Master Tutorial

TITLE

Text Analytics and NLP with R

SHORTENED TITLE

Text Analytics with R

ABSTRACT

Text is messy! Extracting information from text data is not as simple as analyzing quantitative questionnaires. This tutorial session will walk you through how to clean, describe, summarize, display, and predict outcomes from text using the powerful statistical language R. Bring your laptop for this interactive session (download session materials here: <https://bit.ly/2KKXlHQ>).

PRESS PARAGRAPH

Data that is useful is not always easily amenable to quantitative analysis. Much of that data is in the form of unstructured text, whether in interviews, open-ended questionnaire responses, essays, or online comments. The statistical computer language R provides tools for cleaning and standardizing text for the purpose of summaries, displays, models, and prediction. Text mining tools can illuminate how employees feel about their job as well as determining areas of research missed by a questionnaire. This session will give a hands-on and step-by-step tutorial on how to clean and analyze text-based data.

WORD COUNT: 1888

**Text Analytics and NLP with R**

R (R Core Team, 2019) is an open-source programming language that is designed for statistical computing (Hornik, 2013). R can perform anything from standard data analysis (e.g. Multiple Regression, Hierarchical Linear Modeling, or Structural Equation Modeling) to machine learning and natural language processing to highly specialized computations that may be unique to a scientific field. R is a programming *language* and not just a statistical analysis package. By some measures, R has become one of the ten most popular programming languages (Cass, 2018). R’s popularity may be partly due to the large ecosystem of support pages, books, blogs, tutorials, and R specific conferences. Several R packages, including dplyr (Wickham, François, Henry, and Müller, 2019), ggplot2 (Wickham, 2016), and data.table (Dowle and Srinivasan, 2019) have over 12,000 mentions on Stack Overflow (Robinson, 2017).

Many data scientists and practitioners can contribute to R by writing new and unique software, called “packages” in R. At the time of this writing, the Comprehensive R Archive Network (CRAN) contains 12,959 available packages, including packages to read data in varying formats (e.g., readr, open.xlsx, haven, rjson, officer, vroom), access databases (e.g., DBI, odbc, RSQLite), clean data (e.g., dplyr, tidyr, stringr, reshape2), perform data analyses and machine learning (e.g., infer, caret, xgboost, randomForest, survival, DALEX), visualize results (e.g., shiny, ggplot2), and interface with other programming languages (e.g., Rcpp, reticulate, RJava). These packages, just like R itself, are free of charge.

The Master Tutorial will teach attendees how to leverage R and several packages to transform text data into statistical displays and predictive models. We will show users how to extract data from common text sources, including surveys, interviews, and online reviews/comments, standardize the text into a useful form, and predict quantitative and qualitative outcome measures. One can think of this Master Tutorial as a direct continuation of the R Master Tutorial at the 2019 SIOP conference on web scraping: after extracting data from the web, what do you do with that data? Attendees should be familiar with R and have both R and RStudio installed prior to the workshop. We will walk through and explain each line of code in detail, but we will have little time to review the basics of R itself.

*Proposed Session*

Many studies require parsing and analyzing existing data. Much of this data is in the form of unstructured text. Anyone who has ever read a book knows that unstructured text contains substantial information. Humans are specially attuned to spotting patterns in these types of stimuli. However, manually parsing millions of reviews, thousands of books, or hundreds of articles would take extensive time and effort. Computers can quickly parse information but lack the nuance to spot novel patterns contained therein. Cleaning and parsing unstructured text data for analyses requires special strategies. R has many tools designed to clean, describe, display, model, and predict text data (e.g., Munzert, Rubba, Meißner, and Nyhuis, 2015; Silge and Robinson, 2017). Unfortunately, I-O psychologists often lack the specialized training required to successfully parse unstructured data without tedious, manual coding methods. Building on several R-based master tutorials over the past few years (e.g., Schwall, Lustenberger, Beatty, and Jones, 2014; Schwall, Beatty, & Jones, 2015; Goebl, Jones, & Semmell, 2016; Goebl, Jones, & Semmell, 2018; Jones, Nydick, & Wiseman, 2019a; Jones, Nydick, & Wiseman, 2019b), this tutorial aims to break down useful R methods for I/O psychologists. Specifically, this tutorial can be seen as extension of Web Scraping and APIs with R (Jones, Nydick, & Wiseman, 2019b) that describes what to do with the data being extracted from the web. We will explain text mining as implemented by R in three parts.

The first part of the tutorial will introduce packages and methods for importing, cleaning, filtering, and structuring text data. We will discuss tokens, n-grams, stop words, and stemming, so that common patterns of text can easily be identified and isolated. Much of this processing employ several powerful R packages, including tm (Feinerer and Hornik, 2018), corpus (Perry, 2017), and tidytext (Silge and Robinson, 2016), each of which have tools to translate, organize, and simplify text for follow-up analysis.

The second part of the tutorial will take the structured text and show how to summarize and display useful aspects of the data that might suggest future areas of investigation. Specifically, we will pull comments about specific organizations from Glassdoor and compare the sentiment of words in comments with the frequency of those words appearing across all comments within an organization (e.g., Silge and Robinson, 2017). These results can easily be displayed in, for example, a wordcloud (e.g., Fellows, 2018; Lang and Chien, 2018) or a sentiment barplot using ggplot2 (Wickham, 2016).

Finally, we will show how to create a predictive model with processed text inputs. For instance, we can use various machine learning models (such as Random Forests, e.g., Liaw and Wiener, 2002; or xgboost, Chen et al., 2018) to predict Glassdoor ratings using the words and n-grams in individual comments. These models can be useful when trying to predict employee engagement and voluntary turnover rates (which can have obvious negative financial effects for individual companies). Although our example relates to Glassdoor comments, any unstructured text corpus can be processed in similar steps.

Audience members are strongly encouraged to bring laptops and to have downloaded the materials ahead of time. For those who wish to follow along, we will make available all materials and R scripts at <https://bit.ly/2KKXlHQ>. We request 80 minutes for the tutorial, with the approximate time for each topic as well as additional information provided below. Note that none of the authors are affiliated with the producers of any of the packages described and that there are no material gains (financial or otherwise) for them. All packages are free-of-charge and complete.

TO HERE

**Topic #1: Text Parsing and Cleaning (25 minutes)**

**Topic #2: Summarizing Text Data (20-25 minutes)**

**Topic #3: Predictive Models with Text Data (20-25 minutes)**

**Topic #4: Wrap-up (5-10 minutes)**

Finally, the presenters will answer audience questions and help with technical problems encountered during previous sections. The presenters will also provide materials for participants to read for self-study and include links to useful materials for solving text analytics problems.

**Learning Objectives**

This workshop is designed to help you:

1. Explain steps that need to be taken to transform unstructured text data to a structured corpus, including tokenizing, stemming, and removing stop words.
2. Create basic visual displays and quantitative summaries of text data from R, including wordclouds and basic sentiment analysis.
3. Understand how to include text data in basic predictive modeling and how to run basic predictive text analyses in R.

**Presenter Information**

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**Presenter Bios**

Jeff Jones is the Director of Talent Analytics and Data Systems at Korn Ferry where he oversees the organization’s production scoring services, designs scoring algorithms, and is a subject matter expert for psychometrics and statistical methodology. He has published articles in theoretical and methodological journals such as *Psychometrika* and *Psychological Methods*, and is a coauthor on several CRAN and internal R packages. Jeff received his Ph.D. at the University of Minnesota in Psychometrics and Quantitative Psychology where he focused on creating new statistical methodology, asymptotic statistics, and higher-order geometry of statistical methodology.

Steven Nydick is a Data Scientist Developer at the Korn Ferry Institute, where he designs R-based tools and scoring algorithms. He is the lead author and maintainer of the catIrt R package as well as several internal R packages helping with everything from plotting to powerpoint generation to interfacing with servers. He has contributed to developing psychometric models and corresponding estimation algorithms that have been published in *Applied Psychological Methods* and the *Journal of Educational and Behavioral Statistics*. Steven received his Ph.D at the University of Minnesota in Psychometrics and Quantitative Psychology, where he primarily studied IRT-based adaptive tests for selection and classification. He also has an M.S. in Statistics from the University of Minnesota.

Ben Wiseman is a Data Science Developer at the Korn Ferry Institute responsible for maintaining and developing R-based automation tools, models, reports, and user interfaces. He has publications in entomology, ecology, and molecular evolution and has worked with and trained numerous clients in the military, public, and private sectors on a wide range of applications. Ben received his MSc from Lincoln University (New Zealand) in applied statistical modelling where he developed a user-facing geospatial AI platform for DOCs predator monitoring and control systems.

**References**

Cass, S. (2018). The 2018 top programming languages. Retrieved August 29, 2018, from <https://spectrum.ieee.org/at-work/innovation/the-2018-top-programming-languages>

Chen, T., He, T., Benesty, M., Khotilovich, V., Tang, Y., Cho, H., Chen, K., Mitchell, R., Cano, I., Zhou, T., Li, M., Xie, J., Lin, M., Geng, Y., & Li, Y. (2018). xgboost: Extreme gradient boosting. R package version 0.71.2.

Dowle, M., & Srinivasan, A. (2019). data.table: Extension of `data.frame`. R package version 1.12.2.

Feinerer, I., & Hornik, K. (2018). Tm: Text mining package. R package version 0.7-6.

Fellows, I. (2018). wordcloud: Word clouds. R package version 2.6.

Goebl, A. P., Jones, J. A., & Semmel, S. G. (2016, April). Handling big(gish) data in R:

An introductory and interactive tutorial. Master Tutorial at the annual meeting of the Society of Industrial and Organizational Psychology, Anaheim, CA.

Goebl, A. P., Jones, J. A., & Semmel, S. G. (2018, April). Machine learning in R: A tutorial and jam session. Master Tutorial at the annual meeting of the Society of Industrial and Organizational Psychology, Chicago, IL.

Hornik, K. (2017). The R FAQ. Retrieved from http://CRAN.R-project.org/doc/FAQ/R-FAQ.html

Jones, J. A., Nydick, S. W., & Wiseman, B. (2019a, April). Effective data wrangling and visualization with R. Master Tutorial at the annual meeting of the Society of Industrial and Organizational Psychology, National Harbor, MD.

Jones, J. A., Nydick, S. W., & Wiseman, B. (2019b, April). Web scraping with R. Master Tutorial at the annual meeting of the Society of the Industrial and Organizational Psychology, National Harbor, MD.

Lang, D., & Chien, G. (2018). Wordcloud2: Create Word Cloud by “htmlwidget”. R package version 0.2.1.

Liaw, A., & Wiener, M. (2002). Classification and regression by randomForest. *R News*, *2*, 18-22.

Munzert, S., Rubba, C., Meißner, P., & Nyhuis, D. (2015). *Automated Data Collection with R*. New York, NY: Wiley.

Perry, Patrick O. (2017). Corpus: Text corpus analysis. R package version 0.10.0.

R Core Team. (2019). *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. URL https://www.R-project.org/.

Robinson, D. (2017). The impressive growth of R. Retrieved August 29, 2018, from

https://stackoverflow.blog/2017/10/10/impressive-growth-r/

Schwall, A., Lustenberger, D., Beatty, A., & Jones, J. A. (2014, May). *Getting started*

*with R: Examples and Lessons Learned.* Panel discussion at the annual meeting

of the Society of Industrial and Organizational Psychology, Honolulu, HI.

Schwall, A., Beatty, A., & Jones, J. A. (2015, May). *Getting started with R: An*

*Interactive and Hands on Tutorial.* Master Tutorial at the annual meeting of the

Society of Industrial and Organizational Psychology, Philadelphia, PA.

Silge, J., & Robinson, D. (2016). tidytext: Text mining and analysis using tidy data principles in R.

*The Journal of Open Source Software*, *1*. Retried August 13, 2019, from <https://joss.theoj.org/papers/10.21105/joss.00037>.

Silge, J., & Robinson, D. (2017). *Text Mining with R: A Tidy Approach*. Sebastopol, CA: O’Reilly Media,

Inc. Retrieved August 13, 2019, from https://www.tidytextmining.com/.

Wickham, H. (2016). *ggplot2: Elegant Graphics for Data Analysis*. New York, NY: Springer.

Wickham, H., François, R., Henry, L., & Müller, K. (2018). dplyr: A grammar of data manipulation. R

package version 0.8.3.

**Appendix**

CV Jeff Jones

CV Steven Nydick

CV Benjamin Wiseman

Jeff Jones

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**Education:**

Doctorate in Quantitative Psychology and Psychometrics, University of Minnesota, October, 2013. Advisor: Dr. Niels Waller.

Bachelor of Science, Psychology, University of California, Davis, June 2006.

Bachelor of Arts, Japanese Language and Literature, University of California, Davis, June 2006.

Minor in Mathematics, University of California, Davis, June 2006.

**Employment History:**

Director, Talent Analytics and Data Systems, Korn Ferry, 2017 – Present.

Adjunct Professor, University of Minnesota, 2017 – Present.

Senior Manager of Analytics, Korn Ferry, 2015 – 2017.

Manager of Research and Analytics, Korn Ferry, 2013 – 2015.

Adjunct Professor, Hamline University, Fall 2013.

Graduate Instructor/Section Leader, University of Minnesota, 2006 – 2013.

**Awards:**

Korn Ferry Founder’s Award for Innovation, 2015.

Eva O. Miller Fellowship, 2012.

Graduate Summer Research Fellowship, 2009.

Graduate Research Partnership Program Fellowship, 2007.

**Publications:**

Jones, J. A. & Waller, N. G. (2016). Fungible weights in logistic regression. *Psychological Methods, 21,*

241-260*.*

Jones, J. A. & Waller, N. G. (2015). The normal-theory and asymptotic distribution-free covariance matrix of standardized regression coefficients: Theoretical extensions and finite sample behavior. *Psychometrika, 80,* 365-378.

Jones, J. A. & Waller, N. G. (2013). Computing confidence intervals for standardized regression coefficients. *Psychological Methods, 18,* 435-453.

Jones, J. A. & Waller, N. G. (2013). Abstract: The normal-theory and asymptotic distribution-free covariance matrix of standardized regression coefficients. *Multivariate Behavioral Research, 48,* 161.

Waller, N. G. & Jones, J. A. (2011). Investigating the performance of alternate regression weights by studying all possible criteria in regression models with a fixed set of predictors. *Psychometrika, 76,* 410-439.

Jones, J. A. (2010). GenCorr: An R routine to generate correlation matrices from a user-defined eigenvalue structure. *Applied Psychological Measurement, 34,* 68-69.

Waller, N. G. & Jones, J. A. (2010). Correlation weights in multiple regression.  *Psychometrika, 75,* 58-69.

Waller, N. G. & Jones, J. A. (2009). Locating the extrema of fungible regression weights. *Psychometrika,*

*74,* 589-602.

**Software:**

Wiseman, B., Nydick, S. W., & Jones, J. A. (2018). roperators: Additional operators to

help you write cleaner R code. R package version 1.0.1.

<https://CRAN.R-project.org/package=roperators>

Goebl, A. P., Jones, J. A., Dahlke, J., & Beatty, A. S. (2016). iopsych: Methods for

industrial/organizational psychology. R package version 0.90.

Waller, N. G. & Jones, J. A. (2015). fungible: Fungible coefficients and Monte Carlo

functions. R package version 1.3.

**Presentations and Workshops:**

Jones, J. A., Nydick, S. W., & Wiseman, B. (2019, April). *Web scraping with R.* Master Tutorial at the

annual meeting of the Society of the Industrial and Organizational Psychology, National Harbor, MD.

Jones, J. A., Nydick, S. W., & Wiseman, B. (2019, April). *Effective data wrangling and visualization with R.*

Master Tutorial at the annual meeting of the Society of Industrial and Organizational Psychology, National Harbor, MD.

Goebl, A. P., Jones, J. A., & Semmel, S. G. (2018, April). *Machine learning in R: A*

*tutorial and jam session.* Master Tutorial at the annual meeting of the Society of

Industrial and Organizational Psychology, Chicago, IL.

Thompson, I. B., Song, Q. C., Goebl, A. P., Hall, S., Meade, A. W., Newman, D. A.,

Wee, S., & Jones, J. A. (2018, April). *Machine learning techniques for multiple*

*criteria optimization.* Alternative Session at the annual meeting of the Society of

Industrial and Organizational Psychology, Chicago, IL.

Wendt, H., Goff, M., Jones, J. A., & Hezlett, S. A. (2017, May). *Examining relationships*

*between the Korn Ferry personality inventory and job engagement across*

*countries.* In S. Dilchert and D. Ones (Chairs), *An IRT based approach to*

*personality measurement: Some cross cultural examinations.* Paper presented at

the annual meeting of the European Association of Work and Organizational

Psychology, Dublin, Ireland.

Hezlett, S. A., Jones, J. A., Lewis, J., Goff, M., & Stirling, E. (2017, April). *What*

*motivates may alienate: Linking motivational factors to derailment risks.* In S.

Hezlett (Chair), *Maladaptation: Building the nomological net of derailing traits and behaviors.* Paper presented at the annual meeting of the Society of Industrial and Organizational Psychology, Orlando, FL.

Jones, J. A., Goebl, A. P., & Semmel, S. G. (2017, April). *Modern methods for I-O*

*psychologists: An interactive tutorial in R.* Master Tutorial at the annual meeting of the Society of Industrial and Organizational Psychology, Orlando, FL.

Schwall, A., Beatty, A., & Jones, J. A. (2017, April). *Data visualization with R.* Master

Tutorial at the annual meeting of the Society of Industrial and Organizational

Psychology, Orlando, FL.

Semmel, S. G., Jones, J. A., & Goebl, A. P. (2017, April). *What is machine learning?*

*Foundations and introductions to useful methods.* Master Tutorial at the annual meeting of the Society of Industrial and Organizational Psychology, Orlando, FL.

Jones, J. A., Goebl, A. P., & Semmel, S. G. (2016, April). *Handling big(gish) data in R:*

*An introductory and interactive tutorial.* Master Tutorial at the annual meeting of the Society of Industrial and Organizational Psychology, Anaheim, CA.

Goebl, A. P. & Jones, J. A. (2016, April). *An R package for I-O psychology simulation*

*building: iopsych.* Poster presented at the annual meeting of the Society of

Industrial and Organizational Psychology, Anaheim, CA.

Goebl, A. P. & Jones, J. A. (2016, April). *Creative performance is a viable criterion for*

*personnel selection.* Poster presented at the annual meeting of the Society of

Industrial and Organizational Psychology, Anaheim, CA.

Blazek, S. & Jones, J. A. (2016, April). *A year on the job: Simulations-based*

*assessments’ versatile utility.* In D. Guangrong (Chair), *The art and science of executive assessment: Research and practice.* Paper presented at the annual meeting of the Society of Industrial and Organizational Psychology, Anaheim, CA.

Blazek, S. & Jones, J. A. (2016, February). Streamlining your voice of the customer

program: Automating survey follow-ups, panel updates, and reports. Presentation given at Qualtrics Insight Summit, Salt Lake City, UT.

Jones, J. A. & Beatty, A. (2015, December). *R Workshop*. Workshop given at the

monthly meeting of Minnesota Professionals for Psychology Applied to Work, Minneapolis, MN.

Schwall, A., Beatty, A., & Jones, J. A. (2015, May). *Getting started with R: An*

*Interactive and Hands on Tutorial.* Master Tutorial at the annual meeting of the

Society of Industrial and Organizational Psychology, Philadelphia, PA.

D’Mello, S. & Jones J. A. (2015, May). *Demographic Differences in the Motivational*

*Drivers of Leaders*. Poster presented at the annual meeting of the Society of

Industrial and Organizational Psychology, Philadelphia, PA.

Goebl, A., Jones J. A., & Sharpe, E. (2015, May). *Relative Criteria Importance Depends*

*on Predictor Choices*. Poster presented at the annual meeting of the Society of

Industrial and Organizational Psychology, Philadelphia, PA.

Schwall, A., Lustenberger, D., Beatty, A., & Jones, J. A. (2014, May). *Getting started*

*with R: Examples and Lessons Learned.* Panel discussion at the annual meeting

of the Society of Industrial and Organizational Psychology, Honolulu, HI.

Huber, C. & Jones, J. A. (2014, May). *Principal components and factor scores in*

*multiple regression: A simulation.* Poster presented at the annual meeting of the

Society of Industrial and Organizational Psychology, Honolulu, HI.

Jones, J. A. & Waller, N. G. (2012). *The normal-theory and asymptotic distribution-free covariance matrix of standardized regression coefficients.* Annual Meeting, Society for Multivariate Experimental Psychology Conference, Vancouver, British Columbia.

Morris P. E. & Jones, J. A. (2005). *Using formal inference-based recursive*

*modeling to detect plausible interactions for multiple regression.* Annual Meeting, American Psychological Society Conference, Los Angeles, CA.

**Technical Reports and White Papers:**

Blazek, E. S., Jones, J. A., Lewis, J. L, & Orr, J. E. (2018). Develop and select the best

CEOs. Korn Ferry Institute, Korn Ferry.

Blazek, E. S., Jones, J. A., Lewis, J. L, & Orr, J. E. (2017). CEO staying power. Korn

Ferry Institute, Korn Ferry.

Lewis, J., Goff, M., Hezlett S., Jones, J. A., Li, T., Dai, G., & Deege, A. (2017). Korn

Ferry four dimensional enterprise assessment: Research guide and technical

manual. Version 17.1a—11/2017, Korn Ferry.

<http://www.kornferry.com/technical-manuals>

Blazek, E. S., Jones, J. A., Lewis, J. L, & Orr, J. E. (2016). Predicting financial gains.

Korn Ferry Institute, Korn Ferry.

Blazek, E. S., Jones, J. A., Lewis, J. L, & Orr, J. E. (2016). Leading indicators. Korn

Ferry Institute, Korn Ferry.

Blazek, E. S., Jones, J. A., Lewis, J. L, & Orr, J. E. (2016). Korn Ferry simulations-based

assessments predict CEO success: CEO outcomes research technical paper. Korn

Ferry Institute, Korn Ferry.

Dai, G., Davies, S., Goff, M., Jones J. A., D’Mello, S., Orr, J. E., Storfer, P., & Tang, K.

Y. (2014). Korn Ferry Leadership Architect: Research guide and technical manual. Version 14.2a—01/2016. <http://www.kornferry.com/technical-manuals>

Jones. J. A. & Waller, N. G. (2013). The normal-theory and asymptotic distribution-free

(ADF) covariance matrix of standardized regression coefficients: Theoretical

extensions and finite sample behavior. Technical Report 052513. University of

Minnesota, Twin Cities.

http://www.psych.umn.edu/faculty/waller/downloads/techreports/TR052913.pdf

Lewis, J. & Jones, J. A. (2016). Fit matters. Korn Ferry Institute, Korn Ferry.

<http://www.kornferry.com/institute/fit-matters>

Lewis, J., Goff, M., Jones, J. A., Hezlett S., Tang, K. Y., Dai, G., D’mello, S., Henry, L.,

Zes, D., Fetzer, J., Xie, C., & Scheer, P. (2015). Korn Ferry four dimensional executive assessment: Research guide and technical manual. Version 15.1a—01/2016, Korn Ferry. <http://www.kornferry.com/technical-manuals>

**Courses Taught:**

Introduction to Data Analysis/Statistics for Undergraduates

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Data Scientist Developer, Korn Ferry, 2018 – Present.

Senior Psychometrician, Pearson VUE, 2016 – 2018.

Psychometrician, Pearson VUE, 2013 – 2016.

Research Assistant, University of Minnesota, 2013 – Present.

Intern in Psychometrics, ARRT, 2012 – 2013.

Intern in Psychometrics, ACT, 2011.

Graduate Instructor/Section Leader, University of Minnesota, 2007 – 2013.

**Awards:**

Doctoral Dissertation Fellowship, 2013

Graduate Research Partnership Program, 2010

Archimedes Prize in Mathematics, 2006

**Manuscripts Published and In Press:**

Wang, C. & Nydick, S. W. (2015). Comparing two algorithms for calibrating the restricted non-

compensatory multidimensional IRT model. *Applied Psychological Measurement*, *39*, 119-134.

Nydick, S. W. (2014). The sequential probability ratio test and binary item response models. *Journal of*

*Educational and Behavioral Statistics*, *39*, 203-230.

**Software:**

Wiseman, B., Nydick, S. W., & Jones, J. A. (2018). roperators: Additional operators to

help you write cleaner R code. R package version 1.0.1.

<https://CRAN.R-project.org/package=roperators>

Nydick, S. W. (2014). catIrt: An R package for simulating computerized adaptive tests. R package version

0.5-0).

**Presentations and Workshops:**

Jones, J. A., Nydick, S. W., & Wiseman, B. (2019, April). Web scraping with R. Master Tutorial at the

annual meeting of the Society of the Industrial and Organizational Psychology, National Harbor, MD.

Jones, J. A., Nydick, S. W., & Wiseman, B. (2019, April). Effective data wrangling and visualization with R.

Master Tutorial at the annual meeting of the Society of Industrial and Organizational Psychology, National Harbor, MD.

Nydick, S. W. (2016, April). The expected likelihood in computerized classification testing. Paper

presented at the annual meeting of the National Council on Measurement in Education, Washington, DC.

Nydick, S. W. (2014, April). Multidimensional mastery testing with CAT. Paper presented at the annual

meeting of the National Council on Measurement in Education, Philadelphia, PA.

Nydick, S. W., Wang, C., & Xiong, X. (2014, April). Measuring multidimensional growth—a higher-order

IRT perspective. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.

Nydick, S. W., Nozawa, Y., & Zhu, R. (2012, April). Accuracy and efficiency in classifying examinees using

computerized adaptive tests: An application to a large scale test. Paper presented at the Annual Meeting of the National Council on Measurement in Education, Vancouver, BC.

Nydick, S. W., & Weiss, D. J. (2010, June). Accepting the null: No change in change CAT. Paper presented

at the IACAT conference on CAT, Arnhem, NL.

Nydick, S. W., & Weiss, D. J. (2009). A hybrid simulation procedure, evaluated for the development of

CATs. In D. J. Weiss (Ed.) *Proceedings of the 2009 GMAC Conference on Computerized Adaptive Testing.*

**Unpublished Manuscripts:**

Nydick, S. W. (2013). *Intro to R for Psychologists.* Minneapolis, MN: Author.

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**Professional Experience:**

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Owner, Wiseman Analytics, 2016 – 2018.

Information Services, DHS, 2015 – 2016.

Instructor, Lincoln University, 2013 – 2014.

Research Assistant, Lincoln University, 2011 – 2015.

Research Assistant, Seoul National University, 2011.

**Awards:**

Freemasons university scholarship

Forest and Bird research award

AGLS research scholarship

**Manuscripts Published and In Press:**

Wiseman, BH., Fountain, ED., Bowie, MH. He, S., Cruickshank, RH. 2016. Vivid molecular divergence over volcanic remnants: the phylogeography of Megadromus guerinii on Banks Peninsula, New Zealand. New Zealand Journal of Zoology

Fountain, ED., Pugh, AR., Wiseman, BH., Smith, VR., Cruickshank, RH., and Paterson, AM. 2015. On the captive rearing of Hadramphus tuberculatus (Pascoe 1877) (Coleoptera: Curculionidae: Molytinae):is ex-situ conservation the lesser of two weevils? New Zealand Entomologist.

Gillespie, M., Cruickshank, RH., Wiseman, BH., Wratten, S. 2013. Incongruence between morphological and molecular markers in the butterfly genus Zizina (Lepidoptera: Lycaenidae) in New Zealand.Systematic Entomology 38:151-163.

Fountain, ED., Wiseman, BH., Cruickshank, RH., and Paterson, AM. 2013. The ecology and conservation of Hadramphus tuberculatus (Pascoe 1877) (Coleoptera: Curculionidae: Molytinae). Journal of Insect Conservation 17:737-745.

**Software:**

Wiseman, B. W., Nydick, S.W., Jones, J (2018) roperators: Additional Operators to Help you Write Cleaner R Code. R package version 1.0-1).

Wiseman, B. W. (2015) Neurofriendly: Artificial Neural Networks Made Simple

Wiseman, B. W. (2015) Geofriendly: Easy Spatial Application of Artificial Neural Networks

**Presentations and Workshops:**

Jones, J. A., Nydick, S. W., & Wiseman, B. (2019, April). Web scraping with R. Master Tutorial at the

annual meeting of the Society of the Industrial and Organizational Psychology, National Harbor, MD.

Jones, J. A., Nydick, S. W., & Wiseman, B. (2019, April). Effective data wrangling and visualization with R.

Master Tutorial at the annual meeting of the Society of Industrial and Organizational Psychology, National Harbor, MD.

Wiseman, B. H. 2017 Data Science with Python. ESRI Developer Summit, Palm Springs, CA.

Wiseman, B. H. 2013 Messy data, messy models and applied statistics. Presented for Bio-Protection seminar, Lincoln University, New Zealand.

Marris, J. and Wiseman, B. H. 2012. Islands in the snow: Ecology, systematics and biogeography of the New Zealand beetle genus Protodendrophagus (Coleoptera:Silvanidae:Brotini). Presented at the New Zealand Ecological Society conference.

Cripps, M., McNeil, M., Patrick, H., Wiseman, B., Nobilly, F., Edwards, G. 2012. Invertebrate abundance and diversity in intensively managed dairy pastures.New Zealand Plant Protection Society Conference.

Wiseman, B. H., Cruickshank, R. H., Bowie, M. H., Fountain, E. D. 2011. Unexpected genetic variation in an endemic ground beetle: The molecular mystery of Megadromus guerinii (Coleoptera: Carabidae). 3rdAnnual Combined Australian and New Zealand Entomological Societies Conference

Wiseman, B. H. (2011). The curious case of Megadromus guerinii: phylogeographic oddities on Bank’s Peninsula. Presented to the Canterbury branch of the New Zealand Entomological Society.

**Courses Taught:**

Research and Analytical Skills

Geospatial Information Systems with Arc GIS

Business Statistics

Intermediate Statistics for Commerce