

# Open Research at Nottingham Trent University

**Darren Rhodes<sup>1</sup>**

Open Research Coordinator

<sup>1</sup>Department of Psychology, Nottingham Trent University, Nottingham, United Kingdom

## Summary

Open Research is a paradigm shift in how we do science. In this position paper, I outline a series of achievable actions that can level up and future proof the way we do research at the department of Psychology (DoP) at NTU. This position paper first outlines the core tenets of the Open Research approach, and the current status at NTU. I will then outline initial priorities for improving psychological research within the department. This work precedes an *Open Research Manifesto* that will provide a deeper context and narrative for implementing Open Research practices. Finally, this paper may then serve as a prototype for Open Research at Nottingham Trent University as a wider organisation.

## Why Open Research?

Science is changing. *Open Science* is a movement focused on improving scientific research by making scientific processes transparent, and results accessible. In this way, Open Science fosters a collegiate, collaborative and benevolent work environment, not only within research centres, but across countries and cultures (Allen & Mehler, 2019). Here, however, we use the term *Open Research* as a more inclusive term, to not only include Open Science practices, but the varied processes and research themes that span our department. The goal of Open Research is to create systems that generate robust and replicable science through new technologies, open resources, open data, refocused attitudes, and altered incentives. To be sector leaders in research *and* teaching at NTU – we need to adapt to the benevolent wave of Open Research practices.

## Why is Open Research Important?

Unfortunately, there have been numerous examples uncovered in the last ten years or so of research outputs in the field of psychology that question the integrity of the discipline. Concerns about *p*-hacking (adding participants to study until you get significant effects), HARKing (changing the hypotheses given the results), lack of statistical power (or rather not using power calculations), non-replicable results, journal review and publication biases, file drawer problems, lack of access to data and code, fraudulent results and the inappropriate use of statistics; have spurred on the open science movement (Spellman et al., 2018). Open science is a way of improving the scientific rigour, replicability and quality of our research through

achievable and (in some cases) quick and efficient actions (Asendorpf et al., 2012; Lakens & Nosek, 2014; Munafò et al., 2017; Nosek et al., 2015; Popper, 1959).

The changes prescribed in this paper not only affect the processes we use in our day-to-day work, but ultimately a change in mind-set. This is, of course, not to say the work people have done (and are doing) is somehow 'wrong'. This is categorically not what I intend to say here, rather the change in attitude to research may come about organically through sensible and timely exposure to open research practices.

### **Status Quo at NTU**

We already have a burgeoning Open Research community within the DoP. We have colleagues who upload preprints, pre-register their work, make data and code publically available, and use online methods. We are also fortunate to have the *replication lab* that investigates the reproducibility of established (or so it seems) effects in psychology. We already have a collective that can come together to start the process of letting Open Research permeate throughout the department. This is important because this whole process should not be dictatorial or dogmatic in its aims. We need to foster a collaborative, dynamic and realistic attitude to levelling up Open Research at NTU. Quite simply, a sanctimonious, self-righteous attitude will most likely have the reverse effect. We are lucky to have such a collegiate and positive department and we should embrace that: I do not foresee much resistance or negativity arising from moving to more Open Research practice. We will listen-to and understand any concerns raised as a result of any of the ideas, policies, and resources that are born out of this process – and act upon them.

## Principles

Open Research means absolutely nothing without the work we are doing being of rigorous, robust quality. That is why Open Research spans more than just making data, methods and outputs being publically accessible. We are very fortunate to have such varied research interests within the DoP – which could be harnessed to effectively usher in a new era at NTU. What I mean here, is that Open Research should not be thought about being limited just to those making programming code available in Cognitive Science (for example), but should be, for instance, applied to Qualitative work too; interview transcripts and intended thematic analysis techniques could be both pre-registered and made available during the research process.

As such, to become a department awash with Open Researchers, the following principles should be encouraged:

- *Pre-registration of all scientific work*
- *Open Materials* – making all research apparatus publically available
- *Open Data* – making all research data and analysis scripts publically available
- *Open Access* – making all research outputs available to the public
- *Online Research Methods* – Try to use web-based tools for the sharing and creation of experimental protocols and analyses to aid collaboration

## Open Research Next Steps

So, what are the next steps? Here I outline initial priorities for levelling up Open Research at NTU DoP:

## **Priority 1: Open Access to Research Outputs**

At present, the only policy we have for the open dissemination of our scientific work (or book chapters) is detailed here: <https://www.ntu.ac.uk/m/library/supporting-researchers/open-access-and-open-research> . There is nothing wrong with this, and in fact, should be encouraged, however in this sense, the policy is *post-acceptance* of research. Instead, and allied to this policy, we should disseminate our work *pre-acceptance*, that is, through prep-print articles made available on the many servers for this practice, such as *PsyArXiv*, and *BioArXiv* (to name but a few). Pre-printing scientific work is useful in a few ways, but there is a scientific component, as well as more functional component. Pre-printing work encourages feedback about the work, before review. Secondly, pre-printing work actually increases the expected number of citations and attention a paper receives (Fraser et al., 2019; Fu & Hughey, 2019).

## **Priority 2: Open Methods**

We are forging ahead with our move to online experimentation within the department and have purchased licenses for Gorilla and Labvanced (and hopefully PsychoPy3). Such online methods have real open research potential, given that in all of these software, there is the ability to access both previously created experiments/surveys, but also create and make your own work open to others.

We are also perfectly positioned to integrate open methods within our scientific work given the move to using *R* (Open statistical programming software) (R Team, 2020). We can leverage what we learn about *R* during the formulation of teaching methods into our research. I foresee as staff become more used-to (and

comfortable) with using *R*, then making data and code available when submitting research becomes a smoother process.

However, we can and should, do more. We propose pre-registration of all scientific work, such that we become as clear and transparent as possible. Pre-registration is not only desirable, it is essential and best research practice (Chambers & Tzavella, 2020; Clarke et al., 2020; Dirnagl, 2020; Munafò et al., 2017; Nosek et al., 2015). Of course, this cannot happen in all cases (and we must be mindful of that), but there is no reason why a researcher should not pre-register their work. We also propose one step further, in that such training is integrated within our PhD training process, such that not only are we adopting and maintaining open research strategies but producing our *own* open researchers.

### ***Priority 3: Open Data***

We presently have the ability to store our data on NTU servers, but I do not think this is efficient nor open. Many journals are now requiring data and accompanying analyses to be submitted at submission. The best (and most widely used) online tool for scientific data dissemination is the Open Science Framework ([www.osf.io](http://www.osf.io)). This is a free service that not only houses data and code on secure servers (but see also GitHub), but manages pre-prints, pre-registration and automatic article upload to journals. I propose that we actively train our researchers and students to become accustomed to open data practice, with guidance also from Prof. Thom Baguley, who sits on the BPS Open Data Working Group.

## ***Priority 4: Changing the Research Culture***

The positive changes prescribed in this paper are sometimes trivial but focus on the software or the methods that we should expose our staff to (if they want to).

However, I believe the move to more Open Science practice requires a premeditated shift in attitude and toward an open research culture. To this end, I am presently working on an action plan that has 3 clear stages: Awareness, Implementation, and Maintenance:

### ***Stage 1. Awareness***

Introducing Open Research practices to the department through workshops, how-to seminars and online videos – all housed on the newly created Open Research @ NTU Teams page.

### ***Stage 2. Implementation***

Implementing core changes as outlined in the Open Science Priorities above, including the to-be-mentioned Open Research Committee and Centre for Open Research.

### ***Stage 3. Maintenance***

For long-term adherence to Open Research practice, we must monitor staff training and be proactive and responsive towards future changes in this movement.

## ***Priority 5: Rewarding Open Research***

We are moving into a new age of research, both due to the pandemic but the Open Science movement. Altering incentives such that our practice is open and

transparent should be a top priority. As such, one might propose that for any registered report accepted, that we might support subject participation costs, or fund equipment to-do the experiment through a dedicated QR Open Research fund. We may also think about rewarding examples of contributions to both open research practice, and impactful open research work with conference attendance, and/or stimulus QR grants for developing work into larger projects. I am reticent to suggest too much here, given the pandemic and situation with regards UK funding (both internally and externally) here, but it should be something we think about to encourage a positive research environment.

## **Looking Ahead**

Finally, I review two ideas for long term strategies to become sector leaders in Open Research policy and practice in the UK. As I mentioned before, I genuinely believe we have the raw ingredients at NTU DoP to develop a world-class Open Science environment. This will not happen overnight, but with continued support and creativity from within the school and above.

We have a collegiate and positive staff that already engaging in some of the practices I have outlined above, we have: the replication lab, world-class statistics experts (I am biased here), Qualitative experts, the *R* revolution, a supportive and (most importantly a) wide spectrum of research and practice that would allow us to have a real overview of the challenges in adopting Open Research.

The following mini-sections are some initial long-term ideas that although are fairly optimistic, are an indication of the belief I and others have for enacting positive change at NTU:

### ***Centre for Open Research?***

Following on from the above, I propose (in the medium-to-long) term a *Centre for Open Research*, that not only supports and stimulates a fruitful research environment; but actively researches and evaluates open science policy and practice. In this way, I see the (presently hypothetical) centre as part of the 'maintenance' stage of the initial Action Plan, in so far as being a pillar within the department to provide support and guidance for academic staff. However, the centre could also be leveraged across schools and be an important asset for the University across disciplines – providing a network for Open Research at NTU. I know of no Centre for Open Research in the UK –this could be an avenue to be sector leaders.

### ***University-Wide Open Research Strategy Committee?***

Allied to the previous point, it is very important to have a University-wide Open Research Strategy committee to share and develop staff development materials for use across disciplines. This should not be limited to just psychology – but any department engaged in research. Especially now, given the 'virtual' environments we have available for meetings, this could be a real possibility. Open Research could provide a platform for cross-school collaboration, and a conduit for the whole point of this position paper: improving the way we do research at NTU.

## ***Conclusion***

Originally, I intended this position paper to be two pages long (apologies), but I realised whilst writing this piece that there is so much potential both in our department, and across the entire university. Given Grant funders and journals are now looking for Open Research in submissions, we need to get ahead of the game and future-proof ourselves. This will not be without challenge, but I have confidence we have all the raw tools to level-up our research practice and lead the sector in Open Research in the UK.

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