

## RESEARCH ARTICLE

## Questionable research practices in ecology and evolution

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## OPEN ACCESS

**Citation:** Fraser H, Parker T, Nakagawa S, Barnett A, Fidler F (2018) Questionable research practices in ecology and evolution. PLoS ONE 13(7): e0200303. <https://doi.org/10.1371/journal.pone.0200303>

**Editor:** Jelle M. Wicherits, Tilburg University, NETHERLANDS

**Received:** March 21, 2018

**Accepted:** June 22, 2018

**Published:** July 16, 2018

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**Data Availability Statement:** All quantitative data and code will be openly available on the Open Science Framework <https://osf.io/gt3ju/>, DOI: 10.17605/OSF.IO/GT3JU. Due to ethical constraints, only re-ordered qualitative information can be openly shared (in publicly available data there is no way to link these qualitative responses to any other answers given by participants). This data is sufficient to reproduce all of the results presented in this article. The full raw dataset is stored on the same OSF page but kept private. Authors will provide access for the purpose of validation and fraud detection.

## Abstract

We surveyed 807 researchers (494 ecologists and 313 evolutionary biologists) about their use of Questionable Research Practices (QRPs), including cherry picking statistically significant results, *p* hacking, and hypothesising after the results are known (HARKing). We also asked them to estimate the proportion of their colleagues that use each of these QRPs. Several of the QRPs were prevalent within the ecology and evolution research community. Across the two groups, we found 64% of surveyed researchers reported they had at least once failed to report results because they were not statistically significant (cherry picking); 42% had collected more data after inspecting whether results were statistically significant (a form of *p* hacking) and 51% had reported an unexpected finding as though it had been hypothesised from the start (HARKing). Such practices have been directly implicated in the low rates of reproducible results uncovered by recent large scale replication studies in psychology and other disciplines. The rates of QRPs found in this study are comparable with the rates seen in psychology, indicating that the reproducibility problems discovered in psychology are also likely to be present in ecology and evolution.

## Introduction

All forms of science communication, including traditional journal articles, involve transforming complicated, often messy data into a coherent narrative form. O'Boyle et al [1] likened the process to a Chrysalis effect, turning "ugly initial results into beautiful articles". Repeated failures to reproduce a large proportion of results in the published literature of other disciplines (e.g. [2,3]) has triggered reflection and meta-research about the ways in which this transformation process is susceptible to confusion and corruption. To date, large scale meta-research and replication projects have not been conducted in ecology and evolution [4,5]. However, many of the drivers of low reproducibility in other fields, such as publication bias and inflated type I errors, also appear common in ecology and evolution [6–9]. For example, Jennions and Møller [10] found that 38% of meta-analyses appeared to suffer publication bias, and that adjustments for missing (file drawer) studies changed the statistical conclusion (from statistically significant to non-significant) in 21% of cases. Low statistical power is a long-standing problem in ecology

# Questionable Practices

**Gideon J. Mellenbergh**



## Questionable Practices:

*Developments in Aging* United States. Congress. Senate. Special Committee on Aging,1974      **Research and Publications Practices** United States. Congress. House. Committee on Science and Technology. Task Force on Science Policy,1987      **Ethics in International Management** Brij Nino Kumar,Horst Steinmann,2015-05-19 No detailed description available for Ethics in International Management      Foundations of Clinical Nurse Specialist Practice, Third Edition Janet S. Fulton,Kelly A. Goudreau,Kristen L Swartzell,2020-03-16 2014 AJN BOOK OF THE YEAR AWARD 2014 DOODY S CORE TITLE Now in its third edition this highly acclaimed text remains the leading comprehensive textbook and professional reference for Clinical Nurse Specialist CNS education and practice Supported by theory research and current literature the book focuses on CNS roles and scope of practice expanding opportunities in primary and home care settings and outcomes of CNS practice throughout the care continuum and across the three spheres of impact The third edition is updated to reflect current trends affecting CNS practice with several new chapters that focus on telehealth home care and quality improvement The text begins with an overview of the evolution attributes philosophical underpinnings and key outcomes of CNSs in the United States It then addresses nursing interventions quality and care delivery as well as the business side of CNS practice consultation mentoring project management and entrepreneurship It features examples of CNS practice in a variety of settings and specialty areas This resource provides students and professionals with the guidance required to achieve core competencies and improve patient outcomes NEW TO THE THIRD EDITION Updated to reflect current practices and the latest core competencies Features a new section Creating a Culture of Quality that addresses patient safety high reliability organizations Big Data and efficiency Highlights emerging areas of CNS practice such as telehealth pediatric palliative care wound care and home care KEY FEATURES Emphasizes the importance of the CNS practitioner as expert clinician consultant researcher and educator Written and edited by more than 40 individuals representing the Who s Who of CNS nursing Highlights core competencies and practice outcomes identified in NACNS s 2019 Statement on Clinical Nurse Specialist Practice and Education Presents models of CNS specialty care and CNS practice with outcomes Includes discussion questions ethical considerations analysis and synthesis exercises and clinical application considerations Instructor s PowerPoint slides included      *School and Home Education* ,1897      *The Public-school Journal* ,1898      Journal of the Senate of the State of California California. Legislature. Senate,1963      The Journal of the Assembly During the ... Session of the Legislature of the State of California California. Legislature. Assembly,1963      *Journal of the Assembly, Legislature of the State of California* California. Legislature. Assembly,1963      **Ethical Concerns in Sport Governance** Souvik Naha,David Hassan,2020-04-02 Sport governance no longer stirs public opinion only when scandals surface it has become a persistent concern for a number of stakeholders such as the media sport followers and corporates that produce and sponsor sport Contemporary sport governance is characterised by tension between sport s potential for

commercial benefit on the one hand and moral education and social development on the other The perceived incompatibility of these two aspects has led to intense conversations in the media administrative circles and the public sphere about the need for ethics to be the key element of governance The chapters in this volume explore the contemporary forms of governance that is structured by sport s extensive transnational networks shifts in what the stakeholders mentioned above understand by ethics and the emergence of new stakeholders They identify as the two major directions of contemporary sport governance the growing significance of the non West especially in relation to event hosting and the need for controlling the behaviour of emergent interest groups The latter is a complex constellation of athletes officials supporters lawyers and politicians who share power and collectively determine corporate and non profit governance legal aspects and regulatory mechanisms from within their subjective locations The chapters in this book were originally published in a special issue in *Sport in Society*

**Federal Response to Criminal Misconduct by Bank Officers, Directors, and Insiders** United States. Congress. House. Committee on Government Operations. Commerce, Consumer, and Monetary Affairs Subcommittee,1984

*Federal Workers' Compensation Fraud and Abuse* United States. Congress. Senate. Committee on Governmental Affairs. Permanent Subcommittee on Investigations,1981

*Counteracting Methodological Errors in Behavioral Research* Gideon J. Mellenbergh,2019-05-16 This book describes methods to prevent avoidable errors and to correct unavoidable ones within the behavioral sciences A distinguishing feature of this work is that it is accessible to students and researchers of substantive fields of the behavioral sciences and related fields e g health sciences and social sciences Discussed are methods for errors that come from human and other factors and methods for errors within each of the aspects of empirical studies This book focuses on how empirical research is threatened by different types of error and how the behavioral sciences in particular are vulnerable due to the study of human behavior and human participation in studies Methods to counteract errors are discussed in depth including how they can be applied in all aspects of empirical studies sampling of participants design and implementation of the study instrumentation and operationalization of theoretical variables analysis of the data and reporting of the study results Students and researchers of methodology psychology education and statistics will find this book to be particularly valuable Methodologists can use the book to advice clients on methodological issues of substantive research

**Prescription for Fraud** United States. Congress. Senate. Committee on Finance,2001

Research Ethics Deni Elliott,Judy E. Stern,1997 This reader provides a thorough overview of the ethical dilemmas confronting contemporary research scientists Original material reprints and cases on topics such as relationships with colleagues institutional responsibility conflict of interest experimentation with animals and humans and methodologies for ethically conducting reporting and funding research clarify difficult questions for students and professionals alike The collection supports efforts in response to increasingly stringent federal mandates to include ethics instruction in research training

**The Seven Deadly Sins of Psychology** Chris Chambers,2019-07-16 With a new preface by the author Title

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*Status of Open Recommendations* United States. General Accounting Office, 1992

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