

Globalising open and reproducible science



lei-zhang.net
X @lei_zhang_lz



Dr. Lei Zhang

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Adaptive Learning Psychology & Neuroscience (ALPN) Lab

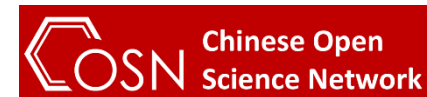
Centre for Human Brain Health, School of Psychology

University of Birmingham

24.04.2024, BNA Members' Meeting, Credibility session

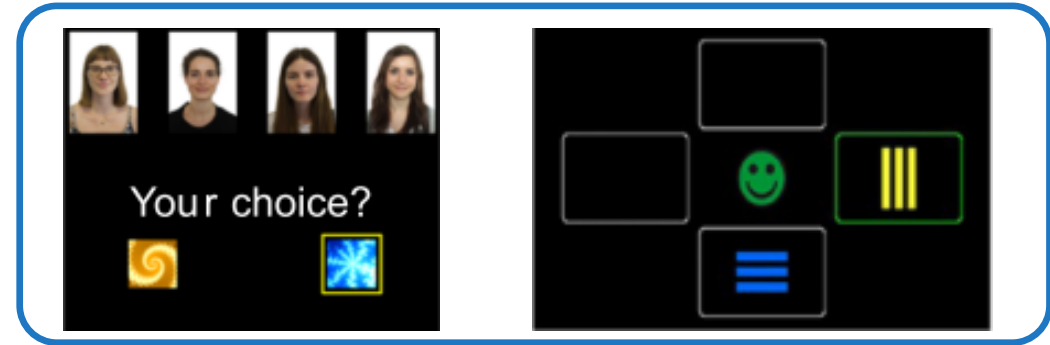


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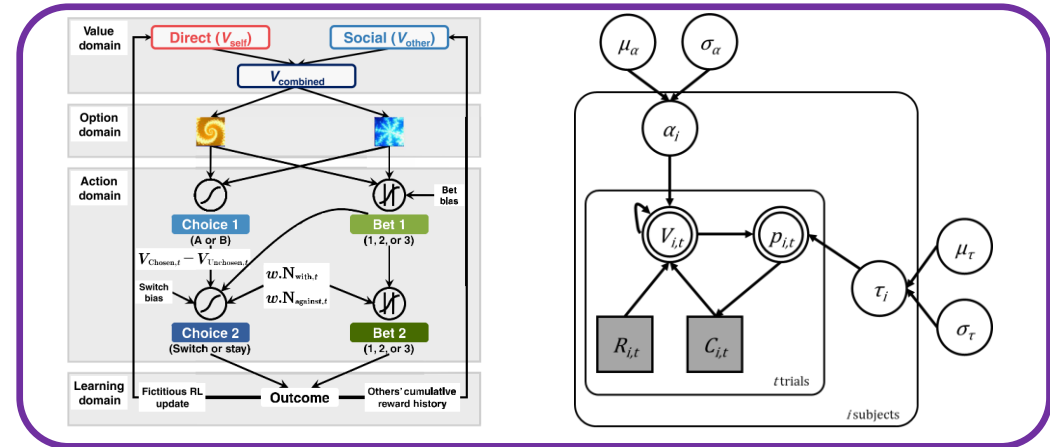


My research: snapshot

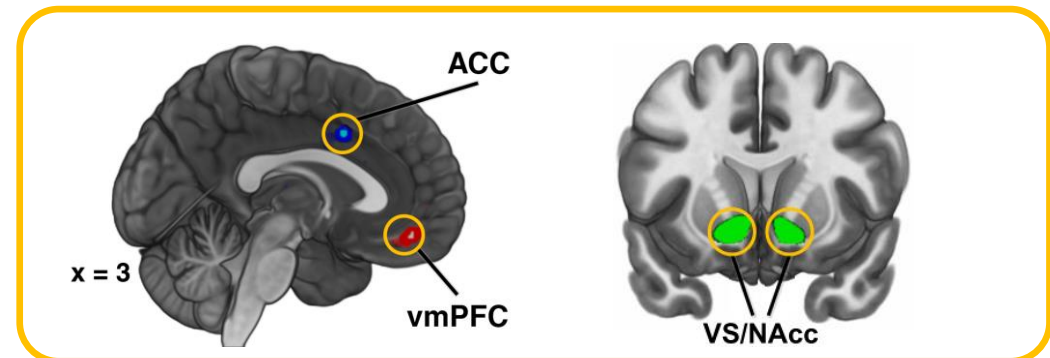
- I ask people to make decisions
Computation



- I build computational models
Algorithm



- I examine neural mechanisms
Implementation



Open data and code

SIT

repo size 226 MB languages 3 DOI 10.1126/sciadv.abb4159

last commit august 2020

@lei_zhang_lz 2.5k @SysNeuroHamburg 657 @ScanUnit 1.5k



Code and data for the social influence task (SIT), accompanying the paper:

Zhang, L. & Gläscher, J. (2020). A brain network supporting social influences in human decision-making. *Science Advances*, 6, eabb4159.
DOI: 10.1126/sciadv.abb4159.

Outreach:

- A 1.4-min #SciComm video in lay English is available on [YouTube](#) and [bilibili](#).
- A 1-hour talk on this paper is available on [YouTube](#) and [bilibili](#). The slides deck is available [here](#).
- Part of the experimental setup was previously covered by a European television channel [Arte Xenius](#) (in [German](#) and [French](#)).
- A [Twitter thread](#) is compiled to summarize the main findings; see here for an [unroll version](#).
- Media coverage (selection): [COSMOS](#), [UNIVIE](#), [UKE](#) (German), [APA.at](#) (German), [EurekAlert](#), [ScienceDaily](#), [medicalxpress](#), [SingularityHub](#).

This repository contains:

```
root
├── data # Preprocessed behavioral data & fMRI BOLD time series data
│   ├── behavioral
│   └── fMRI
├── code # Matlab, R, & Stan code to run analyses and produce figures
│   ├── behavioral
│   ├── fMRI
│   └── stanmodel
```

SCIENCE ADVANCES | RESEARCH ARTICLE

COGNITIVE NEUROSCIENCE

A brain network supporting social influences in human decision-making

Lei Zhang^{1,2*} and Jan Gläscher^{1*†}

Humans learn from their own trial-and-error experience and observing others. However, it remains unknown how brain circuits compute expected values when direct learning and social learning coexist in uncertain environments. Using a multiplayer reward learning paradigm with 185 participants (39 being scanned) in real time, we observed that individuals succumbed to the group when confronted with dissenting information but observing confirming information increased their confidence. Leveraging computational modeling and functional magnetic resonance imaging, we tracked direct valuation through experience and vicarious valuation through observation and their dissociable, but interacting neural representations in the ventromedial prefrontal cortex and the anterior cingulate cortex, respectively. Their functional coupling with the right temporoparietal junction representing instantaneous social information instantiated a hitherto uncharacterized social prediction error, rather than a reward prediction error, in the putamen. These findings suggest that an integrated network involving the brain's reward hub and social hub supports social influence in human decision-making.

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Jo Cutler @DrJoCutler · Dec 12, 2021

Lists of open science benefits often include increased access for non-academics but I've always wondered how much just making the paper open access improves this... Love this approach by @lei_zhang_lz sharing #scicomm videos, tweets, and media links with the data & code #S4SN2021



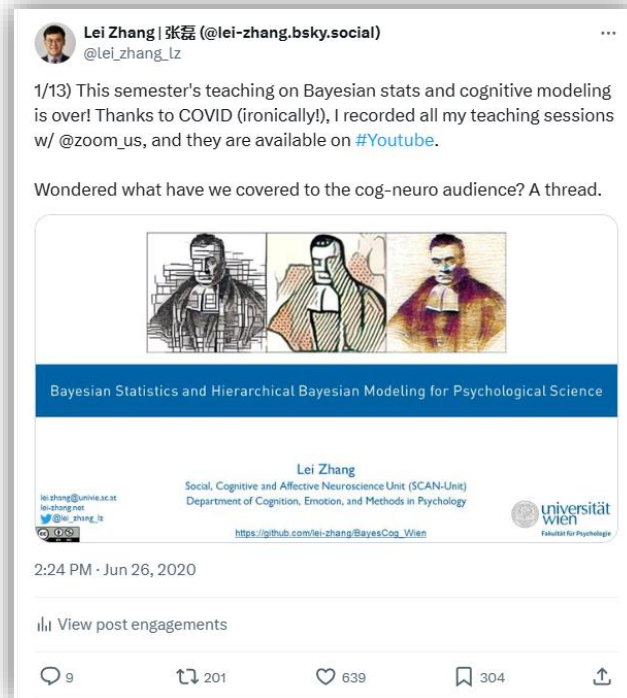
Zhang & Gläscher, 2020, *Science Advances* <https://github.com/lei-zhang/SIT>

Open software + teaching

hBayesDM

repo status **Active** build **passing** CRAN **1.0.2 – 2019-11-13** downloads **33K**
DOI [10.1162/CPSY_a_00002](https://doi.org/10.1162/CPSY_a_00002)

hBayesDM (hierarchical Bayesian modeling of Decision-Making tasks) is a user-friendly package that offers hierarchical Bayesian analysis of various computational models on an array of decision-making tasks. hBayesDM uses [Stan](#) for Bayesian inference.



Jacob Elder <jacob.elder@email.ucr.edu>
to me ▾

Thu, 30 Sept 2021, 16:47 ☆ 😊 ↩

Hi Dr. Zhang,

My name's Jake, and I'm a fourth-year PhD candidate at UC Riverside. I'm currently working on or have worked on some RL projects and had been intending to learn RStan and Hierarchical Bayesian modeling. I had nearly given up on it until I encountered your resources online, and they have been such an immense help! With your resources, I finally was able to implement my somewhat unusual design with Hierarchical Bayesian Modeling in RStan. Moreover, your RL tutorial Zhang et al. (2020) continues to be a source of education for me on prior and subsequent papers I am working on.

I'm grateful for your open source education materials, code, and your published work in cognitive modeling, and thanks for all the work that you do. It is incredibly useful and helpful to learning cognitive modelers such as myself. Looking forward to see what you come out with next!



@manuelmanolo7099 • 3 years ago

This is so valuable! Thank you for uploading this on youtube! :)



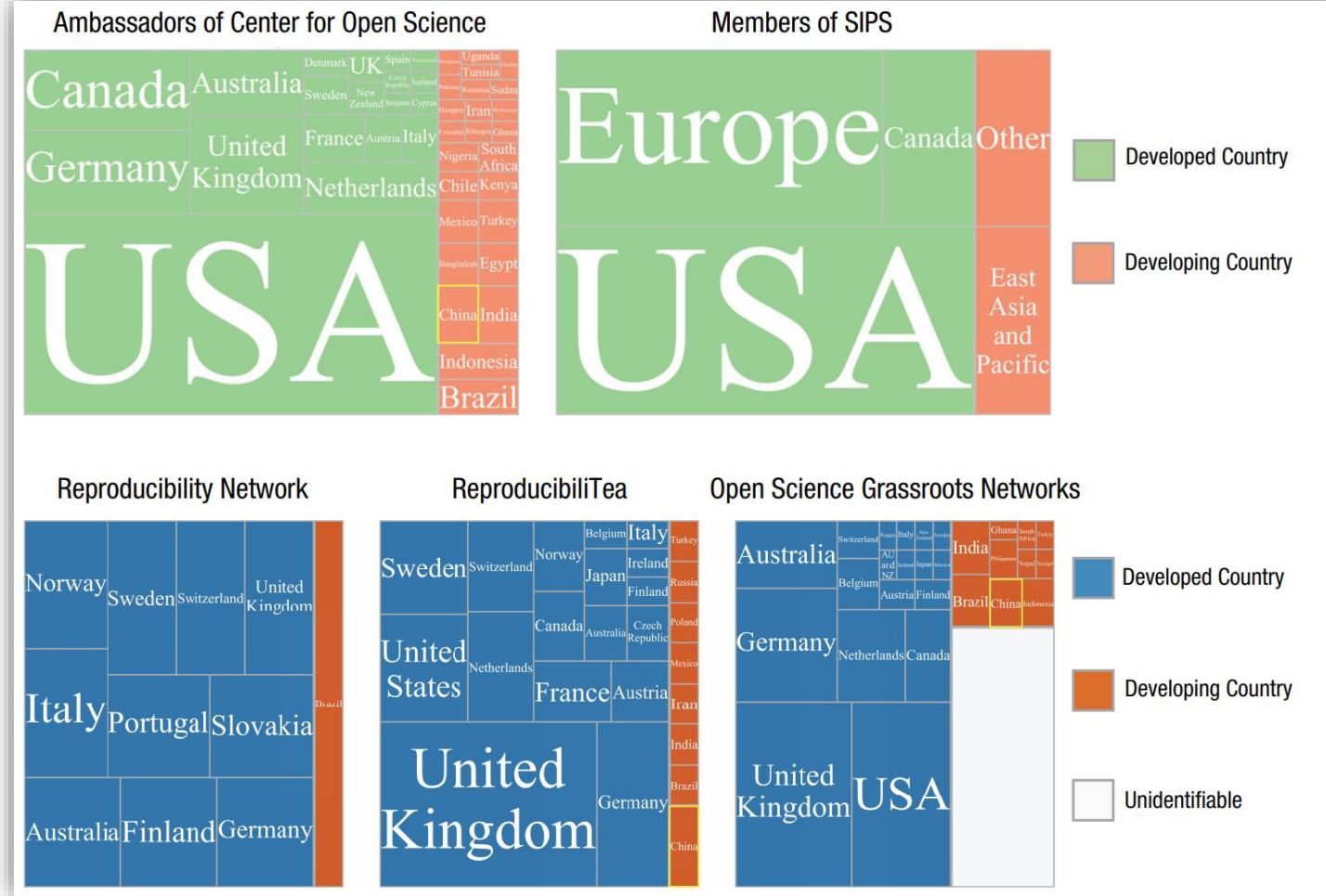
@valeriepu6619 • 3 years ago

Very well explained! Easy to understand. Beginner friendly.

Ahn, Haines, Zhang, *Computational Psychiatry*, (2017)

The **global** open science **challenge**: WEIRD (Western, Educated, Industrialized, Rich, & Democratic)

- **Open Science** is becoming mainstream in the last decade, and we've seen many initiatives worldwide (e.g., Open Science Framework, OSF)
- But, taking a closer look, it's still mostly taking place in the Global North. Participation of researchers from developing countries (i.e., The **Global South**) remains strikingly low!

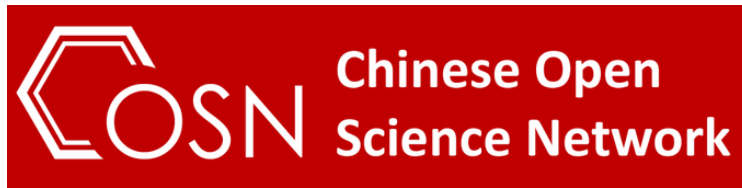


Why is the challenge?

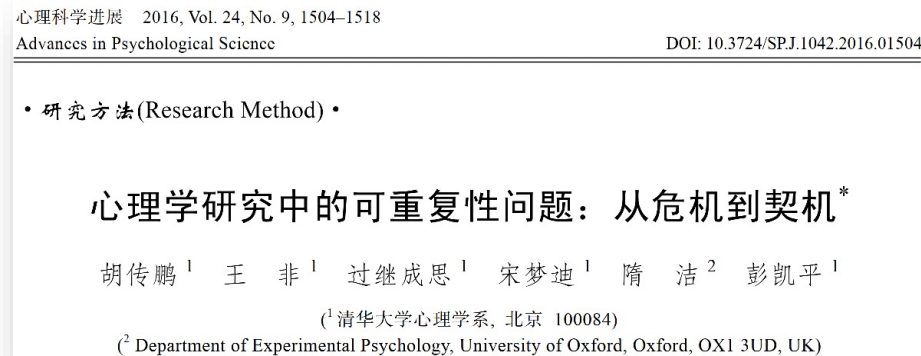
- Researchers from developing countries face many obstacles in practising and engaging in OS, e.g., lack of institutional support, strongly misaligned incentives, peer support, & not to mention language barriers.
- Moreover, **local cultural norms** stand in the way of Open Science, eg, Chinese society values social harmony and conformity.
- Plus, **reforming dominant scientific** practices is considered disruptive and trouble-making, and thus may be disliked!

Therefore, actions and initiatives are needed!

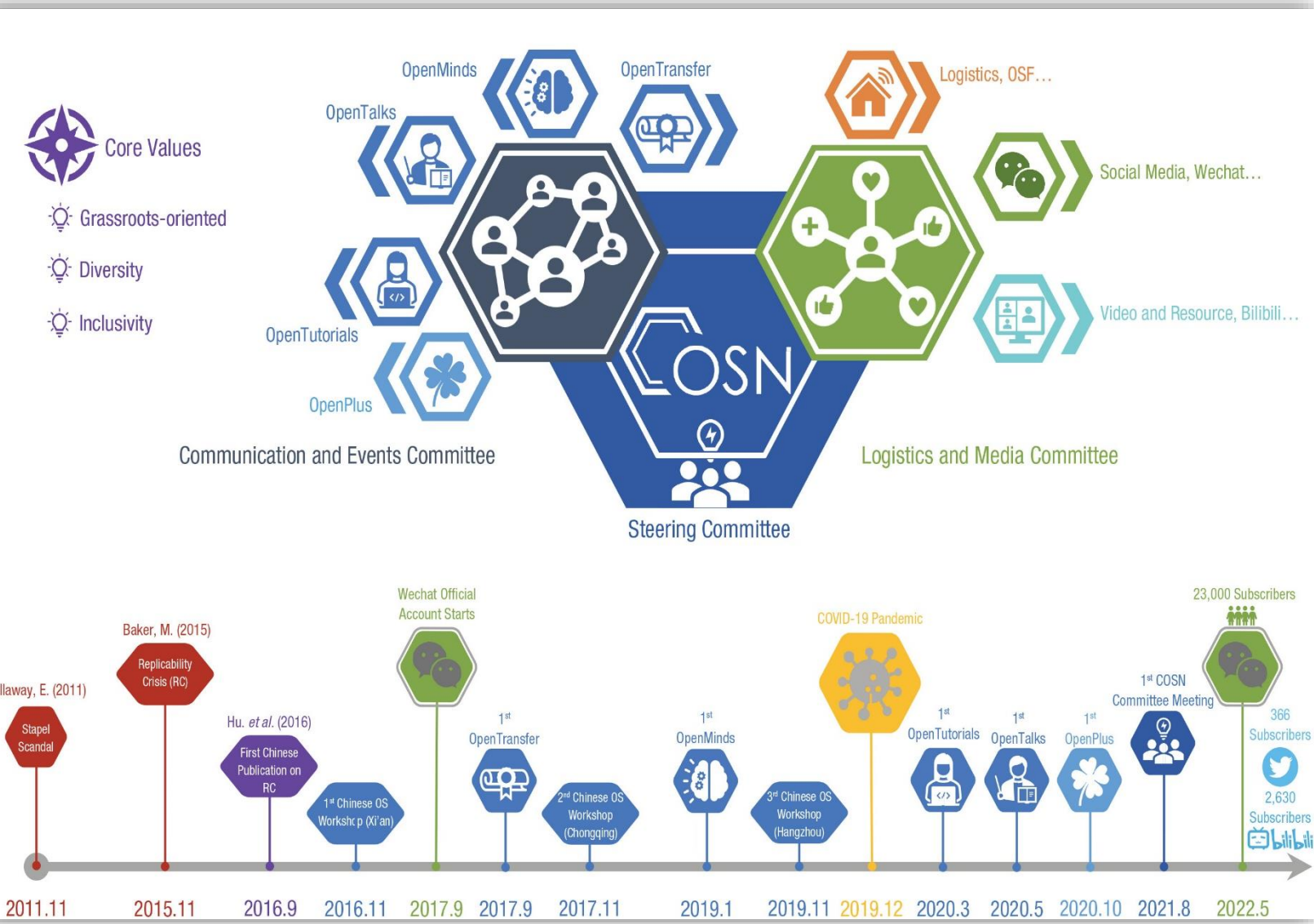
Our solution:



- To tackle these challenges, we, started the **Chinese Open Science Network (COSN)** in 2017, first as a small interest group. (see also: <https://osf.io/9d7y4/>; <https://open-sci.cn>)
- COSN: **the first** grass-root network for promoting open science practices and awareness of reproducibility in the **Chinese-speaking community**.
- COSN is run **by Early Career Researchers (ECRs) and for ECRs**, especially for the next generation researchers.



Open Science connects us and enables the network



Open access | Research article | First published online March 27, 2023

The Chinese Open Science Network (COSN): Building an Open Science Community From Scratch

Haiyang Jin ¹, Qing Wang ², Yu-Fang Yang ³, Han Zhang ⁴, Mengyu (Miranda) Gao ⁵, Shuxian Jin ⁶, Yanxiu (Sharon) Chen ⁷, Ting Xu ⁸, Yuan-Rui Zheng ⁹, Ji Chen ¹⁰, Qinyu Xiao ¹¹, Jinbiao Yang ¹², Xindi Wang ¹³, Haiyang Geng ¹⁴, Jiangqiao Ge ¹⁵, Wei-Wei Wang ¹⁶, Xi Chen ¹⁷, Lei Zhang ¹⁸, Xi-Nian Zuo ¹⁹, and Hu Chuan-Peng ²⁰ ¹⁷ [View all authors and affiliations](#)

Jin, Haiyang, Qing Wang, Yu-Fang Yang, et al. (2023) *Adv Methods Pract Psychol Sci*

Executive Committees (Ordered in surname)

 Gao, Miao Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Chen, Ji Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Chen, Yanxiu (Sharon) Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago
 Chen, Zhiyi Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Gao, Mengyu (Miranda) Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Ge, Jiangqiao Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago
 Geng, Haiyang Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Hu, Chuan-Peng Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Jin, Haiyang Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago
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 Wang, Xindi Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Wang, Xindi Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Xiao, Qinyu Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago
 Xu, Ting Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Yang, Jinbiao Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Yang, Yufang Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago
 Zhang, Han Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	 Zhang, Lei Associate Professor, Department of Psychology and Neuroscience, University of Illinois at Chicago	

COSN Open Science activities

OpenTalks | #25 Russell Poldrack: 拥抱计算上可重复性的研究文化

Original: OpenTalks 团队 OpenScience 2021-09-03 12:00

OpenTalks是OpenScience的学术策划小组与NeuroChat团队联合组织的在线学术交流互动。旨在促进研究者之间的交流。我们将邀请国内外的研究者，尤其是青年研究者，进行在线学术报告与讨论。学术报告的主题涉及可重复性、神经影像等。分享语言以中文为主，分享人偏好英文时，将使用英文。欢迎大家推荐报告人或者自荐作为报告人。

摘要 [Abstract]

Ensuring that the results of data analysis are both valid and reproducible is a fundamental responsibility of every scientist who uses computational methods, but both are increasingly difficult in the context of complex analysis workflows and big data. Building off of ideas from software engineering, I will argue that we need to embrace a culture of computational reproducibility. I will outline a set of values that motivate this work and principles that guide the work, and then focus on a set of practices that can help improve reproducibility in computational science. I will conclude by addressing some potential concerns about the impacts of this cultural shift.

时间 [Time]

北京时间[GMT+8] 09月15日(周三) 09:00

欧洲中部时间[CEST] 09月15日(周三) 03:00

美国东部时间[EDT] 09月14日(周二) 21:00

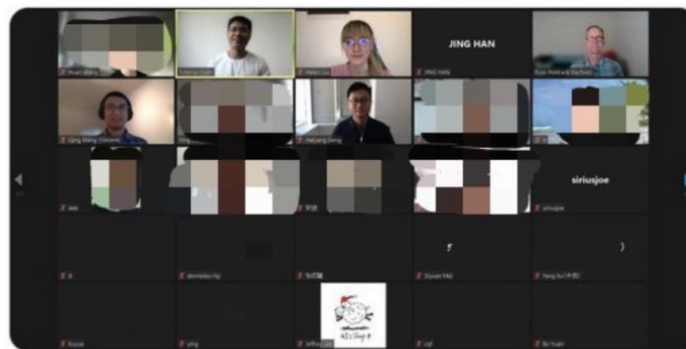
美国太平洋时间[PDT] 09月14日(周二) 18:00

COSN Chinese Open Science Network(开放科学中文圈)
@OpenSciChina

#OpenTalks #25 @russpoldrack's talk "Toward a culture of computational reproducibility" brought the Chinese community so many new ideas.

It great that there were always 100 attendees online (b/c of the limit of our self-funded zoom account)

thx to all

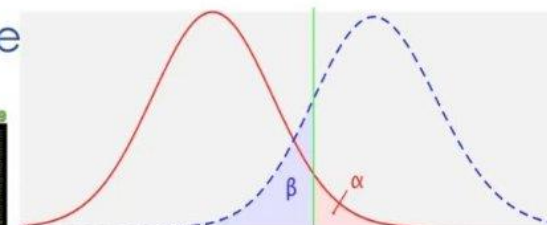
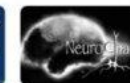


10:53 AM · Sep 15, 2021 · Twitter Web App

Chinese Open Science Network
COSN 1st COSN hackathon

May the **POWER** be with you!

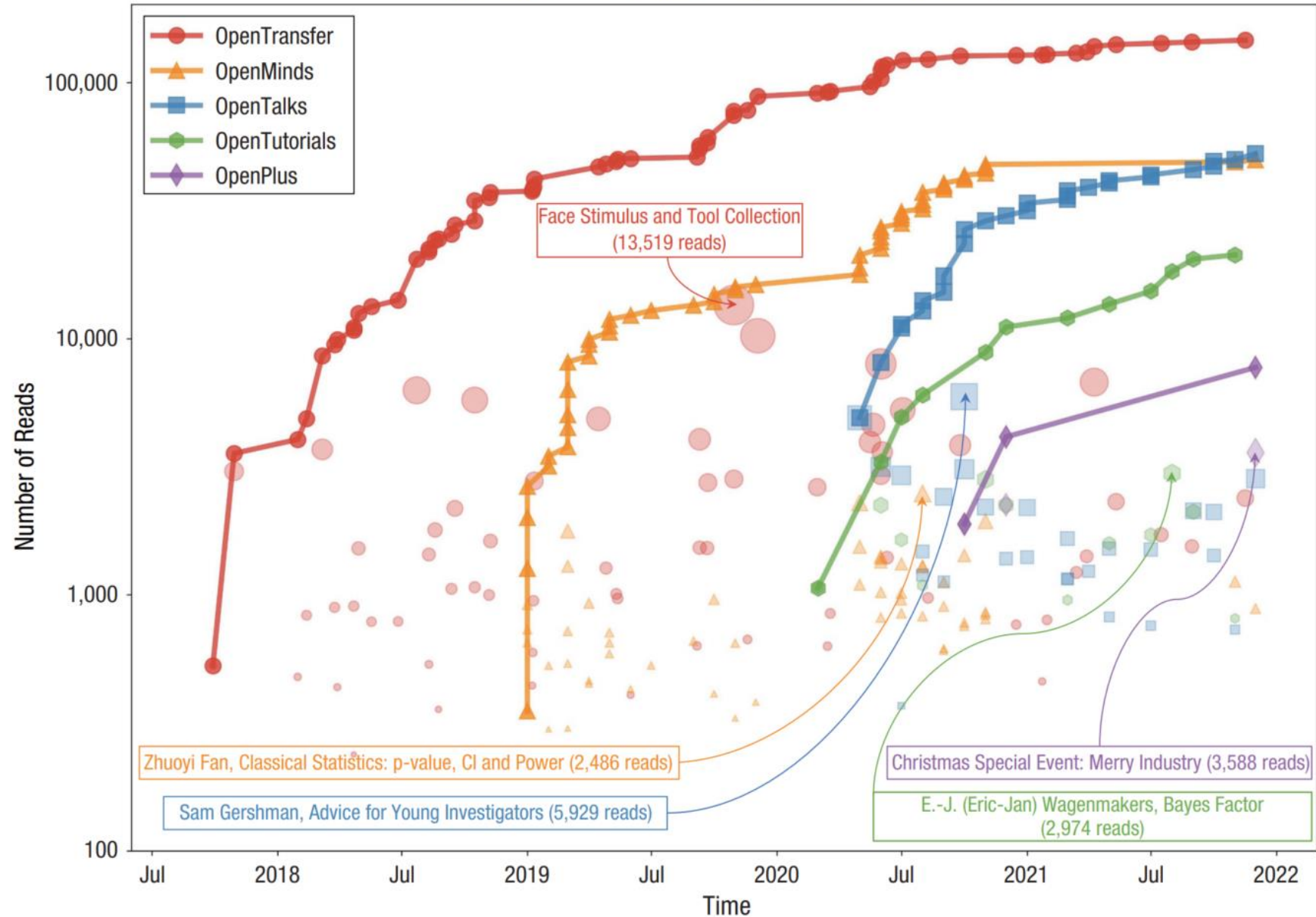
Aug. 27th-28th 2022, Online



35,000 + followers!



Reads of COSN Events Posts (2017 Jun. ~ 2022 Jan.)



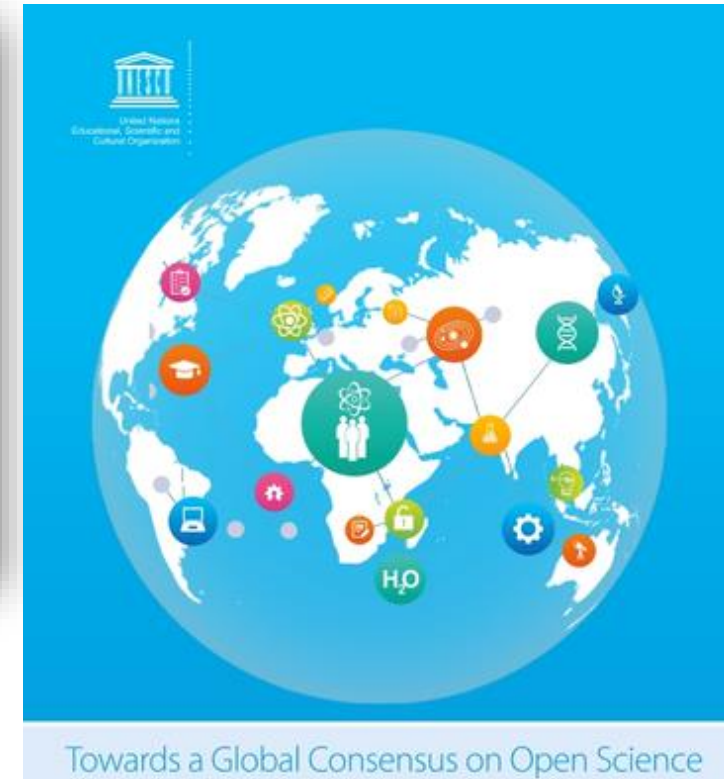
Experiences for building a local Open Science Networks

Suggested mentality	Suggested actions	Examples from Chinese Open Science Network
Be bold and optimistic	Engage in Open Science now	Most Steering Committee members started to engage in Open Science during their PhD education.
Be connected	Stay connected to both local and international communities and grow together	We regularly use both WeChat Groups and Twitter and attend the Society for the Improvement of Psychological Science and other conferences.
Be practical	Start by sharing practical skills/methods/ information; emphasize concrete benefits of Open Science	OpenTransfer and OpenTutorials provide information about and training in practical skills.
Be visible	Transform your contributions to concrete items on your curriculum vitae	We engage in large-team science, for example, the Psychological Science Accelerator, and publish articles related to Open Science in Chinese and English.
Be affordable	Do what you can do; avoid overcommitment	We crowdsource translations, typesetting, etc.
Be local	Adapt to local cultural norms	We avoid presenting ourselves as influencers. We use the most popular local media platform, WeChat, to promote Open Science principles and ideas.

Globalising open and reproducible science

COSN perspectives:

- Continually support the Chinese-speaking research communities to embrace Open Science and make contributions to the international communities.
- Establish a better organizational structure to survive and sustain (e.g., establish election systems for our committees, draft by-laws of committees).
- Continue and improve Open 4+ events.
- Archive and organize the materials we accumulated. These efforts will result in courses, books, or databases about Open Science.
- Support regional-wise grassroots networks within China and, if possible, outside China.
- Collaborate with and contribute to international organizations. As more early-career researchers (ECRs) gain knowledge about Open Science in Chinese Open Science Network (COSN), they can contribute to not only COSN but also international communities such as the Psychological Science Accelerator or the Society for the Improvement of Psychological Science.

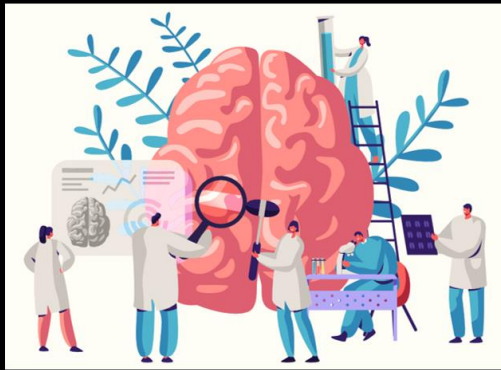


Open Source and Open Science in Latin America

15/09/2022 · 24 min read · Topics



New form of teaching @UniBham



26539 LM Proposing Research in Psychology

Dr. Lei Zhang

Associate Professor

Adaptive Learning Psychology & Neuroscience (ALPN) Lab
Centre for Human Brain Health, School of Psychology
University of Birmingham, UK



Week - date	Topic
Week 1 (16th Jan)	Introduction
Week 2 (23rd Jan)	Replication crises and Registered Reports
Week 3 (30th Jan)	Open Science Framework
Week 4 (6th Feb)	Ethics in research
Week 5 (13h Feb)	Asking a good Research Question
Week 6 (20th Feb)	Psyched@UoB week
Week 7 (27th Feb)	Power Analysis
Week 8 (5th Mar)	How to write a good proposal - peer review session
Week 9 (12th Mar)	My research question - module clinic / assessment support
Week 10 (19th Mar)	How to obtain funding/thinking of a PhD
Week 11 (23nd Apr)	Drop-in session for support



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