White Rose Research Online

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk
Universities of Leeds, Sheffield and York

Deposited via The University of Sheffield.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/id/eprint/200852/

Version: Accepted Version

Article:
Forsberg, A. (2022) Pre-registration in developmental psychology: benefits and challenges. Developmental Psychology Forum, 1 (95). pp. 4-6. ISSN: 2057-3952

https://doi.org/10.53841/bpsdev.2022.1.95.4

This is a pre-publication version of the following article: Forsberg, Alicia (2022) Pre-registration in developmental psychology: Benefits and challenges, Developmental Psychology Forum 95: 4-6 https://doi.org/10.53841/bpsdev.2022.1.95.4

Reuse
Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

UNIVERSITY OF LEEDS
University of Sheffield
UNIVERSITY of York

This is a pre-publication version of Forsberg, A., (2022). Pre-Registration in Developmental Psychology: Benefits and Challenges. *Developmental Psychology Forum*.

Pre-Registration in Developmental Psychology: Benefits and Challenges

Imagine that you have just finished data collection. Your key hypothesis is supported if you exclude outliers using a certain threshold, but not another. Bias towards choosing the approach which produces a significant, more 'interesting' result is a critical factor in the 'Replication Crisis,' inflating the number of published false-positive results (Davis-Kean & Ellis, 2019; Simmons et al., 2011). The preference for 'interesting' results is fueled by publication bias, making significant results easier to publish, and broader career incentive structures that reward publications. To reduce this bias, one can specify hypotheses, methods, and analyses prior to data collection, in a *pre-registration*. Alternatively, a *registered report* involves submitting the introduction, methods, and detailed analysis plan, for peer review before data collection. However, these practices may seem challenging to implement in developmental research, as child data collection is wonderfully unpredictable. Below, I reflect on the benefits and challenges of pre-registering my developmental working memory research as an early-career researcher.

The first and arguably primary benefit of pre-registration is that it helps *reduce unintentional questionable research practices* by minimising the number of analysis choices required post data collection. Any analyses deviating from this plan are labelled as 'exploratory', which helps the reader better assess the robustness of the effect. If significance is only found when using a specific, post-data collection outlier-exclusion approach, it might moderate our expectations that the effect would replicate. The second benefit is *improved communication and study design*. As a brand-new postdoc, writing a registered report helped my PI and I pinpoint the subtle differences in our conceptualisations of the constructs we were trying to explore. In this process, we redesigned our study, which substantially improved it. Finally, *pre-registration experience is increasingly valued in job and grant applications* and may also increase the chances of publication (Allen & Mehler, 2019). Additionally, if you submit a registered report, you are able to incorporate reviewer feedback before data collection. Since it is accepted before data collection, it will be published regardless of the results. Third, including a Stage-1 acceptance on your CV is beneficial if you are on the job market but data collection is slow.

However, there are some challenges as well. First, these practices may *delay the start of data collection* compared to a non-registered project. It can feel difficult and inefficient to ask your research team to postpone testing while you agonise over analytical details. Even so, planning the analyses before data collection allows you to change the study design if needed, which likely saves time overall. The second challenge is *less flexibility*. Developmental research involves various unpredictable practical problems. Perhaps the youngest children overwhelmingly fail to complete the study. Without a pre-registration, you could simply exclude that group. In contrast, if your method was pre-registered, you would ideally submit an amended pre-registration to explain why and when you dropped that age group – this document can be as short as a few sentences. For a registered report, you would need the Editor's approval and

perhaps additional review. We tried to prevent these problems by pre-specifying various "if… then" rules. For example, failure to complete the study would trigger a switch to a program with reduced trials but increased participant numbers. Also, collecting pilot data is not incompatible with pre-registering, as long as you report it. Ultimately, a pre-registration is useful because it provides a transparent record of your research process – regardless of whether the project went precisely to plan. In my experience, keeping such a record is entirely compatible with the surprises developmental research can bring. Overall, I have found journal editors and reviewers very understanding of various amendments and deviations due to both unforeseen situations and pure mistakes.

Finally, it is essential to acknowledge that non-preregistered research findings are not inherently unreliable or 'false.' Pre-registration is not a solution to all research problems (see van Rooij, 2019), nor is it always possible. However, pre-registration has helped me reduce biases and questionable research practices – which, arguably, no researcher is immune to – in my developmental research. Additionally, I have found that pre-registration has improved collaborator communication and study design, which ultimately makes my research process more efficient. If you are interested in pre-registering your developmental research but worry about making mistakes or things not going according to plan, in my experience: perfection is not required, and the benefits outweigh the challenges.

Notes: For an example of a pre-registered developmental study including various unexpected events, see Forsberg et al. (2021). Our Stage-1 registered report is available here: https://www.researchgate.net/publication/343770174, Forsberg, Adams, and Cowan, N. (*In-Principle Acceptance: Stage 1 Registered Repor*t). Why does Visual Working Memory Ability Improve with Age: More objects, more feature detail, or both? A Registered Report. *Developmental Science.*

Dr. Alicia Forsberg

Lecturer at the University of Sheffield

a.forsberg@sheffield.ac.uk

Twitter: @AliciaForsberg

References

Allen, C., & Mehler, D. M. (2019). Open science challenges, benefits and tips in early career and beyond. *PLoS biology*, *17*(5), e3000246.

Davis-Kean, P. E., & Ellis, A. (2019). An overview of issues in infant and developmental research for the creation of robust and replicable science. *Infant Behavior and Development*, *57*, 101339.

Forsberg, A., Guitard, D., Adams, E. J., Pattanakul, D., & Cowan, N. (2021). Children's long-term retention is directly constrained by their working memory capacity limitations. *Developmental Science*, e13164.

Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological Science*, *22*(11), 1359-1366.

Van Rooij, I. (2019). Psychological science needs theory development before pre-registration. *See https://featuredcontent. psychonomic. org/psychological-science-needs-theory-development-before-preregistration*.