Dan R. Johnson

Department of Cognitive and Behavioral Science
Washington and Lee University
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Current Position

David G. Elmes Professor of Cognitive and Behavioral Science
Washington and Lee University   2021-present

Chair, Data Science*, Washington and Lee University*   2019-present

Neuroscience Faculty Member, *Washington and Lee University*   2009-present

Education

Ph.D. University of Oklahoma, Psychology   2009
B.A. Luther College, Majors in Psychology and Biology   2003

Grants, Awards, and Honors

National Science Foundation Grant   2022-2025
Type: Collaborative Grant, ECR-EDU Core Research 2155071
Lead PI: Roger Beaty, Pennsylvania State University
Co-PIs: Dan Johnson, Janet van Hell, Scarlett Miller, Mark Fuge
Title: Construction and validation of the creativity assessment platform:
Educational technology to evaluate creativity in engineering design.
Total costs: $1,117,805

U.S. Army Research Institute for the Behavioral and Social Sciences   2023-2026
Type: Basic, Applied, and Advanced Research W911NF-18-S-0005
Co-PIs: Roni Reiter-Palmon and Roger Beaty
Computational/Statistical Consultant: Dan Johnson
Title: Automated Creativity Evaluation System (ACES)
Total costs: $753,337

Awarded David G. Elmes Term Professorship   2021-present

Behavior Research Methods Top Paper of the Year Award   2021
Paper entitled, *"Automating Creativity Assessment with SemDis:*
An open platform for computing semantic distance"

Lenfest Research Grant   2010-2023
Annual amount awarded: $6,500
Funded by: Washington and Lee University
Purpose: Collaborative research with students

Howard Hughes Medical Institute Curriculum Development Grant   2015
     Amount awarded: $500
     Funded by: Washington and Lee University
     Purpose: Innovation in pedagogical methods

Teaching Innovation Grant   2009-2023
     Annual amount awarded: $750
     Funded by: Washington and Lee University

Howard Hughes Medical Institute Research Grant   2012-2013
     Amount awarded: $3,750
     Funded by: Washington and Lee University
     Purpose: Collaborative research with students, focus on quantitative skills

Charles Gettys Graduate Student Career Research Award   2008
     Amount awarded: $500
     Funded by: University of Oklahoma

Foundation Fellowship   2003 – 2008
     Total award: $25,000
     Funded by: University of Oklahoma

Research Interests

The Computational Cognition and Creativity Lab uses computational models and empirical data to investigate the mechanisms underlying creativity processes like the generation and evaluation of novel ideas. We are particularly interested in automating creativity assessment and making it widely and freely accessible to researchers and educators. We employ diverse methodologies like natural language processing, large language models, machine learning, distributional semantic modeling, simulation, and interactive web applications. We use the statistical and graphics platform, *R*, for modeling and data work. Other topics we explore include metacognition in creativity.

Publications

**student co-authors

Chaudhuri, S., Dooley, M., Johnson, D. R., Beaty, R., Bhattacharya, J. (in press). Evaluation of poetic creativity: Predictors and Role Expertise – A Multilevel Approach. *Psychology of Aesthetics, Creativity, and the Arts.* Advanced Online Publication.

Yu, Y., Forthmann, B., Beaty, R. E., & Johnson, D. R. (2023). Optimal compositional models of multi-word responses: Maximum associative distance (MAD), rank order weighted average (ROWA), and more. *Psychology of Aesthetics, Creativity, and the Arts.* Advanced Online Publication.

Patterson, J. D., Merseal, H., Johnson, D. R. … Beaty, R. E. (2023). Multilingual semantic distance: Automatic verbal creativity assessment in many languages. *Psychology of Aesthetics, Creativity, and the Arts,* 17(4), 495-507.

Johnson, D. R., Kaufman, J. C., Baker, B. S., Patterson, J. D., Barbot, B., Green, A. E., van Hell, J., Kennedy, E., ****Sullivan, G. F.,** Taylor, C. L., Ward, T., & Beaty, R. E. (2022). Divergent semantic integration (DSI): Extracting creativity from narratives with distributional semantic modeling. *Behavior Research Methods.*

Forthmann, B., Johnson, D. R., & Beaty, R. E. (2022). Semantic spaces are not created equal – how should we weigh them in the sequel? An in-depth examination of composites in the automated creativity scoring.

European Journal of Psychological Assessment. Advanced Online Publication.

Johnson, D. R., & Hass, R. W. (2022). Semantic context search in creative idea generation. *Journal of Creative Behavior, 56*(3), 362-381.

Beaty, R. E., Forthmann, B., Zeitlen, D., & Johnson, D. R. (2022). Semantic distance and the alternate uses task: Recommendations for reliable automated assessment of originality. *Creativity Research Journal, 34*(3), 245-260.

Beaty, R. E., & Johnson, D. R. (2021). Automating creativity assessment with SemDis: An open platform for computing semantic distance. *Behavior Research Methods, 53,* 757-780.

Johnson, D. R., **Cuthbert, A. S., & **Tynan, M. E.** (2021). The neglect of idea diversity in idea generation and evaluation. *Psychology of Aesthetics, Creativity, and the Arts, 15,* 125-135.

Gavaler, C., & Johnson, D. R. (2019). The literary genre effect: A one-word science fiction (vs. realism) manipulation reveals intrinsic text properties outweigh extrinsic expectations of literary quality. *Scientific Study of Literature, 9,* 34 - 52.

Vervoort, T., Kai, K., Johnson, D., Stefan, S., & Dimitri, D. (2019). Parental emotion and pain control behavior when faced with child's pain: The emotion regulatory role of parental-related attention-set shifting and heart rate variability. *PAIN, 160,* 322-333.

Shuman, E., Johnson, D., Saguy, T., & Halperin, E. (2018). Threat to the group's image can motivate high identifiers to take action against in-group transgressions. *Personality and Social Psychology Bulletin, 44,* 1523-1544.

Johnson, D. R., **Tynan, M. E., **Cuthbert, A. S., & **Q'Quinn, J. K**. (2018). Metacognition in argument generation: The misperceived relationship between emotional investment and argument quality. *Cognition and Emotion, 32,* 566-578.

Heinen, D. J., & Johnson, D. R. (2018). Semantic distance: An automated measure of creativity that is novel and appropriate. *Psychology of Aesthetics, Creativity, and the Arts, 12,* 144-156.

Gavaler, C., & Johnson, D. R. (2017). The genre effect: A science fiction (vs. realism) manipulation decreases inference effort, reading comprehension, and perception of literary merit. *Scientific Study of Literature, 7,* 79-108.

Johnson, D. R. (2017). Improving skeptics' reasoning when evaluating climate change material: A cognitive intervention. *Ecopsychology, 9,* 130-142.

Johnson, D. R. (2017). Bridging the political divide: Highlighting explanatory power mitigates biased evaluation of climate arguments. *Journal of Environmental Psychology, 51,* 248-255.

Johnson, D. R., **Murphy, M., & **Messer, R.** (2016). Reflecting on explanatory ability: Detecting gaps in causal knowledge. *Journal of Experimental Psychology: General, 145,* 573-588.

Callinan, S., Johnson, D. R., & Wells, A. (2015). A randomised controlled study of the effects of the attention training technique on traumatic stress symptoms, emotional attention set shifting, and flexibility. *Cognitive Therapy and Research, 39,* 4-13.

Stirling, B., **Greskovich, M., & Johnson, D.R. (2014). Response bias toward fearful stimuli increases as stimulus noise increases. *Psi Chi Journal of Psychological Research, 19,* 37-42.

Johnson, D. R., **Huffman, B., & **Jasper, D.** (2014). Changing race boundary perception by reading narrative fiction. *Basic and Applied Social Psychology, 36,* 83-90.

Johnson, D. R., **Jasper, D. M., **Griffin, S., & **Huffman, B**. (2013). Reading narrative fiction reduces Arab-Muslim prejudice and offers a safe haven from intergroup anxiety. *Social Cognition, 31*, 578-598.

Roebuck-Spencer, T., Vincent, A., Gilliland, K., Johnson, D. R., & Cooper, D. B. (2013). Initial clinical validation of an embedded performance validity measure within the Automated Neuropsychological Metrics (ANAM). *Archives of Clinical Neuropsychology, 28,* 700-710.

Johnson, D. R., **Cushman, G., **Borden, L., & **McCune, M**. (2013). Potentiating empathic growth: Generating imagery while reading fiction increases empathy and prosocial behavior. *The Psychology of Aesthetics, Creativity, and the Arts, 7,* 306-312.

Johnson, D. R. (2013). Transportation into literary fiction reduces prejudice against and increases empathy for Arab-Muslims. *Scientific Study of Literature, 3,* 77-92.

Johnson, D. R., & Whiting, W. L. (2013). Detecting subtle expressions: Older adults demonstrate automatic and controlled positive response bias in emotional perception. *Psychology and Aging, 28,* 172-178.

Johnson, D. R., & **Borden, L. A**. (2012). Participants at your fingertips: Using Amazon's Mechanical Turk to increase student-faculty collaborative research. *Teaching of Psychology, 39*, 245-251.

Johnson, D. R. (2012). Transportation into a story increases empathy, prosocial behavior, and perceptual bias toward fearful expressions. *Personality and Individual Differences, 52,* 150-155.

Johnson, D. R. (2009). Emotional attention set-shifting and its relationship to anxiety and emotion regulation. *Emotion, 9,* 681-690.

Johnson, D. R. (2009). Attentional control capacity for emotion: An individual-difference measure of internal controlled attention. *Cognition and Emotion, 23,* 1516-1536.

Johnson, D. R. (2009). Goal-directed attentional deployment to emotional faces and individual differences in emotional regulation. *Journal of Research in Personality, 43,* 8-13.

Johnson, D. R., & Gronlund, S. D. (2009). Individuals lower in working memory capacity are particularly vulnerable to anxiety's disruptive effect on performance. *Anxiety, Stress, and Coping, 22,* 201-213.

Johnson, D. R., Vincent, A. S., Johnson, A. E., Gilliland, K., & Schlegel, R. E. (2008). Reliability and construct validity of the Automated Neuropsychological Assessment Metrics (ANAM) Mood Scale. *Archives of Clinical Neuropsychology, 23,* 73-85.

Johnson, D. R. (2008). A multi-level model of individual differences in speed/accuracy tradeoff (SATin). Multivariate Behavioral Research, 43(4) (Abstract).

Njus, D., & Johnson, D. R. (2008). Need for cognition as a predictor of psychosocial identity development. *Journal of Psychology, 142,* 645-655.

In Progress

**student co-authors

Kandemerci, B., Beaty, R. Johnson, D. R. Oliver, B. R., Kovas, Y., & Toivainen, T. (submitted). What is childhood writing? Computationally measured linguistic characteristics explain much of the variance in subjective human-rated creativity scores.

Editorial Board Service

Associate Editor, Creativity Research Journal

Presentations

**bolded names are student co-authors

Johnson, D. R. (2023). Semantic distance solves a discernment assessment problem in creative idea evaluation. Poster presented at the annual meeting Midwestern Psychological Association, Chicago, IL.

Johnson, D. R. (2022). Divergent semantic integration: Extracting creativity from narratives. Talk presented at the Annual Meeting of the Society for the Neuroscience of Creativity virtually.

Johnson, D. R. & **Sullivan, G. F. (2022). Automating creativity assessment of short narratives with semantic diversity. Poster presented at the annual meeting Midwestern Psychological Association, Chicago, IL.

Johnson, D. R., **Hurst, J., ** & **Dolwick, A. (2019). *Corpus-based assessment of novelty and diversity in creativity.* Poster presented at the annual meeting Midwestern Psychological Association, Chicago, IL.

Johnson, D. R. (2018). *Enhancing creativity using polysemy.* Invited talk was given at the annual meeting Midwestern Psychological Association, Chicago, IL.

Johnson, D. R., **Tynan, M. E., **Cuthbert, A. S., & **Q'Quinn, J. K. (2017). *Metacognition in argument generation: The misperceived relationship between emotional investment and argument quality.* Poster presented at the annual meeting Midwestern Psychological Association, Chicago, IL.

Johnson, D. R., **Magee, C., **Epelbaum, M., & **Lane, L. (2015). *Coherence-seeking increases memory for false details.* Poster presented at the annual meeting of the Midwestern Psychological Association, Chicago, IL.

Johnson, D. R., **Shuman, E., **Roberts, M., **Huffman, B. (2014). *Self-generated stories enhance long-term retention of textbook material.* Poster presented at the annual meeting of the Midwestern Psychological Association, Chicago, IL.

Johnson, D. R., **Jasper, D., **Griffin, S., & **Huffman, B. (2013). *Reading narrative fiction reduces Arab-Muslim prejudice and offers a safe haven from intergroup anxiety.* Poster presented at the annual meeting of the Midwestern Psychological Association, Chicago, IL.

Whiting, W., Johnson, D. R., **Strong, R., **Fletcher, K. (2012*). Detecting subtle expressions: Older adults demonstrate automatic and controlled positive response bias in emotional perception.* Presented at the annual meeting of the Society for Psychology and Aging.

Johnson, D. R., **Cushman, G., **Borden, L., & **McCune, M. (2012, May). *Transportation into a story increases empathy and prosocial behavior.* Poster presented at the annual meeting of the Midwestern Psychological Association, Chicago, IL.

Johnson, D. R. (2011, July). *Trait worry and individual differences in valence-specific enhancement and hindrance of executive set-shifting processing.* Poster presented at the bi-annual meeting of the International Society for the Study of Individual Differences. London, England.

Johnson, D. R., ****Cushman, G., **Tipton, L. A., & **Blackburn, K.** (2011, March). *Attentional deployment in emotion regulation: A measure of thought switching ability.* Poster presented at the annual meeting of the Eastern Psychological Association, Boston, MA.

Johnson, D. R. (2010, May). *Threatening faces have opposing effects on full and residual switch cost.* Poster presented at the annual meeting of the Association for Psychological Science, Boston, MA.

Johnson, D. R., Gilliland, K., & Vincent, A. (2009, November). *Automated Neuropsychological Assessment Metrics (ANAM)'s Measure of Invalid Responding (AMIS): A Simulator Study.* Poster presented at the 29th annual meeting of the National Academy of Neuropsychology, New Orleans, LA.

Johnson, D. R., Beasley, W., & Baird, D. (2008, September). *A multi-level model of individual differences in speed/accuracy tradeoff.* Paper to be presented at the bi-annual meeting of the Society for Multivariate Experimental Psychology. Montreal, Canada.

Johnson, D. R. (2008, May). *Attentional control capacity for emotion: A mechanism for emotion regulation.* Poster session presented at the annual meeting of the Association for Psychological Science, Chicago, IL.

Johnson, D.R. (2007, July). Defensive Repressor Identification: Scale Matters. *Abstracts from the International Society for the Study of Individual Differences, Giessen, Germany, 1,* 151.

Johnson, D.R. (2007, May). *Defensive Repressor Identification: Scale Matters.* Poster session presented at the annual meeting of the Association for Psychological Science, Washington, D.C.

Johnson, D.R. (2006, December) Invited guest lecture. "Computer-based cognitive tests: Application to Neuropsychological Screening" – Senior Capstone Course, University of Oklahoma

Johnson, D.R., & Gilliland, K. (2006, May). *Processing efficiency theory: An investigation in to the role of defensiveness.* Paper presented at the annual meeting of the Midwestern Psychological Association, Chicago, IL.

Johnson, D.R., & Gronlund, S. (2006, May). *Working memory capacity: The relative contributions of anxiety and executive functions.* Poster presented at the annual meeting of the Association for Psychological Science, New York, NY.

Johnson, D.R., & Gronlund, S. (2005, July). *Individual differences in working memory capacity: A dual-efficiency hypothesis.* Poster presented at the International Society for the Study of Individual Differences, Adelaide, Australia.

Popular Press Coverage

The Guardian - June, 2019
"The science of influencing people: six ways to win an argument" By David Robson
https://www.theguardian.com/science/2019/jun/30/the-science-of-influencing-people-six-ways-to-win-an-argument

The Guardian – November 23, 2017
"Science fiction triggers 'poorer reading', study finds?" by Alison Flood
https://www.theguardian.com/books/2017/nov/23/science-fiction-triggers-poorer-reading-study-finds

Garrison Institute – March 31, 2017
"Does reading fiction make you a better person?" by Alex Tzelnic
https://www.garrisoninstitute.org/blog/reading-fiction-make-better-person/

Pacific Standard – March 10, 2014
"Reading Literary Fiction Can Make You Less Racist" By Tom Jacobs
http://www.psmag.com/navigation/books-and-culture/reading-literary-fiction-can-make-less-racist-76155/

Huffington Post - May 7, 2014
"Does Literary Fiction Challenge Racial Stereotypes?" By Jalees Rehman
http://www.huffingtonpost.com/jalees-rehman/does-literary-fiction-cha_b_5227418.html?utm_hp_ref=books

APS Observer - September, 2014
"Literary character: Researchers test fiction as a foundation for empathy and social skills?" By Scott Sleek
http://www.psychologicalscience.org/index.php/publications/observer/2014/september-14/literary-character.html

The Atlantic - November, 2014
"The Psychological Comforts of Storytelling" By Cody Delistraty
http://www.theatlantic.com/health/archive/2014/11/the-psychological-comforts-of-storytelling/381964/2/

The Boston Globe – April 29, 2012
"Why fiction is good for you," By Jonathan Gottschall
http://bostonglobe.com/ideas/2012/04/28/why-fiction-good-for-you-how-fiction-changes-your-world/nubDy1P3viDj2PuwGwb3KO/story.html

The Chicago Tribune - December 12, 2012
"Better living through reading" By John Warner
http://articles.chicagotribune.com/2012-12-07/news/ct-prj-1209-biblioracle-20121207_1_empathy-gap-suicide-attempt-college-students

Teaching

Courses
- Cognition (CBSC 112)
- Social Psychology (CBSC 114)
- Psychology Mythbusters (CBSC 118)
- Introduction to Data Science: Mind Analytics (CBSC 240)
- Cognition and Emotion (CBSC 259)
- Advanced Research Methods in Cognition (CBSC 359)
- Statistics and Research Design (CBSC 250 Lecture and Lab)
- Senior and Honor's Thesis (CBSC 413, NEUR 423)
- Introduction to Psychology, Behavioral Statistics, Personality Psychology (University of Oklahoma)

Skills for Integrating Teaching and Research

Statistics / Data Science Programs
- Expertise using R, Shiny R, SAS, and SPSS for data management, analysis, visualization, and interactive web apps for undergraduate research courses and student-faculty collaborative research.

Amazon's Mechanical Turk (MTurk) and Prolific
- MTurk and Prolific are online participant pools and programs for generation of unique experiments including surveys, pictures, and video presentation. Diverse participants can be collected efficiently and inexpensively for use in research courses, senior theses, and student-faculty collaborative research.

Qualtrics
- Qualtrics an experiment-delivery software that can be used to perform varied designs, including survey and experimental. It can be used in conjunction with MTurk to assist in student-faculty collaborative research.

E-Prime Software
- E-Prime is a computerized experiment management system that can be used to create sophisticated psychology experiments that collects survey data, accuracy, and millisecond response time data. It can also be used for research and teaching demonstrations where data is collected and analyzed in real time.

Professional Affiliations/Honor Societies

- Association for Psychological Science
- Midwestern Psychological Association
- National Academy of Neuropsychology
- International Society for the Study of Individual Differences
- Phi Beta Kappa (inducted 2003)
- Phi Kappa Phi (inducted 2005)

Professional Development, Departmental Service, and Volunteer Work

Elected to the *Student Perceptions of Teaching Development Committee*	2023-present
Elected to the *General Education Implementation Committee*	2022-present
Appointed Head of the *Data Science Program*	2019-present
Elected to *General Education Review Committee*	2019-2022
Elected to the *University Board of Appeals*	2019-2022
Presented at Faculty Training Academy	2017, 2018
○ "Re-examining the General Education Curriculum	
Invited and paid workshop leader for National Endowment of the Humanities	2016
Regular speaker for faculty academy on teaching and advising (Fall and Winter terms)	2011-present
Annual Getting into Graduate School Talk	2009-present
Qualtrics Software Administrator	2015-present
Workshop Leader for *LEAD*, student-led leadership organization	2014-present
Appointed to *Future of STEM Teaching Committee*	2015-2016
Elected to *Committee to Consider Faculty Handbook Revisions for Undergraduate Tenure and Promotion*	2012-2015
Interviewed and posted video on summer research at W&L	2014
Interviewed and video created for capital campaign donors	2014
Invited to present at Faculty Training Academy	2012
○ Washington and Lee University	
○ "Active Teaching Strategies"	
Community Discussion With First-Years	2012-2013
Concussion Assessment Volunteer for Rockbridge High School athletes	2012
○ administered cognitive assessments for concussion baseline testing	
Member, Institutional Review Board	2011-present
○ Washington and Lee University	
Appointed as Alumni Ambassador by Alumni Affairs	2010-present
○ Washington and Lee University	
Invited to present at Faculty Training Academy	2011
○ Washington and Lee University	
○ "How to survive and thrive in the Spring Term"	
Interviewed and posted story by W&L on Spring Term course	2011

- o Psychology Mythbusters
- Interviewed and posted story by W&L media on research program   2010
- Interviewed and posted story by W&L media on   2010
  - o Robert E. Lee Research student experience
- Served as Interviewer for Johnson Scholar applicants   2009- 2012
  - o Washington and Lee University
- Gave talks to W&L students entitled, "Getting into Graduate School"   2009, 2011
- Reviewer for *Psychological Science*; *Trends in Cognitive Sciences; Psychophysiology; Psychology of Aesthetics, Creativity, and the Arts; Creativity Research Journal; Journal of Creative Behaviour; Journal of Environmental Psychology, Journal of Media Psychology; Discourse Processes; Poetics; Psychology and Aging; Emotion; Aging, Neuropsychology, and Cognition; British Journal of Social Psychology; Personality and Individual Differences; Anxiety, Stress, and Coping; Journal of Personality; Teaching of Psychology*