Methodological Advances in Behavioral Research: Crowdsourcing Science
Pan-Singaporean PhD Boot camp, March 7-11, 2016, INSEAD, Singapore
Open to All Singapore-based PhD students interested in Behavioral Research

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Course Description:

The results of many published studies across many scientific domains are not easily reproduced by independent laboratories. For example, an initiative by Bayer Healthcare to replicate 67 pre-clinical studies led to a reproducibility rate of 20-25% (Prinz et al., 2011), and researchers at Amgen were only able to replicate 6 of 53 influential cancer biology studies (Begley & Ellis, 2012). Similar replication failures have been reported in social and cognitive psychology (Ebersole et al., 2015; Klein et al., 2014; Open Science Collaboration, 2015). This PhD Boot camp introduces PhD students in the behavioral sciences to 1) the ongoing "crisis of confidence" in science, 2) typical methodological challenges of conducting replications, 3) the philosophy of science and statistical background of replications, 4) highly collaborative approaches to replication, in which findings are replicated in independent laboratories before (rather than after) they are published.

As part of the boot camp, students will be organized into replication teams and take part in a crowdsourced pre-publication independent replication project on which they will be credited as co-authors. Participation in the bootcamp is free, the replications will be funded by a grant from INSEAD, and the infrastructure for data collection is already in place. Crowdsourcing research involves recruiting numerous scientific teams to achieve large-scale projects no single team could feasibly carry out. Leveraging crowds of researchers increases the statistical power and generalizability of research designs, reduces investigator error and bias, and enhances scientific transparency. Actively participating in a large-scale replication effort provides an opportunity for students to experience the power of a crowd of researchers firsthand.

Lecture topics will include the scientific crisis caused by high-profile replication failures, publication bias, questionable research practices, the open data movement, and crowdsourced replication efforts, among others.

Pre-Publication Independent Replication (PPIR) team project

As their course project, teams of graduate students will carry out a Pre-Publication Independent Replication (PPIR) of an unpublished study from researchers who have nominated their own findings for replication. Each team's final PowerPoint presentation and report of their replication results will be the only assignment for the class. Further graduate methods courses at partner universities will likewise participate in the PPIR initiative, whose results will be reported in a scientific article in which student-replicators are co-authors.

Grading

The team presentation of their Pre-Publication Independent Replication will count for 50% of the final grade, and individual class participation for 50%.

We are looking forward to this unique "Pan-Singy" class and hope you will join us!
Please don't hesitate to contact us with any questions.

Lecture 1: The Crisis of Confidence in Science

Today management, psychology, political science, economics, medicine, and other fields are grappling with a crisis of confidence not only in our research findings, but also the effectiveness of the tools to use to discover knowledge. This opening session will cover perverse incentives in science, publication bias, questionable research practices, and statistical analyses that suggest many published findings are not reliable.

We will further discuss the costs and benefits of proposed approaches to increasing the robustness of scientific research. These include mandatory disclosure of data exclusions and stopping rules, pre-registration of analysis plans, increasing sample sizes to achieve high statistical power, adversarial collaborations, and registered replication reports, among others.

Lecture 2: The Replication Revolution

This lecture will cover the results of mass replication initiatives, as well as recent efforts to independently replicate findings *before* (rather than after) they are published.

Lecture 3: The Open Data Movement

One proposal to improve the reliability of our science is to make data from published research articles publicly available on the internet. This raises challenging issues regarding intellectual property and subject confidentiality.

CLOSING SESSION
(Date and time to be announced)

In a final session to be scheduled after all the replications are completed, each team of students will present the results of their Pre-Publication Independent Replications (PPIR) project.

Optional further readings: The crisis of confidence in science

Nosek, B. A., Spies, J. R., & Motyl, M. (2012). Scientific utopia: II. Restructuring incentives and practices to promote truth over publishability. *Perspectives on Psychological Science, 7,* 615-631.
Full text available open access here, http://pps.sagepub.com/content/7/6/615.abstract, just click on "Full Text pdf"

Bakker, M., van Dijk, A, & Wicherts, J. M. (2012). The rules of the game called psychological science. *Perspectives on Psychological Science, 7*, 543-554.
Full text available open access here, http://pps.sagepub.com/content/7/6/543.abstract, just click on "Full Text pdf"

Simmons, J., Nelson, L., & Simonsohn, U. (2011). False-positive psychology: *Undisclosed* flexibility in data collection and analysis allow presenting anything as significant. *Psychological Science, 22(11)*, 1359-1366.
Full text available open access here, http://pss.sagepub.com/content/22/11/1359.full.pdf+html, just click on "Full Text pdf"

Gelman, A., & Loken, E. (2014). The statistical crisis in science. *American Scientist*, *102*, 460. (aka "The garden of forking paths"
Full text of draft: http://www.stat.columbia.edu/~gelman/research/unpublished/p_hacking.pdf

Ioannidis, J.P. (2005). Why most published research findings are false. PLoS Medicine. http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.0020124
Full text: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1182327/

Cumming, G. (2013). The new statistics: Why and how. *Psychological Science, 25, 7-29.*
Full text available at: http://pss.sagepub.com/content/25/1/7, just click "Full text pdf"

Simonsohn, U., Nelson, L.D., & Simmons, J. (2014). P-Curve and effect size: Correcting for publication bias using only significant results**.** *Perspectives on Psychological Science*, *9*, 666 - 681.
Full text: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2377290

Schimmack, U. (2012). The ironic effect of significant results on the credibility of multiple study articles. *Psychological Methods, 17(4),* 551-566.
Full text: http://www.utm.utoronto.ca/~w3psyuli/PReprints/IC.pdf

Simmons, J., Nelson, L., & Simonsohn, U. (2011). *Life after p-hacking*. Presentation at the Meeting of the Society for Personality and Social Psychology, New Orleans, LA, 17-19 January 2013
Full text available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2205186

Wagenmakers, E.-J., Wetzels, R., Borsboom, D., van der Maas, H.L.J. & Kievit, R.A. (2012). An agenda for purely confirmatory research. *Perspectives on Psychological Science, 7*(6), 632-638.
Full text available at: http://pps.sagepub.com/content/7/6/632.abstract, click "Full text pdf"

Optional further readings: The replication revolution

Open Science Collaboration (2015). Estimating the reproducibility of psychological science. *Science, 349*(6251). Full text: http://science.sciencemag.org/content/349/6251/aac4716.full

Gilbert, D. T., King, G., Pettigrew, S., & Wilson, T. D. (2016). Comment on "Estimating the reproducibility of psychological science." *Science, 351, 1037-a-1038-a.*
Full text: http://science.sciencemag.org/content/351/6277/1037.2.full

Klein et al., (2014). Investigating variation in replicability: A "many labs" replication project. *Social Psychology, 45(3)*, 142–152.
Full text available open access here, http://psycnet.apa.org/journals/zsp/45/3/142/, just click on "Full Text pdf"

Schweinsberg et al. (2016). The pipeline project: Pre-publication independent replications of a single laboratory's research pipeline. *Journal of Experimental Social Psychology*.
http://home.uchicago.edu/davetannenbaum/documents/pipeline%20project.pdf

The entire *Social Psychology* replication special issue is open-access and downloadable here:
https://osf.io/e4nxu/

Asendorpf et al. (2013). Recommendations for increasing replicability in psychology. *European Journal of Personality, 27*, 108-119.
Full text available at: https://www.psychologie.hu-berlin.de/de/prof/per/pdf/2013/Replicability_target_Peer_commentary.pdf

Optional further readings: The open data movement

Nosek, B. A., & Bar-Anan, Y. (2012). Scientific utopia: I. Opening scientific communication. *Psychological Inquiry, 23*, 217-243.
Full text available at: http://arxiv.org/ftp/arxiv/papers/1205/1205.1055.pdf

Simonsohn, U. (2013). Just post it: The lesson from two cases of fabricated data detected by statistics alone. *Psychological Science, V24(10)*, 1875-1888.
Full text:
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2114571&http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2114571

Finkel, E. J., Eastwick, P. W., & Reis, H. T. (in press). Best research practices in psychology: Illustrating epistemological and pragmatic considerations with the case of relationship science. *Journal of Personality and Social Psychology.*
Full text available at: http://faculty.wcas.northwestern.edu/eli-finkel/documents/2015_FinkelEastwickReis_JPSP.pdf

LeBel, E. P., Loving, T. J., & Campbell, L. (in press). Benefits of open and high-powered research outweigh costs. *Journal of Personality and Social Psychology.*
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2616384

Silberzahn, R., & Uhlmann, E.L. (2015). Many hands make tight work: Crowdsourcing research can balance discussions, validate findings and better inform policy. *Nature*, *526*, 189-191. Full text: http://www.nature.com/news/crowdsourced-research-many-hands-make-tight-work-1.18508

Ongoing reading: Blogs and websites that address open science issues

Simine Vazire's blog
http://sometimesimwrong.typepad.com/

Sanjay Srivastava's blog
https://hardsci.wordpress.com/

Rolf Zwaan's blog
http://rolfzwaan.blogspot.sg/

Daniel Lakens blog:
http://daniellakens.blogspot.sg/

Elizabeth Paluck's blog
http://www.betsylevypaluck.com/blog/

Center for Open Science blog:
http://osc.centerforopenscience.org/

Political Science Replication blog
https://politicalsciencereplication.wordpress.com/about/

Replication index blog
https://replicationindex.wordpress.com/tag/r-index/page/2/

Data Colada Blog
http://datacolada.org/