Data is not available upon request

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Many journals now require data sharing and require articles to include a Data Availability Statement. However, several studies over the past two decades have shown that promissory notes about data sharing are rarely abided by, and that data is generally not available upon request. This has negative consequences for many essential aspects of scientific knowledge production, including independent verification of results, efficient secondary use of data, and knowledge synthesis. Here, I assessed the prevalence of data sharing upon request in articles employing the Implicit Relational Assessment Procedure published within the last 5 years. Of 52 articles, 42% contained a Data Availability Statement, most of which stated that data was available upon request. This rose from 0% in 2018 to 100% in 2022. Only 25% of articles' authors actually shared data upon request. Among articles stating that data was available upon request, only 17% shared data upon request. The presence of Data Availability Statements was not associated with higher rates of data sharing ($p = .80$). Results replicate those found elsewhere: data is generally not available upon request, and promissory Data Availability Statements are typically not adhered to. Issues, causes, and implications are considered.

Verifiability is a cornerstone of the scientific method. Sharing research data is crucial for the advancement of scientific knowledge through verification. Data sharing promotes transparency, reproducibility, and credibility in scientific research, which are essential for maintaining the integrity of the scientific process (Munafò et al., 2017). One way in which journals have sought to promote data sharing is through the use of Data Availability Statements, which provide information on the availability and accessibility of research data. In this article, I examine the prevalence of both Data Availability Statements and actual data sharing upon request, and the relationship between them.

It is increasingly common for journals to require Data Availability Statements to be reported in submissions. Typically, these journal policies require that a URL to the publicly available data is reported in the manuscript or, failing that, the authors state that the data is[1] available upon request. Naturally, policies also allow for situations where it is not possible to share the data for stated reasons. These policies therefore build on the same principle that many funding organisations have built their data sharing policies around, namely that data should be "as open as possible, and as closed as necessary" (European Comission, 2023).

Journal policies requiring and explicating data sharing are to be applauded, as data sharing is essential to independent verification of results, efficient secondary use of data, and knowledge synthesis (Evans, 2022). Journals are also joined by both professional societies (e.g., APA, APS, and ACBS) and the world's largest research funding agencies (e.g., NIH and EU) in encouraging or requiring data sharing (Nunes, 2021).

However, there is unfortunately already evidence that mere encouragements to share data are insufficient. Nearly two decades ago, Wicherts et al. (2006) showed that, at journals that had policies requiring data sharing upon request, only 27% of datasets could be obtained when requested. Unfortunately, even with the increasing number of platforms that make it easy to share data, the rate at which data can be obtained upon request is still problematically low (Alsheikh-Ali et al., 2011; Savage & Vickers, 2009; Tedersoo et al., 2021). Recently, a large study of several thousand publications found that, among articles that included a statement that data was available upon request, only 7% of datasets could be obtained (Gabelica et al., 2022).

[1] I use data as singular throughout, following both its modal usage (Google Trends, 2023) and the recommendations of leading style guides for the last decade (Rogers, 2012).

The motivation for this study, and the choice of the specific literature in which I examined, came from my own experience of the difficulty of obtaining data upon request. Recently, I received peer reviews for a manuscript I wrote that meta-analysed the reliability of the Implicit Relational Assessment Procedure (IRAP; for reliability meta-analysis see Hussey & Drake, 2020). Reviewers raised the concern that the data, which came from two research groups, may not be representative of IRAP data collected in other labs. In order to try to address this point, I contacted other researchers who had published research using the IRAP to ask them to contribute their data to the meta-analysis. Often, authors could not be contacted, didn't reply, or declined, even when their published articles contained explicit statements that they would share data upon request. Examination of the literature showed that this anecdotal experience was the norm rather than the exception (Alsheikh-Ali et al., 2011; Gabelica et al., 2022; Savage & Vickers, 2009; Tedersoo et al., 2021; Wicherts et al., 2006). Only one study to date has examined the prevalence of Data Availability Statements within the behavioral research community, finding a very low prevalence (6.2%: Lear et al., 2023). However, this study was limited to the inspection of a single journal, the Journal of Contextual Behavioral Science. This study seeks to provide convergent evidence via different means, by studying data sharing in publications using a task generated by and mostly used by the behavioral research community, agnostic to which journal it is published in. Additionally, whereas Lear et al. (2023) examined articles published in a single year, the current work examines a five year period in order to examine trends across them.

Method & Results

Data availability statement

All data and code to reproduce the results reported here are available at osf.io/nugzb. All IRAP datasets that could be publicly shared are also available at that link. Datasets that cannot be publicly shared due to the original author's requirements are available upon request from the author (ian.hussey@icloud.com).

Article search

I contacted the authors of every IRAP publication published in the last 5 years with a data sharing request. In order to choose the articles that I would attempt to obtain the data for, I employed an existing systematic search of the published IRAP literature (2006 to 2022, in English, listed in the Web of Science or psycINFO databases). Full details of that systematic search, including Boolean search strings, all materials necessary to reproduce, reuse, or update the search, all data, and R code to reproduce the analyses are available in that manuscript (Hussey, 2023). Given that data has a half-life, insofar as it becomes increasingly hard to obtain over time, I considered only articles published within the last 5 years (i.e., those with a publication date of 2018 to 2022). I excluded articles that either I or Chad Drake was a co-author of, as I already had the data for these studies (i.e., they are included in Hussey & Drake, 2020). I found 52 such articles. The number of IRAP articles per journal can be found in Table 1.

Table 1. Number of IRAP articles by journal.

Journal	*N* articles
The Psychological Record	24
International Journal of Psychology & Psychological Therapy	8
Journal of Contextual Behavioral Science	5
Frontiers in Psychology	4
Behavior and Social Issues	2
Behavioural Processes	2
Dementia: The International Journal of Social Research and Practice	1
Emotional & Behavioural Difficulties	1
International Journal of Environmental Research and Public Health	1
Journal of Behavior Therapy and Experimental Psychiatry	1
Journal of Eating Disorders	1
Motivation and Emotion	1
Social Psychology of Education: An International Journal	1

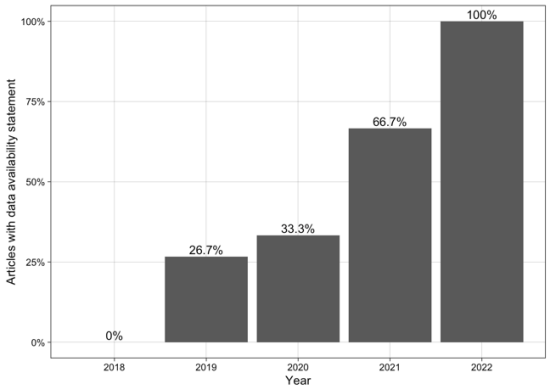
Journal policies

Interestingly, three of the top four journals have data sharing policies that require data sharing. The Psychological Record requires data sharing except in circumstances that must be justified at time of submission: "A submission to the journal implies that materials described in the manuscript, including all relevant raw data, will be freely available to any researcher wishing to use them for non-commercial purposes, without breaching participant confidentiality... All original research must include a Data Availability Statement." (The Psychological Record, 2023). The International Journal of Psychology & Psychological Therapy does not have a data sharing policy (International Journal of Psychology and Psychological Therapy, 2023). The Journal of Contextual Behavioral Science requires data sharing except in circumstances that must be justified at time of submission: "It is expected that all authors who publish in the Journal of Contextual Behavioral Science will share data upon reasonable request. Therefore, we ask authors who do not already have their data openly available to the public to include an author note indicating 'Data is available upon reasonable request'. Authors can request to leave this note out if they can provide an adequately strong justification for not doing so in the cover letter." (Journal of Contextual Behavioral Science, 2023). Finally, Frontiers requires data sharing except in circumstances that must be justified at time of submission: "Frontiers requires that authors make the 'minimal data set' underlying the findings described and used to reach the conclusions of the manuscript, available to any qualified researchers." (Frontiers, 2023).

Prevalence of Data Availability Statements

Of the 52 articles, 21 (42.3%) contained a data sharing statement. Encouragingly, the proportion of articles increased from 0% in 2018 to 100% in 2022 (see Figure 1). It is worth noting that it is difficult to define a precise date when these policies came into effect. For example, from speaking the editor of JCBS, these policies were progressively rolled out through the different levels of the journal's article handling processes over time. Regardless, results demonstrate that data sharing statements have moved from absent to ubiquitous across these years.

Figure 1. Percent of articles reporting a Data Availability Statements by year.



Prevalence of data sharing upon request

I sent a data sharing request to authors of every article via email. A copy of the email can be found in the supplementary materials (osf.io/nugzb). In summary, it stated that I wished to obtain the data from publications using the IRAP published in the last 5 years; that data would be screened for any personally identifying information and then posted to a project on the Open Science Framework; and that I hoped that authors could reply within two weeks to indicate whether they are able and willing to share the data.

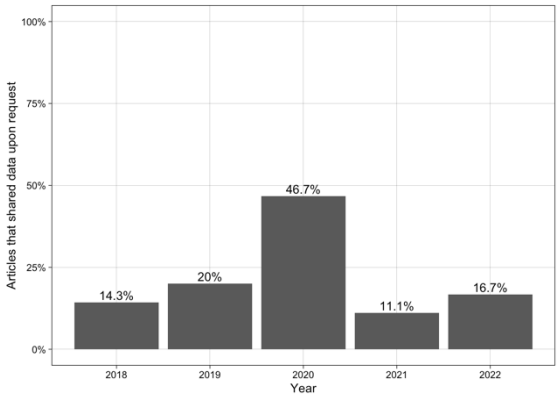
In some cases, authors replied that they could not allow data to be made public, in which cases I replied that I was also willing to obtain the data and not make it public. I also noted that I was willing to sign any data sharing agreements that authors felt were necessary. The strategy was therefore to request data in order to make it openly available in the first instance, and to request it be shared with me but not made public as a fallback option.

In the first instance I attempted to contact the corresponding author using the email listed in the published article. If I did not receive a response offering to share the data, I then contacted the apparent senior author. If I again did not receive a response, I contacted other authors starting with the senior author. In many cases, authors instructed me to speak to other co-authors to obtain the data. This was therefore a highly iterative process of sending email request. At least two co-authors of every article were contacted.

In order to define an study endpoint, results were finalised 60 days after sending the first email to each author. This number was based on previous work by Tedersoo and colleagues (2021) who demonstrated that authors who shared data upon request tend to do so relatively quickly, with the probability of data being shared per day of waiting falling rapidly over time (50% within 15 days, c.85% within 30 days, c.97% within 60 days).

Aggregating results across all co-authors of each article, I received a reply to my email in 82.7% of cases (43 articles). Authors reported being able and willing to share their data in 42.3% of cases (22 articles). Authors actually shared their data in 25.0% of cases (13 articles).

Figure 2. Percent of articles sharing data upon request by year of publication.



Unlike the prevalence of data availability statements, no linear trend in data sharing upon request was observed between articles published in 2018 to 2022 (see Figure 2). This was somewhat surprising, given that (a) more recent years had greater coverage of Data Availability Statements, and (b) it might be reasonably assumed that the prevalence of data losses or co-authors becoming uncontactable would increase over time.

Relationship between Data Availability Statements and actual data sharing

Of the 30 articles without a Data Availability Statement, 7 shared data upon request (23.3%). Of the 22 articles with a Data Availability Statement, 6 shared data upon request (27.3%). A Chi-squared test suggested that the presence of a Data Availability Statement was not associated with a higher rate of actual data sharing upon request, $\chi(1) = 0.06$, $p = .80$.

It is also useful to consider data sharing in the subsets of different types of Data Availability Statements. I make a distinction between actual sharing at time of publication (e.g., a URL included in the article that links to a data repository containing the data for the study, or reference to supplementary

materials published alongside the article) and promissory data sharing (e.g., a statement that data is available upon request, or upon 'reasonable' request).

Three articles' data sharing statements represented claims of actual data sharing at time of publication. Of those two actually provided the data (both via links to the Open Science Framework or ResearchGate). One article stated that "All data generated or analysed during this study are included in this article and its supplementary information files" (Murphy et al., 2022). However, no such supplementary materials were available on the journal's website. 66.7% of articles with data sharing statements implying actual data sharing at time of publication shared data without the need to contact the authors.

Eighteen articles with promissory data sharing statements were found (e.g., stated that data was available upon request). Of these 16.7% (3 articles) actually shared the data upon request. Even this result is qualified by the fact that, when contacted, the author named in the Data Availability Statement stated that they in fact never were in possession of the data (although a different author was able to supply the data). As such, it is important to note that even when data can be obtained upon request, Data Availability Statements can be misleading or incorrect.

Impediments to data sharing

This section contains some slightly more qualitative reflections on the replies that I received and their insights they provide into impediments to data sharing.

It is often not possible to correspond with corresponding authors. Some first and corresponding authors were simply impossible to find working contact details for: the email addresses listed in article did not work, and no up to date details could be found online, from contacting their collaborators, or scouring social media. Worryingly, this included authors of articles published within the last calendar year (2022).

In their replies to the data sharing request, multiple authors stated to that they were on maternity leave or were retired. Both are reasonable circumstances, however both situations highlight ways in which promissory data sharing is ineffective due to extremely foreseeable circumstances. For example, whereas academics put plans in place to cover or their research and teaching duties while on leave, it seems that less attention is given to handing over responsibility for data availability. Similar foreseeable circumstances involve researchers moving between institutions, leaving academia for other careers, or retiring.

Some authors were initially responsive to my email and stated that I should instead contact the first author, but when asked did not offer any suggestions for current contact details for those authors. In some cases, this was plausibly due to losing contact with the author. In other cases, this was less plausibly so. For example, one author who was previously responsive to emails stopped replying when I asked for two of his co-authors' contact details that I could not find elsewhere online. Given that these co-authors were clearly known to the author (i.e., their spouse and their spouses' business partner), it seems implausible that the author did not have these details. While there are many structural impediments to data sharing and we should assume good will, there were nonetheless situations where individuals' behaviour was difficult to distinguish from stonewalling. Data 'available upon request' leaves us entirely at the whim of authors' willingness not only to share the data, but even to share the contact details for those who might have the data.

Reasonable steps should be made to be able to ensure that we can in fact correspond with a corresponding author. For example, use of email addresses that are not tied to employment at a specific institution, and a deeper understanding of and commitment to the lasting responsibilities that come with being corresponding author.

The ethics of data sharing should be considered holistically. Data sharing has ethical implications, but not sharing also has ethical and research integrity implications. Some authors stated that the data could not be shared under the requested circumstances on the basis that the consent forms did not state that the data would be made public (i.e., denial on ethical grounds). In each case, I followed up with a request that it be shared privately without public sharing, and that I was happy to sign any necessary data sharing agreement. However, in the majority of such cases, these initial ethical considerations were made redundant as authors then replied that data from projects was in fact lost, or the authors stopped replying. This may represent a selective deployment of caution: much caution placed on the ethical requirement not to share data in certain ways, and not enough on research integrity, such as ensuring that results can be independently verified and uphold prior commitments to data sharing (e.g., to journals, funders, and professional bodies).

Unfortunate and sometimes untimely data losses occur. One researcher noted that they did have the data until very recently but they mistakenly wiped the hard drive of the laptop on which they were stored. Given the high concentration of authorships of IRAP papers by a small number of authors (Hussey, 2022) – a concentration of authorship that is likely to also be found in many other small subfields – even a single data loss can involve the loss of data associated with large proportions of the literature, as was the case here.

Violations of Data Availability Statements, institutional data policies, and public statements about data sharing were observed. In addition to journals' data sharing policies, institutions and funding bodies increasingly also assert their own Research Data Management policies regarding the retention, storage, and access to data by those seeking to verify results. In addition to non-adherence to journal Data Availability Statements, researchers were observed violating their

institutions' research data management policies (e.g., RDM policies at Ghent University and Radboud University). Some authors also contradicted their own recent public statements about the importance of data sharing. For example, one author of IRAP papers who declined to sharing any data was also a co-author of the Association for Contextual Behavioral Science's recent Open Science recommendations report, which states "we recommend open data and transparency whenever possible." (Task Force on the Strategies and Tactics of Contextual Behavioral Science Research, 2021).

Finally, there were instances of apparent inclusion of tokenistic or misleading Data Availability Statements. Some authors listed as the contact person in the Data Availability Statement, when contacted, stated not only did they not currently have access to the data but that they had never been in possession of it.

Discussion

Results demonstrated that the prevalence of Data Availability Statements in IRAP articles has risen from 0% in 2018 to 100% in 2022. This is encouraging and the journals should be applauded for embracing these policies and investing in the administrative infrastructure to implement them.

However, results also demonstrated that very few authors of recent IRAP publications share data on request (25.0%, 13 of 52 articles). Worryingly, data sharing was lower in articles that stated that data was available upon request (16.7%, 3 of 18 articles) than those that included no Data Availability Statement at all (25.8%, 8 of 31 articles). Disappointingly, there was therefore no evidence that Data Availability Statements increased data sharing.

While the overall rate of data sharing is disappointing, the non-adhere to journals' data sharing policies – which authors explicitly agree upon submission – is obviously unacceptable. If authors are shown to routinely disregard this specific journal policy (and in some cases also their institutional Research Data Management Policies and their own public positions on data sharing), this raises the question: has the research integrity of other as-yet unexamined elements of the research process also been undermined?

Unfortunately, perhaps these results are less surprising when viewed through the lens of the incentive structures in science. The contingencies that govern scientific research generally stop at publication of a given article. Publications typically function as reinforcers. Curating data and code to make it openly available, or even genuinely sharable upon request, has few reinforcers: it is more work for little reward. Nonetheless, there are now many resources which practical guidance to researchers on how to share data more easily (Gilmore et al., 2018; Meyer, 2018). Research elsewhere has considered other specific elements of the research process that make data sharing easier, such as the content of consent forms in light of the EU's GDPR data legislation (Hallinan et al., 2023), how-to guides on using data sharing platforms such as the Open Science Framework (Soderberg, 2018), and tools to easily create data codebooks that allow others to interpret and use shared data (Horstmann et al., 2020).

Equally, there are currently few punishers for failing to adhere to Data Availability Statements. As employers, institutions have the more scope to enforce Research Data Management policies among their employees as a matter of research integrity. Having spoken to them about the unfulfilled data requests described here, many institutions Research Integrity offices seem to have a growing interest in defining and enforcing such policies. However, as yet, journals have asserted relatively fewer demands on authors. Some journals go further than requiring Data Availability Statements and actually require data and code to be shared as a condition of publication. A small number of journals even check the computational reproducibility of results prior to publication (e.g., Meta-Psychology). No journal as yet has established any punishment mechanisms for breaches of data sharing agreements, such as a policy of rejecting future submissions to the journal if they receive and verify a report of a refusal to abide by the data sharing agreement in a previous publication. These policies and others would all likely be extremely effective in increasing data sharing, however they also require yet more investment from already-under resourced journal staff, most of whom are volunteers. No solution to these problems is trivial, but in my opinion the current state of affairs is untenable. As stated in previous similar articles, I conclude that "statements of data availability upon (reasonable) request are inefficient and should not be allowed by journals" (Tedersoo et al., 2021). The presence of Data Availability Statements that are not adhered to or enforced in any way risks giving rise to what is referred to as 'Open Washing': the appearance of transparency without adequate follow-through (Villum, 2014).

Of course, data sharing is not a panacea or an end itself, but merely one step towards increasing the reproducibility of findings and unlocking data reuse potential. Recent research has demonstrated that even when articles share their data, the results reported in the articles can only be precisely reproduced in a small minority of cases. If future research is to become increasingly reproducible, it will have to become not only increasingly verifiable through transparency, but also increasingly verified through actual checks, at least in a proportion of cases. It may also be the case that even a small but non-zero expectation that others may actually ask for our data or check our reported results for their accuracy may increase the their reproducibility. If so, although studies such as the current one do not show support for the efficacy of low intensity data sharing interventions such as Data Availability Statements, it is possible that the act of conducting research such as this also acts as an intervention. Historically, the probability of being

asked to share ones data is quite low. Studies such as the current one, or indeed the potential for future journal-wide audits of data sharing held on a regular basis (e.g., Lear et al., 2023), may serve not only to test but also establish normative expectations of data sharing.

Author notes

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