Sharing and Reusing Data among Researchers in the Traumatic Stress Field: The Correlation between Perceived Effort and Data Exchange Behaviour moderated by Researcher's Age

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Abstract

Background. Data sharing and data reuse are important procedures in research academia to draw meta conclusions but are still not common practice yet. Trauma research is a field with a potentially vulnerable target population, in which data exchange proves to be of great importance. To facilitate and work on data exchange in such community, the willingness to share and reuse data of trauma researchers is investigated. Exploring the barriers is therefore an essential step towards collaborative research. Perceived effort is one of those challenges and is additionally with age two variables which are investigated in this paper. Moreover, it was investigated whether the association between perceived effort and data exchange is moderated by age.

Methods. An online survey was conducted to investigate the willingness of data exchange among trauma researchers ($N = 190$). To test the hypotheses, simple and multiple linear regression analyses were performed.

Results. This research found a positive significant relationship between data sharing and data reuse. Also, perceived effort proved to have a negative correlation with data sharing, as well as data reuse. However, the hypotheses that the association between perceived effort and data reuse and data sharing are moderated by age were found to be insignificant.

Discussion. The findings are in line with previous research and give additional information on perceptions of data exchange by trauma researchers. This paper stresses the importance of further research in the field, to ensure the protection of at-risk groups in research.

Keywords. Data sharing behaviour. Data Reuse. Traumatic Stress Field. Open science. Data Exchange.

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Sharing information and knowledge are key aspects in contributing to research academia, and researchers have both a power as well as a responsibility to contribute to such collective knowledge. Creating a meaningful pool of knowledge is crucial to translate research theory properly into practice but is still not commonly performed yet (Kim & Yoon, 2017). The importance of exchanging research data is highlighted by the fact that such cumulative knowledge is not only built on primary research, but also on secondary research. Secondary research includes *data reuse* as in combining studies and conducting meta-analyses, which are important for drawing new conclusions, offering new connections and to underline scientifically relevant results (Kassam-Adams & Olff , 2020; The Global Collaboration on Traumatic Stress, n.d). This can be achieved if researchers upload their data in a repository or distribute data by personal connections, known as *data sharing* (The Global Collaboration on Traumatic Stress, n.d.). Data sharing and data reuse is in the following referred to as *data exchange*.

However, there are a variety of reasons why data sharing and re-use is still not commonly carried out by researchers up to now. Perceived effort, career risk and availability of data repositories have been identified as barriers which seem to have a negative impact on data sharing behaviour to some extent (Kim & Stanton, 2015; Tenopir et al., 2015). Referring to the perceived career risk, some scientists might be concerned that they do not get credited for data sharing, lose publication opportunities or that their data is misused or misinterpreted (Tenopir et al., 2015). Another challenge might illustrate the unpopularity of databases and data repositories, in which researchers can upload and access data. There are already some approaches to create suitable and secure databases, but the internal resources, such as adequate support from their organisations, enough information, access and money for instance, are often missing (Kassam-Adams & Olff , 2020).

Especially important is the investigation of such challenges in fields of research, in which a researcher cannot come up with an infinite number of participants, due to ethical reasons. This in turn makes data sharing and reuse more important, as researchers are reliant on existing research. The traumatic stress field, which researches the response of individuals to a distressing event, is one of those areas in academia. The participants of such studies have often experienced

trauma or harmful events, and the reuse of data would prevent these at-risk groups from avoidable retraumatization and exposure to potentially traumatising memories in studies, since a lot of areas of interest can be investigated with existing information. Besides, it is common that studies within the field consist of rather small sample sizes, due to the rarity of events and rarity of people willing to participate. Therefore, connecting data from existing projects allows researchers to investigate new questions that could not have been answered by using a sole dataset (Kassam-Adams and Olff, 2020).

Taking a closer look at some barriers might be crucial and fundamental in order to overcome them and improve research collaboration in the traumatic stress field. Especially investigating to what extent perceived effort is considered a barrier to sharing data might be of great importance in this debate, since overcoming this specific barrier might have a positive impact on data sharing and data reuse behaviour (Kim, 2013). One facet of perceived effort, includes the time investment a researcher needs to commit to before being able to share and reuse data. Preparing data for sharing takes a certain amount of knowledge and time, which some researchers might not have or they do not perceive the time investment as worth the effort, irrespective of the perceived usefulness of data sharing (Tenopir et al., 2015). In terms of data reuse, perceived effort also includes getting adequate funding and resources to process data sets for a new study, which are often lacking. Lastly, some researchers perceive it as difficult to locate, then to request access and to get permission for the reuse of their own dataset (Kim & Stanton, 2013). Furthermore, it needs to be said that these prior papers did not explicitly set their focus on trauma research. Whether the association of perceived effort and data exchange is different among trauma researchers illustrates a gap in existing research.

Acknowledging other influences on data sharing and reuse, some researchers identified demographic factors related to the topic. Some of them are, years of experience, field of research, geographics or age. To follow up on the last one and relate it to data sharing first, existing research found that younger researchers score higher on the intention to share data, but actually share their data less than older researchers, contradictingly (Tenopir et al., 2015). This relates to the finding that older researchers have more experience in data sharing, which can therefore facilitate the process (Linek et al., 2017; Zhu, 2019). Tenopir et al. (2011) compared data sharing practices among different age groups and highlighted that the oldest age group shared data the most, in contrast to the youngest age group engaging the least in data sharing

practices. Possible explanation for this is illustrated by Zhu (2019), as the authors argue that younger researchers might fear that sharing data might endanger their opportunities of publishing their results before other academic publicists. In terms of data reuse, it becomes apparent that lack of access to other researcher's data is a greater problem for younger researchers than for older ones (Tenopir et al., 2011). Even though Tenopir demonstrates that younger researchers have a positive perception on data reuse, they often lack internal support in terms of having experience to use already shared data properly (Tenopir et al., 2011). Followingly, this inhibits data reuse. Tenopir et al. (2015) did not find significant differences on the perceived risk of reusing data depending on age. However, results were found that younger researchers had a significantly more positive perception of reusing data given the case that such data was easily accessible. Perceptions on data reuse are varying in the case that younger researchers often perceive data reuse more important than older ones, but in practice older researchers are reusing more data than younger researchers (Zhu, 2019). It needs to be acknowledged that prior research which investigated the relationship between demographic information and data exchange among researchers did often fail to distinguish between data sharing and data reuse (Tenopir et al., 2015). This makes the exploration of the relationship between age and data exchange blurry and hence, makes this relationship an area of interest while accounting for the difference between data sharing and data reuse. Lastly, other studies did not focus on traumatic stress researchers that results in the question whether prior findings about data exchange are generalisable to trauma research.
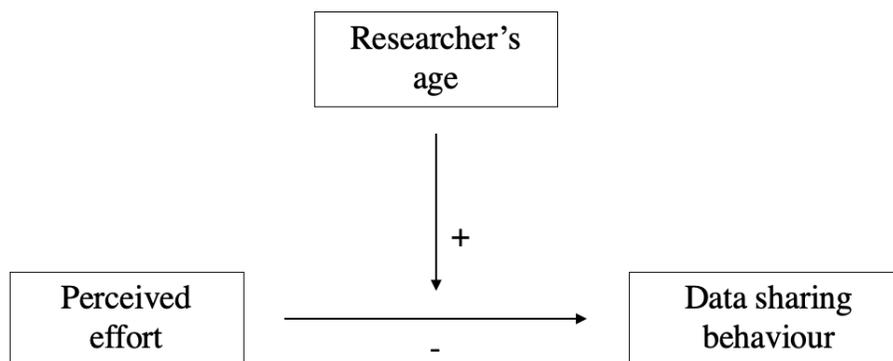
The current study

Although prior research seems to be narrow given the correlation between demographic information to perceived effort, some studies seem to give an indication that the perceived effort of data exchange might decrease with age, which then facilitates data sharing and data reuse in turn (Tenopir et al., 2011). Still, it needs to be acknowledged that existing research did not explicitly investigate the interaction between both variables, age and perceived effort and its effect on data exchange. Due to this lack of research, the research question of this paper illustrates whether the association between perceived effort and data exchange is moderated by the researcher's age in the traumatic stress field. Data exchange is then separated into data sharing behaviour and data reuse behaviour. Exploring and deepening the knowledge of

researcher's willingness to share and reuse data is essential to overcome the barriers of data exchange and to work on it effectively. Connecting that to the traumatic stress field of research is essential, in order to create a meaningful pool of knowledge which can help to draw inferential conclusions for trauma prevention and treatment. The majority of previous literature that investigates researcher's willingness to share and reuse data is built on various academic fields, not necessarily the traumatic stress field. With that being said, this paper aimed at contributing to this research gap by investigating scientists' perceptions and behaviour of data exchange in the traumatic stress community.

Coming to the hypotheses which derived from the aforementioned research question, the hypotheses are separated into data sharing and data reuse. The first three hypotheses focus on data sharing, and more specifically the first hypothesis investigates whether age has a positive association with data sharing behaviour for traumatic stress researchers. Previous research papers already indicated a positive direction of the relationship (Tenopir et al., 2011). Next to that, for hypothesis two it is theorised that perceived effort has a negative correlation with data sharing behaviour of traumatic stress researchers. The aforementioned construct of perceived effort has proven to have a negative correlation with data sharing, as highlighted by Kim and Stanton (2015). Testing this hypothesis is important to investigate the moderating effect later on. For hypothesis three, it is investigated whether the correlation between perceived effort and data sharing behaviour is moderated by age (see Figure 1). This hypothesis will be tested in an exploratory manner, since literature on that model is lacking. Previous research named a distinctive set of reasons why the increase of age is a predictor of data sharing, indicating slightly that it has an association with the perceived effort of data sharing (Tenopir et al., 2011).
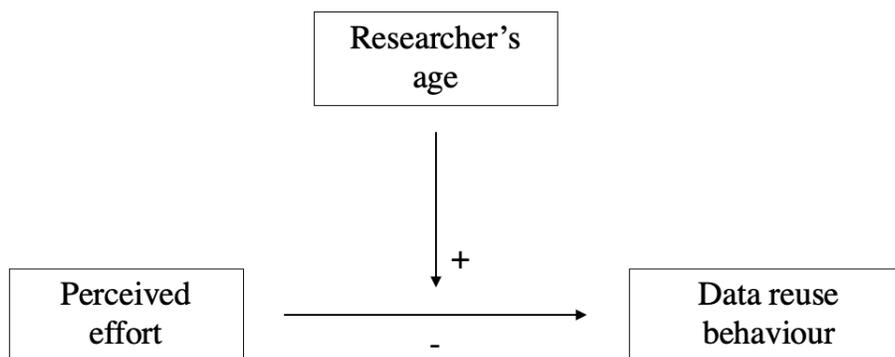
Figure 1

Correlational model for the expected relationship between perceived effort and data sharing behaviour moderated by age.

Coming to the hypotheses of data reuse, the fourth hypothesis explores whether there is a positive correlation between age and data reuse behaviour. Previous papers often do not clearly distinguish between data sharing and data reuse or solely focus on data sharing (Zhu, 2019). As data reuse is similarly important in the discussion around data exchange among researchers, this hypothesis will be tested in an exploratory manner. Similarly, hypothesis five investigates the association between perceived effort and data reuse behaviour of traumatic stress researchers. Again, most literature is blurry when it comes to the distinction between data reuse and data sharing (Tenopir et al., 2015) and therefore this hypothesis of importance, as it measures different aspects of data exchange. Lastly, for hypothesis six, it is hypothesised that the correlation between perceived effort and data reuse is moderated by age (see Figure 2). Similarly to data sharing, it is already investigated that older researchers reuse more data, because they might find it easier to locate and use data sets, which could indicate that the effort decreases with age (Tenopir et al., 2015).

Figure 2

Correlational model for the expected relationship between perceived effort and data reuse behaviour moderated by age.

Methods

Participants and Procedures

Researchers who work within the traumatic stress field represent the target population, which is therefore an inclusion criterion of this study. The questionnaire was provided in 7 languages, namely Arabic, Brazilian Portuguese, English, French, Japanese, Korean, and Spanish. The researcher must be proficient in one of those languages to participate in the study.

Prior data collection, an ethical approval was granted through the *Institutional Review Board* (IRB) of the Committees for the Protection of Human Subjects. The used questionnaire was assembled by the Global Collaboration of Traumatic Stress and can be found in Appendix A (The Global Collaboration on Traumatic Stress, n.d.). As the data collection procedure was a cooperation with the composer of the survey, they first recruited participants in May 2021. We, as the group of Bachelor students, have recruited participants in February 2022 additionally, as we distributed the link of the survey via mail (see recruitment message in Appendix B). The access to the mail addresses of the research population were found through the different journals connected to trauma research. Moreover, every participant was given the opportunity to consent by submitting the answers. Intending to reach a satisfactory sample size, a power analysis was conducted using the software g*power. The required sample size equals 55 participants given a medium effect size of 0.15.

In this study, a cross-sectional correlational online study design was used. The study used a snowball sampling method, since announcements were made on international

psychotrauma-conferences and were additionally posted on social media, which resulted in a sample of 190 participants.

Materials and Measures

International Survey on Data Sharing and Re-use in Traumatic Stress Research

Regarding the materials, which were used for this study, the aforementioned study from the Global Collaboration of Trauma (n.d.) was utilised (Appendix A). The majority of the final items are based on prior papers from Kim and colleagues, while some were newly developed (Kim, 2013; Kim & Stanton, 2013; Kim & Yoon, 2017). The items were selected on the basis of a consensus between the researchers of this study, deciding on the item which represented the underlying construct most accurately.

The first questions ask about demographic data, such as field of research, years of experience in research, academic rank, publications, age, gender, country or research population (Appendix A). The survey follows up with a section investigating data sharing and reuse intentions, as well as experience and the research community which the researcher is part of.

Data sharing

The survey of the Traumatic Stress Collaboration included the definition of data *sharing* to ensure that all participants have a similar understanding of this terminology before answering the items which ensures a higher validity. Data sharing is defined as "Providing the raw, participant-level data from your research to investigators outside your research group(s) - by making it accessible through data repositories, via formal data use agreements, or by sending the data via personal communication methods upon request." (The Global Collaboration on Traumatic Stress, n.d.). Two example items are "How often have you 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)?" and "How often have you Uploaded your data / dataset, NOT IN CONNECTION TO A SPECIFIC PUBLICATION, into a "public" Web space?". These items could be answered with a 3-point Likert-scale (1 = *Never*, 2 = *1 or 2 times*, 3 = *More than two times*). The score of the answers were later summed up; therefore, a higher score indicates more data sharing and is hence a continuous variable. This construct was measured with a total of 6 items referring to item number 53 to 58 (Appendix A).

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The internal consistency of data sharing behaviour was assessed with Cronbach's alpha, which proved to be satisfactory ($\alpha = 0.75$).

Data reuse

According to the Global Collaboration on Traumatic Stress (n.d.) data re-use is defined as "using raw, participant-level data that has been collected by others for new secondary analyses, or for replication studies. It may involve using a single dataset, or may involve combining data from multiple datasets/studies." An example item of data reuse in this questionnaire is "How often have you downloaded or requested data from a repository for your own analyses / research?". The items measuring data reuse could be answered with a 3-point Likert-scale (1 = *Never*, 2 = *1 or 2 times*, 3 = *More than two times*). The score of the answers were later summed up; therefore, a higher score indicates more data reuse and is classified as a continuous variable. Data re-use is measured with four items, and covers items 59 to 62 in Appendix A. The reliability coefficient Cronbach's alpha is considered to be satisfactory, as $\alpha = 0.78$.

Perceived effort

Perceived effort is one of the measured barriers of data sharing which refers to the degree to which a scientist believes that sharing data would require work, energy and time (Kim, 2013).

"I have adequate time and funding for any effort that may be required in sharing my data." is an example item which measures perceived effort. After reversing items, the scores were summed up; therefore, a higher score indicates that a researcher perceives higher effort to share data and is categorised as a continuous variable. The internal consistency of this study equals $\alpha = .75$, which is considered to be sufficient. The item-total-correlation ranges from 0.73 to 0.81, which indicates a very good discrimination.The construct of perceived effort is measured with 7 items in total on a 7-level Likert scale (1 = *strongly disagree* to 7 = *strongly agree*) and represent items 24, 37 to 39 and 50 to 52 in Appendix A.

Data Analysis

Once the process of data collection was completed, the data was imported into the statistical program SPSS (Version 27). First, descriptive statistics (Means, SD) were calculated to describe the study sample, which are visualised in a frequency table portraying relevant demographic information.

Before conducting the analyses for the hypotheses, the assumption of normality was checked for each variable (see Appendix C). Investigating hypothesis 1, the association between the independent variable *age* and the dependent variable *data sharing*, a simple linear regression analysis was conducted. Next, hypothesis 2, the association between the independent variable perceived effort and the dependent variable data sharing behaviour, a simple linear regression analysis was conducted. Referring to hypothesis 3, it is investigated whether the correlation between *perceived effort* and *data sharing* behaviour is moderated by the continuous variable *age* using a multiple regression analysis. Perceived effort, age and perceived effort*age represent the independent variables, while data sharing illustrates the dependent variable. To test hypothesis 4, the association between the independent variable *age* and the dependent variable *data reuse*, a simple linear regression analysis was used. For hypothesis 5, the association between the independent variable perceived effort and the dependent variable data reuse, a simple linear regression analysis was conducted. Lastly, for hypothesis 6, a multiple regression analysis containing a moderating effect was performed. Perceived effort, age and perceived effort*age illustrate the independent variables, in contrast to data reuse representing the dependent variable.

Results

Descriptive statistics

For an overview, Table 1 summarises the sample characteristics. The sample consisted of 190 participants in the age range from 23 to 83 years ($M = 42.55$, $SD = 12.86$). The majority of the participants were female and issued on average 16 publications in the last five years. The sample's years of experience ranged from one year to 60 years ($M = 14.38$, $SD = 10.86$). Data reuse ranged from a minimum of 4 to a maximum of 12 ($Mdn = 6$, $SD = 2.26$). Furthermore, data sharing ranged from 6 to 18 ($Mdn = 8$, $SD = 2.54$). At last, perceived effort ranged from 8 to 40 ($Mdn = 28$, $SD = 5.89$).

Table 1

Demographic characteristics of the sample (N = 190)

Demographic category	N	%	*M*	*SD*

Gender				
Male	71	37.4		
Female	112	58.9		
Non-binary	1	0.5		
Other	0	0		
Prefer not so say	2	1.1		
Missing	4	2.		
Age			42.55	12.86
Region				
Africa	5	2.6		
Asia	29	15.3		
Australia	11	5.8		
Europe	68	35.8		
Middle East	6	3.2		
North America	49	25.8		
South America	22	11.6		
Discipline				
Psychology	141	74.2		
Psychiatry	47	24.7		
Medicine	8	4.2		
Nursing	6	3.2		
Social Work	6	3.2		
Public Health	15	7.9		
Education	6	3.2		
Other	9	4.7		
Missing	0	0		
Research Population				
Adults	175	41.6		

Adolescents	79	35.3		
Children	67	92.1		
Missing	0	0		
Career stage				
Trainee	55	28.9		
Junior	76	40.0		
Senior	57	30.0		
Missing	2	1.1		
Trauma/Traumatic stress as primary research				
Yes	156	83		
No	33	17		
Years spent researching			14.12	10.38
Publications in the last 5 years			15.99	21.21
How many of these publications involved analysis of researched data collected by others			3.49	8.35
Type of trauma				
Acute/Single Trauma	89	47		
Child Abuse/Maltreatment	95	50		
Chronic/Repeated Trauma	86	45		
Death/Bereavement	34	18		
Disaster	49	26		
Intimate Partner Violence	60	32		
Medical Trauma	32	17		
Racism/Historical Trauma	13	7		
Rape/Sexual Assault	77	41		
Refugee/Displacement Experiences	31	16		
	37	20		

Secondary/Vicarious Traumatization in Professionals/Helpers	22	12
Terrorism	19	10
Torture	22	12
War/ Post-Conflict Settings - Civilians	42	22
War/ Military/Peacekeeper/Veterans	17	7
Other(s)	0	0
Missing		
Type of collected data		
Survey / Questionnaires	174	92
Standard Interviews	116	61
Qualitative Data	103	54
Intensive Longitudinal (EMA/ESM) Data	30	16
Experimental Task Performance Data	47	25
Genetic Data	24	13
Biological/Physiological Data (other than Genetic)	58	31
Data retrieved from Health/Medical records	72	38
Data from other non-research records or sources (Administrative data, online/social media data)	30	16
Other	6	3
Missing	0	0
Part of under-represented ethnic/cultural in the discipline/research community worked in		
Yes	30	16
No	152	80
Prefer not to say	5	3

Association between Age and Data Sharing Behaviour

Concerning the first hypothesis, a simple linear regression shows a positive significant relationship between age and data sharing behaviours ($\beta = .32$, $SE = .02$, $p < .001$). The results of the regression indicated that the model explained 9.8% of the variance ($R^2 = 0.09$, $F(1,172) = 5.56$, $p < .001$). Therefore, hypothesis 1 is accepted.

Association between Perceived Effort and Data Sharing behaviour

Answering hypothesis 2, a simple linear regression indicated that there is a negative correlation between perceived effort and data sharing behaviour ($\beta = -.21$, $SE = .03$, $p = .01$). The results of the regression indicated that the model explained 4.4% of the variance ($R^2 = 0.04$, $F(1,165) = 9.14$, $p = .01$). Therefore, hypothesis 2 is accepted.

Association between Perceived Effort and Data Sharing Behaviour moderated by Age

Referring to hypothesis 3, there is a negative correlation between perceived effort and data sharing behaviour moderated by age, no significant results were found ($\beta = -.01$, $SE = .01$, $p = .98$). The main and interaction effects can be found in table 2. The results of the regression indicated that the model explained 13.8% of the variance ($R^2 = 0.14$, $F(1,150) = 8.02$, $p = 0.98$). Hence, hypothesis 3 is rejected.

Table 2

Multiple regression results for the association between perceived effort and data sharing behaviour moderated by age

Effect	Estimate	*SE*	95 % CI		Beta	*p*
			LL	*UL*		
Constant	8.16	3.22	1.81	14.52		.01
perceived effort	-0.08	0.12	-0.31	0.15	-.19	.48
age*perceived effort	0	0.01	-0.01	0.05	-.01	.98
age	0.07	0.07	-0.08	0.21	.31	.36

Note. Dependent variable: Data sharing. CI = Confidence Interval; *LL* = Lower Limit; *UL* = Upper Limit.

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Association between Age and Data Reuse behaviour

Looking at the fourth hypothesis concerning the association between age and the reuse of data, a simple linear regression showed a positive significant relationship (β = . 23, SE = .01, p = .01). The results of the regression indicated that the model explained 5.4% of the variance (R^2 = 0. 05, $F(1,169)$ = 9.71, p = .01). Therefore, hypothesis 4 is accepted.

Association between Perceived Effort and Data Reuse Behaviour

Coming to the fifth hypothesis, a simple linear regression shows a significant negative correlation between perceived effort and data reuse behaviour (β = - 0.31, SE = .03, p < .001). The results of the regression indicated that the model explained 9.6% of the variance (R^2 = 0. 09, $F(1,165)$ = 17.54, p < .001). Hypothesis 5 is accepted.

Association between Perceived Effort and Date Reuse Behaviour moderated by Age

Regarding hypothesis 6, the multiple regression analysis including a moderating effect has revealed that the value of perceived effort is not contingent upon the value of age (β = .41, SE = .01, p = .32). The main and interaction effects can be found in table 3. The results of the regression indicated that the model explained 16% of the variance (R^2 = 0. 16, $F(1,150)$ = 9.53, p = 0.32). Hypothesis 6 is rejected.

Table 3

Multiple regression results for the association between perceived effort and data reuse behaviour moderated by age

Variable	Estimate	*SE*	95 % CI		Beta	*p*
			LL	UL		
Constant	9.95	2.87	4.95	15.62		< .001
perceived effort	-0.21	0.10	-0.41	-0.01	-.52	.04
age*perceived effort	0.01	0.01	-0.01	0.01	.41	.32
age	-0.01	0.06	-0.14	0.11	-.06	.86

Note. Dependent variable: Data reuse. CI = Confidence Interval; *LL* = Lower Limit; *UL* = Upper Limit

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Discussion

Findings and implementation

The objective of this study was to extend knowledge about the perceptions and behaviours of data sharing and data reuse among traumatic stress researchers. More specifically, this study aimed to investigate the research question whether perceived effort and data exchange is significantly moderated by age.

The first hypothesis, that age and data sharing behaviour have a positive correlation, was accepted. This means that an increase of age corresponds with a higher score of data sharing. In line with this outcome, Tenopir et al. (2011) presented that older respondents engage in more data sharing than their younger counterparts. One possible explanation is that older researchers want to leave behind a legacy to be remembered by (Tenopir et al., 2015). Moreover, due to the experience that was collected over years of research they are likely to have more expertise, which leads them to perceive tasks as having less effort than younger researchers (Tenopir et al., 2015). Moreover, hypothesis 2, the assumption that perceived effort and data sharing have a negative correlation, was found to be significant as well. This means for this sample, that a higher score on perceived effort is associated with a lower score of data sharing, but does not imply causality. These findings are in accordance with discoveries of previous research, which showed that perceived effort is one of the barriers which makes data sharing and data reuse less likely (Kim, 2013; Kim & Stanton, 2013; Kim & Yoon, 2017). However, the correlation appears to be weak, possibly due to other factors and barriers in the general model, such as perceived usefulness, perceived career benefit or perceived concern, as established by previous research (Kim, 2013; Kim & Stanton, 2015). Regarding hypothesis 3, the investigation whether the correlation between perceived effort and data sharing is moderated by age, was found to be insignificant. This means that perceived effort and age do not interact with each other. Prior research lacks the exploration of the interaction between age and perceived effort and its association with data exchange. Incorporating this result into a bigger context is elaborated with hypothesis 6.

Coming to the hypotheses of data reuse, hypothesis 4 which referred to the assumption that age and data reuse behaviour are also positively correlated. Even though previous studies did mostly not distinguish between data sharing and data reuse, these findings are still supported by previous research. One study of Tenopir et al. (2011) stated that in terms of reusing data, younger

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researchers have a higher intention of using other researcher's data than older researchers and the lack of it illustrates an important barrier for research. Furthermore, hypothesis 5, the expectation that perceived effort and data reuse have a negative correlation was found to be significant as well, meaning that a higher score on perceived effort corresponds with lower data reuse. These findings are in accordance with discoveries of previous research, which showed that perceived effort is one variable which hinders data reuse to some extent(Kim, 2013; Kim & Stanton, 2013; Kim & Yoon, 2017). However, a rather weak correlation was found, possibly due to the aforementioned reason in the context of data sharing. It further needs to be highlighted that data reuse and data sharing were separately investigated, which adds new implications, as it can be informative whether there are differences, in terms of challenges, between data sharing and data reusing practices, to direct work and improvement to the proper areas. Also for hypothesis 6, the association between perceived effort and data sharing were not significantly moderated by age. In other words, the strength of the relationship between perceived effort and data reuse is not affected by the researcher's age. A study by Tenopir (2011) mentions that age might mitigate the barriers of data sharing and data reuse, which could not be confirmed in this context. Even though both perceived effort and age illustrate an association with data sharing and data re-use, they might not interact due to the fact that other underlying concepts have an impact on the decision to share. Tenopir et al. (2011) for example accounts for the difference of data sharing between age groups demonstrating that younger scientists do not receive as much organisational support as scientists with a higher age. Moreover, experience and years of research might also account for more data sharing behaviour and could illustrate a focus for future research, since the two concepts correspond with age. The study of Tenopir et al. (2020) found out that age had a negative association with perceived barriers, but implies to be of a mediating character instead of a moderating one. Schmidt et al. (2016) argues that the willingness of data sharing and data reuse also depends on the career stage and years of experience, because researchers who are less experienced are more concerned about publishing their own results first rather than releasing data for secondary research. As career stage and years of experience often correspond with age and offer therefore a possible explanation of insignificant findings.

Limitations and strengths of the study

Coming to the limitations of this study, the assumption of normality was violated which needs to be acknowledged. Before analysing the data with the belonging tests, the assumption of

normality was investigated and showed that the data of perceived effort, data sharing and data reuse were not normally distributed. Irrespective of this violation, linear regression analyses were conducted due to the lack of non-parametric alternative forms of assessment. However, the subsequent findings must be interpreted with caution.

In addition, the two variables *data sharing* and *data reuse* were summed up to analyse the data. However, taking a closer look at both variables, the corresponding items that ask about data exchange are mostly related to different webpages for uploading and accessing data. To illustrate that, two example item are "How often have you 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)?" and "How often have you Uploaded your data, RELATED TO AN ARTICLE YOU PUBLISHED, into a "public" Web space (e.g. PsyArxiv, MedArxiv, OSF)?", both attempting to measure data sharing. It might be questionable whether this ensures validity, as it is doubtful whether a higher score on the representative scale indicates more data sharing, respectively data reuse. The items rather ask about data exchange in terms of sharing and accessing via different platforms. What also adds to that is the scale which is used for the items. Using a 3-point Likert scale with the options *Never*, *1 or 2 times* or *more than 2 times* is not a sensitive tool to measure data sharing, as it does not account for a differentiation of how often researchers actually share data when they share their data more than 2 times. The last limitation might be the composition of the items. The majority of the items were derived from previous papers from Kim (2013). Even though in those papers good psychometric properties were found, most items were selected irrespective of the assessed scale, but based on a consensus among researchers. This might have an impact on the reliability and internal consistency of the scale.

Yet, the study presents some unique characteristics and therefore significant strengths, which can also be adhered to in the future. The survey addresses an international target group, as people all over the world did, in fact, participate. Such studies are rather rare but of immense importance to draw proper conclusions and to work towards a better cooperation and communication among scientists, especially when it comes to data sharing and especially in the traumatic stress field. This study offers several chances to inform academia and work on the barriers and strengthen the motivators of these findings, which is able to result in higher engagement regarding sharing and re-using data.

Conclusion and Implications for future research

Coming to the conclusion of this study, there is an association that age and perceived effort are associated with data exchange among traumatic stress researchers. However, drawing inferential conclusions about age interfering with the perceived effort on the data exchange behaviour among trauma researchers, exceeds the scope of this paper. Hence, more research is needed, due to the limitations of this study and the insignificant results which might be explained by other constructs, such as perceived usefulness for instance. This limitation offers chances for new research and studies concerning these areas of interest. The previously mentioned findings give incentives to further research and work on the challenges which come with data exchange, as the information can be of great importance for altering traumatic stress researchers' perceptions toward data sharing and reusing. Existing approaches to facilitate data sharing can be improved with findings of such research and helps to translate theory into practice.

Connecting these findings to trauma research still needs to be the topic of future research, in order to further protect vulnerable populations which are part of trauma research. Outcomes of this paper give incentives to create interventions and approaches which are helpful for trauma researchers which can then in turn be helpful for the target population, individuals who had to face trauma throughout their lives. Working towards that direction in a collaborative and effective manner is supported by this research and hopefully benefits academia in the context of traumatic stress in the time ahead.

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Appendices

Appendix A

International Survey on Data Sharing and Re-use in Traumatic Stress Research

The Global Collaboration on Traumatic Stress, a coalition of 11 scientific societies in the field of traumatic stress, is conducting a survey to better understand traumatic stress researchers' opinions and experiences regarding data sharing and data re-use. Results of this global survey will be shared on the Global Collaboration website (https://www.global-psychotrauma.net/), and will help us create tools and resources for traumatic stress researchers. The final dataset from this survey will be available upon request for use by other researchers.

If you are a traumatic stress researcher at any career stage (including trainees) we invite you to share your opinions and experiences by participating in this survey. The survey is anonymous, and your participation is voluntary. There are no known risks or personal benefits to you from participating in this study.

If you have questions about the survey, the study, or the study dataset, please contact the study team at childtraumadata@chop.edu.

By continuing to the survey, you are consenting to participate in this study.

THANK YOU for your participation.

==

Part 1 - So that we can describe the respondents to this survey, please tell us a bit about yourself.

1. What is your academic / research discipline? CHECK ALL THAT APPLY
    - Psychology
    - Psychiatry
    - Medicine – other than psychiatry - specify:

- Nursing

- Social Work

- Public Health

- Education

- Other – Specify: _____

2. How many years have you been conducting research in this discipline? (include research conducted during your training, e.g., masters, doctoral, or any post-graduate/professional research)

3. What is your current job title / academic rank / trainee status? If multiple apply, select highest rank.

- Full Professor

- Associate Professor

- Assistant Professor / Lecturer

- Instructor

- Research scientist

- Post-doctoral trainee

- Doctoral/PhD student

- Masters student

- Other – Specify: _____

4. In the last 5 years, how many publications involving research data have you published (including those as first author or co-author)?

5. How many of these publications involved analyses of research data collected by others outside you / your research team / your co-authors?

6. Is trauma / traumatic stress your primary research focus? Yes / No

SKIP PATTERN – If no ITEM 6 then go to ITEM 7

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If yes – go to ITEM 8

7. What is your primary area of research?

8. What types of trauma have been included in your research? CHECK ALL THAT APPLY

   - Acute/Single trauma
   - Child Abuse/Maltreatment
   - Chronic/Repeated Trauma
   - Community Violence
   - Death/Bereavement
   - Disaster
   - Intimate Partner Violence
   - Medical Trauma
   - Racism / Historical Trauma
   - Rape/Sexual Assault
   - Refugee/Displacement Experiences
   - Secondary / Vicarious Traumatization in Professionals / Helpers
   - Terrorism
   - Torture
   - War / Post-Conflict Settings – Civilians
   - War – Military/Peacekeepers/Veterans
   - Other(s) – Specify: _____

9. What populations have been included? CHECK ALL THAT APPLY

   - Adults
   - Adolescents
   - Children

10. What types of data have you collected? CHECK ALL THAT APPLY

   - Data from surveys / questionnaires
   - Data from standard interviews

- Qualitative data

- Intensive longitudinal (EMA / ESM) data

- Experimental task performance data

- Genetic data

- Biological / physiological data (other than genetic)

- Data retrieved from health / medical records

- Data from other non-research records or sources (administrative data, online / social media data)

- Other – Specify: _____

11. What is your age in years?

12. How do you identify your gender?

- Male

- Female

- Non-binary

- Other

- Prefer not to say

13. Do you consider yourself to be of an ethnic / cultural background that is under-represented amongst researchers in the discipline / research community in which you work?"

Yes / No / Prefer not to say

14. In what country do you live and work? [DROP DOWN LIST – SEE LIST AT END OF THIS DOC]

Part 2 - Please indicate to what extent you agree with the following statements, thinking about the institutions and research communities that you are part of.

IN MY RESEARCH COMMUNITY ....

RESPONSES FOR THIS SECTION: 1, Strongly Disagree | 2, Moderately Disagree | 3, Slightly Disagree | 4, Neutral | 5, Slightly Agree | 6, Moderately Agree | 7, Strongly Agree | -99, Don't Know

15. It is expected that researchers would share data.

16. Researchers share data even if not required by policies.

17. Many researchers are currently participating in data sharing.

18. Public funding agencies require researchers to share data.

19. Journals require researchers to share data.

20. Researchers can easily access metadata about existing data sources.

21. Researchers have the tools they need to share appropriate metadata along with their data.

22. Data repositories are available for researchers to deposit / share their data.

23. Researchers can easily access data repositories to request / acquire data for re-use.

24. It is difficult to publish work that is based in data re-use, i.e. new analyses of data collected by others.

25. Re-using data for new / secondary analyses has led to advances in the field.

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Part 3 - Thinking about YOUR OWN VIEWS AND EXPERIENCES, please indicate the extent to which you agree with the following statements.

RESPONSES FOR THIS SECTION: 1, Strongly Disagree | 2, Moderately Disagree | 3, Slightly Disagree | 4, Neutral | 5, Slightly Agree | 6, Moderately Agree | 7, Strongly Agree

26. I am willing to help other researchers within my institution / research community by sharing data.

27. I am willing to help other researchers outside my institution / research community by sharing data.

28. I can earn academic 'credit' such as more citations by sharing data.

29. Data sharing would be helpful in my academic career.

30. Sharing data is an ethical obligation as a researcher.

31. Sharing data honors the contributions of research participants.

32. Sharing data has a high risk of violating the rights of research participants.

33. There is a high probability of losing publication opportunities if I share data.

34. Data sharing may cause my research ideas to be stolen by other researchers.

35. My shared data may be misused or misinterpreted by other researchers.

36. I believe that the overall riskiness of sharing data is high.

37. Sharing data involves too much time for me (e.g. to organize / annotate).

38. I would find data sharing difficult to do.

39. I have adequate time and funding for any effort that may be required in sharing my data.

40. I include statements about data sharing in my participant consent forms.

41. My institution's ethics committee / IRB makes it hard for me to share research data gathered in IRB approved studies.

42. When I begin a project, I organize the data to enable later data re-use and sharing.

43. I feel prepared (via training or experience) to manage my data in a way that facilitates re-use and sharing.

44. I know how to de-identify / anonymize my data so that it can be shared.

45. I know how to clearly document how my raw data was processed / cleaned for analysis.

46. Re-using other researchers' data can improve the quality of my overall program of research.

47. Re-using other researchers' data reduces the time/cost/effort I spend on my research.

48. If I re-use other researchers' data, I worry that I might misinterpret the data.

49. If I re-use other researchers' data, I worry that I might not be able to publish with that data.

50. Re-using other researchers' data requires too much time and effort to locate data sets.

51. Re-using other researchers' data requires too much time and effort to access (or get permission to use) data sets.

52. Re-using other researchers' data requires too much time and effort to process data sets for a new study.

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Part 4 - How often have you...

RESPONSES FOR THIS SECTION: Never | 1 or 2 times | More than 2 times

53. 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)?

54. Uploaded your data, RELATED TO AN ARTICLE YOU PUBLISHED, into a "public" Web space (e.g. PsyArxiv, MedArxiv, OSF)?

55. Deposited your data / dataset, NOT IN CONNECTION TO A SPECIFIC PUBLICATION, into an institutional repository?

56. Uploaded your data / dataset, NOT IN CONNECTION TO A SPECIFIC PUBLICATION, into a "public" Web space?

57. Been personally asked to share data for an article you published?

58. Provided data (in response to a request) via personal communication methods? (e.g., email or fileshare)?

59. Downloaded or requested data from a repository for your own analyses / research?

60. Directly requested data from another researcher / research team for use in your own work?

61. Collaborated with other researchers to combine (your & their) data for new analyses / new work?

62. Published results of work that included use of others' data?

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Part 5 – Any additional comments?

63. Please share any additional comments about your views or experiences regarding data sharing or data re-use: OPEN TEXT FIELD

Portions of this survey were adapted from the following studies:

Kim, Y. (2013). *Institutional and Individual Influences on Scientists' Data Sharing Behaviors* (Doctoral Dissertation). surface.syr.edu/it_etd/85/.

Kim, Y., & Stanton, J. M. (2016). Institutional and Individual Factors Affecting Scientists'

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Kim, Y., & Yoon, A. (2017). Scientists' data reuse behaviors: A multilevel analysis. *Journal of the Association for Information Science and Technology*, *68*(12), 2709–2719. https://doi.org/10.1002/asi.23892

END OF SURVEY

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Appendix B

Recruitment message

Dear [Name],

My name is Jana Berger and I am a psychology student at the University of Twente and currently working on my Bachelor thesis. In cooperation with Lonneke Lenferink, Nancy Kassam-Adams, and the Global Collaboration on Traumatic Stress, we are conducting an international survey to better understand traumatic stress researchers' opinions and experiences regarding data sharing and data re-use. Therefore, we are recruiting traumatic stress researchers at any career stage (including trainees) to share opinions and experiences by participating in the following survey. The survey will take approximately 10 min to complete.

The results of this global survey will be shared on the Global Collaboration website (https://www.global-psychotrauma.net/) and in scientific publications and it will help us to create tools and resources for traumatic stress researchers. The final dataset from this survey will be available upon request for use by other researchers.

Participation is voluntary and there are no known risks or personal benefits to you from participating in this study.

As the survey is available in multiple languages (English, Japanese, Spanish, French, Portuguese, Korean, and Arabic), we would kindly ask to participate if you are proficient in one of the available languages.

If you have questions about the survey, the study, or the study dataset, please contact the study team at childtraumadata@chop.edu.

Follow this link to the survey:

https://www.global-psychotrauma.net/data-sharing

Thank you for your participation.

Regards,

Jana Berger

University of Twente, NL

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Appendix C

Checking Normality

Before conducting simple and multiple linear regression, the assumption of normality for each variable was checked. For perceived effort, the Kolmogorov-Smirnov test indicated that the data does not follow a normal distribution $D(169) = .10$, $p < .001$. For data sharing, the Kolmogorov-Smirnov test indicated that the data does not follow a normal distribution $D(188) = .18$, $p < .001$. For perceived effort, the Kolmogorov-Smirnov test indicated that the data does not follow a normal distribution $D(185) = .163$, $p < .001$.