

The landscape of preclinical neuroscience systematic reviews: an evidence map

Bernard Friedrich Hild, David Brüsweiler, Sophia Theodora Katharina Hild, Julia Bugajska, Marianna Rosso, Eva Furrer, Kim Elaine Wever, Benjamin Victor Ineichen

Identifier: DOI 10.17605/OSF.IO/WX5TA

Metadata

Background

Background: There is an increase in animal systematic reviews. However, there is limited knowledge about their quality, scope, and geographical distribution over time. Objective: This study aimed to assess the quality and demographic trends of animal systematic reviews in neuroscience, including changes over time. Methods: We performed an umbrella review of animal systematic reviews, searching Medline and Embase for reviews until January 27, 2023. A validated data mining method was used to automatically evaluate the quality of these reviews. Results: From 18'065 records identified, we included 1'358 systematic reviews in our study. These reviews are widely used across diverse topics, often in translational research. They originate from 64 countries, with the United States, China, the UK, Brazil, and Iran being the most prolific. The automated quality assessment indicated high reliability, with F1-scores over 80% for most criteria. Overall, the reviews were of high quality and the quality improved over time. However, many did not include a pre-registered study protocol. Reviews with a pre-registered protocol generally scored higher in quality. No significant differences in quality were observed between countries. Conclusion: Animal systematic reviews in neuroscience are of overall of high quality. Our study highlights specific areas for enhancement such as the recommended pre-publication of study protocols. Such measures can contribute to the effective translation of animal research findings to clinical applications.

Contents

Metadata	1
Background.....	1
Files	3
Analysis files.....	3
Data files	4

Files

Analysis files

File path	Description	Inputs	Outputs
DataViz.Rmd	Data visualization pipeline to generate the figures of the manuscript	alldata.csv	Figures of the manuscript
RoB Automated/1_lib_regex_sectionsFUN.R	The file first defines the regular expressions to be mined to perform the automated risk of bias assessment as well as the “temp_mapping_function” which can section a paper into different chapters (introduction, methods, results, discussion)	-	R function
RoB Automated/2_pdfs_to_html FUN.R	The file contains a script which converts all the pdfs files of the research papers contained in a source folder into html files, and stores them in a output directory	.pdf (in directory All_PDFs_automated_RoB)	.html (in directory All_PDFs_automated_RoB/html)
RoB Automated/3_Mining.R	The script runs the mining function (“temp_mapping_function”) on all the htmls previously generated and stores the results	.html (from directory All_PDFs_automated_RoB/html)	RoB_predicted.csv
RoB Automated/Mining_Validation.Rmd	The script first generated the reliability set from the complete list of papers for which the RoB was performed automatically (Rob_predicted.csv). 10% (n = 73) of the papers are to be scanned manually,	RoB_predicted.csv, validation_D.csv, validation_B.csv	Reliability_mining.csv

	33 papers by each reviewer (stored in validation_D.csv and validation_b.csv), and 7 papers by both reviewers to assess inter-rater reliability. Accuracy measures are calculated and stored in the file "Reliability_mining.csv"		
--	--	--	--

Data files

alldata.csv – clean data used for the analysis and the visualization, containing the following fields:

Field name	Data type	Description
doi	Character	Digital Object Identifier of the study.
key	Character	Unique identifier for the data entry.
title	String	Title of the study or research paper.
year	Integer	Publication year of the study.
journal	Character	Name of the journal where study was published.
issn	Character	International Standard Serial Number of the journal.
authors	Character	List of authors of the study.
url	Character	URL link to the study or publication.
location	Character	Geographic location or affiliation of the study.
abstract	Character	Summary or abstract of the study.
notes	Character	Additional notes or comments.
Author Addresses	Character	Addresses of the authors.
Correspondence Address	Character	Contact address for correspondence.
ISSN	Character	Alternative ISSN format for the journal.
keywords	Character	Keywords associated with the study.
n_authors	Integer	Number of authors of the study.
country	Character	Country of the lead author or study location.
Rob_protocol	Binary (yes = 1/no = 0)	Does the study follow a pre-specified protocol?: The protocol needs to be unequivocally identified online (update March 3, 2023: Mentioning of a protocol alone is sufficient for scoring 1). 0=no, 1=yes, 2=not reported
Rob_question	Binary (yes = 1/no = 0)	Was the research question focused and clearly defined?: Research question or

		objective must be stated in the introduction, methods, discussion, or abstract.
Rob_inexclusioncriteria	Binary (yes = 1/no = 0)	Are in- and exclusion criteria for studies listed?
Rob_search	Binary (yes = 1/no = 0)	Was the search strategy comprehensive?: The search should cover at least 2 different data bases.
Rob_date	Binary (yes = 1/no = 0)	Is there a search date provided in the publication?
Rob_string	Binary (yes = 1/no = 0)	Is there a full or partial search string reported in the publication?
Rob_rob	Binary (yes = 1/no = 0)	Did the study assess risk of bias for eligible studies? (independent of employed tool)
Rob_guidelines	Binary (yes = 1/no = 0)	Study in accordance with systematic review guidelines? Mentioning of either PRISMA, QUOROM, SYRCLE, or CAMARADES.
Rob_metaanalysis	Binary (yes = 1/no = 0)	Were the data pooled appropriately for meta-analyses?: There must be a statement how data is pooled/synthesized (e.g. random effect model).
Rob_flowchart	Binary (yes = 1/no = 0)	Is there a flow chart provided showing in- and exclusion of studies at different levels?
Rob_coi	Binary (yes = 1/no = 0)	Do the authors mention whether there is a conflict of interest?
Rob_deviations	Binary (yes = 1/no = 0)	Are protocol deviations mentioned in the publication?
Rob_extraction	Binary (yes = 1/no = 0)	Was the data abstraction from each study appropriate?: Data extraction must have been performed by at least two reviewers.

Rob_predicted.csv – this file contains the automatically extracted scoring for the risk of bias assessment. The column “file_name” indicates the file name for which the extraction was performed. All the other columns follow the same description detailed in the alldata.csv (column starting with “Rob_”).

validation_D.csv, validation_B.csv – these files contain the manual coding for the risk of bias assessment performed by two reviewers (_D and _B). The structure of the file follows the description detailed for “Rob_predicted.csv”.

Reliability_mining.csv – this file contains the accuracy scores obtained when comparing the automated risk of bias assessment and the manual scoring performed by two reviewers. For each item of the risk of bias assessment (column “item”) we report:

- False negative rate (FN)
- False positive rate (FP)
- True negative rate (TN)
- True positive rate (TP)
- Sensitivity score (sensitivity)

- Specificity score (specificity)
- Precision score (precision)
- F1
- Accuracy score (accuracy)