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Data sharing and re-use in the traumatic stress field: An international survey of trauma researchers

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ABSTRACT

Background: The FAIR data principles aim to make scientific data more Findable, Accessible, Interoperable, and Reusable. In the field of traumatic stress research, FAIR data practices can help accelerate scientific advances to improve clinical practice and can reduce participant burden. Previous studies have identified factors that influence data sharing and re-use among scientists, such as normative pressure, perceived career benefit, scholarly altruism, and availability of data repositories. No prior study has examined researcher views and practices regarding data sharing and re-use in the traumatic stress field.

Objective: To investigate the perspectives and practices of traumatic stress researchers around the world concerning data sharing, re-use, and the implementation of FAIR data principles in order to inform development of a FAIR Data Toolkit for traumatic stress researchers.

Method: A total of 222 researchers from 28 countries participated in an online survey available in seven languages, assessing their views on data sharing and re-use, current practices, and potential facilitators and barriers to adopting FAIR data principles.

Results: The majority of participants held a positive outlook towards data sharing and re-use, endorsing strong scholarly altruism, ethical considerations supporting data sharing, and perceiving data re-use as advantageous for improving research quality and advancing the field. Results were largely consistent with prior surveys of scientists across a wide range of disciplines. A significant proportion of respondents reported instances of data sharing and re-use, but gold standard practices such as formally depositing data in established repositories were reported as infrequent. The study identifies potential barriers such as time constraints, funding, and familiarity with FAIR principles.

Conclusions: These results carry crucial implications for promoting change and devising a FAIR Data Toolkit tailored for traumatic stress researchers, emphasizing aspects such as study planning, data preservation, metadata standardization, endorsing data re-use, and establishing metrics to assess scientific and societal impact.

Intercambio de datos científicos y su reutilización en el área del estrés traumático: Una encuesta internacional en investigadores de trauma

Antecedentes: Los principios FAIR para el manejo de los datos científicos tiene como objetivo el hacer los datos más fáciles de encontrar, accesibles, interoperativos y reutilizables. Respecto a la investigación en el área de estrés traumático, las prácticas FAIR pueden ayudar a acelerar los avances científicos para mejorar la práctica clínica y pueden reducir la carga de los participantes. Los estudios previos han identificado factores que influyen el intercambio de los datos científicos y su reutilización entre científicos, tales como la presión normativa, la percepción del beneficio sobre la carrera, el altruismo académico y la disponibilidad de repositorios de datos. Ningún estudio previo ha evaluado la perspectiva de los investigadores y las prácticas relacionadas con el intercambio de datos científicos y su reutilización en el área del estrés traumático.

Objetivo: Investigar las perspectivas y las prácticas de los investigadores del área de estrés traumático alrededor del mundo en relación con el intercambio de datos científicos, su reutilización y la implementación de las prácticas FAIR para la construcción informada de un Instrumento de Datos FAIR para investigadores de estrés traumático.

Métodos: Un total de 222 investigadores de 28 países participaron en una encuesta en línea disponible en siete idiomas para analizar sus perspectivas en relación con el intercambio de datos científicos, su reutilización, prácticas actuales y potenciales facilitadores y barreras para adoptar los principios FAIR para el intercambio de datos científicos.

Resultados: La mayoría de los participantes mostraron una perspectiva positiva relacionada con el intercambio de datos científicos y su reutilización, respaldando un alto altruismo académico,

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Datos FAIR; intercambio de datos; reutilización de datos; prácticas de investigación; investigación en estrés traumático; perspectiva de investigadores

关键词

FAIR数据, 数据共享, 数据重用, 研究实践, 创伤应激研究, 研究者观点

HIGHLIGHTS

- Traumatic stress researchers worldwide responding to a survey held generally positive views on data sharing, endorsing scholarly altruism and pro-sharing ethical considerations, and rating data re-use as useful for advancing the field.
- While many respondents reported instances of sharing or re-using data, gold standard practices such as formally depositing data in established repositories were reported as infrequent.
- Barriers to data sharing and re-use included time constraints, funding, and a lack of familiarity with practices to make data more Findable, Accessible, Interoperable, and Re-usable (FAIR).

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consideraciones éticas que sustentan el intercambio de datos científicos y percibiendo la reutilización de datos científicos como ventajosa para mejorar la calidad de la investigación y el avance del área. Los resultados fueron muy consistentes con encuestas previas en científicos a lo largo de diferentes disciplinas. Una proporción significativa de los encuestados refirieron ejemplos de intercambio de datos científicos y su reutilización, pero se reportaron como infrecuentes el uso de prácticas consideradas como patrones de oro para el ingresar formalmente la información en repositorios ya establecidos. El estudio identifica barreras potenciales tales como limitaciones de tiempo, financiación y escasa familiaridad con los principios FAIR.

Conclusiones: Estos resultados poseen implicaciones cruciales para promover el cambio y formular un Instrumento de Datos FAIR diseñado específicamente para investigadores de estrés traumático, enfatizando aspectos como la planificación del estudio, preservación de datos, estandarización de metadatos, respaldo de la reutilización de datos y el establecimiento de parámetros para evaluar su impacto científico y social.

创伤应激领域的数据共享和重用：创伤研究者的国际调查

背景: FAIR 数据原则旨在使科学数据更易于查找、可访问、可共同操作和可再利用。在创伤应激研究领域，FAIR数据实践可以帮助加速科学进步，以提高临床实践，并可以减轻参与者的负担。前人研究已经确定了影响科学家之间数据共享和重用的因素，例如规范压力，感知的职业利益，学术利他主义和数据存储库的可用性。之前没有研究考查研究者关于创伤应激领域数据共享和重用的观点和实践。

目的: 调查世界各地创伤应激研究者在数据共享、重用和实施FAIR数据原则方面的观点和实践，以便为创伤应激研究者开发FAIR数据工具包提供信息。

方法: 来自28个国家的222名研究者参加了以七种语言提供的在线调查，评估了他们对数据共享和重用、当前做法以及采用FAIR数据原则的潜在促进因素和障碍的看法。

结果: 大多数参与者对数据共享和重用持积极态度，赞同强烈的学术利他主义，支持数据共享的道德考虑，并认为数据重用有利于提高研究质量和推进该领域。结果与之前对各学科科学家的调查基本一致。相当大比例的受访者报告了数据共享和重用的情况，但如将数据正式存入已建立的存储库的金标准做法，据报告并不常见。该研究确定了潜在的障碍，例如时间限制，资金和对FAIR原则的熟悉程度。

结论: 这些结果对于促进变革和设计为创伤应激研究者量身定制的FAIR数据工具包，强调研究计划、数据保存、元数据标准化、认可数据重用以及建立评估科学和社会影响指标等方面具有重要意义。

1. Introduction

The FAIR guiding principles for scientific data were introduced in 2016 as part of the larger movement toward more open and transparent science, across all disciplines (Wilkinson et al., 2016). Making our data more Findable, Accessible, Interoperable, and Reusable (FAIR) can help researchers and research communities address multiple goals, including better stewardship of scientific data for the benefit of the entire research community and extending the impact of any single research study. In fields of study related to clinical health and mental health, such as the traumatic stress field, perhaps the most important aim of FAIR data practices is the acceleration of scientific discovery regarding effective interventions and their delivery – to help ameliorate the impact of adversity and ill health for individuals and communities (Sadeh et al., 2023). By fully utilizing existing research data to address new questions and to help design efficient new studies only when needed, FAIR data practices can also reduce participant burden. While there have been calls to improve the FAIRness of traumatic stress research (Kassam-Adams & Olf, 2020), there have been no prior studies assessing these practices in our field, and thus there is a crucial gap in our knowledge about FAIR data practices (including data sharing and re-use) amongst traumatic stress researchers.

The FAIR principles provide guidance but not specific requirements, as these must necessarily vary by discipline and data type. In summary, the principles state that to be findable, data should be indexed in a searchable resource, preferably a well-established credible repository (*Core Trust Seal*); to be accessible, potential users should have a clear means of gaining (or requesting) access to the data; to be interoperable, data should be encoded in a way that can be read across various software systems; and to be re-usable, data should be richly described in ways that allow future researchers to understand how data were collected and what they represent. The FAIR principles emphasize the key role of metadata (ie, data about data; machine-readable descriptions) – particularly for findability and re-usability.

It is important to note that FAIR is not the same as ‘open’; data can be FAIR but not open (and vice versa). None of the FAIR principles require data to be openly or freely available; FAIR data can be made accessible and re-usable while subject to certain constraints or restrictions on access or use (Wilkinson et al., 2016). Conversely, ‘open data’ are data made available to the public without restrictions on use or dissemination (Collins et al., 2018). But making data openly available does not guarantee that those data are easily findable, preserved in an interoperable format, or documented

sufficiently to support meaningful re-use (ie, FAIR). While there are particular obstacles to making traumatic stress data fully open, nearly all can be made accessible in some form.

1.1 Fairness in practice

Long-standing evidence synthesis approaches, such as meta-analysis, rely on study-level aggregate data. Recent advances such as ‘meta-analytic research domains’ combine and disseminate study-level data in innovative ways (Cuijpers et al., 2023; Cuijpers et al., 2022). In the traumatic stress field, the PTSD-Repository brings together study-level data from over 400 RCTs evaluating treatment of PTSD and substance use in adults (O’Neil et al., 2019). Preservation and integration of individual participant data (IPD) complement and extend these methods, enabling investigators to undertake a range of novel analyses to address research questions not possible with study-level data (Mun & Ray, 2018).

There is a great deal of variation regarding awareness and proficiency in application of the FAIR principles for IPD (David et al., 2020). This variation can be both location- and discipline-specific. There are national and regional variations in funder expectations and governmental regulations related to data protection and privacy, data sharing mandates, and how data must (or must not) be shared or accessed (Sadeh et al., 2023). Researchers working in some disciplines may face particular challenges due to the nature of their data. The field of traumatic stress research, like other health-related research fields, deals both with sensitive data and with potentially identifiable data, which requires balancing the benefits of data accessibility and re-use with protection of participant privacy (Landi et al., 2020). Understanding the current state of knowledge, motivations, and barriers in applying FAIR principles could be very helpful in increasing FAIR data use in the traumatic stress field.

In contrast to ‘big data’ research disciplines, fields such as mental health, neuroscience, and traumatic stress deal largely with what has been termed the ‘long tail’ of data, i.e. data that comes from a large number of smaller studies that, when combined, can yield novel insights and advances (Ferguson et al., 2014). For example, in the field of neuroscience, IPD from multiple studies deposited with the Federal Interagency Traumatic Brain Injury Research Informatics System (FITBIR) can be pooled and harmonized to develop better prognostic models for long term TBI outcomes (Yaseen et al., 2023). Recent developments in combining ‘long tail’ data can also be seen within various initiatives in the field of traumatic stress, as well as mental health more broadly (Sadeh et al., 2023). With regard to interventions, there are

now projects integrating individual participant data (IPD) from treatment trials that target PTSD in adults (Wright et al., 2022) or children (de Haan et al., 2021), PTSD with substance use disorders (Hien et al., 2023), or traumatic grief (<https://people.utwente.nl/l.i.m.lenferink?tab=projects>). Other initiatives bring together IPD from prospective studies of traumatic grief (Boelen & Lenferink, 2022) or of individuals – adults or children – with recent trauma (Kassam-Adams et al., 2020; Lai et al., 2021; Shalev et al., 2019). These initiatives vary in findability and accessibility, but each has made existing data more re-usable and enabled novel analyses. See Sadeh et al. (2023) for more on these and other IPD sharing efforts in the mental health field.

1.2 Researcher perspectives and barriers to FAIRness

Despite the initiatives described above, for the most part traumatic stress data are not consistent with FAIR principles (Kassam-Adams & Olf, 2020). Why is this? What are the barriers to making our data FAIR? To our knowledge, there have been no prior studies of data sharing and re-use practices, nor factors influencing these practices, amongst traumatic stress researchers. But cross-disciplinary research conducted with a broader range of scientists may yield some insights. Kim et al. (Kim, 2013; Kim & Stanton, 2016) surveyed over 1300 scientists in the US across 43 disciplines to examine individual and institutional factors that may influence data sharing. They found that the factors most strongly associated with data sharing were normative pressure at a discipline level, perceived career benefit, and ‘scholarly altruism’, while perceived effort involved in data sharing had a significant negative association. In a subsequent survey of data re-use practices amongst over 1200 scientists from 53 disciplines, Kim et al. (Kim & Yoon, 2017) found that data re-use was most influenced by the availability of data repositories, the perceived usefulness of data re-use (to advance scientific aims or save time and effort), concerns about misinterpreting others’ data or not being able to publish, and having institutional resources to support data re-use. Closer to the field of traumatic stress, a 2019 survey (Borghgi & Van Gulick, 2021) that recruited authors of papers in high-impact psychology journals found that many (63%) of the 274 respondents from 31 countries indicated that they archived, deposited, or published a dataset to make it available to others, and 40% said that they had requested data from another researcher. Barriers to sharing included concerns about sensitive data (51%) and wanting to hold on to data for additional analyses (40%); 71% reported that their institution did not provide support for data sharing activities (Borghgi & Van Gulick, 2021).

1.3 The Global Collaboration on Traumatic Stress and the motivation for this study

In 2019, the Global Collaboration on Traumatic Stress initiated a new ‘theme’ on FAIR Data (<https://www.global-psychotrauma.net/fair>). The FAIR Data workgroup has undertaken a number of projects, including creating tools and resources to enable traumatic stress researchers to move toward more FAIR data practices. As part of this effort, we realized that we lacked information about which tools and resources are most needed, and whether there are variations (in circumstances or perceptions) within our global research community that must be taken into account in creating an effective FAIR Data Toolkit. Beyond anecdotal accounts, we do not have much information about researcher perspectives and practices related to FAIRness in traumatic stress research, nor about the specific (and potentially malleable) barriers that individual traumatic stress researchers face to make their data FAIR.

The current survey project was designed to begin to address this gap, and is largely exploratory, with the goal of understanding the general views of traumatic stress researchers about FAIR data in our field. We adapted the surveys used by Kim et al. in order to capture key elements of researcher perspectives and practices; we added a number of concepts of particular relevance to traumatic stress research (i.e. ethical issues). The study aims to describe the current state, in order to prioritize areas for action as we create a toolkit for FAIR data practices in our field. In addition, we wanted to explore two areas of potential variation in practices or perspectives that might guide our work: whether there are world regional differences in funder, journal, or community norms about data sharing or re-use, and whether equity issues (i.e. researchers’ career stage, gender, or marginalized status) may be associated with perceived career benefit or risk of data sharing.

2. Methods

2.1 Participants and recruitment procedures

We invited traumatic stress researchers to complete an online survey about their experiences and practices regarding data sharing and data re-use. Investigators and research trainees anywhere in the world with any involvement in traumatic stress research were eligible to participate; the survey and study recruitment materials were translated and made available in multiple languages. The Global Collaboration and its member societies helped to disseminate information about the survey to traumatic stress researchers globally. We also publicized the survey via email and online announcements, in social media, and via word of mouth and personal communication. While

we did not conduct formal sample size calculations for this exploratory project, we aimed for a sample of at least 200, to allow several exploratory analyses of associations across sub-groups, and we disseminated study announcements broadly to encourage diversity of geography, career stage, and type of trauma research.

The online survey was delivered from May 2021 to July 2022 via Research Electronic Data Capture (REDCap) tools hosted at the Children’s Hospital of Philadelphia. REDCap is a secure, web-based software platform designed to support data capture for research studies (Harris et al., 2009). The first screen in the online survey described study eligibility criteria, content, and purpose, and stated that if respondents clicked to continue to the survey they were consenting to participate. We did not collect participant names or contact information. The informed consent language also included the research team’s intention to make the final dataset publicly available. In the final shared dataset, some variables from the original raw data have been aggregated into categories to reduce re-identification risk, i.e. specific position titles into career stages, age in years into decade ranges, countries into world regions. For example, in the shared dataset and in the current analyses, full and associate professors were categorized as ‘senior academics’; lecturers, assistant professors, and instructors as ‘junior academics’; and master or doctoral students and post-doctoral trainees as ‘trainees’. The project had ethics approval from the Institutional Review Board (IRB) of the Children’s Hospital of Philadelphia (IRB # 20-018334).

2.2 Measures

2.2.1 Researcher professional and demographic information

We asked participants to provide basic work-related information including their academic discipline; number of years conducting research; current position / academic rank; primary research area; trauma types, populations, and types of data included in their research; and number of research publications in the past five years. Participants also reported their age in years, their gender, and the country in which they live and work. As a basic indicator of marginalized status across nations and communities, we asked whether the individual considered themselves to be of an ethnic or cultural background under-represented in their discipline or research community.

2.2.2 Researcher experiences with data sharing and data re-use

We adapted two related surveys designed to assess scientists’ data sharing (Kim, 2013; Kim & Stanton, 2016) or data re-use (Kim & Yoon, 2017) practices

plus individual (i.e. perceived career benefit or risk, effort, scholarly altruism) and institutional (i.e. regulatory or normative pressure) factors that may influence these practices. In prior US-based studies across a wide range of scientific disciplines, survey items within each individual or institutional factor demonstrated strong internal consistency (Kim & Stanton, 2016; Kim & Yoon, 2017). To reduce participant burden, we selected items within each factor most relevant to trauma researchers worldwide. We changed ‘in my discipline’ to ‘in my research community’ when assessing institutional factors because our target population has less variation in discipline, but potentially greater international variation in research community standards. Finally, we added items to address ethical considerations (4 items), data re-use behaviours (4 items), and broader FAIR data practices across the research lifecycle (5 items). Copies of the survey (in each language), as well as documentation of how items and constructs were adapted from Kim et al. (Kim & Stanton, 2016; Kim & Yoon, 2017), are available at <https://osf.io/p2vy5/>.

2.2.3 Multi-language measures and study materials

All study materials were produced in English, Japanese, Spanish, French, Brazilian Portuguese, Korean, and Arabic. Survey items and study materials were written initially in English. Survey items and instructions, study descriptions, consent language, and recruitment announcements were translated into the other six languages via the generous effort of volunteer translation teams, many associated with member societies of the Global Collaboration, made up of trauma professionals or trainees familiar with trauma research and the content of the survey. The Global Collaboration for Traumatic Stress website hosted a study landing page with information in each language that linked to a REDCap survey in that language.

2.3 Data analyses

Analyses were conducted in R (R Core Team, 2021) software and the psych package (Revelle & Revelle, 2023) and in SPSS (IBM, version 25). We calculated mean item scores for each individual or institutional factor / construct using Kim et al. (2016, 2017) as a guide. We then conducted descriptive analyses of work-related and demographic information, data sharing and re-use behaviours and FAIR data practices, and survey items and factor / construct scores. Finally, we undertook exploratory analyses (t-tests or ANOVA, as appropriate) to better understand potential associations (a) between geographic region and researcher perceptions of funder, journal, and research community norms, and (b) between researcher career

stage, gender, or marginalized status and perceptions of career risk or benefit from data sharing.

3. Results

3.1 Survey participants

In total, 222 researchers from 28 countries completed the survey, with responses in five languages (English, Japanese, Brazilian Portuguese, French, and Spanish). One individual started the survey but did not complete it; otherwise, missing data was minimal across item responses. Table 1 presents work-related and demographic characteristics of survey participants. Participants overall were active researchers: mean years of experience conducting research was 14.7 (SD 11.0) and 92% had at least one research publication in the past five years (median number of research publications in past five years = 10). Most (81%) participants reported that trauma / traumatic stress was their primary research focus. Participants reported a wide range of types of trauma, and types of data collected, as part of their research (see Table 1); 93% reported conducting research with adult participants, 42% with adolescent participants, and 34% with child participants. Regarding potential marginalized status, 14% of participants reported that they considered themselves of an ethnic / cultural background that is under-represented amongst researchers in the research community in which they work.

3.2 Researcher views

We used the factors identified by Kim et al. as a guide to create mean scores (1–4 items per construct) for specific constructs related to potential individual- and community/institutional-level facilitators or barriers for data sharing and re-use (Figure 1). Mean scores for individual items within each construct are presented in Table 2.

Potential facilitators that were endorsed most strongly by participants (i.e. a mean rating of 5 or higher on 1–7 scale) were scholarly altruism (willingness to help other researchers within or outside one’s institution by sharing data), ethical considerations that favour sharing (sharing data as an ethical obligation, and the view that sharing data honours the participation of research participants), and the perceived usefulness of data re-use (i.e. that re-use can improve the quality of one’s research, reduce time / cost / effort, and lead to advances in the field). The potential facilitators that received the weakest ratings were the current accessibility of metadata tools for data sharing or re-use. No potential barriers were strongly endorsed (mean rating >5), and most ratings were very close to the mid-point of the 1–7 rating scale. Among potential barriers, only one individual item was endorsed strongly as a potential barrier: (Lack of) adequate time and funding to share data (Table 2).

Table 1. Work-related and demographic characteristics of survey participants ($N = 222$).

	<i>N</i> (%)
<i>Work-related characteristics</i>	
<i>Career Stage</i>	
Senior Academic	74 (33.6%)
Junior Academic	86 (39.1%)
Trainee	60 (27.0%)
Not reported	2 (1.0%)
<i>Discipline (respondents could select >1)</i>	
Psychology	165 (74.3%)
Medicine – Psychiatry	52 (23.4%)
Public health	18 (8.1%)
Medicine – Other than psychiatry	9 (4.1%)
Social work	7 (3.2%)
Nursing	7 (3.2%)
Education	6 (2.7%)
<i>Research focus – Type of trauma (respondents could select >1)</i>	
Child abuse / maltreatment	105 (47.3%)
Acute / single trauma	101 (45.5%)
Chronic / repeated trauma	95 (42.8%)
Rape / sexual assault	83 (37.4%)
Intimate partner violence	67 (30.2%)
Disaster	54 (24.3%)
Death / Bereavement	46 (20.7%)
Secondary / vicarious traumatization	46 (20.7%)
War – Military	43 (19.4%)
Community violence	37 (16.7%)
Refugee / displacement experiences	37 (16.7%)
Medical trauma	36 (16.2%)
War / post-conflict settings – civilians	25 (11.3%)
Terrorism	23 (10.4%)
Torture	21 (9.5%)
Racism / historical trauma	13 (5.9%)
<i>Types of data collected (respondents could select >1)</i>	
Data from surveys / questionnaires	205 (92.3%)
Data from standardized interviews	139 (62.6%)
Qualitative data	127 (57.2%)
Data from health records	78 (35.1%)
Biological / physiological data (other than genetic)	68 (30.6%)
Experimental task data	57 (25.7%)
Intensive longitudinal data	38 (17.1%)
Genetic data	29 (13.1%)
Data from other non-research records or sources	6 (2.7%)
<i>Demographic characteristics</i>	
<i>Geographic Region (based on 'country where you live and work')</i>	
Europe	86 (38.7%)
North America	56 (25.2%)
Asia	29 (13.1%)
South America	22 (9.9%)
Australia	13 (5.9%)
Middle East	6 (2.7%)
Africa	5 (2.3%)
Not reported	5 (2.3%)
<i>Gender</i>	
Female	129 (58.1%)
Male	85 (38.3%)
Non-binary	1 (0.5%)
Not reported or Prefer not to say	7 (3.2%)
<i>Age</i>	
20–29	26 (11.7%)
30–39	66 (29.7%)
40–49	54 (24.3%)
50–59	33 (14.9%)
60–69	21 (9.5%)
70 and above	6 (2.7%)
Not reported	16 (7.2%)

3.3 Researcher practices

Survey participants reported on the frequency of past behaviours related to data sharing or re-use (Table 3). Many participants had engaged in some degree of data sharing or re-use: 65% of survey participants reported at least one instance of formal or informal data

sharing; and 75% reported at least one instance of requesting existing data, combining data with colleagues, or publishing results that drew from others' data. However, none of these practices were widespread among survey respondents (Table 3). Looking across the specific practices, about half (53%) reported informal data sharing in response to personal requests, and a similar proportion (51%) reported formal data sharing (i.e. depositing data in a formal repository or other online resource). About half (46%) reported ever depositing data related to a published article; only about one quarter (23%) reported ever depositing datasets not connected to a specific publication.

We also asked respondents to rate their use, knowledge, and degree of preparation to implement several specific research practices integral to implementing the FAIR data principles (Table 4). The only item endorsed strongly (>5 on 1–7 scale) was knowledge of how to de-identify / anonymize data for sharing.

3.4 Exploring potential variation by region or researcher status

Finally, we conducted exploratory analyses related to potential variation in researcher views. One-way analyses of variance (ANOVAs) comparing senior academics, junior academics, and trainees did not reveal any significant differences by career stage in perceived career benefit ($F = 0.856$, $df = 2$, $p = .43$) or career risk ($F = 1.532$, $df = 2$, $p = .22$). We conducted t-tests to compare groups based on participant under-represented ethnicity/cultural background (vs not) and participant gender (female or non-binary versus male). We did not find significant differences between groups in perceived career benefit or career risk from data sharing. For under-represented ethnicity/culture vs not: career benefit ($t = 0.616$, $p = .54$), career risk ($t = 1.098$, $p = .27$). For gender comparisons: career benefit ($t = -1.052$, $p = .29$), career risk ($t = -0.043$, $p = .97$). For the five regions with more than 10 respondents (Europe, North America, Asia, South America, Australia) we used ANOVAs to compare mean ratings by region for perceived community norms ($F = 2.819$, $df = 4$, $p = .026$), perceived regulatory pressure from funders ($F = 7.440$, $df = 4$, $p < .001$) and perceived regulatory pressure from journals ($F = 1.808$, $df = 4$, $p = .129$). Post hoc comparisons suggest that participants in North America rated funder expectations for data sharing somewhat more highly (mean = 4.84) than those from other regions (means for Europe 3.98; Asia 3.62; Australia 3.46; South America 3.00). Post hoc comparisons are not as clear for ratings of research community norms about data sharing – participants from Europe appeared to provide the highest ratings of pro-data sharing norms (mean for Europe 4.14; North America 4.05; Australia 3.77; South America 3.61; Asia 3.27),

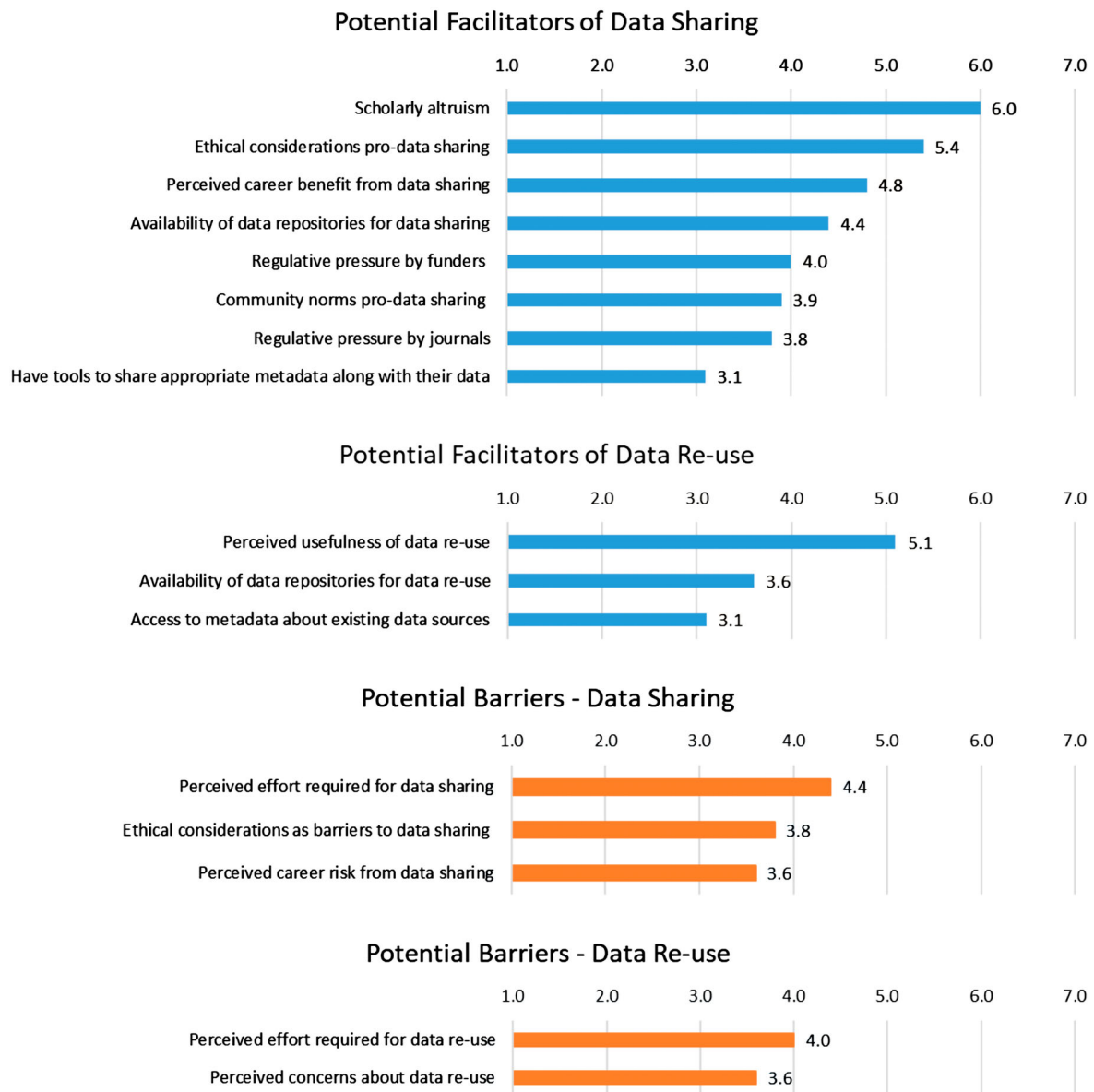


Figure 1. Mean item ratings for constructs reflecting potential facilitators and barriers to data sharing or re-use.

but small subgroup sizes preclude confident interpretation of these findings.

4. Discussion

Improving implementation of the FAIR data principles requires the actions of many stakeholders, including funders, journals, academic institutions, scientific societies, and research communities (Kasam-Adams & Olf, 2020). However, researchers are key as they represent the frontline for changing research practice on a day-to-day basis, and to shifting the culture of the field to embrace new practices. This study represents the first survey specifically aimed at gauging the views and practices of traumatic stress researchers around the world. In this international sample of traumatic stress researchers, views of data sharing and re-use were generally positive. Participant responses indicated that they are willing to help others

by sharing data, perceive positive ethical considerations in favour of sharing data, and see re-using data as potentially useful for their own research and for the field. Results also suggest that researchers see some potential career benefits from data sharing and re-use. Many (two thirds) survey participants reported that they had shared their data at least once, (either formally depositing or informally sharing in response to a personal request). And even more (three-quarters) reported some degree of data re-use by requesting data, working with colleagues to combine their data for new analyses, or publishing analyses based on existing data. Yet, these practices do not appear to be built into regular practice for most – the number of researchers in this sample who report doing any of these things frequently (more than twice) is extremely low.

This survey also identified gaps in knowledge and practice and some potential barriers to implementing FAIR data practices. Formally depositing datasets into

Table 2. Mean individual item ratings for potential facilitators and barriers to data sharing or re-use.

	Mean (SD) item rating ^a
POTENTIAL FACILITATORS	
DATA SHARING	
Community norms pro-data sharing (alpha = .76)	
(In my research community ...) It is expected that researchers would share data.	4.2 (1.7)
(In my research community ...) Researchers share data even if not required by policies.	3.7 (1.7)
(In my research community ...) Many researchers are currently participating in data sharing.	3.8 (1.4)
Regulative pressure by funders	
(In my research community ...) Public funding agencies require researchers to share data.	4.0 (1.6)
Regulative pressure by journals	
(In my research community ...) Journals require researchers to share data.	3.8 (1.5)
Availability of data repositories for data sharing	
(In my research community ...) Data repositories are available for researchers to deposit / share their data.	4.4 (1.7)
Have tools to share appropriate metadata along with their data ^b	
(In my research community ...) Researchers have the tools they need to share appropriate metadata along with their data.	3.1 (1.5)
Perceived career benefit from data sharing (alpha = .75)	
I can earn academic 'credit' such as more citations by sharing data.	4.6 (1.6)
Data sharing would be helpful in my academic career	5.1 (1.6)
Scholarly altruism (alpha = .88)	
I am willing to help other researchers within my institution / research community by sharing data.	6.2 (1.1)
I am willing to help other researchers outside my institution / research community by sharing data.	5.8 (1.2)
Ethical considerations pro-data sharing ^b (alpha = .76)	
Sharing data is an ethical obligation as a researcher.	5.4 (1.4)
Sharing data honours the contributions of research participants.	5.4 (1.4)
DATA RE-USE	
Availability of data repositories for data re-use	
(In my research community ...) Researchers can easily access data repositories to request / acquire data for re-use.	3.6 (1.5)
Access to metadata about existing data sources ^b	
(In my research community ...) Researchers can easily access metadata about existing data sources.	3.1 (1.4)
Perceived usefulness of data re-use (alpha = .59)	
Re-using other researchers' data can improve the quality of my overall programme of research.	5.4 (1.3)
Re-using other researchers' data reduces the time/cost/effort I spend on my research.	5.0 (1.5)
(In my research community ...) Re-using data for new / secondary analyses has led to advances in the field.	5.0 (1.3)
POTENTIAL BARRIERS	
DATA SHARING	
Perceived career risk from data sharing (alpha = .81)	
There is a high probability of losing publication opportunities if I share data.	3.2 (1.6)
Data sharing may cause my research ideas to be stolen by other researchers.	3.4 (1.7)
My shared data may be misused or misinterpreted by other researchers.	4.4 (1.4)
I believe that the overall riskiness of sharing data is high.	3.4 (1.5)
Perceived effort required for data sharing (alpha = .65)	
Sharing data involves too much time for me (e.g. to organize / annotate).	4.3 (1.5)
I would find data sharing difficult to do.	3.8 (1.5)
I have adequate time and funding for any effort that may be required in sharing my data. (<i>note reverse direction – item was reverse-coded when used to derive mean construct score</i>)	2.8 (1.4)
Ethical considerations as barriers to data sharing ^b (alpha = .37)	
Sharing data has a high risk of violating the rights of research participants.	3.7 (1.7)
My institution's ethics committee / IRB makes it hard for me to share research data gathered in IRB approved studies.	3.8 (1.6)
DATA RE-USE	
Perceived concerns about data re-use (alpha = .57)	
If I re-use other researchers' data, I worry that I might misinterpret the data.	4.0 (1.5)
If I re-use other researchers' data, I worry that I might not be able to publish with that data.	3.4 (1.5)
(In my research community ...) It is difficult to publish work that is based in data re-use, i.e. new analyses of data collected by others.	3.5 (1.3)
Perceived effort required for data re-use (alpha = .88)	
Re-using other researchers' data requires too much time and effort to locate data sets.	3.9 (1.5)
Re-using other researchers' data requires too much time and effort to access (or get permission to use) data sets.	4.2 (1.5)
Re-using other researchers' data requires too much time and effort to process data sets for a new study.	3.9 (1.5)

^aItems were rated on a 1–7 Likert scale from strongly disagree to strongly agree.

^bItems regarding metadata and ethical considerations were created for this study.

an established repository where they can be preserved, curated, made accessible to others, and their impact tracked was not reported as a frequent practice in this group of relatively active researchers with multiple publications. Not surprisingly, having adequate time and funding for data sharing appears to be a barrier. Ratings of knowledge and preparation to implement several basic FAIR data practices (related to consent, data organization and management, tracking data processing) indicate room for improvement.

Comparing our findings from this group of traumatic stress researchers to those from an international survey of 274 psychology researchers conducted in 2019 (Borghgi & Van Gulick, 2021), we see that our participants were somewhat less likely to have deposited data in a repository (51% vs 63%); in both surveys about 40% had ever requested data from others for re-use. The traumatic stress researchers in our study gave relatively strong ratings for several constructs (scholarly altruism, perceived career benefit) previously

Table 3. Reported frequency of data sharing or re-use practice among survey participants ($N = 222$).

Data sharing: How often have you ...	Never	1 or 2 times	> 2 times
<i>Formal data sharing</i>			
Deposited your data, RELATED TO AN ARTICLE YOU PUBLISHED, into an institutional repository (i.e. repository maintained by a journal, university, funder, national data archive, etc)?	136 (61.3%)	56 (25.2%)	30 (13.5%)
Uploaded your data, RELATED TO AN ARTICLE YOU PUBLISHED, into a 'public' Web space (e.g. PsyArxiv, MedArxiv, OSF)?	176 (79.3%)	32 (14.4%)	14 (6.3%)
Deposited your data / dataset, NOT IN CONNECTION TO A SPECIFIC PUBLICATION, into an institutional repository?	177 (79.7%)	28 (12.6%)	17 (7.7%)
Uploaded your data / dataset, NOT IN CONNECTION TO A SPECIFIC PUBLICATION, into a 'public' Web space?	203 (91.4%)	16 (7.2%)	2 (0.9%)
<i>Informal data sharing</i>			
Been personally asked to share data for an article you published?	118 (53.2%)	63 (28.4%)	40 (18.0%)
Provided data (in response to a request) via personal communication methods? (e.g. email or fileshare)?	104 (46.8%)	69 (31.1%)	49 (22.1%)
Data re-use: How often have you ...	Never	1 or 2 times	> 2 times
Downloaded or requested data from a repository for your own analyses / research?	146 (65.8%)	54 (24.3%)	21 (9.5%)
Directly requested data from another researcher / research team for use in your own work?	133 (59.9%)	61 (27.5%)	27 (12.2%)
Collaborated with other researchers to combine (your & their) data for new analyses / new work?	89 (40.1%)	82 (36.9%)	49 (22.1%)
Published results of work that included use of others' data?	111 (50.0%)	62 (27.9%)	48 (21.6%)

Table 4. Mean item ratings – endorsement of specific FAIR data practices^a.

	Mean (SD) item rating
I include statements about data sharing in my participant consent forms.	3.7 (2.1)
When I begin a project, I organize the data to enable later data re-use and sharing.	3.9 (1.7)
I feel prepared (via training or experience) to manage my data in a way that facilitates re-use and sharing.	3.6 (1.8)
I know how to de-identify / anonymize my data so that it can be shared.	5.1 (1.7)
I know how to clearly document how my raw data was processed / cleaned for analysis.	4.7 (1.7)

^aMean item ratings on 1–7 Likert scale (strongly disagree to strongly agree).

identified as strongly associated with scientists' data sharing behaviours, and for one of the constructs (perceived usefulness) previously identified as related to scientists' data re-use behaviours (Kim & Stanton, 2016).

This study had several limitations that must be taken into account in interpreting its findings. We must be cautious in generalizing these results to all traumatic stress researchers. The sample included researchers with a reasonable degree of geographic and other diversity (career stage, specific trauma focus) but likely under-represents researchers in the global South and from marginalized communities. Relative to the number of traumatic stress researchers worldwide (unknown, but likely in the many thousands) we enrolled a relatively small sample of participants. Respondents may have been self-selected based on interest or experience with this topic, although survey item ratings indicate that the sample included researchers with a wide range of views about, and familiarity with, data sharing and re-use. Comments (provided by about one fifth [21%] of respondents) further demonstrated this range of views, e.g. these included comments characterizing data sharing and re-use as 'important', 'the way of the future', 'problematic', or 'misguided'.

4.1 Implications for promoting change and developing a toolkit

The strengths and the barriers identified in this survey will help guide our development of a FAIR Data Toolkit for traumatic stress researchers. In a 2020 editorial in this journal, Kassam-Adams and Olf provided a call to action with a vision for the future of FAIR traumatic stress data (Kassam-Adams & Olf, 2020). Figure 2 summarizes the specific components of that vision, with key findings from this study, and their implications for next steps in building a toolkit and resources to help traumatic stress researchers implement FAIR data practices.

Developing and sustaining more FAIR data practices amongst researchers in our field will require both practical tools and culture change. While the focus of this study is on researchers themselves, change must also come from larger entities such as funders, journals, and scientific societies (see Kassam-Adams & Olf, 2020). Beyond the practices of individual researchers, a variety of national policies and regulations impact mental health data sharing and reuse (Sadeh et al., 2023). Around the world, national and non-governmental research funders are increasingly requiring data sharing or formal data management plans as a condition of funding; see: (National Health and Medical Research Council Australian Research Council and Universities Australia, 2019; National Institute of Health, 2022; Obiora et al., 2021; The United Nations Economic Commission for Latin America and the Caribbean, 2022; Van den Eynden et al., 2011; Wellcome Trust, 2022). Overcoming barriers for researchers may require funders not only to mandate these practices but also to increase funding levels to cover any additional costs, and to fund development of innovative tools and infrastructure to make it easier to embed these practices in the research lifecycle.

Vision for the future of FAIR traumatic stress data (Kassam-Adams & Olf, 2020)		Survey findings & implications
STUDY PLANNING	Traumatic stress research studies - of any size - are planned with data preservation, sharing, and re-use in mind	<i>Key findings:</i> Only modest ratings of knowledge / comfort with basic practices. <i>Implications:</i> Build tools to help researchers plan for and implement appropriate consent, data management, and data documentation practices to facilitate sharing and re-use.
DATA PRESERVATION	Traumatic stress datasets are collected in a few well-curated repositories that provide long-term preservation and machine-readable persistent identifiers.	<i>Key findings:</i> About half report depositing in established repositories, mostly related to specific publications. <i>Implications:</i> Share information about available repositories and provide training to researchers for preparing data for depositing, including the use of machine readable identifiers.
MACHINE-ACTIONABLE METADATA	We use a common set of machine-actionable metadata standards for traumatic stress research data that ensure findability and re-usability across repositories / data resources.	<i>Key findings:</i> Low ratings for access to metadata tools / resources for sharing or re-use. <i>Implications:</i> Develop and share metadata standards and provide training to researchers in their use.
DATA RE-USE TO ADVANCE SCIENCE	Re-use of traumatic stress data is valued and results in novel findings not possible from single studies.	<i>Key findings:</i> Strong ratings for the value and utility of data re-use (personally and for the field). <i>Implications:</i> Publicize / make it easier to find new and existing traumatic stress data resources and encourage their use and dissemination.
METRICS & RECOGNITION	Producing useful data resources is a key career milestone for researchers. There are well-accepted metrics for the scientific and societal impact of these resources.	<i>Key findings:</i> Relatively strong ratings of potential personal career benefit. Use of established repositories for data sharing or re-use is not widespread. <i>Implications:</i> Increase awareness and knowledge of available, established repositories and their benefits such as tracking impact and citations of those data.

Figure 2. Next steps for a FAIR Data Toolkit for traumatic stress research.

The current study sheds some light on the current views and practices of traumatic stress researchers and can provide some guidance on broad directions for change. As the Global Collaboration's FAIR Data work continues, it may be useful to work with member societies to periodically survey members / researchers to identify ongoing facilitators and barriers and to gauge our progress as a field.

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No potential conflict of interest was reported by the author(s).

Data availability statement

The final study dataset, along with other study materials, is available at <https://osf.io/p2vy5/>.

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