

STEVEN W. NYDICK, PhD – CURRICULUM VITAE

PERSONAL INFORMATION

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Pittsburgh, PA 15228

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swnydick.github.io/about/
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EDUCATION

2007 – 2013

PhD, University of Minnesota
Psychometrics/Quantitative Psychology
Advisor: Niels Waller
Dissertation Title: Multidimensional Mastery Testing with CAT

2007 – 2012

MA, University of Minnesota
Psychometrics/Quantitative Psychology
Advisor: Niels Waller
Master's Thesis Title: Classifying Examinees using Adaptive Tests

2010 – 2011

MS, University of Minnesota
Statistics
Advisor: Sanford Weisberg
Project Title: Clustering Minnesota Physician Clinics

2002 – 2006

BS, Syracuse University
Mathematics and Psychology
Summa Cum Laude with Honors in Psychology
GPA: 3.90
Honors Thesis Title: Moral Emotion Regulation: The Case of Abortion

PROFESSIONAL EXPERIENCE

May 2022 – Present: Lead Psychometrician

1. Basic Information

- Duolingo
5900 Penn Avenue
Pittsburgh, PA 15206
- Current Manager: J.R. Lockwood, PhD

2. Responsibilities:

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August 2021 – May 2022: Senior Manager: Measurement, Data, and Automation

January 2018 – August 2021: Data Scientist Developer

1. Basic Information

- Korn Ferry
33 South 6th St #4900
Minneapolis, MN 55402

- Manager: Cathy Means
- Manager: Jeff Jones, PhD

2. Responsibilities:

- Wrote R and Python code to efficiently score personality and performance ratings for production reports that inform hiring and promotion decisions for major corporate clients.
- Created dashboards in R Shiny to generate tailored and automated business quality plots and reports in Word, Powerpoint, and L^AT_EX.
- Developed internal R packages that facilitate systematizing code development, producing flexible graphics, and greatly reducing bugs and other errors.
- Deployed R applications, R packages, and R/Python scoring services on Amazon Web Services (using both Docker and AWS Lambda), in local CRAN repositories, and with shinyproxy (an open source enterprise-level Java package to automatically launch containerized and scalable shiny applications).
- Contributed psychometric and statistical insight to thought leadership studies on disruption in Talent Management.
- Improved client DE&I people management practices by applying targeted predictive analyses (e.g., elastic net linear and logistic regression and Random Forests) on client data, following analyses with deep dives on segmented groups, and providing summaries for executive-level consumption.
- Provided ad hoc analyses of business data using statistical and machine learning techniques, such as why people voluntarily leave organizations by analyzing custom surveys using a variety of machine learning and standard methods (for instance, logistic regression, Random Forests, and Gradient Boosting) in R.
- Built an R package to simulate responses and estimate parameters for the Multi-Unidimensional Pairwise Preference IRT model, including coding modified Newton-Raphson and MCMC algorithms for parameter estimation. This package was designed for use in productionalized code serving production reports.
- Managed the hiring and development of an intern in data science. Supervised the development of an R package on Thurstonian IRT models that she used in her Master's thesis in statistics.

November 2016 – January 2018: Senior Psychometrician

November 2013 – November 2016: Psychometrician

1. Basic Information

- Pearson VUE
5601 Green Valley Drive
Bloomington, MN 55437
- Manager: James Ingrisone, PhD
- Manager: Xin Li, PhD

2. Responsibilities:

- Oversaw all psychometric work for a complex professional client with more than 20 exams, including linear-on-the-fly and fixed-form delivery methods, and has organized the analysis process to better facilitate automation and prevent errors.
- Designed psychometric tasks, data collection methods, and analytic procedures across more than twenty complex regulatory and professional clients.
- Guided content experts in determining appropriate exam cut scores via Angoff and Bookmark standard settings.
- Independently designed and conducted Job Task Analyses. The JTA process includes facilitating a discussion on the content of a field across professionals of wide-ranging backgrounds and experience, constructing and publishing a complicated survey for distribution to thousands of experts, and collecting/analyzing/integrating data from various sources to determine exam content.
- Conducted and verified item analyses, automatic test assembly, equating, and analytic and demographic reports for regulatory and professional clients, and has completed work almost entirely on time and error free.
- Wrote code in R to efficiently conduct all analyses. The R scripts interface with WINSTEPS and Bilog-MG for item analyses and the lp_solve C routine for automatic test assembly and pool sculpting. Has successfully applied linear programming concepts to more efficiently build tests given particular blueprint and statistical specifications.
- Designed a comprehensive simulation to transition a program from a linear fixed-form exam to a computer adaptive exam. Completed the simulation, analysis, and writeup in an expedited fashion to meet compressed timelines, and was complimented by the client for the level of detail and recommendations presented therein.
- Wrote a Python GUI to parse HTML input and create a Pearson-approved Word poolbook for standard settings with various sorting, filtering, and display capabilities. This program saved hours when preparing for standard settings and provided client-requested flexibility in poolbook displays.
- Automated the creation of client reports using R and markdown, knitr, or ReporteRs.
- Served as a psychometric liaison for determining the reporting capabilities of the BI and has successfully intermediated between the requirements of the psychometric team in terms of data format and structures and the capabilities of the BI tool.
- Assisted in completing and replicating analyses due to data processing efficiency and expertise.

June 2013 – Present: Research Assistant

1. Basic Information:

- University of Minnesota
75 East River Parkway
Minneapolis, MN 55455

- Project Topic: Longitudinal Higher-Order IRT Models
- Contact: Chun Wang, PhD

2. Responsibilities:

- Edited, modified, and wrote sections of a grant proposal to research longitudinal models in item response theory.
- Designed and conducted Markov Chain Monte Carlo simulation studies in R.
- Wrote algorithms in and invoked algorithms from the C programming language, which resulted in a reduction of 98.5% of computing/simulation time.

May 2012 – September 2013: Intern in Psychometrics

1. Basic Information:

- The ARRT
1255 Northland Drive
St. Paul, MN 55120
- Contact: Lauren Wood, PhD
- Contact: Michael Yoes, PhD
- Contact: Ben Babcock, PhD

2. Responsibilities:

- Conducted literature reviews on various psychometric topics, including standard setting, cognitive diagnosis models, and item types.
- Wrote programs to automate exporting exam data from SQL databases into R. These programs also analyzed/plotted examinee and exam characteristics.
- Designed, conducted, and wrote-up for publication real-data studies on exam quality.

June 2011 – August 2011: Summer Intern in Psychometrics and Statistics

1. Basic Information:

- ACT, Inc.
500 ACT Drive
Iowa City, IA 55243
- Project Topic: Stopping Rules in Classification CAT
- Contact: Yuki Nozawa, PhD
- Contact: Xiaohong Gao, PhD

2. Responsibilities:

- Designed a comprehensive simulation study on computerized classification testing.
- Compiled and presented results from the simulation study at the 2012 NCME conference.
- Assisted several interns on learning R, adopting clean R coding habits, and using R for simulations.

TEACHING
EXPERIENCE

University of Minnesota

| | | |
|----------------------------|------------|--|
| Instructor: | PSY 8814 | Analysis of Psychological Data I (F2014) |
| Instructor: | PSY 3801H: | Honors Intro to Data Analysis (F2011) |
| Instructor: | PSY 3801: | Introduction to Data Analysis (F2010, Spr2011, Spr2012, Sum2012) |
| Instructor: | PSY 2801: | Introduction to Data Analysis (Sum2009, F2009, Spr2010) |
| Lab Instructor: | PSY 8815: | Analysis of Psychological Data II (Spr2009, Spr2013) |
| Lab Instructor: | PSY 8814: | Analysis of Psychological Data I (F2012) |
| Lab Instructor: | PSY 5865: | Advanced Psychological Measurement (Spr2010) |
| Lab Instructor: | PSY 2801: | Introduction to Data Analysis (F2007, Spr2008, F2008) |
| Teaching Assistant: | PSY 3001H: | Honors Research Methods (F2008) |
| Teaching Assistant: | PSY 2801: | Introduction to Data Analysis (F2007, Spr2008) |

FELLOWSHIPS,
AWARDS,
AND FUNDING

- Fall 2013:** Doctoral Dissertation Fellowship (DDF), University of Minnesota, \$22,500 + tuition.
- Summer 2013 – Spring 2014:** Research Assistantship, University of Minnesota, stipend for 10-20 hours per week.
- Spring 2012:** CLA Student Travel and Research Award, University of Minnesota, \$500.
- Summer 2010:** CLA Student Travel and Research Award, University of Minnesota, \$500.
- Summer 2010:** Graduate Research Partnership Program (GRPP) Fellowship, University of Minnesota, \$4000.
- Fall 2007 – Spring 2013:** Teaching Assistantship, University of Minnesota, stipend + tuition.
- Spring 2006:** Archimedes Prize in Mathematics, Syracuse University, awarded to an outstanding Undergraduate Mathematics student at the culmination of each year, \$150.

MANUSCRIPTS
PUBLISHED
AND
IN PRESS

- [1] Fuglestad, P.T., Volz, S., Joyal-Desmarais, K., Nydick, S. W., DeYoung, C. G., & Rothman, A. (2024). A new measure of regulatory focus: Preventing measurement error by promoting best validation practices. *Journal of Personality*.
- [2] Cardwell, R., Naismith, B., Burstein, J., Nydick, S. W., Goodwin, S., & Verardi, A. (2024). From pen to pixel: Rethinking English language proficiency assessments in the digital era. *CALICO Journal*, 41, 209–234.
- [3] Zheng, Y., Nydick, S. W., Huang, S., & Zhang, S. (2024) MxML (exploring the relationship between measurement and machine learning): Current state of the field. *Educational Measurement: Issues and Practice*, 43, 19–38. <https://onlinelibrary.wiley.com/doi/full/10.1111/emip.12593>
- [4] Nydick, S. W. (2023). Detecting careless cases in practice tests. *Chinese/English Journal of Educational Measurement and Evaluation*. 4, 1-18. <https://www.ce-jeme.org/cgi/viewcontent.cgi?article=1047&context=journal>
- [5] Cardwell, R. L., Nydick, S. W., & Lockwood, J. R. (2023). Practical considerations when building concordances between English tests. *Language Testing*. 41, 192–202. <https://journals.sagepub.com/doi/10.1177/02655322231195027>
- [6] Wang, C., & Nydick, S. W. (2020). On longitudinal item response theory models: A didactic. *Journal of Educational and Behavioral Statistics*, 45, 339 – 368. <https://doi.org/10.3102/107699861988202>
- [7] Wang, C., & Nydick, S. W. (2015). Comparing two algorithms for calibrating the restricted non-compensatory multidimensional IRT model. *Applied Psychological Measurement*, 39, 119–134. <https://doi.org/10.1177/0146621614545983>
- [8] Nydick, S. W. (2014). The sequential probability ratio test and binary item response models. *Journal of Educational and Behavioral Statistics*, 39, 203–230. <https://doi.org/10.3102/1076998614524824>

BOOK CHAPTERS

- [1] Nydick, S. W., Lockwood, J. R., & Liao, M. (2024). Psychometric considerations for a computerized adaptive language test. In A. J. Kunnan (Ed.), *The Concise Companion to Language Assessment (TCCLA)* (pp. 619–635). Wiley Blackwell.

PRESENTATIONS

- [1] Nydick, S. W., Cardwell, R. L., & Burstein, J. (2024, April). Examining test preparation, test-taker attitudes, and high-stakes outcomes. Paper presented at the annual meeting of the National Council on Measurement in Education, Philadelphia, PA.
- [2] Zheng, Y., Huang, S., Nydick, S. W., & Zhang, S. (2024, April). MxML Phase 2: Survey of the measurement community. Paper presented at the annual

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

- [3] Lockwood, J. R., & Nydick, S. W. (2023, July). Scalable explanatory IRT modeling with sparse data structures. Paper presented at the International Meeting of the Psychometric Society, College Park, MD.
- [4] Cardwell, R. L., Burstein, J., Goodwin, S., & Nydick, S. W. (2023, June). Syncing university English language use and language assessment in a digital era. Poster presented at the Language Testing Research Colloquium, New York, NY.
- [5] Cardwell, R. L., & Nydick, S. W. (2023, April). Considering inter-test relationships in high-stakes admissions testing: The case of English. Paper presented at the international conference of the Association of Language Testers in Europe, Madrid, Spain.
- [6] Cardwell, R. L., Nydick, S. W., & Lockwood, J. R. (2023, April). Sampling considerations for building concordance tables. Paper presented at the annual meeting of the National Council on Measurement in Education, Chicago, IL.
- [7] Zheng, Y., Nydick, S. W., Zhang, S., & Huang, S. (2023, April). MxML: Exploring the relationship between measurement and machine learning in recent years. Paper presented at the annual meeting of the National Council on Measurement in Education, Chicago, IL.
- [8] Cardwell, R. L., Nydick, S. W., & Lockwood, J. R. (2023, March). Reporting bias in correlations between DET and other English proficiency assessments. Roundtable at the annual meeting of American Association for Applied Linguistics, Portland, OR.
- [9] Goodwin, S., LaFlair, G. T., Lockwood, J. R., Nydick, S. W., & von Davier, A. A. (2023, March). Finding time in language assessments: Maximizing properties by unit testing time. Paper presented at the annual meeting of the American Association for Applied Linguistics, Portland, OR.
- [10] Nydick, S. W., Lodge, F., & Wang, Y. (2022, April). Interactive dashboards with R and shiny. Master tutorial at the annual meeting of the Society of Industrial and Organizational Psychologists, Seattle, WA.
- [11] Nydick, S. W., Wiseman, B., & Wisner, T. (2022, April). Natural language processing with R and Python. Master tutorial at the annual meeting of the Society of Industrial and Organizational Psychologists, Seattle, WA.
- [12] Jones, J. A., Nydick, S. W., & Wiseman, B. (2021, April). Text analytics and NLP with R. Master tutorial at the annual meeting of the Society of Industrial and Organizational Psychologists, Virtual.
- [13] Jones, J. A., Nydick, S. W., & Wiseman, B. (2021, April). Big data systems with R. Master tutorial at the annual meeting of the Society of Industrial and Organizational Psychologists, Virtual.
- [14] Jones, J. A., Nydick, S. W., & Wiseman, B. (2020, April). Text analytics and NLP with R. Master tutorial at the annual meeting of the Society of Industrial and Organizational Psychologists, Austin, TX. (Conference canceled)
- [15] Jones, J. A., Nydick, S. W., & Wiseman, B. (2020, April). Big data systems with R. Master tutorial at the annual meeting of the Society of Industrial and Organizational Psychologists, Austin, TX. (Conference canceled)

- [16] 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 Psychologists, National Harbor, MD.
- [17] Jones, J. A., Nydick, S. W., & Wiseman, B. (2019, April). Web Scraping with R. Master tutorial at the annual meeting of the Society of Industrial and Organizational Psychologists, National Harbor, MD.
- [18] Nydick, S. W. (2016, April). The expected likelihood ratio in computerized classification testing. Paper presented at the annual meeting of the National Council on Measurement in Education, Washington, DC.
- [19] 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.
- [20] 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.
- [21] 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.
- [22] 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.
- [23] 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

- [1] Nydick, S. W. (2013). *Intro to R for Psychologists*. Minneapolis, MN: Author. swnydick.github.io/assets/reports/Introduction_to_R_Guide.pdf.
- [2] Nydick, S. W. (2012). *The Wishart and Inverse Wishart Distributions*. Minneapolis, MN: Author. swnydick.github.io/assets/reports/Wishart_Distribution.pdf.

SOFTWARE

- [1] Nydick, S. W. (2021). An R package for Simulating Responses and Estimating Parameters to the Multi-Unidimensional Pairwise Preference (MUPP) Model (R Package Version 0.1.0). Available from <https://github.com/swnydick/mupp>
- [2] Nydick, S. W. (2014). An R package for Simulating Computerized Adaptive Tests (R Package Version 0.5-0). Available from <http://CRAN.R-project.org/package=catIrt>

REVIEWING

- Starting 2017:** Applied Psychological Measurement
- Starting 2013:** Behavioral Research Methods
- Starting 2023:** Chinese/English Journal of Educational Measurement and Evaluation
- Starting 2020:** Journal of Computerized Adaptive Testing
- Starting 2014:** Journal of Statistical Software
- Starting 2009:** SAGE Textbook on Statistics
- Starting 2009:** Statistics in Medicine

PROFESSIONAL
SERVICES

- Summer 2010:** Curriculum Planning, Psychology Department, University of Minnesota. Helped build and plan the curriculum of PSY 3801, the redesigned undergraduate course in Data Analysis. Also, designed, organized, and kept the joint item bank across course sections.
- Contact: David Weiss, Professor, University of Minnesota
- Summer 2010:** Tricam Lab, Psychology Department, University of Minnesota. Translated SPSS, JMP, and Matlab scripts into R and consulted on R coding.
- Contact: Angus MacDonald III, Associate Professor, University of Minnesota
- Spring 2009 – Fall 2009:** Core Curriculum Group, Psychology Department, University of Minnesota. Helped organize and structure the content of the undergraduate psychology major.

PROFESSIONAL
ORGANIZATIONS

- Current Member:** International Association for Computerized Adaptive Testing
- Current Member:** National Council on Measurement in Education
- Current Member:** Psychometric Society
- Past Member:** Society for Industrial and Organizational Psychology
- Past Member:** American Educational Research Association

SOFTWARE
KNOWLEDGE

Proficient: R, L^AT_EX, SQL, Python, Git

Experienced: C, C++, HTML/CSS/XML/JavaScript, AWS, Docker, LISREL, MPlus, SPSS, Various IRT Software (WINSTEPS, BILOG, etc.)

Familiar: Matlab, SAS, Stata, MX, C#

RELEVANT
COURSEWORK

| Date Taken | Course Number | Course Description |
|-------------|---------------|--|
| Spring 2011 | Stat 8054 | Applied Stat Methods IV: Computing |
| | Stat 8801 | Statistical Consulting |
| Fall 2010 | Stat 8053 | Applied Stat Methods III: Multivariate |
| | Stat 8321 | Regression Graphics |
| Spring 2010 | EPSY 5271 | Becoming a Teacher of Statistics |
| | Stat 8052 | Applied Stat Methods II: Experimental Design |
| Fall 2009 | Stat 5601 | Nonparametric Methods |
| | Stat 8051 | Applied Stat Methods I: Linear Model |
| Spring 2009 | Stat 5102 | Theory of Statistics II |
| Fall 2008 | PSY 8960 | Seminar in Item Response Theory |
| | Stat 5101 | Theory of Statistics I |
| Spring 2008 | PSY 5865 | Advanced Psychological Measurement |
| | PSY 8960 | Multivariate Data Analysis for Social Scientists |
| Fall 2007 | PSY 5862 | Psychological Measurement |
| | PSY 8960 | Seminar in Computerized Adaptive Testing |