28 May 2021

Donald R.Williams

email: drwwilliams@ucdavis.edu
web page: https://donaldrwilliams.github.io/

Education

Ph.D. Quantitative Psychology, University of Califorina, Davis (2017 - Present)
Advisor: Phillipe Rast

B.A. Psychology, Sonoma State University (2014 - 2016)
Minor: Statistics

A.A. Psychology, Humanities, & Religious Studies, Santa Rosa Junior College (2012 - 2014)

Research Interests

- Gaussian graphical models (a.k.a., psychological networks)
- Bayesian multilevel models
  - Meta-analysis
  - Individual differences
  - Heterogeneous variance components
- Bayesian inference
  - Posterior predictive
  - Bayes factor testing
- Frequentist inference
- Regularization
- Measurement reliability

Awards

National Science Foundation Graduate Research Fellow. (2017 - 2022)

National Academies of Sciences, Engineering, and Medicine Ford Foundation Pre-Doctoral Fellow. (2017 - 2022)

Pre-prints

1. **Williams, D. R.**, Rodriguez, J. E., & Bürkner, P. (2021). Putting Variation into Variance: Modeling Between-Study Heterogeneity in Meta-Analysis. *PsyArXiv*
   Psychological Methods: submitted
2. **Williams, D. R.** (2021). Many Mixture Components, Oh My: Extending the Spike and Slab to Bayesian Hypothesis Testing with Multinoulli Indicators. *PsyArXiv*.
   Behavior Research Methods: submitted
3. **Williams, D. R.** (2021). GGMnonreg: Non-Regularized Gaussian Graphical Models in R. *PsyArXiv*.
   Journal of Open Source Software: submitted

4. **Williams, D. R.** (2021). The Confidence Interval that Wasn't: Bootstrapped "Confidence Intervals" in L1-Regularized Partial Correlation Networks. *PsyArXiv*.
   Psychological Methods: submitted

5. **Williams, D. R.**, Briganti, G., Linkowski, P., & Mulder, J. (2021). On Accepting the Null Hypothesis of Conditional Independence in Partial Correlation Networks: A Bayesian Analysis. *PsyArXiv*.
   Multivariate Behavioral Research: submitted

6. Rodriguez, J. E., **Williams, D. R.**, & Rast, P. (2021). Who Is and Is Not "Average"? *PsyArXiv*. Random Effects Selection with Spike-and-Slab Priors.
   Psychological Methods: submitted

7. Rodriguez, J. E., & **Williams, D. R**. (2021). Painless Posterior Sampling: Bayesian Bootstrapped Correlation Coefficients. *PsyArXiv*.
   Working paper

8. Jongerling, J., Epskamp, S., & **Williams, D. R.** (2021). Bayesian Uncertainty Estimation for Gaussian Graphical Models and Centrality Indices. *PsyArXiv*.
   Multivariate Behavioral Research: revision

9. **Williams, D. R.**, & Rodriguez, J. (2020). Why Overfitting is Not (Usually) a Problem in Partial Correlation Networks. *PsyArXiv*.
   Psychological Methods: revision

10. **Williams, D. R.** (2020). vICC: Varying Intraclass Correlation Coefficients in R. *PsyArXiv*.
    Working paper

11. **Williams, D. R.**, Martin, S. R., DeBolt, M., Oakes, L., & Rast, P. (2020). A fine-tooth comb for measurement reliability: Predicting true score and error variance in hierarchical models. *PsyArXiv*.
    Multivariate Behavioral Research: submitted

12. **Williams, D. R.** (2020). GGMncv: Nonconvex Penalized Gaussian Graphical Models in R. *PsyArXiv*.
    R Journal: submitted

13. **Williams, D. R.** (2020). Beyond Lasso: A Survey of Nonconvex Regularization in Gaussian Graphical Models. *PsyArXiv*.
    Psychometrika: submitted

14. Rodriguez, J. E., **Williams, D. R.**, Rast, P., & Mulder, J. (2020). On formalizing theoretical expectations: Bayesian testing of central structures in psychological networks. *PsyArXiv*.
    Working paper

15. Heck, D. W., Boehm, U., Böing-Messing, F., Bürkner, P. C., Derks, K., Dienes, Z., **...** & Hoijtink, H. (2020). A Review of Applications of the Bayes Factor in Psychological Research. *PsyArXiv*.
    Psychological Methods: submitted

16. Martin, S. R., **Williams, D. R.**, & Rast, P. (2019). Measurement invariance assessment with Bayesian hierarchical inclusion modeling. *PsyArXiv*.
    Working paper

17. **Williams, D. R.**, Piironen, J., Vehtari, A., & Rast, P. (2018). Bayesian estimation of Gaussian graphical models with predictive covariance selection. *arXiv preprint*
    Working paper

18. **Williams, D. R.**, Rast, P., & Bürkner, P. C. (2018). Bayesian Meta-Analysis with Weakly Informative Prior Distributions. *PsyArXiv*.
    Working paper

19. **Williams, D. R.**, & Martin, S. R. (2017). Rethinking robust statistics with modern Bayesian methods. *PsyArXiv*.
Working paper

20. Martin, S. R., & **Williams, D. R.** (2017). Outgrowing the Procrustean Bed of Normality: The Utility of Bayesian Modeling for Asymmetrical Data Analysis. *PsyArXiv*.
Working paper

Publications (*peer-reviewed*)

1. **Williams, D. R.** (in press). Learning to Live with Sampling Variability: Expected Replicability in Partial Correlation Networks. *Psychological Methods*.

2. **Williams, D. R.** (2021). Bayesian estimation for Gaussian graphical models: Structure learning, predictability, and network comparisons. *Multivariate Behavioral Research*, 1-17.

3. **Williams, D. R.**, Martin, S. R., & Rast, P. (in press). Putting the Individual into Reliability: Bayesian Testing of Homogeneous Within-Person Variance in Hierarchical Models. *Behavior Research Methods*.

4. **Williams, D. R.**, Liu, S., Martin, S. R., & Rast, P. (2021). Bayesian Multivariate Mixed-Effects Location Scale Modeling of Longitudinal Relations among Affective Traits, States, and Physical Activity. *European Journal of Psychological Assessment*. 36 (6).

5. Mulder, J., **Williams, D. R.**, Gu, X., Olsson-Collentine, A., Tomarken, A., Böing-Messing, F., Hoijtink, H., ... & van Lissa, C. (in press). BFpack: Flexible bayes factor testing of scientific theories in r. *Journal of Statistical Software*.

6. **Williams, D. R.**, Mulder, J., Rouder, J. N., & Rast, P. (2020). Beneath the surface: Unearthing within-person variability and mean relations with Bayesian mixed models. *Psychological Methods*.

7. **Williams, D. R.** & Joris Mulder. Bayesian Hypothesis Testing for Gaussian Graphical Models: Conditional Independence and Order Constraints. *Journal of Mathematical Psychology*, 99, 102441.

8. **Williams, D. R.**, Rast, P., Pericchi, L. R., & Mulder, J. (2020). Comparing Gaussian graphical models with the posterior predictive distribution and Bayesian model selection. *Psychological methods*.

9. **Williams, D. R.**, & Rast, P. (2020). Back to the basics: Rethinking partial correlation network methodology. *British Journal of Mathematical and Statistical Psychology*, 73(2), 187-212.

10. **Williams, D. R.**, & Mulder, J. (2020). BGGM: Bayesian Gaussian Graphical Models in R. *Journal of Open Source Software*, 5(51), 2111.

11. **Williams, D. R.**, & Bürkner, P. (2020). Coding errors lead to unsupported conclusions: a critique of Hofmann et al. (2015). *Meta-Psychology*, 4.

12. Briganti, G., **Williams, D. R.**, Mulder, J., & Linkowski, P. (2020). Bayesian network structure and predictability of autistic traits. *Psychological Reports*.

13. Jones, P. J., **Williams, D. R.**, & McNally, R. J. (2020). Sampling variability is not nonreplication: A Bayesian reanalysis of Forbes, Wright, Markon, and Krueger. *Multivariate Behavioral Research*, 1-7.

14. Rast, P., Martin, S. R., Liu, S., & **Williams, D. R.** (2020). A new frontier for studying within-person variability: Bayesian multivariate generalized autoregressive conditional heteroskedasticity models. *Psychological Methods*.

15. **Williams, D. R.**, Zimprich, D. R., & Rast, P. (2019). A Bayesian nonlinear mixed-effects location scale model for learning. *Behavior research methods*, 51(5), 1968-1986.

16. **Williams, D. R.**, Rhemtulla, M., Wysocki, A. C., & Rast, P. (2019). On nonregularized estimation of psychological networks. *Multivariate behavioral* research, 54(5), 719-750.

17. Nalborczyk, L., Bürkner, P. C., & **Williams, D. R.** (2019). Pragmatism should not be a substitute for statistical literacy, a commentary on Albers, Kiers, and van Ravenzwaaij (2019). *Collabra: Psychology*, 5(1).

18. Quintana, D. S., & **Williams, D. R.** (2018). Bayesian alternatives for common null-hypothesis significance tests in psychiatry: a non-technical guide using JASP. *BMC psychiatry*, 18(1), 178.

19. Lakens, D., Adolfi, F. G., Albers, C. J., Anvari, F., Apps, M. A., Argamon, S. E., **...** & Buchanan, E. M. (2018). Justify your alpha. *Nature Human Behaviour*, 2(3), 168.

20. Carlsson, R., Agerström, J., **Williams, D.**, & Burns, G. N. (2018). A Primer on the benefits of differential treatment analysis when predicting discriminatory behavior. *Quantitative Methods for Psychology*, 14(3), 193-198.

21. Merritt, J. R., Davis, M. T., Jalabert, C., Libecap, T. J., **Williams, D. R.**, Soma, K. K., & Maney, D. L. (2018). Rapid effects of estradiol on aggression depend on genotype in a species with an estrogen receptor polymorphism. *Hormones and behavior*, 98, 210-218.

22. **Williams, D. R.**, Carlsson, R., & Bürkner, P. C. (2017). Between-litter variation in developmental studies of hormones and behavior: Inflated false positives and diminished power. *Frontiers in neuroendocrinology*, 47, 154-166.

23. **Williams, D. R.**, & Bürkner, P. C. (2017). Effects of intranasal oxytocin on symptoms of schizophrenia: a multivariate Bayesian meta-analysis. *Psychoneuroendocrinology*, 75, 141-151.

24. Bürkner, P. C., **Williams, D. R.***, Simmons, T. C., & Woolley, J. D. (2017). Intranasal oxytocin may improve high-level social cognition in Schizophrenia, but not social cognition or neurocognition in general: a multilevel bayesian meta-analysis. *Schizophrenia Bulletin*, 43(6), 1291-1303.
* shared first authorship

25. **Williams, D. R.**, & Bürkner, P. C. (2017). Data extraction and statistical errors: A quantitative critique of Gumley, Braehler, and Macbeth (2014). *British Journal of Clinical Psychology*, 56(2), 208-211.

26. Carlsson, R., Schimmack, U., **Williams, D. R.**, & Bürkner, P. C. (2017). Bayes factors from pooled data are no substitute for Bayesian meta-Analysis: commentary on Scheibehenne, Jamil, and Wagenmakers (2016). *Psychological science*, 28(11), 1694-1697.

27. Maninger, N., Mendoza, S. P., **Williams, D. R.**, Mason, W. A., Cherry, S. R., Rowland, D. J., ... & Bales, K. L. (2017). Imaging, behavior and endocrine analysis of "Jealousy" in a monogamous primate. *Frontiers in ecology and evolution*, 5, 119.

28. Bales, K. L., del Razo, R. A., Conklin, Q. A., Hartman, S., Mayer, H. S., Rogers, F. D., **...** & Witczak, L. R. (2017). Focus: Comparative medicine: Titi monkeys as a novel non-human primate model for the neurobiology of pair bonding. *The Yale journal of biology and medicine*, 90(3), 373.

Software (1 – 11 *are freely available on CRAN*)

1. **BGGM**: Bayesian Gaussian Graphical Models (1^{st} author, GitHub repo)

2. **vICC**: Varying Intraclass Correlation Coefficients (1^{st} author, GitHub repo)

3. **GGMnonreg**: Non-regularized Gaussian Graphical Models (1^{st} author, GitHub repo)

4. **GGMncv**: Gaussian Graphical Models with Non-Convex Penalties (1^{st} author, GitHub repo)
5. **IRCcheck**: Irrepresentable Condition Check (1^{st} author, GitHub repo)
6. **BBcor**: Bayesian Bootstrapping Correlations (1^{st} author, GitHub repo)
7. **blsmeta**: Bayesian Location-Scale Meta-Analysis (1^{st} author, GitHub repo)
8. **bayeslincom**: Linear Combinations of Bayesian Posterior Samples (2^{st} author, GitHub repo)
9. **BFpack**: Flexible Bayes Factor Testing of Scientific Expectations (3^{rd} author, GitHub repo)
10. **glaxo**: An Implementation of the Relaxed Lasso for Gaussian graphical Models (2^{nd} author, GitHub repo)
11. **psychmetadata**: Open Datasets from Meta-analyses in Psychology (2^{nd} author)
12. **ICCier**: Computes ICCs, per person, or per observation, using the Bayesian mixed effects location scale model (2^{st} author, GitHub repo)

Talks

Estimating Gaussian Graphical Models with the Bayesian Bootstrap. (2018). *International Meeting of the Psychometric Society*. NYC. (PDF)

Reviewer

- Advances in Methods and Practices in Psychological Science
- Behavior Research Methods
- Biostatistics
- Multivariate Behavioral Research
- Psychometrika
- Psychological Methods
- Psychological Science

Interests and Skills

- C ++
- Diversity
- Open Science
- R programming language

Outreach

- Lead workshops for applying to the National Science Foundation Graduate Research and Ford Fellowship
  (*specifically for underrepresented students*)
- Yolotli Scholarship board member
  (*specifically for underrepresented high-school students*)

- Academic Twitter @wdonald_1985
- Moderator of Facebook group for psychological methods (39k members, link)

Donald R.Williams
https://donaldrwilliams.github.io/