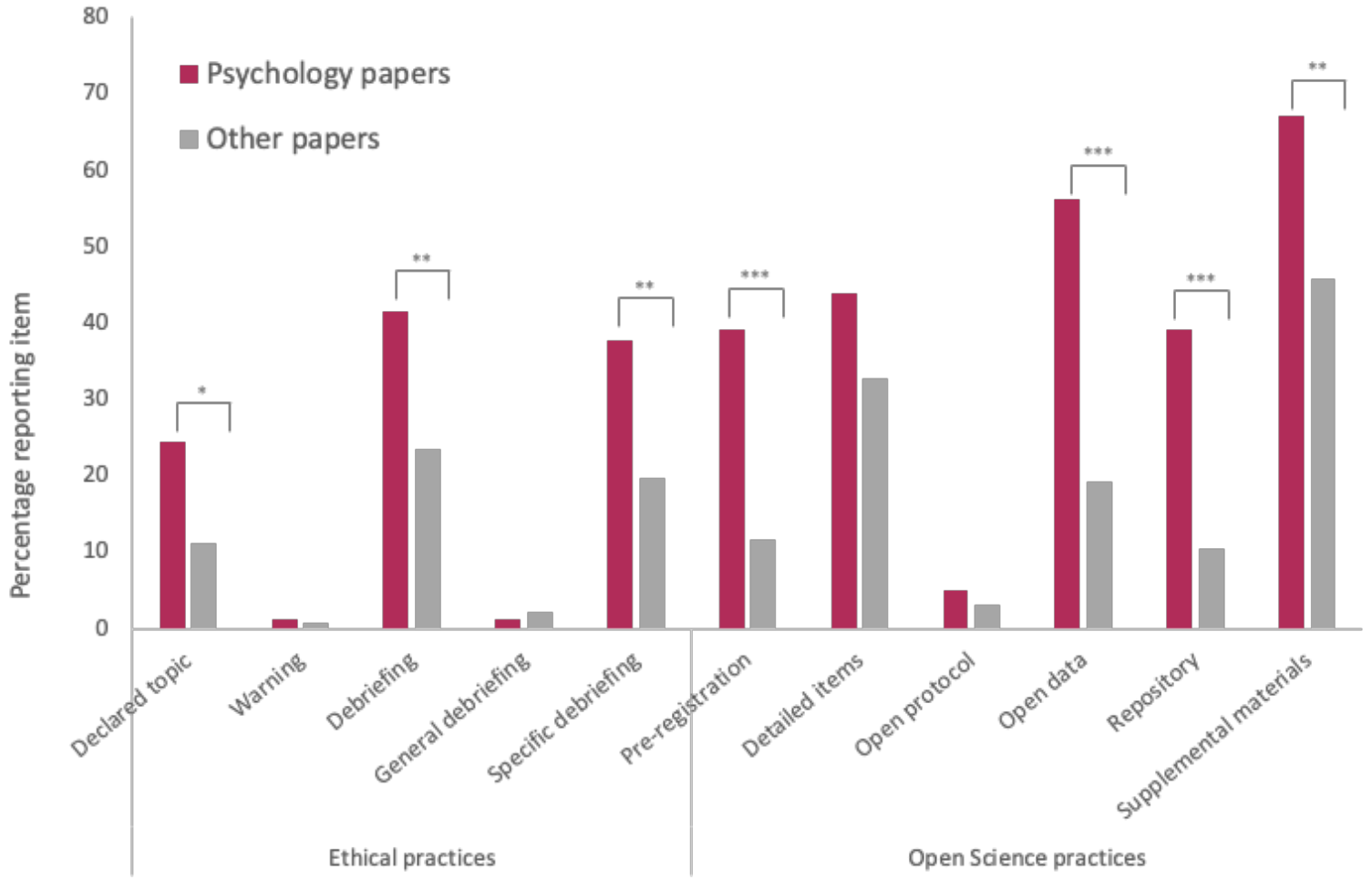
Percentage of Included Papers that Report Each Element of Ethical and Open Science Practices

		Ethical Practices							Open-science Practices					
Year	***n***	**Declared study topic**	**Warning**	**Presence of debriefing**	**General debrief**	**Specific debrief**	**Post-debrief consent**	**Debriefing effectiveness**	**Pre-registration**	**Detailed items**	**Open protocol**	**Open data**	**Repository**	**Supplemental materials**
2016	3	33.33	0.00	33.33	33.33	0.00	0.00	0.00	0.00	33.33	0.00	0.00	0.00	33.33
2017	17	0.00	0.00	41.18	0.00	41.18	0.00	0.00	5.88	47.06	0.00	35.29	11.76	41.18
2018	18	0.00	0.00	16.67	0.00	11.11	0.00	0.00	5.56	44.44	0.00	22.22	16.67	61.11
2019	50	10.00	0.00	24.00	2.00	22.00	0.00	0.00	12.00	40.00	4.00	32.00	22.00	44.00
2020	123	19.51	0.81	29.27	2.44	23.58	0.81	0.81	19.51	32.52	4.07	25.20	13.82	47.15
2021	135	14.07	1.48	25.93	1.48	23.70	0.00	0.00	22.22	32.59	2.96	29.63	20.00	57.04
Total	346	14.16	0.87	27.17	2.02	23.41	0.29	0.29	17.92	34.97	3.18	28.03	17.34	50.87

We then compared the frequency with which each practice was reported in psychology and non-psychology papers. Proportions were compared using z-tests, with Holm-Sidak correction for multiple comparisons. Details can be found in Table S2; see Figure 3 for an illustration. In general, psychology papers were more likely than non-psychology papers to report both ethical and open-science practices. Notably, however, even among psychology papers, only 41.46% reported debriefing participants.

Figure 3

Proportion of Psychology and Non-Psychology Papers Reporting Each Practice.



Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Unreported Practices: Data From a Survey of All Authors

Out of 281 unique corresponding authors, 87 took part in the survey (31% response rate), providing answers for 97 articles (28% of the included papers). A higher response rate was obtained from authors of psychology papers (40%) than non-psychology papers (28%). The authors of 11 papers had shared the full study protocol, but were still included in case they wished to declare additional practices. Prior to analysis, responses to some multiple-choice questions were recoded based on authors' text answers. For instance, some participants declared they had publicly shared materials, but when asked to specify what they had made available, only mentioned examples provided in the article itself. Others declared having used only a general debriefing, but then described a detailed debriefing. Summaries of original versus recoded responses may be found in Table S3.

Table 2 examines papers written by survey respondents, comparing how often each practice was reported in the papers and declared in the survey. Data for papers published in psychology versus other journals can be found in Tables S4 and S5. The data demonstrate that survey respondents were in fact engaging in ethical practices—especially debriefing—at higher rates than suggested by the published record. For example, only 37.5% of participants reported debriefing in their papers, but 73% reported engaging in this practice in the survey. In general, researchers who provided detailed debriefings were more likely to report this in their papers than those who only provided more general debriefings. Virtually no authors reported obtaining post-debriefing consent or measures of debriefing efficacy in their papers, with rates of only 7% and 4%, respectively, even among survey respondents. Similarly, authors also reported using open-science practices that were not declared in the papers, particularly regarding availability of the full study protocol. Use of open-science practices was reported by approximately half of survey respondents.

Finally, we looked at the relationship between open-science and ethical practices in the data we extracted and in what was reported by the authors. To do so, we transformed each set of practices into a discrete variable, counting the number of related practices extracted or reported (e.g., using both open data and a preregistration yielded a score of 2 for open-science practices). The relationship between open-science and ethical practices extracted during the review was significant in the overall dataset, $r(344) = .27$, $p < .001$, and in the subset of papers covered in the survey, $r(94) = .24$, $p = .018$. This suggests that authors who engage in open-science practices are indeed more likely to report details of their ethical approach and debriefing processes. However, there was no relationship between open-science and ethical practices in what the authors declared in the survey, $r(94) = .08$, $p = .457$.

Table 2

Comparison of Data Reported in Papers and Declared in the Survey Among the Survey Respondents (N = 86, covering 97 papers).

	Ethical practices						Open-science practices			
	Warning	**Debriefing**	**General debrief**	**Specific debrief**	**Post-debrief consent**	**Measure of debriefing efficacy**	**Pre-registration**	**Detailed items**	**Open data**	**Open protocol**
Reported in paper (%)	2.08	37.50	2.08	33.33	1.04	1.04	29.17	37.50	38.54	4.17
Obtained from survey (%)[5]	19.79	72.92	29.17	41.67	7.29	4.17	38.54	52.08	51.04	42.71
Δ survey - paper	17.71	35.42	27.09	8.34	6.25	3.13	9.37	14.58	12.50	38.54
% change	851.44	94.45	1302.40	25.02	600.96	300.96	32.12	38.88	32.43	924.22
z	-3.93	-4.93	-5.17	-1.19	-2.17	-1.36	-1.37	-2.03	-1.74	-6.30
p	< .001	< .001	< .001	.233	.030	.174	.170	.042	.082	< .001
Corrected *p*	**.001**	**< .001**	**< .001**	.428	.168	.428	.428	.194	.289	**< .001**

[5] These data include recoded responses, in line with the rules outlined above. The declared and recoded data may be viewed in supplemental materials.

Discussion

What Do Misinformation Researchers Do, and What Do They Report?

Two main conclusions may be derived from the present scoping review: First, misinformation researchers are less likely to engage in ethical practices such as debriefing than we might hope, and second, those who do include a debriefing do not always report it in their papers. Less than a third of all included papers reported debriefing procedures; however, more than two-thirds of survey respondents indicated that they debriefed participants.

The rates at which authors reported debriefing were lower than those reported in previous studies of deceptive research (e.g., Sharpe & Faye, 2009). One explanation for this may relate to the recent growth in misinformation research conducted in disciplines other than psychology (i.e., more than 70% of included papers). Our results demonstrate that authors of psychology papers were more likely to report debriefing—though the rate of reporting was still only about 42%. It is perhaps unsurprising that psychologists are more likely to engage in formal ethical practices; explicit ethical codes of practice are available from virtually every national psychology body (e.g., the American Psychological Association, Psychological Society of Ireland, etc.). Moreover, many psychology undergraduates are trained in ethical practice and required to obtain ethical approval for their research (Ruiz et al., 2020).

Another potential explanation relates to research design. As noted in the Method section, we had initially intended to exclude non-experimental research. To avoid arbitrary exclusions of misinformation studies employing cross-sectional methods (e.g., studies of individual differences in misinformation susceptibility; Greene & Murphy, 2020; Pennycook & Rand, 2019), we broadened inclusion criteria to encompass all empirical study designs. As a result, the review included a high proportion of survey-style studies (approximately 40% of included papers), in which misinformation exposure took the form of a list of “myths” or

"common beliefs" about a given topic (e.g., COVID-19) that participants were asked to endorse. Anecdotally, judging from e-mail responses to our survey invitation, the authors of these papers often do not consider themselves to be exposing participants to misinformation, and therefore do not believe debriefing to be necessary. The rapid growth of research into online misinformation—especially as it relates to COVID-19—may have led to a blurring of the lines between experimental research (which would typically be followed by a debriefing) and non-experimental, non-deceptive survey studies, which often do not require debriefing (Allen, 2017; APA, 2017).

The rate at which researchers tend to report their debriefing procedures appears to be determined in part by the nature of the debriefing. Overall, about 23% of papers reported providing a specific debriefing, though this was more common in psychology papers (approx. 38%). The results of the author survey indicate that, where a specific debriefing was employed, authors tended to report it in their papers; where a more general debriefing that did not address specific items was used, authors tended not to mention the debriefing.

Despite calls for researchers to obtain explicit post-debriefing consent for data use (e.g., Barchard & Williams, 2008, Miller et al., 2008), the use of this practice was vanishingly rare. Only one paper (Murphy et al., 2020) reported using both post-debriefing consent and a measure of debriefing effectiveness, and only a handful of authors reported obtaining post-debrief consent in their survey responses.

As part of our investigation of researchers' reporting practices, we also considered the frequency with which they engaged in open-science practices, with the goal of encouraging transparent conduct and reporting of misinformation research. As with the other ethical practices, authors were more likely to report having engaged in open-science practices when explicitly asked about them in the survey than they were to declare them in their papers. While the frequency of some practices—such as preregistration—seems to be increasing over

time, the reporting of other practices has remained at a fairly stable rate over the last six years. Approximately half of the included papers incorporated some open-science elements. A moderate correlation was observed between the reporting of open-science and ethical practices, suggesting that transparency in one domain tends to be accompanied by transparency in the other. This provides support for the idea that engaging with open-science practices may increase reporting of debriefing and other ethical protocols, thus demystifying these procedures for novice researchers.

Recommendations for Best Practice

We recommend that all studies in which participants are exposed to misinformation with potential real-world impact should be followed by an explicit debriefing in which the incorrect information is corrected, even if the study is not framed as an investigation of misinformation, but instead focuses more generally on beliefs or misperceptions. As noted earlier, only explicit and specific debriefings are effective at reducing belief in misinformation presented during an experiment (Misra, 1992; Greenspan & Loftus, 2021). Researchers may wish to refer to the Debunking Handbook for concrete suggestions for designing debunking interventions (Lewandowsky et al., 2020). A common complaint regarding debriefing is that too little background information is supplied regarding the purpose of the experiment, even though participants typically view detailed explanations favourably and are happy to engage with well-designed debriefing materials (Brody et al., 2000). Even when communicating evidence about objectively false claims, it is important to communicate in a non-authoritative way. We should not appear to dictate what our participants believe even if we provide strong evidence for factual (and against false) claims.

Sometimes, misinformation researchers may wish to forego debriefing entirely, because they (i) fear participants may be upset about being exposed to false information, (ii) assume participants may not appreciate being told that some information has been

deemed true or false, or (iii) worry about participant-pool contamination if debriefed participants pass on information about the nature of the experiment. None of these reasons justify foregoing debriefing (Dearman & Beard, 2009; Sommers & Miller, 2013).

Special attention is warranted in studies where a substantial number of participants are expected to drop out after misinformation exposure (e.g., two-part online studies). A solution can be to send every participant of the first phase a hyperlink to the debriefing sheet at the conclusion of the study via the participation platform (after obtaining consent to do so at the outset). Anecdotally, we have had a surprising amount of positive (and no negative) feedback from online participants in such cases, especially where the debriefing sheet provided useful resources, such as access to high-quality information (e.g., WHO information on vaccines). In cases where the misinformation has the potential to cause harm, it may be prudent to provide a prominent button on the experiment web page that participants are encouraged to click if they wish to leave the study early. This button can redirect to a full debriefing, to avoid participants being left with the impression that presented misinformation was true.[6]

A secondary recommendation is to include more information on debriefing procedures in our papers. As noted above, and in previous work (Miller et al., 2008; Sharpe & Faye, 2009), many researchers fail to fully report their debriefing procedures. While there is much current debate about methodological reporting standards (e.g., LeBel et al., 2013), these often do not include any reference to debriefing procedures (e.g., AERA, 2006). Current APA reporting standards (Appelbaum et al., 2018) mention "ethical standards […] and safety monitoring" but do not mention debriefing explicitly. The absence of this information in our papers may give the erroneous impression that debriefing is not an ethical

[6] Sample code for including such a button in Qualtrics surveys is provided on the OSF at https://osf.io/756nv/?view_only=712e902800944febb16e389a4ea8eefd.

necessity in misinformation studies. Absent mandatory journal policies, it is up to authors to provide more information on debriefing procedures to make this a normative behaviour.

The below list summarises our main recommendations. It presents a number of aspects that researchers using real-world misinformation should consider when planning, implementing, and describing debriefing procedures.[7]

1. Consider whether exposure to real-world misinformation is necessary to answer the research question. If so, can a topic with low risk of harm be used?
2. Explain to participants that they were exposed to misinformation, *why* they were exposed, and what the potential consequences of being exposed to misinformation may be.
3. Specifically list all pieces of misinformation participants were exposed to, clearly indicating that they are false and, if possible, explaining why they are false. This can involve explaining the misleading argumentation strategy used (e.g., cherry picking; see Cook, 2020) or providing factual alternative information.
4. Do not present participants with misinformation that they did not encounter. In studies where participants are exposed to a random sample of misinformation items, it may be tempting to provide a common debriefing to all participants containing the full list of items. This can be confusing, and may lead to a lack of trust in the debriefing procedure if participants do not remember having previously encountered some of the items.
5. Provide additional relevant facts where appropriate (e.g., information on the scientific consensus on climate change). To minimise the potential for alienating participants and the appearance of bias, highlight that true-versus-false

[7] Note that there are additional elements of a debriefing that apply more generally, such as providing participants with an opportunity to ask questions or express concern to the relevant ethics office.

designations refer only to the factual information presented (e.g., that there is a scientific consensus on climate change and the need to reduce carbon emissions) and not to any related issues that are a matter of social or political opinion (e.g., do not prescribe any specific approach towards emissions reduction).

6. Provide access to useful information from expert sources or organizations, where appropriate (e.g., a WHO fact sheet on vaccines).
7. Test participants' understanding of the misdirection, for example with a multiple-choice question.
8. Offer participants the opportunity to withdraw their data post-debriefing once they have been informed about the misdirection.
9. Ensure all participants exposed to the misinformation have an opportunity to engage with the debriefing materials.
10. Explain the debriefing procedure fully in the manuscript and consider making debriefing materials accessible (e.g., in a supplement or public repository such as the Open Science Framework).

Conclusion

The rise of the internet and social media as a central feature of public discourse has been accompanied by an increase in online misinformation. It is therefore critical that psychologists continue to study the impact of such misinformation, as well as the factors affecting its spread. However, in doing so it is essential that we adhere to the highest standards of ethical practice, and that we make these practices visible and normative.

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