The culture of open scholarship

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Slides: bit.ly/broman2023

open access

open educational resources

open source

open science

About me

- Applied statistician working in genetics
- Write & support many open-source software packages
- Co-author on 170 papers and 1 book
- Reviewer for 90 different journals
- Formerly
  - Associate Editor and Senior Editor at *Genetics*
  - Associate Editor at *Biostatistics*
  - Associate Editor at *Journal of the Americal Statistical Association*
  - Academic Editor at *PeerJ*
  - Editorial Board member of *BMC Biology*

THE AMERICAN STATISTICIAN
2018, VOL. 72, NO. 1, 2–10
https://doi.org/10.1080/00031305.2017.1375989

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Data Organization in Spreadsheets

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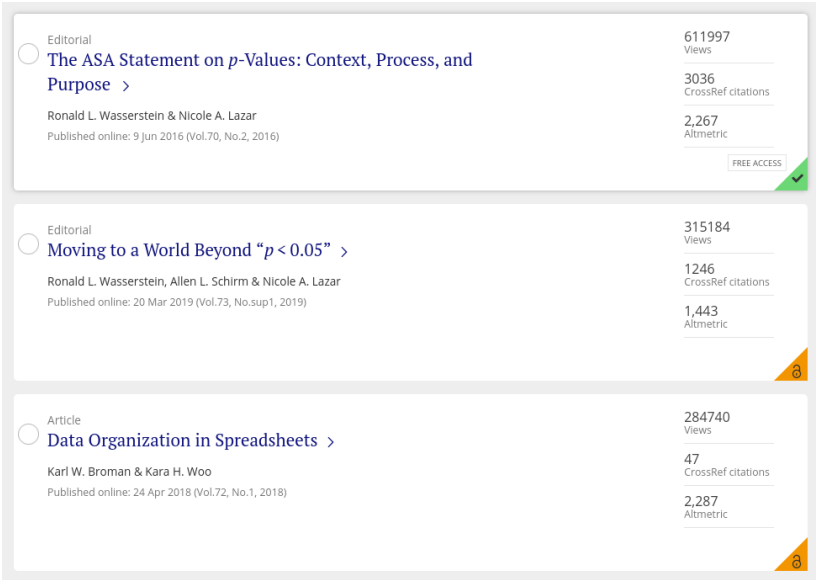
ABSTRACT

Spreadsheets are widely used software tools for data entry, storage, analysis, and visualization. Focusing on the data entry and storage aspects, this article offers practical recommendations for organizing spreadsheet data to reduce errors and ease later analyses. The basic principles are: be consistent, write dates like YYYY-MM-DD, do not leave any cells empty, put just one thing in a cell, organize the data as a single rectangle (with subjects as rows and variables as columns, and with a single header row), create a data dictionary, do not include calculations in the raw data files, do not use font color or highlighting as data, choose good names for things, make backups, use data validation to avoid data entry errors, and save the data in plain text files.

ARTICLE HISTORY
Received June 2017
Revised August 2017

KEYWORDS
Data management; Data organization; Microsoft Excel; Spreadsheets

	A	B	C	D	E	F	G
1							
2	Date	11/3/14					
3	Days on diet	126					
4	Mouse #	43					
5	sex	f					
6	experiment		values			mean	SD
7	control		0.186	0.191	1.081	0.49	0.52
8	treatment A		7.414	1.468	2.254	3.71	3.23
9	treatment B		9.811	9.259	11.296	10.12	1.05
10							
11	fold change		values			mean	SD
12	treatment A		15.26	3.02	4.64	7.64	6.65
13	treatment B		20.19	19.05	23.24	20.83	2.17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Karl W. Broman & Kara H. Woo
Published online: 24 Apr 2018 (Vol.72, No.1, 2018)
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2,287
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data organization organizing data in spreadsheets

My collaborators sometimes ask me, “In what form would you like the data?” My response is always, “In its current form!” If the data need to be reformatted, it’s much better for me to write a script than for them to do a bunch of cut-and-paste. I’m a strong proponent of data analysts being able to handle any data files they might receive.

But in many cases, I have to spend **a lot** of time writing scripts to rearrange the layout of the data. And how would you like your data analysts to spend their time? Reorganizing data, or really analyzing data?

Most of my collaborators enter and store their data in spreadsheets, and mostly Microsoft Excel. Before starting to enter data into a spreadsheet, it’s good to spend some time thinking about the layout. The way that you organize the data in spreadsheets can have a big impact on your data analyst’s quality of life.

This is a tutorial on that topic: *how to organize data in spreadsheets*. For complex, high-dimensional data, it may be better to use a formal database. But for many projects, spreadsheets are perfectly fine. But data in spreadsheets can be pretty and easy to work with, or they can be a sloppy mess requiring serious downstream reorganization efforts. We want to avoid the latter.

I don’t think these ideas come naturally to anyone. So if you’re not happy with the structure of your current data files, don’t despair! And also don’t apply tedious and potentially error-prone hand-editing to revise the arrangement. Rather, apply these principles when designing the layout for your next dataset, to help make analyses easier.

- Be consistent.
- Write dates as `YYYY-MM-DD`.
- Fill in all of the cells.

Data organization in spreadsheets

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September 11, 2018

Abstract

Spreadsheets are widely used software tools for data entry, storage, analysis, and visualization. Focusing on the data entry and storage aspects, this paper offers practical recommendations for organizing spreadsheet data to reduce errors and ease later analyses. The basic principles are: be consistent, write dates like YYYY-MM-DD, don't leave any cells empty, put just one thing in a cell, organize the data as a single rectangle (with subjects as rows and variables as columns, and with a single header

doi.org/10.7287/peerj.preprints.3183v2

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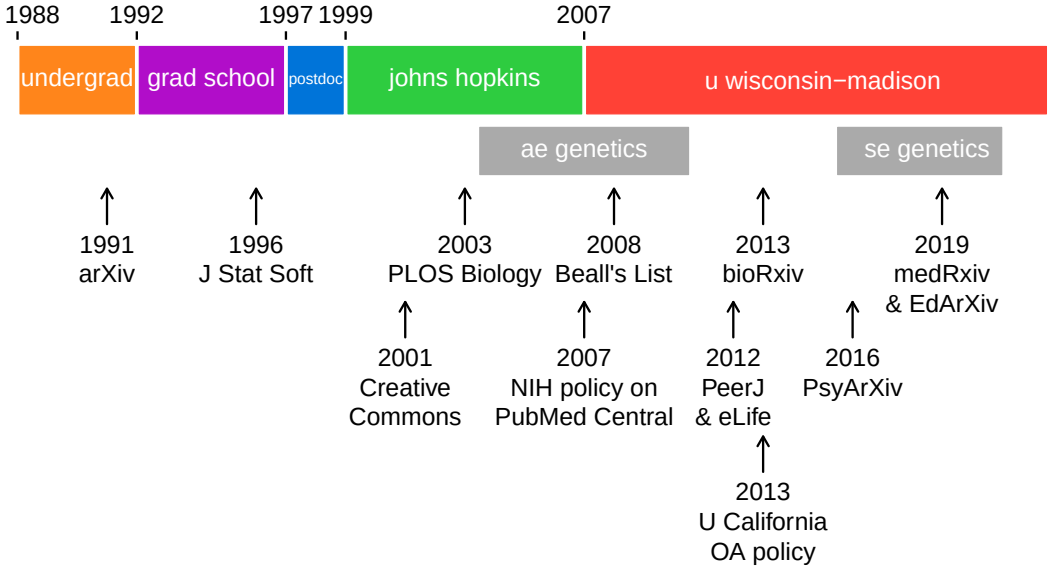
Personal timeline



What is new?

- Rise of preprints in biology and medicine
- Rise of *Nature Communications*
- PubMed Central: expansion, with no embargo
- No longer stigma on OA
- Emphasis on computational reproducibility

What isn’t new?

- Attachment to Journal Impact Factor
- Attachment to Glam Journals
- Journal and conference spam
- The 20 open access enthusiasts on campus
- Researchers don’t read much

Culture of open scholarship

- Community before individual
- Sharing makes better science
  - Data, methods, software, materials, manuscripts

Traditional scholarship

What’s in it for me?

Barriers to open scholarship

- Focus on glamour/prestige
- Apathy
- Ignorance
- Concern about being scooped
- Cost
- Funding of scientific societies

How to persuade?

- Moral arguments
- Advantages for the researcher
- Institution policies
- Government policies

Privilege

white, male, US-born full professor
in cargo shorts and a hoodie
whose father was a university professor

Privilege

white, male, US-born full professor
in cargo shorts and a hoodie
whose father was a university professor

credentials seldom questioned

Questions

- How to relax reliance on journal prestige?
- How to support junior faculty to be open scholars?
- How to reorganize the way publishing is funded?
- How to persuade researchers to care?