

## The Early Access Effect in bioRxiv preprints

**OASE (Open Access Effects)** is a new BMBF-funded project conducted jointly between ZBW and GESIS. The objective of OASE is to detect and describe the transformation process from traditional to open access (OA) publishing via bibliometric data and indicators. Establishing open science practices as a natural component of scientific working routines remains a challenge; in the case of open access, this is manifested in author concerns regarding quality assurance and impact of OA journals and articles. Conversely, compelling evidence exists that a citation advantage exists for OA articles (cf. Swan, 2010), but the exact driver remains unclear: is it simply due to increased accessibility, or due to more complex interactions with structural (e.g. OA mandates, publication funds) and author-specific (e.g. institutional affiliation, career status or self-selection) influencing factors? Understanding these issues will help to alleviate the concerns of authors, and to build tools to tackle weaknesses in the OA publishing system. Our project therefore aims to answer the question: wherein lies the ‘genuine’ OA effect?

To address this question, we will combine large bibliometric datasets (e.g. from Crossref, Web of Science) with altmetric data (e.g. from Altmetric.com), and validate our results with quantitative and qualitative author surveys. We will test effects previously proposed in the literature systematically and longitudinally, and attempt to identify causal associations between bibliometrics, altmetrics, and structural and author-specific properties of papers.

As a first step of the project we re-examine a widely proposed cause of the OA citation advantage, the so-called ‘Early Access Effect’. The Early Access Effect describes the hypothesis that providing earlier access to articles via deposition of preprints increases the subsequent citations the published paper receives, through increased accessibility and wider dissemination. Such an effect has been documented in the fields of Physics, Mathematics and Computer Science (e.g. Davis and Fromerth, 2007; Moed, 2007; Gentil-Beccot et al., 2009). However, the narrow subject focus of ArXiv, combined with its long-term operation and community acceptance, makes the application of these findings to other subjects where preprint servers are a relative novelty unclear.

To explore this effect further, we have undertaken an analysis of the Early Access Effect of preprints deposited to bioRxiv, a preprint server for Biological Sciences launched in 2013. Our analysis is based upon extracted metadata, citation counts and altmetrics of all bioRxiv preprints deposited between November 2013 and December 2017, which were matched to their respective published papers ( $N = 8,404$ ) and compared with a date and journal-matched control group of concurrently published papers that were not deposited as bioRxiv preprints. Confounding variables, such as publication venue and author demographics, are examined and quantified. Through this, we provide constraints on the effect of depositing work in bioRxiv on citations and altmetrics, and their possible interaction. Results of this study will increase our understanding of the potential benefits of preprints, which will influence author’s decisions on including them in their open science practices.

### References

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