



Open Science: Recommendations for Research on School Bullying

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Abstract

The open science movement has developed out of growing concerns over the scientific standard of published academic research and a perception that science is in crisis (the “replication crisis”). Bullying research sits within this scientific family and without taking a full part in discussions risks falling behind. Open science practices can inform and support a range of research goals while increasing the transparency and trustworthiness of the research process. In this paper, we aim to explain the relevance of open science for bullying research and discuss some of the questionable research practices which challenge the replicability and integrity of research. We also consider how open science practices can be of benefit to research on school bullying. In doing so, we discuss how open science practices, such as pre-registration, can benefit a range of methodologies including quantitative and qualitative research and studies employing a participatory research methods approach. To support researchers in adopting more open practices, we also highlight a range of relevant resources and set out a series of recommendations to the bullying research community.

Keywords Bullying research · Open science · Pre-registration · Replication

Bullying in school is a common experience for many children and adolescents. Such experiences relate to a range of adverse outcomes, including poor mental health, poorer academic achievement, and anti-social behaviour (Gini et al., 2018; Nakamoto & Schwartz, 2010; Valdebenito et al., 2017). Bullying research has increased substantially over the past 60 years, with over 5000 articles published between 2010 and 2016 alone (Volk et al., 2017). Much of this research focuses on the prevalence and antecedents of bullying, correlates of bullying, and the development and evaluation of anti-bullying interventions (Volk et al., 2017). The outcomes of this work for children and young people can therefore be life changing, and researchers should strive to ensure that their work

is trustworthy, reliable, and accessible to a wide range of stakeholders both inside and outside of academia.

In recent years, the replication crisis has led to growing concern regarding the standard of research practices in the social sciences (Munafò et al., 2017). To address this, open science practices, such as openly sharing publications and data, conducting replication studies, and the pre-registration of research protocols, have provided the opportunity to increase the transparency and trustworthiness of the research process. In this paper, we aim to discuss the replication crisis and highlight the risks that questionable research practices pose for bullying research. We also aim to summarise open science practices and outline how these can benefit the broad spectrum of bullying research as well as to researchers themselves. Specifically, we aim to highlight how such practices can benefit both quantitative and qualitative research and studies employing a participatory research methods approach.

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The Replication Crisis

In 2015, the Open Science Collaboration (Open Science Collaboration, 2015) conducted a large-scale replication of 100 published studies from three journals. The results

questioned the replicability of research findings in psychology. In the original 100 studies, 97 reported a significant effect compared to only 35 of the replications. Furthermore, the effect sizes reported in the original studies were typically much larger than those found in the replications. The findings of the Open Science Collaboration received significant academic and mainstream media attention, which concluded that psychological research is in crisis (Wiggins & Chrisopherson, 2019). While these findings are based on the analysis of psychological research, challenges in replicating research findings have been reported in a range of disciplines including sociology (Freese & Peterson, 2017) and education studies (Makel & Plucker, 2014). Shrout and Rodgers (2018) suggest that the notion that science is in crisis is further supported by (1) the number of serious cases of academic misconduct such as that of Diederick Stapel (Nelson et al., 2018) and (2) the prevalence of questionable research practices and misuse of inferential statistics and hypothesis testing (see Ioannidis, 2005). The replication crisis has called into question the degree to which research across the social sciences accurately describes the world that we live in or whether this literature is overwhelmingly populated by misleading claims based on weak and error-strewn findings.

The trustworthiness of research reflects the quality of the method, rigour of the design, and the extent to which results are reliable and valid (Cook et al., 2018). Research on school bullying has grown exponentially in recent years (Smith & Berkun, 2020) and typically focuses on understanding the nature, prevalence, and consequences of bullying to inform prevention and intervention efforts. If our research is not trustworthy, this can impede theory development and call into question the reliability of our research and meta-analytic findings (Friese & Frankenbach, 2020). Ultimately, if our research findings are untrustworthy, this undermines our efforts to prevent bullying and help and support young people. Bullying research exists within a broader academic research culture, which facilitates and incentivises the ways that research is undertaken and shared. As such, the issues that have been identified have direct relevance to those working in bullying.

The Incentive Culture in Academia

“The relentless drive for research excellence has created a culture in modern science that cares exclusively about what is achieved and not about how it is achieved.”

Jeremy Farrar, Director of the Wellcome Trust (Farrar, 2019).

In academia, career progression is closely tied to publication record. As such, academics feel under considerable pressure to publish frequently in high-quality journals to advance their careers (Grimes et al., 2018; Munafò et al., 2017). Yet, the publication process itself is biased toward accepting novel or statistically significant findings for publication (Renkewitz & Heene, 2019). This bias fuels a perception that non-significant results will not be published (the “file drawer problem”: Rosenthal, 1979). This can result in researchers employing a range of questionable research practices to achieve a statistically significant finding in order to increase the likelihood that a study will be accepted for publication. Taken together, this can lead to a perverse “scientific process” where achieving statistical significance is more important than the quality of the research itself (Frankenhuis & Nettle, 2018).

Questionable Research Practices

Questionable research practices (QRPs) can occur at all stages of the research process (Munafò et al., 2017). These practices differ from research misconduct in that they do not typically involve the deliberate intent to deceive or engage in fraudulent research practices (Stricker & Günther, 2019). Instead, QRPs are characterised by misrepresentation, inaccuracy, and bias (Steneck, 2006). All are of direct relevance to the work of scholars in the bullying field since each weakens our ability to achieve meaningful change for children and young people. QRPs emerge directly from “researcher degrees of freedom” that occur at all stages of the research process and which simply reflect the many decisions that researchers make with regard to their hypotheses, methodological design, data analyses, and reporting of results (see Wicherts et al., 2016 for an extensive list of researcher degrees of freedom). These decisions pose fundamental threats to how robust a study is as each compromises the likelihood that findings accurately model a psychological or social process (Munafò et al., 2017). QRPs include *p*-hacking; hypothesising after the result is known (HARKing); conducting studies with low statistical power; and the misuse of *p* values (Chambers et al., 2014). Such QRPs may reflect a misunderstanding of inferential statistics (Sijtsma, 2016). A misunderstanding of statistical theory can also lead to a lack of awareness regarding the nature and impact of QRPs (Sijtsma, 2016). This includes the prevailing approach to quantitative data analysis, Null Hypothesis Significance Testing (NHST) (Lyu et al., 2018; Travers et al., 2017), which is overwhelmingly the approach used in the bullying field. QRPs can fundamentally threaten the degree to which research in bullying can be trusted, replicated, and effective in efforts to implement successful and impactful intervention or prevention programs.

P-Hacking

P-hacking (or data-dredging) reflects methods of re-analysing data in different ways to find a significant result (Raj et al., 2018). Such methods can include the selective deletion of outliers, selectively controlling for variables, recoding variables in different ways, or selectively reporting the results of structural equation models (Simonsohn et al., 2014). While there are various methods of *p*-hacking, the end goal is the same: to find a significant result in a data set, often when initial analyses fail to do so (Friese & Frankenbach, 2020).

There are no available data on the degree to which *p*-hacking is a problem in bullying research per se, but the nature of the methods commonly used mean it is a clear and present danger. For example, the inclusion of multiple outcome measures (allowing those with the “best” results to be cherry-picked for publication), measures of involvement in bullying that can be scored or analysed in multiple ways (e.g. as a continuous measure or as a method to categorise participants as involved or not), and the presence of a diverse selection of demographic variables (which can be selectively included or excluded from analyses) all provide researchers with an array of possible analytic approaches. Such options pose a risk for *p*-hacking as decisions can be made on the results of statistical fishing (i.e. hunting to find significant effects) rather than on any underpinning theoretical rationale.

P-hacking need not be driven by a desire to deceive; rather, it can be used by well-meaning researchers and their wish to honestly identify useful or interesting findings (Wicherts et al., 2016). Sadly, even in this case, the impact of *p*-hacking remains profoundly problematic for the field. The *p*-hacking process biases the literature towards erroneous significant results and inflated effect sizes, impacting on our understanding of any issue that we seek to understand better, and biasing effect size estimates reported in meta-analyses (Friese & Frankenbach, 2020). While such effects may seem remote or of only academic interest, they compromise all that we in the bullying field seek to accomplish because they make it much less likely that effective, impactful, and meaningful intervention and prevention strategies can be identified and implemented.

HARKing

Typically, quantitative research follows the hypothetico-deductive model (Popper, 1959). From this perspective, hypotheses are formulated based on appropriate theory and previous research (Rubin, 2017). Once written, the study is designed, and data are collected and analysed (Rubin, 2017). Hypothesising after the result is known, or HARKing (Kerr, 1998), occurs when researchers amend their hypotheses to reflect their completed data analysis (Kerr, 1998). HARKing

results in confusion between confirmatory and exploratory data analysis (Shrout & Rodgers, 2018), creating a literature where hypotheses are always confirmed and never falsified. This inhibits theory development (Rubin, 2017) in part because “progress” is, in fact, the accumulation of type I errors.

Low Statistical Power

Statistical power reflects the power in a statistical test to find an effect if there is one to find (Cohen, 2013). There are concerns regarding the sample sizes used in bullying research, as experiences of bullying are typically of a low frequency and positively skewed (Vessey et al., 2014; Volk et al., 2017). Low statistical power is problematic in two ways. First, it increases the type II error rate (the probability of falsely rejecting the null hypothesis), meaning that researchers may fail to report important and meaningful effects. Statistically significant effects can still be found under the conditions of low statistical power; however, the size of these effects is likely to be *exaggerated* due to a lower positive predictive value (the probability of a statistically significant result being genuine) (Button et al., 2013). In this case, researchers may find significant effects even in small samples, but those effects are at risk of being inflated.

QRPs in Qualitative Research

Apart from the previously discussed issues, there are also QRPs in qualitative work. Mainly, these involve issues pertaining to trustworthiness such as credibility, transferability, dependability, and confirmability (See Shenton, 2004). One factor that can influence perceptions about qualitative work is the possibility of subjectivity or different interpretations of the same data (Haven & Van Grootel, 2019). Additionally, the idea that the researcher will be biased and that their experiences, beliefs, and personal history will all influence how they both collect and interpret data has also been discussed (Berger, 2015). Clearly stating the positionality of the researcher and how their experiences informed their current research (the process of reflexivity) can help others better understand their interpretation of the data (Berger, 2015). Finally, one decision that qualitative researchers should consider when thinking about their designs is their stopping criteria. This might imply code or meaning saturation (see Hennink et al., 2017, for more detail on how these two types are different from one another). Thus, making it clear in the conceptualisation process when and how the data collection will stop is important to assure transparency and high-quality research. This is not a complete list of QRPs in qualitative research, but these seem to be the most urgent when it comes to bullying research when thinking about open science.

The Prevalence and Impact of QRPs

Identifying the prevalence of QRPs and academic misconduct is challenging as this is reliant on self-reports. In their survey of 2155 psychologists, John et al. (2012) identified that 78% of participants had not reported all dependent measures, 72% had collected more data after finding their statistical effects were not statistically significant, 67% reported selective reporting of studies that “worked” (yielded a significant effect), and 9% reported falsifying data. Such problematic practices have serious implications for the reliability of effects reported in the research literature (John et al., 2012), which can impact interventions and treatments such evidence may inform. Furthermore, De Vries et al. (2018) have highlighted how biases in the publication process threaten the validity of treatment results reported in the literature. Although focused on the treatment of depression, their work has clear lessons for the bullying research community. They demonstrate how the bias towards reporting more positive, significant effects, distorts a literature in favour of treatments that appear efficacious but are much less so in practice (Box 1).

Box 1 The Replication Crisis

- **Munafò et al. (2017)** outline a manifesto for reproducible research, highlighting problems with current research practices.
- **Shrout and Rodgers (2018)** provide an overview of the replication crisis and questionable research practices.
- **Steneck (2006)** provides a detailed overview of definitions of academic misconduct, questionable research practices, and academic integrity.

Open Science

Confronting these challenges can be daunting, but open science offers several strategies that researchers in the bullying field can use to increase the transparency, reproducibility, and openness of their research. The most common practices include openly sharing publications and data, encouraging replication, pre-registration, and open peer-review. Below, we provide an overview of open science practices, with a particular focus on pre-registration and replication studies. We recommend that researchers begin by using those practices that they can most easily integrate into their work, building their repertoire of open science actions over time. We provide a series of recommendations for the school bullying research community alongside summaries of useful supporting resources (Box 2).

Box 2 Key Reading on Open Science

- **Banks et al. (2019)** discuss frequently asked questions about open science providing a good overview of open science practices and contemporary debates.
- **Crüwell et al. (2019)** provide an annotated reading list on important papers in open science.
- **Gehlbach and Robinson (2021)** in their introduction to a special edition of the journal *Educational Psychologist* they discuss the adoption of open science practices in the context of what they term “old school” research practices.
- **Lindsay (2020)** outlines a series of steps researchers can take to integrate open science practices into their research.

Open Publication, Open Data, and Reporting Standards

Open Publication

Ensuring research publications are openly available by providing access to pre-print versions of papers or paying for publishers to make articles openly available is now a widely adopted practice (Concannon et al., 2019; McKiernan et al., 2016). Articles can be hosted on websites such as ResearchGate and/or on institutional repositories, allowing a wider pool of potential stakeholders to access relevant bullying research and increasing the impact of research (Concannon et al., 2019). This process also supports access for the research and practice communities in low- and middle-income countries where even Universities may be unable to pay journal subscriptions. The authors can also share pre-print versions of their papers for comment and review before submitting them to a journal for review using an online digital repository, such as PsyArXiv. Sharing publications in this way can encourage both early feedback on articles and the faster dissemination of research findings (Chiarelli et al., 2019).

Open Data

Making data and data analysis scripts openly available is also encouraged, can enable further data analysis (e.g. meta-analysis), and facilitates replication (Munafò et al., 2017; Nosek & Bar-Anan, 2012). It also enables the collation of larger data sets, and secondary data analyses to test different hypotheses. Several publications on bullying in school are based on the secondary analysis of openly shared data (e.g. Dantchev & Wolke, 2019; Przybylski & Bowes, 2017) and highlight the benefits of such analyses. Furthermore,

although limited in number, examples of papers on school bullying where data, research materials, and data analysis scripts are openly shared are emerging (e.g. Przybylski, 2019).

Bullying data often includes detailed personal accounts of experiences and the impact of bullying. Such data are highly sensitive, and there may be a risk that individuals can be identified. To address such sensitivities, Meyer (2018) (see box 3) proposes a tiered approach to the consent process, where participants are actively involved in decisions around what parts of their data and where their data are shared. Meyer (2018) also highlights the importance of selecting the right repository for your data. Some repositories are entirely open, whereas others only provide access to suitably qualified researchers. While bullying data pose particular ethical challenges, the sharing of all data is encouraged (Bishop, 2009; McLeod & O'Connor, 2020).

Reporting Standards

Reporting standards are standards for reporting a research study and provide useful guidance on what methodological and analytical information should be included in a research paper (Munafò et al., 2017). Such guidelines aim to ensure sufficient information is provided to enable replication and promote transparency (Munafò et al., 2017). Journal publishers are now beginning to outline what open science practices should be reported in articles. For example, from July 2021, when submitting a paper for review in one of the American Psychological Association journals, the authors are now required to state whether their data will be openly shared and whether or not their study was pre-registered. In a bullying context, Smith and Berkun (2020) have highlighted that important contextual data is often missing from publications and recommend, for example, that the gender and age of participants alongside the country and date of data collection should be included as standard in papers on bullying in school.

Recommendations:

1. Researchers to start to share all research materials openly using an online repository. Box 3 provides some useful guidance on how to support the open sharing of research materials.
2. Journal editors and publishers to further promote the open sharing of research material.
3. Researchers to follow the recommendations set out by Smith and Berkun (2020) and follow a set of reporting standards when reporting bullying studies.

4. Reviewers be mindful of Smith and Berkun (2020) recommendations when reviewing bullying papers.

Box 3 Useful Resources on Openly Sharing Research Materials & Reporting Standards

- **Banks et al. (2019)** provide a helpful overview of open science practices, alongside a set of recommendations for ensuring research is more open.
- **Meyer (2018)** provides some useful guidance on managing the ethical issues of openly sharing data.
- **The Equator Network** (<https://www.equator-network.org/reporting-guidelines/>) is a useful resource for the sharing of different reporting standards, for example, the PRISMA guidelines for systematic reviews and STROBE standards for observational studies.
- The **Foster** website is an online e-learning portal with a wealth of resources to help researchers develop open science practices <https://www.fosteropenscience.eu/>, including sharing resources and pre-prints.
- The **Open Science Framework** has resources to support open science practices and to use their platform <https://www.cos.io/products/osf>.
- **Smith and Berkun (2020)** provide a review of contextual information reported in bullying research papers and offer recommendations on what information to include.
- The **PsyArXiv** <https://psyarxiv.com> and **SocArXiv** <https://osf.io/preprints/socarxiv> repositories accept pre-print publications in psychology and sociology.

Replication Studies

Replicated findings increase confidence in the reliability of that finding, ensuring research findings are robust and enabling science to self-correct (Cook et al., 2018; Drotar, 2010). Replication reflects the ability of a researcher to duplicate the results of a prior study with new data (Goodman et al., 2018). There are different forms of replication that can be broadly categorised into two: those that aim to recreate the exact conditions of an earlier study (exact/direct replication) and those that aim to test the same hypotheses again using a different method (conceptual replication) (Schmidt, 2009). Replication studies are considered fundamental in establishing whether study findings are consistent and trustworthy (Cook et al., 2018).

To date, few replication studies have been conducted on bullying in schools. A Web of Science search using the Boolean search term bully* alongside the search term “replication” identified two replication studies (Berdondini & Smith, 1996; Huitsing et al., 2020). Such a small number of replications may reflect concerns regarding the value of these and concerns about how to conduct such work when data collection is so time and resource-intensive. In addition,

school gatekeepers are themselves interested in novelty and addressing their own problems and may be reluctant to participate in a study which has “already been done”. One possible solution to this challenge is to increase the number of large-scale collaborations among bullying researchers (e.g. multiple researchers across many sites collecting the same data). Munafò et al. (2017) highlight the benefits of collaboration and “team science” to build capacity in a research project. They argue that greater collaboration through team science would enable researchers to undertake higher-powered studies and relieve the pressure on single researchers. Such projects also have the benefit of increasing generalisability across settings and populations.

Recommendations:

1. Undertake direct replications or, as a more manageable first step, include aspects of replication within larger studies.
2. Journal editors to actively promote the submission of replication studies on school bullying.
3. Journal editors, editorial panels, and reviewers to recognise the value of replication studies rather than favouring new or novel findings (Box 4).

Box 4 Useful Resources on Replication Studies

- **Brandt et al. (2014)** provide a useful step by step guide on conducting replication studies, including a registration template form for pre-registering a replication study (available here: <https://osf.io/4jd46/>).
- **Coyne et al. (2016)** discuss the benefits of replication to research in educational research (with a particular focus on special education).
- **Duncan et al. (2014)** discuss the benefits of replication to research in developmental psychology.

Pre-Registration

Pre-registration requires researchers to set out, in advance of any data collection, their hypotheses, research design, and planned data analysis (van't Veer & Giner-Sorolla, 2016). Pre-registering a study reduces the number of researcher degrees of freedom as all decisions are outlined at the start of a project. However, to date, there have been few pre-registered studies in bullying. There are two forms of pre-registration: the pre-registration of analysis plans and registered reports. In a pre-registered analysis plan, the hypotheses, research design, and analysis plan

are registered in advance. These plans are then stored in an online repository (e.g. the Open Science Framework (OSF) or AsPredicted website), which is then time-stamped as a record of the planned research project (van't Veer & Giner-Sorolla, 2016). Registered reports, however, integrate the pre-registration of methods and analyses into the publication process (Chambers et al., 2014). With a registered report, researchers can submit their introduction and proposed methods and analyses to a journal for peer review. This creates a two-tier peer-review process, where the registered reports can be accepted in principle or rejected in the first stage of review, based on the rigour of the proposed methods and analysis plans rather than on the findings of the study (Hardwicke & Ioannidis, 2018). In the second stage of the review process, the authors then submit the complete paper (at a later date after data have been collected and analyses completed), and this is also reviewed. The decision to accept a study is therefore explicitly based on the quality of the research process rather than the outcome (Frankenhuis & Nettle, 2018) and in practice, almost no work is ever rejected following an in-principal acceptance at stage 1 (C. Chambers, personal communication, December 11, 2020). At the time of writing, over 270 journals accept registered reports, many of which are directly relevant to bullying researchers (e.g. Developmental Science, British Journal of Educational Psychology, Journal of Educational Psychology).

Pre-registration offers one approach for improving the validity of bullying research. Employing greater use of pre-registration would complement other recommendations on how to improve research practices in bullying research. For example, Volk et al. (2017) propose a “bullying research checklist” (see Box 5).

Box 5 Volk et al. (2017) Bullying Research Checklist (*reproduced with permission*)

- State and justify your chosen definition of bullying.
- Outline the theoretical logic underlying your hypotheses and how it pertains to your chosen definition and program of research/intervention.
- Use one's logic model and theoretical predictions to determine which kind of measurements are most appropriate for testing one's hypotheses. There is no gold standard measure of bullying, but be aware of the strengths and weaknesses of the different types of measures. Where possible, use complementary forms of measurement and reporters to offset any weaknesses.

- Implement an appropriate research or intervention design (longitudinal if possible) and recruit an appropriate sample.
- Reflect upon the final product, its associations with the chosen logic model and theory, and explicitly discuss important pertinent limitations with a particular emphasis on issues concerning the theoretical validity of one's findings.

Volk et al.'s (2017) checklist highlights the importance of setting out in advance the definition of bullying, alongside the theoretical underpinnings for the hypotheses.

Pre-Registering Quantitative Studies

The pre-registration of quantitative studies requires researchers to state the hypotheses, method, and planned data analysis in advance of any data collection (van't Veer & Giner-Sorolla, 2016). When outlining the hypotheses being tested, researchers are required to outline the background and theoretical underpinning of the study. This reflects the importance of theoretically led hypotheses (van't Veer & Giner-Sorolla, 2016), which are more appropriately tested using NHST and inferential statistics in a confirmatory rather than exploratory design (Wagenmakers et al., 2012). Requiring researchers to state their hypotheses in advance of any data collection adheres to the confirmatory nature of inferential statistics and reduces the risk of HARKing (van't Veer & Giner-Sorolla, 2016). Following a description of the hypotheses, researchers outline the details of the planned method, including the design of the study, the sample, the materials and measures, and the procedure. Information on the nature of the study and how materials and measures will be used and scored are outlined in full. Researchers are required to provide a justification for and an indication of the desired sample size.

The final stage of the pre-registration process requires researchers to consider and detail all steps of the data analysis process. The data analysis plan should be outlined in terms of what hypotheses are tested using what analyses and any plans for follow-up analysis (e.g. post hoc testing and any exploratory analyses). Despite concerns to the contrary (Banks et al., 2019; Gonzales & Cunningham, 2015), the aim of pre-registration is not to devalue exploratory research, but rather, to make more explicit what is exploratory and what is confirmatory (van't Veer & Giner-Sorolla, 2016). While initially, the guidance on pre-registration focused more on confirmatory analyses, more recent guidance considers how researchers can pre-register exploratory studies (Dirnagl, 2020), and make a distinction between

confirmatory versus exploratory research in the publication process (McIntosh, 2017). Irrespective of whether confirmatory or exploratory analyses are planned, pre-registering an analysis reduces the risk of *p*-hacking (van't Veer & Giner-Sorolla, 2016). A final point, often a concern to those unfamiliar with open science practices, is that a pre-registration does not bind a researcher to a single way of analysing data. Changes to plans are entirely acceptable when they are deemed necessary and are described transparently.

Pre-Registering Qualitative Studies

Pre-registration of qualitative studies is still relatively new (e.g. Kern & Gleditsch, 2017a, b; Piñeiro & Rosenblatt, 2016). This is because most of the work uses inductive and hypothesis-generating approaches. Coffman and Niederle (2015) argue that this hypothesis-generation is one of the most important reasons why pre-registering qualitative work is so important. This could help distinguish between what hypotheses are generated from the data and which were hypotheses conceptualised from the start. Therefore, it could even be argued that pre-registering qualitative research encourages exploratory work. Using pre-registration prior to a hypothesis-generating study will also help with the internal validity of this same study, as it will be possible to have a sense of how the research evolved from before to post data collection.

Using investigator triangulation, where multiple researchers share and discuss conclusions and findings of the data, and reach a common understanding, could improve the trustworthiness of a qualitative study (Carter et al., 2014). Similarly, where establishing intercoder reliability is appropriate, the procedures demonstrating how this is achieved can be communicated and recorded in advance. One example of this would be the use of code books. When analysing qualitative data, developing a code book that could be used by all the coders could help with intercoder reliability and overall trustworthiness (Guest et al., 2012). These are elements that could be considered in the pre-registration process by clearly outlining if intercoder reliability is used and, if so, how this is done. To improve the transparency of pre-registered qualitative work, it has also been suggested that researchers should clearly state whether, if something outside the scope of the interview comes to light, such novel experiences will also be explored with the participant (Haven & Van Grootel, 2019; Kern & Gleditsch, 2017a, b). Issues of subjectivity, sometimes inherent to qualitative work, can be reduced as a result of pre-registering because it allows the researcher to clearly consider all the elements of the study and have a plan before data collection and analysis, which reduces levels of subjectivity.

Kern and Gleditsch (2017a, b) provide some practical suggestions on how to use pre-registration with qualitative studies. For example, when using in-depth interviews, one should make the interview schedule and questions available to help others to comprehend what the participants were asked. Similarly, they suggest that all recruitment and sampling strategy plans should be included to improve transparency (Haven & Van Grootel, 2019; Kern & Gleditsch, 2017a, b). Piñeiro and Rosenblatt (2016) provide an overview of how these pre-registrations could be achieved. They suggested three main elements: conceptualisation of the study, theory (inductive or deductive in nature), and design (working hypothesis, sampling, tools for data collection). More recently, Haven and Van Grootel (2019) highlighted a lack of flexibility in the existing pre-register templates to adapt to qualitative work, as such, they adapted an OSF template to a qualitative study.

Integrating Participatory Research Methods into Pre-Registration

Participatory research methods (PRMs) aim to address power imbalances within the research process and validate the local expertise and knowledge of marginalised groups (Morris, 2002). The key objective of PRM is to include individuals from the target population, also referred to as “local experts”, as meaningful partners and co-creators of knowledge. A scoping review of PRM in psychology recommends wider and more effective use (Levac et al., 2019). Researchers are calling specifically for youth involvement in bullying studies to offer their insight, avoid adult speculation, and assist in the development of appropriate support materials (O’Brien, 2019; O’Brien & Dadswell, 2020). PRM is particularly appropriate for research with children and young people who experience bullying behaviours given their explicit, defined powerlessness. Research has shown that engaging young people in bullying research, while relatively uncommon, provides lasting positive outcomes for both researchers and participants (Gibson et al., 2015; Lorion, 2004).

Pre-registration has rarely been used in research undertaking a PRM approach. It is a common misconception that pre-registration is inflexible and places constraints on the participant-driven nature of PRM (Frankenhuis & Nettle, 2018). However, pre-registration still allows for the exploratory and subjective nature of PRM but in a more transparent way, with clear rationale and reasoning. An appropriate pre-registration method for PRM can utilise a combination of both theoretical and iterative pre-registration. Using a pre-registration template, researchers should aim to document the research process highlighting the main contributing theoretical underpinnings of their research, with anticipatory hypotheses and complementary analyses (Haven & Van

Grootel, 2019). This initial pre-registration can then be supported using iterative documentation detailing ongoing project development. This can include utilising workflow tools or online notebooks, which show insights into the procedure of co-researchers and collaborative decision making (Kern & Gleditsch, 2017a, b). This creates an evidence trail of how the research evolved, providing transparency, reflexivity, and credibility to the research process.

The Perceived Challenges of Pre-Registration. To date, there have been few pre-registered studies in bullying. A Web of Science search using the Boolean search terms *bully** *peer-vict**, *pre-reg**, and *preregist** identified four pre-registered studies on school bullying (Kaufman et al., 2022; Legate et al., 2019; Leung, 2021; Noret et al., 2021). The lack of pre-registrations may reflect concerns that it is a difficult, rigid, and time-consuming process. Reischer and Cowan (2020) note that pre-registration should not be seen as a singular time-stamped rigid plan but as an ongoing working model with modifications. Change is possible so long as this is clearly and transparently articulated, for example, in an associated publication or in an open lab notebook (Schapira et al., 2019). The move to pre-registering a study requires a change in workflow rather than more absolute work. However, this early and detailed planning (especially concerning analytical procedures) can improve the focus on the quality of the research process (Ioannidis, 2008; Munafò et al., 2017).

The Impact of Pre-Registration. The impact of pre-registration on reported effects can be extensive. The pre-registration of funded clinical trials in medicine has been a requirement since 2000. In an analysis of randomised control trials examining the role of drugs or supplements for intervening in or treating cardiovascular disease, Kaplan and Irvin (2015) identified a substantial change in the number of significant effects reported once pre-registration was introduced (57% reported significant effects prior to the requirement but only 8% after). More recently, Scheel et al. (2021) compared the results of 71 pre-registered studies in psychology with the results published in 152 studies that were not pre-registered. They found that only 44% of the pre-registered studies reported a significant effect, compared to 96% of studies that were not pre-registered. As a result, the introduction of pre-registration has increased the number of null effects reported in the literature and presents a more reliable picture of the effects of particular interventions.

Recommendations:

1. When conducting your next research study on bullying, consider pre-registering the study.

2. Journal editors and publishers to actively encourage registered reports as a submission format.

The Benefits of Open Science for Researchers

Employing more open science practices can often be challenging, in part because they force us to reconsider methods that are already “successful” (often synonymous with “those which result in publication”). Based on our own experience, this takes time and is best approached by beginning small and building up to a wider application of the practices we have outlined in this article. Alongside increasing the reliability of research, open science practices are associated with several career benefits for the researcher. Articles which use open science practices are more likely to be accepted for publication, are more visible, and are cited more frequently (Allen & Mehler, 2019). Open science can also lead to the development of more supportive networks for collaboration (Allen & Mehler, 2019). In terms of career advancement, Universities are beginning to reward engagement with science principals in their promotion criteria. For example, the University of Bristol (UK) will consider open research practices such as data sharing and pre-registration in promotion cases in 2020–21. Given that formal recognition such as this has been recommended by the European Union for some time (O’Carroll et al., 2017), it is likely to be an increasingly important part of career progression in academia (Box 6).

Box 6 Pre-Registration

- **van't Veer and Giner-Sorolla (2016)** provide a clear overview of the pre-registration process and provide a template for the pre-registration of studies.
- **Center for Open Science** YouTube channel <https://www.youtube.com/watch?v=PboPpcg6ik4> includes several webinars on pre-registration and the replication crisis. The OSF website also includes a number of pre-registration templates for researchers to use <https://osf.io/zab38/wiki/home/?view>, and provide a list of journals that accept registered reports <https://www.cos.io/initiatives/registered-reports>
- **Haven and Van Grootel (2019)** review the issues around pre-registering of qualitative work and adapted an existing pre-registering OSF template to suit these types of studies.

Conclusion

This paper sought to clarify the ways in which bullying research is undermined by a failure to engage with open science practices. It highlighted the potential benefits of

open science for the way we conduct research on bullying. In doing so, we aimed to encourage the greater use of open science practices in bullying research. Given the importance of this for the safety and wellbeing of children and young people, the transparency and reliability of this research is paramount and is enhanced via greater use of open science practices. Ultimately, researchers working in the field of bullying are seeking to accurately understand and describe the experiences of children and young people. Open science practices make it more likely that we will achieve this goal and, as a result, be well-placed to develop and implement successful evidence-based intervention and prevention programs.

Declarations

Conflict of Interest The authors declare no competing interests.

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