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Dr. Regula Zwicky, Open Science Services

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OPEN SCIENCE PRACTICES FOR GRADUATE STUDENTS 1

Easing Into Open Science: A Tutorial for Graduate Students

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Submitted for review

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OPEN SCIENCE PRACTICES FOR GRADUATE STUDENTS 1

Easing Into Open Science: A Guide for Graduate Students and Their Advisors

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Methodology and Research Practice

Easing Into Open Science: A Guide for Graduate Students and Their Advisors

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This article provides a roadmap to assist graduate students and their advisors to engage in open science practices. We suggest eight open science practices that novice graduate students could begin adopting today. The topics we cover include journal clubs, project workflow, preprints, reproducible code, data sharing, transparent writing, preregistration, and registered reports. To address concerns about not knowing how to engage in open science practices, we provide a difficulty rating of each behavior (easy, medium, difficult), present them in order of suggested adoption, and follow the format of *what*, *why*, *how*, and *worries*. We give graduate students ideas on how to approach conversations with their advisors/collaborators, ideas on how to integrate open science practices within the graduate school framework, and specific resources on how to engage with each behavior. We emphasize that engaging in open science behaviors need not be an all or nothing approach, but rather graduate students can engage with any number of the behaviors outlined.

Open science is best described as "an umbrella term used to refer to the concepts of openness, transparency, rigor, reproducibility, replicability, and accumulation of knowledge, which are considered fundamental features of science" (Crüwell et al., 2018, p. 3), along with "openly creating, sharing, and accessing research" (Bosman, 2020). The Open Science Movement developed in response to a variety of pervasive issues throughout scientific research, including lack of accessibility, transparency, credibility, and reproducibility (Spellman, 2015; Syed, 2019). As doubt was cast upon foundational empirical work, there emerged a desire to better understand the conceptual, methodological, and analytic choices made throughout the research cycle, as doing so enhances knowledge among the scientific community and permits more informed assessments of credibility (Vazire, 2017).

Topics related to open science in psychology have received major attention in the last decade, including new terminology, new methodological and statistical procedures, new journals, and even whole new sub-fields (e.g., Meta-science, https://metascience.com/; see also Nelson et al., 2018; Spellman et al., 2018). This explosion, along with the fact that part of open science involves more rapid dissemination than the traditional scientific model, has resulted in a barrage of new findings, methods, and practices. All of this can be quite overwhelming to any researcher trying to get a handle on best practices, but especially for graduate students who are new to the field and are quickly trying to learn both methodological and substantive content.

The purpose of this guide is to provide a roadmap for how graduate students, their advisors, and those new to open science can wade through this confusion and begin to engage with open science practices. A sense of paralysis associated with not knowing where to begin with open science is a commonly expressed sentiment. Moreover, some may feel like they need to immediately adopt all open science practices in order to "truly do open science." Additionally, some researchers may not see certain open science practices (e.g., preregistration) as relevant to their research practice, and therefore conclude that open science is not something they should be concerned with. We reject this "all or nothing" view and join with others who advocate for a selective approach to open science, with the accumulation of practices over time (Bergmann, 2018; Corker, 2018; Nuijten, 2019; Syed, 2019). Whereas there are other excellent articles on how to get started with open science (e.g., Crüwell et al., 2018; Lewis, 2019; Nuijten, 2019), including Allen and Mehler's (2019) article on benefits to early career researchers, we see a great need for a guide that is student-focused and offers concrete suggestions. Of course, the relevance of our recommendations is not limited to graduate students—anyone who is new to open science should find them useful—but we prioritized the graduate student perspective, both in terms of how graduate students can engage with open science and how advisors can better support their students' engagement with open science. Additional-

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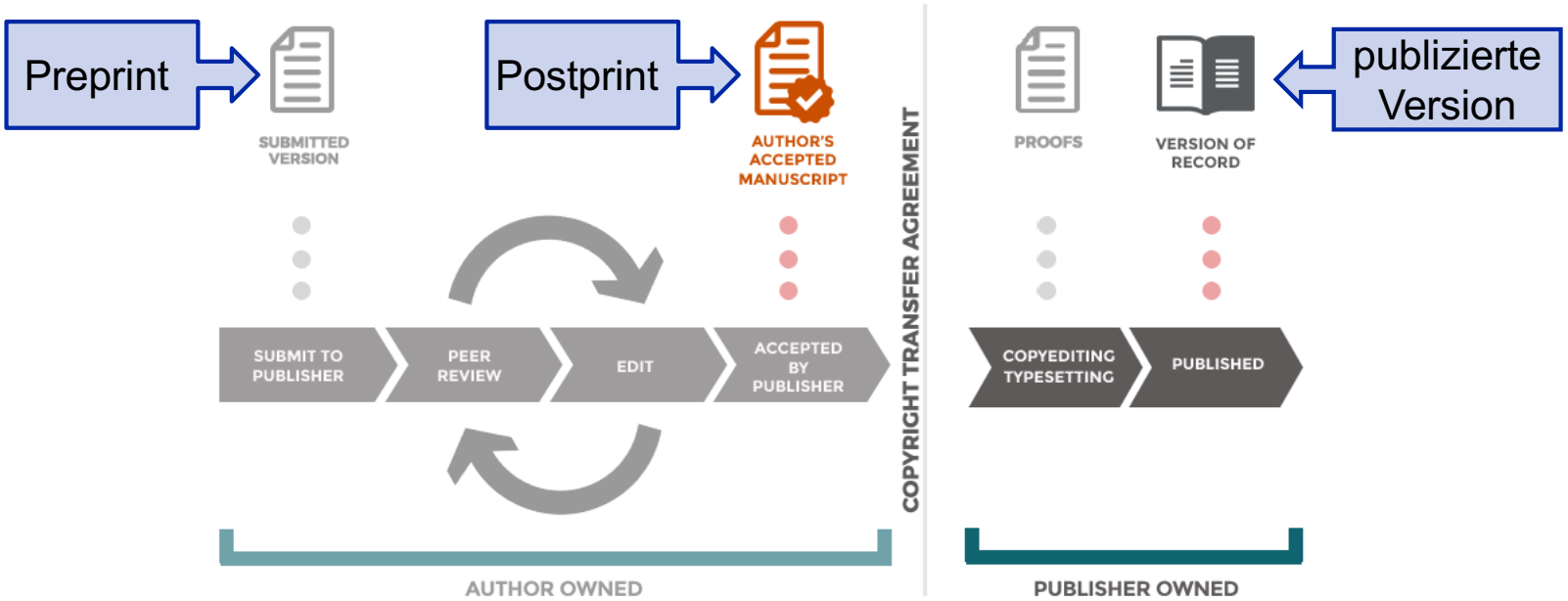

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Reproducible research practices and transparency across linguistics

Agata Bochynska[1], Liam Keeble[2], Caitlin Halfacre[2], Joseph V. Casillas[3], Irys-Amélie Champagne[4], Kaidi Chen[5], Melanie Röthlisberger[6], *Erin M. Buchanan[7], *Timo B. Roettger[1]

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Abstract

Scientific studies of language span across many disciplines and provide evidence for social, cultural, cognitive, technological, and biomedical studies of human nature and behavior. By becoming increasingly empirical and quantitative, linguistics has been facing challenges and limitations of the scientific practices that pose barriers to reproducibility and replicability. One of the proposed solutions to the widely acknowledged reproducibility and replicability crisis has been the implementation of transparency practices, e.g. open access publishing, preregistrations, sharing study materials, data, and analyses, performing study replications and declaring conflicts of interest. Here, we have assessed the prevalence of these practices in randomly sampled 600 journal articles from linguistics across two time points. In line with similar studies in other disciplines, we found a moderate amount of articles published open access, but overall low rates of sharing materials, data, and protocols, no preregistrations, very few replications and low rates of conflict of interest reports. These low rates have not increased noticeably between 2008/2009 and 2018/2019, pointing to remaining barriers and slow adoption of open and reproducible research practices in linguistics. As linguistics has not yet firmly established transparency and reproducibility as guiding principles in research, we provide recommendations and solutions for facilitating the adoption of these practices.

1. Introduction

Linguistics, defined here broadly as scientific studies on language, lies at the intersection of the humanities and the social and biomedical sciences. It informs psychological and neural models of communication, categorization, and memory (1,2); it guides methods for diagnosis and therapy of speech, development, and aging disorders (3,4); it informs methods for educational improvements and facilitate advancement in new technological solutions such as speech recognition and speech synthesis (5,6). Spanning across many subfields, linguistics is also a particularly variegated field when it comes to its methods and the nature of the empirical studies conducted, a field that - while historically observational (7) - is increasingly shaped by quantitative data analysis. As such, linguistics, along with its neighboring fields, is undergoing a sea of change in the way research is conducted and shared.

In recent years, the quantitative sciences have experienced an unprecedented time of introspection and self-evaluation with many scholars raising serious concerns about the credibility of scientific findings (8).

GLOSSA psycholinguistics

Bochynska, A., Keeble, L., Halfacre, C, Casillas, J. V., Champagne, I.-A., Chen, K., Röthlisberger, M., Buchanan, E. M., & Roettger, T. M. (2023). Reproducible research practices and transparency across linguistics. *Glossa Psycholinguistics*, *2*(1): 18, pp. 1–36. DOI: https://doi.org/10.5070/G6011239

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Reproducible research practices and transparency across linguistics

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Reproducible research practices and transparency across linguistics

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