Thomas Busey

Vita, January 2024

BIOGRAPHICAL DATA

Address: Department of Psychological and Brain Sciences
Program in Cognitive Science
Indiana University
Bloomington, IN 47405
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web page with PDFs: https://buseylab.sitehost.iu.edu/

Birth Year: 1966

EDUCATION

B.A.: Cornell University, Psychology, 1988 (Adviser: James Cutting)
Ph.D.: University of Washington, Experimental Psychology, 1994
(Adviser: Geoffrey R. Loftus)

PROFESSIONAL EMPLOYMENT

Professor, Indiana University, 2007-present
Associate Professor, Indiana University, 2000-2007
Assistant Professor, Indiana University, 1994-1999
Instructor, University of Washington, 1994
Research Assistant for Geoffrey Loftus, 1989-1992

AWARDS AND HONORS

Fellowships

National Institute of Mental Health Predoctoral Fellowship, 1992-1994. $23,600

NATIONAL SERVICE

Organization of Scientific Area Committees (OSAC). Member of the Pattern/Physics Scientific Area Committee. 2014-present.

RTI Human Factors Working Group. 2016-present.

Forensic Laboratory Needs Technical Working Group. 2020-present.

DNA Human Factors Working Group. 2019-present.

EDITORIAL WORK

Associate Editor, Psychonomic Bulletin & Review, 2007-2010

Editorial Board, Psychonomic Bulletin & Review, 2006-2007

Editorial Board, Journal of Experimental Psychology: Learning, Memory and Cognition, 2010-present

SERVICE

Associate Chair and Undergraduate Program Director, Psychological and Brain Sciences, Indiana University, 2012-2019.

GRANT SUPPORT

Primary Investigator

National Institutes of Justice. Quantifying the strength of support in fingerprint casework comparisons. Busey is PI. Grant # 15PNIJ-23-GG-04227-SLFO. 1/1/2024-12/31/2026. $609,185.

National Institutes of Justice. Validating Conclusion Scales in the Forensic Sciences. Busey is PI. Grant # 2018-DU-BX-0212. 1/1/2019-6/30/2021. $249,206.

National Science Foundation. Perceptual Categorization in Real-World Expertise. PI on a subcontract with Palmeri, T. Vanderbilt University. 7/1/2013-6/30/2017. $84,399.

National Institutes of Justice. The information content of friction ridge impressions as revealed by human experts. Busey is PI, Chen Yu is Co-PI. Grant #2009-DN-BX-K226. 10/2009-9/2013. $423,000.

National Institutes of Justice. Adding human expertise to the quantitative analysis of fingerprint examiners. Busey is PI, Chen Yu is Co-PI. Grant #2005-MU-BX-K076. 12/2005-12/2009. $430,000.

NIH R03 Grant, Face Recognition and Memory. 1999-2001, $35,000.

Spatial Media, Inc. Stereoscopic depth cues in memory. 1995-2000. $43,000.

CoPI Grants (with separate budget lines)

NIH/NIA Aging and temporal processing: A multi-modality study. 5/1/05-4/30/10 $2,460,364. Larry Humes is PI, Tom Busey and Jim Craig are Co-PI's with yearly budgets of about $150,000 direct.

NSF-DUE grant to support the development of software for Cognitive Science 2002-2007, $150,000. Subcontract with The Mind Project, Illinois State University, David Anderson, PI.

Darpa: Exceptional Sensory-Perceptual Abilities: Identifying Persons with Superior Ability to Learn Auditory, Visual and Tactile Identification and Classification Tasks. 2003-2007. Co-PI with Charles Watson. ~$300,000

Other Grants

NIH/NIA Speech Recognition by Hearing Impaired Elderly. Larry Humes is PI, Tom Busey is a Co-Investigator. 2014-2019. $936,183.

Investigator on NIH R01 Grant to Brian O'Donnell, Visual Processing in Schizophrenia and SPD. 2005-2010. ~$500,000.

Investigator on NIH R01 Grant to Brian O'Donnell, Visual Processing in Schizophrenia and SPD. 2001-2004. ~$500,000.

PUBLICATIONS

Journal Articles

Busey, T., & Coon, M. (2023). Not all identification conclusions are equal: Quantifying the strength of fingerprint decisions. *Forensic Science International, 343*, 111543-111543.

Eldridge, H., Spellman, B. A., Morgan, J., Busey, T., & Taylor, M. K. (2022). Overview of Special Issue: Human Factors in Forensic Science Practice Sourcebook. Annotation.

Busey, T., Klutzke, M., Nuzzi, A., & Vanderkolk, J. (2022). Validating strength-of-support conclusion scales for fingerprint, footwear, and toolmark impressions. Journal of Forensic Sciences, 67(3), 936-954.

Motz, B. A., Goldstone, R. L., Busey, T. A., & Prather, R. W. (2021). Visual Search Asymmetry Due to the Relative Magnitude Represented by Number Symbols. Vision, 5(3), 42.

Mannering, W. M., Vogelsang, M. D., Busey, T. A., & Mannering, F. L. (2021). Are forensic scientists too risk averse? J Forensic Sci. doi:10.1111/1556-4029.14700

Hicklin, R. A., Winer, K. R., Kish, P. E., Parks, C. L., Chapman, W., Dunagan, K., . . . Busey, T. A. (2021). Accuracy and Reproducibility of Conclusions by Forensic Bloodstain Pattern Analysts. Forensic Science International, 110856.

Carlson, L., Kennedy, J., Zeller, K. A., & Busey, T. (2021). Describing communication during a forensic investigation using the pebbles on a Scale Metaphor. Forensic Science International: Synergy, 100199.

Busey, T., Sudkamp, L., Taylor, M. K., & White, A. (2021). Stressors in forensic organizations: Risks and solutions. Forensic Science International: Synergy, 100198.

Busey, T., Heise, N., Hicklin, R. A., Ulery, B. T., & Buscaglia, J. (2021). Characterizing missed identifications and errors in latent fingerprint comparisons using eye-tracking data. Plos One, 16(5).

Carter, K. E., Vogelsang, M. D., Vanderkolk, J., & Busey, T. (2020). The Utility of Expanded Conclusion Scales During Latent Print Examinations. J Forensic Sci. doi:10.1111/1556-4029.14298

Hicklin, R. A., Ulery, B. T., Busey, T. A., Roberts, M. A., & Buscaglia, J. (2019). Gaze behavior and cognitive states during fingerprint target group localization. Cognitive Research-Principles and Implications, 4. doi:ARTN 12 10.1186/s41235-019-0160-9

Motz, B., Busey, T., Rickert, M., & Landy, D. (2018). Finding Topics in Enrollment Data. International Educational Data Mining Society.

Cao, R., Busey, T. A., Nosofsky, R. M., Shiffrin, R. M., & Woodman, G. F. (2018). Tracking the Development of Automaticity in Memory Search with Human Electrophysiology. Proceedings of the Cognitive Science Society, 2018, 1-6.

Vogelsang, M. D., Palmeri, T. J., & Busey, T. A. (2017). Holistic processing of fingerprints by expert forensic examiners. Cogn Res Princ Implic, 2(1), 15. doi:10.1186/s41235-017-0051-x

Busey, T., Nikolov, D., Yu, C., Emerick, B., & Vanderkolk, J. (2017). Characterizing Human Expertise Using Computational Metrics of Feature Diagnosticity in a Pattern Matching Task. Cognitive Science, 41(7), 1716-1759. doi:10.1111/cogs.12452

Roads, B., Mozer, M. C., & Busey, T. A. (2016). Using Highlighting to Train Attentional Expertise. Plos One, 11(1). doi:ARTN e0146266 10.1371/journal.pone.0146266

Fogerty, D., Humes, L. E., & Busey, T. A. (2016). Age-Related Declines in Early Sensory Memory: Identification of Rapid Auditory and Visual Stimulus Sequences. Frontiers in Aging Neuroscience, 8. doi:ARTN 90 10.3389/fnagi.2016.00090

Parada, F. J., Wyatte, D., Yu, C., Akavipat, R., Emerick, B., & Busey, T. (2015). ExpertEyes: Open-source, high-definition eyetracking. Behavior Research Methods, 47(1), 73-84. doi:10.3758/s13428-014-0465-z

Busey, T., Swofford, H. J., Vanderkolk, J., & Emerick, B. (2015). The impact of fatigue on latent print examinations as revealed by behavioral and eye gaze testing. Forensic Science International, 251, 202-208. doi:10.1016/j.forsciint.2015.03.028

Busey, T., Silapiruti, A., & Vanderkolk, J. (2014). The Relation Between Sensitivity, Similar Non-Matches, and Database Size in Fingerprint Database Searches. Law, Probability and Risk, 13(2), 151-168.

Busey, T. A., Yu, C., Wyatte, D., & Vanderkolk, J. (2013). Temporal sequences quantify the contributions of individual fixations in complex perceptual matching tasks. Cogn Sci, 37(4), 731-756. doi:10.1111/cogs.12029

Motz, B. A., James, K. H., & Busey, T. A. (2012). The Lateralizer: a tool for students to explore the divided brain. Advances in Physiology Education, 36(3), 220-225. doi:10.1152/advan.00060.2012

Humes, L. E., Busey, T. A., Craig, J., & Kewley-Port, D. (2012). Are age-related changes in cognitive function driven by age-related changes in sensory processing? Atten Percept Psychophys. doi:10.3758/s13414-012-0406-9

Busey, T., Yu, C., Wyatte, D., Vanderkolk, J. R., Parada, F. J., & Akavipat, R. (2011). Consistency and variability among latent print examiners as revealed by eye tracking methodologies. Journal of Forensic Identification, 61(1), 60-91.

Yu, C., Busey, T., & Vanderkolk, J. R. (2010). Discovering Correspondences between Fingerprints based on the Temporal Dynamics of Eye Movements from Experts. Paper presented at the International Workshop on Computational Forensics, Tokyo, Japan.

Spellman, B. A., & Busey, T. A. (2010). Emerging Trends in Psychology and Law Research. Psychonomic Bulletin & Review, 17(2), 141-142. doi:Doi 10.3758/Pbr.17.2.141

Craig, J. C., Rhodes, R. P., Busey, T. A., Kewley-Port, D., & Humes, L. E. (2010). Aging and tactile temporal order. Attention, Perception, & Psychophysics, 72(1), 226-235.

Busey, T. A., & Parada, F. J. (2010). The nature of expertise in fingerprint examiners. Psychonomic Bulletin & Review, 17(2), 155-160. doi:Doi 10.3758/Pbr.17.2.155

Busey, T., & Dror, I. E. (2010). Special Abilities and Vulnerabilities in Forensic Expertise. In S. a. T. Scientific Working Group on Friction Ridge Analysis (Ed.), The Fingerprint Sourcebook (pp. 15.11-15.24). Washington DC: National Institute of Justice.

Busey, T., Craig, J., Clark, C., & Humes, L. (2010). Age-related changes in visual temporal order judgment performance: Relation to sensory and cognitive capacities. Vision Research, 50(17), 1628-1640. doi:Doi 10.1016/J.Visres.2010.05.003

Burkhardt, A., Blaha, L. M., Jurs, B. S., Rhodes, G., Jeffery, L., Wyatte, D., . . . Busey, T. (2010). Adaptation modulates the electrophysiological substrates of perceived facial distortion: Support for opponent coding. Neuropsychologia, 48, 3743–3756. doi:S0028-3932(10)00370-2 [pii] 10.1016/j.neuropsychologia.2010.08.016

Humes, L. E., Busey, T. A., Craig, J. C., & Kewley-Port, D. (2009). The effects of age on sensory thresholds and temporal gap detection in hearing, vision, and touch. Atten Percept Psychophys, 71(4), 860-871. doi:71/4/860 [pii] 10.3758/APP.71.4.860

Busey, T. A., & Arici, A. (2009). On the role of individual items in recognition memory and metacognition: challenges for signal detection theory. J Exp Psychol Learn Mem Cogn, 35(5), 1123-1136. doi:2009-12193-002 [pii] 10.1037/a0016646

Miller, B., Troyer, M., & Busey, T. A. (2008). Virtual EEG: A Software-Based Electroencephalogram Designed for Undergraduate Neuroscience-Related Courses. The Journal of Undergraduate Neuroscience Education (JUNE), 7(1), 19-25.

Busey, T., & Palmer, J. (2008). Set-size effects for identification versus localization depend on the visual search task. J Exp Psychol Hum Percept Perform, 34(4), 790-810. doi:2008-09670-002 [pii] 10.1037/0096-1523.34.4.790

Schneider, B. L., DeLong, J. E., & Busey, T. A. (2007). Added noise affects the neural correlates of upright and inverted faces differently. J Vis, 7(4), 4. doi:10.1167/7.4.4 /7/4/4/ [pii]

Jeffery, L., Rhodes, G., & Busey, T. (2007). Broadly tuned, view-specific coding of face shape: opposing figural aftereffects can be induced in different views. Vision Res, 47(24), 3070-3077. doi:S0042-6989(07)00376-8 [pii] 10.1016/j.visres.2007.08.018

Humes, L. E., Burk, M. H., Coughlin, M. P., Busey, T. A., & Strauser, L. E. (2007). Auditory speech recognition and visual text recognition in younger and older adults: similarities and differences between modalities and the effects of presentation rate. J Speech Lang Hear Res, 50(2), 283-303. doi:10.1044/1092-4388(2007/021)

Humes, L. E., Burk, M. H., Coughlin, M. P., Busey, T. A., & Strauser, L. E. (2007). Auditory Speech Recognition and Visual Text Recognition in Younger and Older Adults: Similarities and Differences Between Modalities and the Effects of Presentation Rate. J Speech Lang Hear Res, 50(2), 283-303. doi:10.1044/1092-4388(2007/021)

Busey, T. A., & Loftus, G. R. (2007). Cognitive science and the law. Trends Cogn Sci, 11(3), 111-117. doi:S1364-6613(07)00025-3 [pii] 10.1016/j.tics.2006.12.004

Knapp, B. R., Nosofsky, R. M., & Busey, T. A. (2006). Recognizing distinctive faces: a hybrid-similarity exemplar model account. Mem Cognit, 34(4), 877-889. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=17063918

Jeffery, L., Rhodes, G., & Busey, T. (2006). View-specific coding of face shape. Psychol Sci, 17(6), 501-505. doi:PSCI1735 [pii] 10.1111/j.1467-9280.2006.01735.x

Krishnan, G. P., Skosnik, P. D., Vohs, J. L., Busey, T. A., & O'Donnell, B. F. (2005). Relationship between steady-state and induced gamma activity to motion. Neuroreport, 16(6), 625-630. doi:00001756-200504250-00022 [pii]

Busey, T. A., & Vanderkolk, J. R. (2005). Behavioral and electrophysiological evidence for configural processing in fingerprint experts. Vision Res, 45(4), 431-448. doi:S0042-6989(04)00436-5 [pii] 10.1016/j.visres.2004.08.021

Wild, H. A., & Busey, T. A. (2004). Seeing faces in the noise: stochastic activity in perceptual regions of the brain may influence the perception of ambiguous stimuli. Psychon Bull Rev, 11(3), 475-481. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15376798

Busey, T. A., & Zaki, S. R. (2004). The contribution of symmetry and motion to the recognition of faces at novel orientations. Mem Cognit, 32(6), 916-931. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15673180

Craig, J. C., & Busey, T. A. (2003). The effect of motion on tactile and visual temporal order judgments. Percept Psychophys, 65(1), 81-94. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12699311

Busey, T. A., & Townsend, J. T. (2001). Independent Sampling vs Interitem Dependencies in Whole Report Processing: Contributions of Processing Architecture and Variable Attention. J Math Psychol, 45(2), 283-323. doi:10.1006/jmps.2000.1317 jmps.2000.1317 [pii]

Busey, T. A., Tunnicliff, J., Loftus, G. R., & Loftus, E. F. (2000). Accounts of the confidence-accuracy relation in recognition memory. Psychon Bull Rev, 7(1), 26-48. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10780019

Busey, T. A., & Tunnicliff, J. L. (1999). Accounts of blending, distinctiveness, and typicality in the false recognition of faces. J Exp Psychol Learn Mem Cogn, 25(5), 1210-1235. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10505343

Busey, T. A. (1999). Localization and identification tasks rely on different temporal frequencies. Vision Res, 39(3), 513-532. doi:S0042-6989(98)00135-7 [pii]

Busey, T. A., & Loftus, G. R. (1998). Binocular information acquisition and visual memory. J Exp Psychol Hum Percept Perform, 24(4), 1188-1214. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=9706713

Busey, T. A. (1998). Temporal inhibition in character identification. Percept Psychophys, 60(8), 1285-1304. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=9865071

Busey, T. A., & Loftus, G. R. (1994). Sensory and cognitive components of visual information acquisition. Psychol Rev, 101(3), 446-469. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=7938339

Loftus, G. R., Busey, T. A., & Senders, J. W. (1993). Providing a sensory basis for models of visual information acquisition. Percept Psychophys, 54(4), 535-554. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=8255716

Busey, T. A., Brady, N. P., & Cutting, J. E. (1990). Compensation is unnecessary for the perception of faces in slanted pictures. Percept Psychophys, 48(1), 1-11. Retrieved from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=2377436

Book Chapters

Busey, T. (2001). Formal models of familiarity and memorability in face recognition. Wenger & Townsend (Eds.) Computational, Geometric, and Process Perspectives on Facial Cognition. New Jersey: Erlbaum Associates.

Steyvers, M. & Busey, T. (2001). Predicting similarity ratings to faces using physical descriptions. To appear in Wenger & Townsend (Eds.) Computational, Geometric, and Process Perspectives on Facial Cognition. New Jersey: Erlbaum Associates.

O'Donnell, B.F., Wilt M.A.B., Brenner, C.A., Busey, T.A., & Kwon, J.S. (2002). EEG synchronization deficits in schizophrenia spectrum disorders. International Congress Series 1232, 697-703.

Busey, T., & Dror, I. E. (2010). Special Abilities and Vulnerabilities in Forensic Expertise. Scientific Working Group on Friction Ridge Analysis (Ed.), The Fingerprint Sourcebook (pp. 15.11-15.24). Washington DC: National Institute of Justice.

Juried Conference Proceedings

Cottrell, G., Dailey, M. & Busey, T. (1998). Facial memory is kernel density estimation (almost). Proceedings of Neural Information Processing (NIPS) 1998 Conference.

Dailey, Matthew N., Cottrell, Garrison W. & Busey, T. A. (1998) Eigenfaces for familiarity. In Proceedings of the Twentieth Annual Cognitive Science Conference, Madison, WI, Lawrence Erlbaum, Mah-wah.

Wilt M.A.B., O'Donnell, B.F., Lysaker P.H., & Busey, T.A. (2001). Visual EEG synchronization deficits in schizophrenia. Psychophysiology, 32, Suppl 1, S101.

O'Donnell, B.F., Wilt M.A.B., Brenner, C.A., & Busey, T.A. (2001). EEG synchronization deficits in schizophrenia spectrum disorders. International Congress Series 758.

Yu, C., Busey, T., & Vanderkolk, J. R. (2010). Discovering Correspondences between Fingerprints based on the Temporal Dynamics of Eye Movements from Experts. Paper presented at the International Workshop on Computational Forensics, Tokyo, Japan.

DISSERTATION

Temporal Inhibition in Two-Pulse Character Detection and Identification Tasks. University of Washington, August, 1994.

FELLOWSHIP REVIEW PANELS

National Department of Defense Graduate Fellowship panel, February, 1999.
NSF Graduate Fellowship Review Panel, February, 2000.

PROFESSIONAL ACTIVITIES

Papers presented at conferences

Busey (1994). Linear filter models of character identification. Paper presented at the annual meeting of the Mathematical Psychology Society.

Busey (1994). Temporal inhibition and character identification. Paper presented at the Annual Interdisciplinary Conference.

Busey, Tunnicliff, Loftus & Loftus. (1995). Predicting picture-memory performance: Not all confidence judgments are equal. Poster presented at the Annual Psychonomics Society Meeting.

Busey (1996). The Representation of Stereoscopic Depth Cues in Memory. Paper presented at the annual Object Recognition Conference (OPAM) in Chicago, IL.

Busey (1996). The temporal frequencies underlying letter identification and localization. Poster presented at the ARVO Annual Conference, Ft. Lauderdale, FL.

Busey (1997). The temporal frequencies underlying letter identification and localization. Paper presented at the Annual Interdisciplinary Conference.

Busey & Tunnicliff (1997). False recognition of faces. Poster presented at the Psychonomic Society Annual Meeting in Philadelphia.

Busey (1997). Accounts of blending and distinctiveness in face recognition. Paper presented at the annual meeting of the Mathematical Psychology Society.

Busey (1997). How does stereoscopic depth information change the nature of information stored in memory?. Paper presented at the Indiana University Virtual Reality symposium.

Loftus, G. & Busey, T. (1997) Confidence and accuracy in face recognition. Paper presented at the Society for Experimental Psychologists annual conference.

Cottrell, G., Dailey, M. & Busey, T. (1998). Eigenfaces for familiarity. Paper presented at Cognitive Science Society Annual Meeting.

Busey (1998). Summed Similarity Accounts of Face Recognition. Paper presented at the Annual Interdisciplinary Conference.

Zaki, S. & Busey, T. (1998). Recognizing rotated faces: properties of symmetric Relations. Paper presented at the annual Object Perception and Memory conference (OPAM).

Arici, A.& Busey, T. (1998). Exemplar-Based Accounts of the Confidence-Accuracy Relation in Face Recognition. Paper presented at the annual meeting of the Mathematical Psychology Society.

Arici, A.& Busey, T. (1998). Distinctiveness and Typicality in Face Recognition and Metacognition. Poster presented at the annual meeting of the American Psychological Society.

Loftus, G. & Busey, T. (1998) Accounts of blending, distinctiveness and typicality in the false recognition of faces. Paper presented at the Annual Interdisciplinary Conference.

Busey, T. (1999). Accounting for recognition of faces at novel viewpoints with exemplar-based models: effects of symmetric orientations. Paper presented at the Annual Interdisciplinary Conference.

Arici, A.& Busey, T. (1999). Poster presented at the annual meeting of the American Psychological Society.

Arici, A. & Busey, T. (1999). Metacognition in face recognition. Paper presented at the French Metacognitive Conference.

Busey, T. & Arici, A. (1999). Familiarity and recollection in face recognition and metacognition. Paper presented at the Psychonomic Society.

Wild, H. & Busey, T. (2000). Training and the other race effect. Poster presented at the Psychonomic Society.

Busey, T. & Arici, A. (2001). Recognition and Confidence Judgments of Faces: Contributions of Recollection and Familiarity. Paper presented at the Annual Interdisciplinary Conference.

Busey, T. & Palmer, J (2001). Set-Size effects in identification and localization: Theory and data. Paper presented at the Psychonomic Society Annual Meeting.

Busey, T. & Palmer, J (2002). Set-Size effects in identification and localization are mediated by task demands. Paper presented at the Annual Interdisciplinary Conference.

Busey, T. & Palmer, J (2002). In visual search, the difference between "where" and "what" is mediated by the structure of the decision. Paper presented at the Society for Mathematical Psychology Annual Meeting.

Wild, H, & Busey, T. (2002). Seeing faces in noise: the role of stochastic activity in perceptual regions. Paper presented at the Psychonomic Society Annual Meeting.

Wild, H, & Busey, T. (2003). Stochastic activity in face neurons dictates the response to an ambiguous stimulus. Paper presented at the Annual Interdisciplinary Conference.

Knapp, B., Goldstone, R, & Busey, T. (2003). Integration of perceptual and conceptual information in degraded pictures: evidence from EEG. Paper presented at the Psychonomic Society Annual Meeting.

Busey, T. A. & Vanderkolk, J. R. (2004). Configural processing in fingerprint experts: Behavioral and electrophysiological evidence. Paper presented at the Psychonomic Society Annual Meeting.

Busey, T. A. & Vanderkolk, J. R. (2004). Behavioral and electrophysiological evidence for configural processing in fingerprint experts. Poster presented at the Summer Annual Interdisciplinary Conference, Cavelese, Italy.

Busey, T. A. & Vanderkolk, J. R. (2004). Empirical studies of expertise in forensic scientists. Paper presented at the 100th Annual International Association for Identification, St. Louis, MO.

Busey, T. A. & Vanderkolk, J. R. (2004). Implications of cognitive psychology research for Daubert Hearings. Paper presented at the Daubert Seminar, Las Vegas, NV.

Busey, T. A. & Vanderkolk, J. R. (2004). Fingerprint expertise. Paper presented at the Indiana Society for Identification annual meeting.

Busey, T. A. & Vanderkolk, J. R. (2004). Cognitive psychology and fingerprint experts. Paper presented at the Illinois Society for Identification annual meeting.

Liebe, S., Gold, J. M., Busey, T. A., & O'Donnell, B. (2004). Electrophysiological correlates of the effects of perceptual learning on signal and noise in the human visual system [Abstract]. Journal of Vision, 4(8), 297a, http://journalofvision.org/4/8/297/

Busey, T. A. & Vanderkolk, J. R. (2005). Expertise in Fingerprint Examiners. Paper presented at the New England Society for Identification annual meeting.

Busey, T. A. (2005). The role of configural processing in the development of visual expertise. Paper presented at the Annual Interdisciplinary Conference.

Busey, T. A., & Vanderkolk, J. R. (2005). Behavioral and electrophysiological evidence for configural processing in fingerprint experts [Abstract]. Journal of Vision, 5(8), 635a, http://journalofvision.org/5/8/635/

Vanderkolk, J. R., & Busey, T. A. (2005). Forensic individualization of images. Forensic Identification Seminar of Toronto, Canada.

Vanderkolk, J. R., & Busey, T. A. (2005). Expert and novice fingerprint studies. Fingerprint Society Lectures, B righton, United Kingdom.

Busey, T. A. & Vanderkolk, J. R. (2005). Expertise in Fingerprint Examiners. Paper presented at the International Association of Firearm and Toolmark Examiners annual meeting.

Schneider, B., Delong, J., & Busey, T. (2006). On the nature of privileged visual stimuli: Partial immunity from with-in class inhibition. Poster presented at the Annual Interdisciplinary Conference.

Schneider, B., Delong, J., & Busey, T. (2006). On the nature of privileged visual stimuli: Partial immunity from with-in class inhibition. Poster presented at the Vision Sciences Conference, Sarasota, FL.

Jeffery, L., Rhodes, G., & Busey, T. (2006). View-specific coding of face shape [Abstract]. Journal of Vision, 6(6):669, 669a, http://journalofvision.org/6/6/669/, doi:10.1167/6.6.669. Poster presented at the Vision Sciences Conference, Sarasota, FL.

Busey, T.A. & Schneider, B. (2006). What do EEG/ERP early perceptual components tell us about configurality? Paper presented at the 2006 meeting of the Configural Processing Consortium, Houston, TX.

Busey, T.A. (2006). How The Cognitive and Visual Sciences Might Help (and Hurt) in a Daubert Hearing. Paper presented at the 2006 meeting of Forensic Document Examiners Society.

Busey, T.A. (2006). Measuring Expertise in Latent Print Examiners to Improve the Quantitative Analyses of Latent Prints. Paper presented at the 2006 meeting of the International Association for Identification, Boston, MA.

Busey, T.A. (2006). Quantifying Human Expertise During Latent Print Examinations. Paper presented at the annual meeting of the National Institutes of Justice, Boston, MA.

Busey, T. (2007). On the Nature of Privileged Visual Stimuli: An Interaction Between Noise and Inversion. Paper presented at the Annual Interdisciplinary Conference, Jackson, WY.

Schneider, B., DeLong, J., Wyatte, D., James, K., & Busey, T. (2007). The neural correlates of face-like expertise in fingerprint examiners [Abstract]. Journal of Vision, 7(9):575, 575a, http://journalofvision.org/7/9/575/, doi:10.1167/7.9.575. Paper presented at the Vision Sciences Conference, Sarasota, FL.

Blaha, L., & Busey, T. (2007). Electrophysiological substrates of configural learning [Abstract]. Journal of Vision, 7(9):796, 796a, http://journalofvision.org/7/9/796/, doi:10.1167/7.9.796. Paper presented at the Vision Sciences Conference, Sarasota, FL.

Busey, T., Schneider, B., Wyatte, D., DeLong, J., Burkhardt, A., & Tjan, B. (2007). Are inverted faces processed at a later stage? [Abstract]. Journal of Vision, 7(9):618, 618a, http://journalofvision.org/7/9/618/, doi:10.1167/7.9.618. Poster presented at the Vision Sciences Conference, Sarasota, FL.

Craig, J., Humes, L., Busey, T., & Kewley-Port, D. (2007). Temporal processing in hearing, vision, and touch: Effects of aging. Invited paper presented at the International Research Conference on Aging and Speech Communication, Bloomington, Indiana (2007).

Busey, T. A. (2007) Expertise in Latent Print Examiners. Invited paper presented at the Indiana Society for Identification annual meeting, Evansville, IN.

Busey, T., Humes, L., Craig, J., & Kewley-Port, D. (2007). Temporal Processing in Visual, Tactile and Auditory Modalities in the Elderly. Poster presented at the Sixth Annual Summer Interdisciplinary Conference (ASIC 2007), Kalymnos, Greece.

Busey, T.A. (2007). Measuring Expertise in Latent Print Examiners. Paper presented at the 2007 meeting of the International Association for Identification, San Diego, CA.

Busey, T.A. (2007). Extracting Expertise from Latent Print Examiners. Paper presented at the annual meeting of the National Institutes of Justice, San Diego, CA.

Busey, T. A. (2007) Cognitive psychology and fingerprint experts. Paper presented at the Illinois Society for Identification annual meeting, Peoria, IL.

Humes, L.E., Busey, T., Craig, J. and Kewley-Port, D. (2007) Threshold sensitivity and gap detection across modalities: Effects of aging. American Auditory Society, Scottsdale, Arizona (2007).

Humes, L., Craig, J., Busey, T., & Kewley-Port, D. (2007) Temporal processing across modalities. Presentation at the American Speech-Language-Hearing Association meeting, Boston, Massachusetts (2007).

Miller, B.R., Busey, T.A., (2007) A virtual EEG program for undergraduate neuroscience-related courses. Program No. 26.20 2007 Abstract Viewer/Itinerary Planner. San Diego, CA: Society for Neuroscience, 2007. CD-ROM.

Watson, C., Kidd, G., Busey, T., & Craig, J. (2007). Predicting the ability to learn complex auditory tasks. Poster presented to the Acoustical Society of America, November 2007.

Busey, T. A., Humes, L., Craig, J., & Kewley-Port, D. (2008). Temporal Processing in Hearing, Vision and Touch: Effects of Aging. Talk presented at the 2008 Annual Interdisciplinary Conference, Jackson, WY.

Busey, T., Schneider, B. & Wyatte, D. (2008). Expertise and the width of the visual filter in fingerprint examiners. Volume 8, Number 6, Abstract 178, Page 178a http://journalofvision.org/8/6/178/

Schneider, B., Harman-James, K., Wyatte, D & Busey, T. (2008). A noise x inversion paradigm reveals the nature of fingerprint expertise for latent print examiners in EEG and fMRI. Volume 8, Number 6, Abstract 177, Page 177a http://journalofvision.org/8/6/177/

Wyatte, D. & Busey, T. (2008). Low and high level changes in eye gaze behavior as a result of expertise. Volume 8, Number 6, Abstract 112, Page 11 http://journalofvision.org/8/6/112/

Busey, T, & Vanderkolk, J. (2008). Measuring Expertise in Latent Print Examiners. Talk presented at the 2008 International Association for Identification Annual Meeting in Louisville, KY, August 2008.

Busey, T, Yu, C. & Vanderkolk, J. (2008). The Varieties of Expertise in Latent Print Examiners. Talk presented at the 2008 International Association for Identification Annual Meeting in Louisville, KY, August 2008.

Busey, T. A., Humes, L., Craig, J., & Kewley-Port, D. (2008). Temporal Processing in Hearing, Vision and Touch. Talk presented at the 2008 Annual Summer Interdisciplinary Conference, Madonna di Campiglio, Italy, July, 2008.

Busey, T. (2008). Expertise in Latent Print Examiners As Revealed by Behavior, Electrophysiology, and Eyetracking. Invited Syposium presented at the 2008 Psychonomics Society Annual Meeting, Chicago, IL.

Busey, T, Yu, C., Akavipat, R. & Vanderkolk, J. (2009). Adding Human Expertise to the Quantitative Analysis of Fingerprints. Talk presented at the 2009 National Institutes of Justice Grantees meeting in Tampa, FL, August 2009.

Vanderolk, J. & Busey, T. (2009). Talk presented at New England Division of the International Association for Identification, Freeport, Maine, November 10, 2009.

Busey, T., Craig, J., Humes, L. ,& Kewley-Port, D. (2009). Temporal-Order Identification in Visual, Auditory, and Tactile Modalities across the Adult Lifespan. Talk given at the Aging and Speech Communication Conference, Indiana University, Bloomington.

Burkhardt, A., Schneider, B., Rhodes, G., Jeffrey, L., Wyatte, D., DeLong, D., Blaha, L., & Busey, T. (2009). The Electrophysiological Substrates of Face-Selective Adaptation. Poster presented at EPIC XV, Bloomington, IN.

Blaha, L., & Busey, T. (2009). Characterizing EEG Correlates of Configural Learning with Linear Discriminant Analysis. Poster presented at EPIC XV, Bloomington, IN.

Schneider, B. & Busey, T. (2009). The effects of expertise on the visual filter in fingerprint examiners. Poster presented at EPIC XV, Bloomington, IN.

Busey, T. A., Humes, L., Craig, J., & Kewley-Port, D. (2009). Temporal Processing Across the Senses: Individual Differences in Elders. Talk presented at the 50th Annual Meeting of the Psychonomic Society, Boston, MA.

Busey, T. A., Craig, J., Humes, L.,& Kewley-Port, D. (2010). On the nature of age-related changes in temporal order judgment performance. Talk presented at the 2010 Annual Interdisciplinary Conference, Jackson, WY.

Busey, T. A., Yu, C. & Vanderkolk, J. (2010). Expertise in latent print examiners. Talk presented at the 2010 NIJ Grantee Conference, Washington DC.

Busey, T. A., Yu, C. & Vanderkolk, J. (2010). Machine learning and fingerprints. Talk presented at the 2010 ASIC conference in Bend, OR.

Busey, T. A., & Yu, C. The Nature Of Expertise In Fingerprint Examiners As Revealed By Eyetracking. Talk presented at the 2010 annual meeting of the Psychonomic Society, St. Louis, MO.

Busey, T. A., Yu, C., & Parada, F.J. Features and Strategies used by Latent Print Examiners. Talk presented at the 2011 Annual Interdisciplinary Conference, Jackson, WY.

Busey, T.A., Yu, C. & Vanderkolk, J. (2011). What Cognitive Psychology Can Tell Us about Latent Print Examinations? Talk presented at the International Association for Identification Educational Conference, Milwaukee, WI.

Kitchell, L.M., Parada, F.J., Emerick, B. L. & Busey, T.A. (2011). Feature Selection Strategies and Perceptual Expertise in Configuration Search Tasks. Poster presented at the 2011 Psychonomics Society Annual Meeting, Seattle, WA.

Busey, T.A., Yu, C. & Vanderkolk, J. (2012). Cognitive Science and Latent Print Examinations. Talk presented at the Maryland Division of the International Association for Identification.

Busey, T.A., Yu, C. & Vanderkolk, J. (2012). What Cognitive Psychology Can Tell Us about Latent Print Examinations. Talk presented at the Illinois Division of the International Association for Identification.

Parada, F.J. & Busey, T.A. (2012). ExpertEyes: Open source eyetracking software and hardware for research and teaching. Talk presented at the Society for Computers in Psychology conference, Minneapolis, MN.

Busey, T. A., Yu, C., Parada, F. J., Emerick, B. R., & Vanderkolk, J. (2012). The Utility of an Intermediate Representation of Feature Space: Lessons From Fingerprint Examiners. Talk presented at the annual Psychonomics Society Meeting, Minneapolis, MN.

Busey, T.A. & Vanderkolk, J. (2012). What Cognitive Psychology Can Tell Us about Latent Print Examinations. Talk presented at the Texas Division of the International Association for Identification.

Busey, T.A. (2013). The utility of intermediate-level feature representations. Talk presented at the 2013 Annual Interdisciplinary Conference, Jackson, WY.

Busey, T.A. & Vanderkolk, J. (2013). Perceptual Decision Making With Physical Evidence. Talk presented at the International Association for Identification annual meeting, Providence, RI, August 2013.

Busey, T.A., Ketels, S., Busey, O.M. (2014). An instrumentation package for performance monitoring of snowboarding. Talk presented at the 2014 Annual Interdisciplinary Conference, Jackson, WY.

Busey, T.A. (2014). Quantitative Metrics of Friction Ridge Detail Derived From Information Theory. Talk presented at the National Institutes of Justice 2014 Forensic Science R&D meeting, Seattle Washington, February 2014.

Busey, T.A., Emerick, B.A. & Vanderkolk, J. (2014). Sequential Decision Making in Latent Print Examinations. Talk presented at the International Association for Identification. Minneapolis, MN, August 2014.

Emerick, B.A., Busey, T.A., & O'Donnell, B. (2015). Visual perception and neural synchrony differences between chronic cannabis users and nonusers. Poster presented at the Psychonomics Society Meeting, Chicago, IL, November 2015.

Busey, T.A., Emerick, B.A. & Vanderkolk, J. (2015). Tracking the Growth of Evidence in Visual Comparison Tasks. Talk presented at the International Association for Identification. Chicago, IL, November 2015.

Busey, T.A., Emerick, B.A. & Vanderkolk, J. (2015). Tracking the Growth of Evidence in Visual Comparison Tasks. Talk presented at the 2015 Annual Interdisciplinary Conference, Jackson, WY.

Busey, T.A., Emerick, B.A., Vogelsang, M. & Vanderkolk, J. (2016). Expertise in Latent Print Examiners. Talk presented at the International Association for Identification. Cincinnati, OH, August 2016.

Carter, K, Vogelsang, M., Emerick, B., Vanderkolk, J, and Busey, T.A. (2017). How Does the Addition of Less-Definitive Conclusions Affect the Decision-Making of Fingerprint Experts? Poster presented at the Psychonomics Society Meeting, Vancouver, B.C., November 2017.

Mannering, W., Vogelsang, M., and Busey, T.A. (2017). Aligning the Decisions Made by Forensic Examiners With the Values of Society. Poster presented at the Psychonomics Society Meeting, Vancouver, B.C., November 2017.

Carter, K., Vogelsang, M., and Busey, T. A. (2018). How do friction ridge examiners respond when given an expanded conclusion scale? Talk presented at the International Association for Identification. San Antonio, TX, August 2018.

Busey, T. A., Vogelsang, M., and Vanderkolk, J. R. (2018). Developing computer-based visual training techniques for latent print examiners. Talk presented at the International Association for Identification. San Antonio, TX, August 2018.

Busey, T.A., Emerick, B., Carter, K., Vogelsang, M., Mannering, W., Mannering, F. (2018). Calibrating Human Decision Making in Forensic Science. Talk presented at the Psychonomics Society Meeting, New Orleans, LA, November 2018.

Cao, R., Busey, T. A., Nosofsky, R. M., Shiffrin, R. M., & Woodman, G. F. (2018). Tracking the Development of Automaticity in Memory Search with Human Electrophysiology. Poster presented at the Psychonomics Society Meeting, New Orleans, LA, November 2018.

Busey, T.A. Computational Models in Forensic Science. Talk presented at the International Association for Identification. Reno, NV, August 2019.

Busey. T.A. Validating Conclusion Scales in the Forensic Sciences. Talk presented to the Maryland Defense Attorney Conference, Online, July 2021.

Busey. T.A. Validating Conclusion Scales in the Forensic Sciences. Talk presented to the Organization of Scientific Area Committee (OSAC), Online, October 2021.

Busey, T.A. Validating Conclusion Scales in the Forensic Sciences. Talk presented at the 2022 NIJ Research and Development Symposium. Online, March 2022.

Busey, T.A. & Coon, M. Validating Conclusion Scales in the Forensic Sciences. Talk presented at the 2022 NIJ Research and Development Symposium. Online, March 2022.

Busey, T.A. & Coon, M. A gentle introduction to the use of likelihood ratios in forensic disciplines. Talk presented at the International Association for Identification, Washington DC. August 2023.

Busey, T.A. & Coon, M. Quantifying the strength of evidence in footwear comparisons. Talk presented at the International Association for Identification, Washington DC. August 2023.

Busey, T.A. & Coon, M. Not all Identification Conclusions are Equal: Quantifying the Strength of Fingerprint Decisions. Talk presented at the International Association for Identification, Washington DC. August 2023.

Busey, T.A. & Coon, M. Not all Identification Conclusions are Equal: Quantifying the Strength of Fingerprint Decisions. Talk presented at the California IAI, San Diego, CA. May 2023.

Busey, T.A. & Coon, M. Not all Identification Conclusions are Equal: Quantifying the Strength of Fingerprint Decisions. Talk presented at the California Friction Ridge Study Group, Online, September 2023.

Invited addresses

Purdue University, 1997
Vanderbilt University, 1998
Notre Dame, 1999
Illinois University, 2003
DePauw University, 2009
Perceptual Expertise Network, 2011
Notre Dame, 2011
Transylvania University, Lexington, KY, 2014
George Washington University, 2021
Transylvania University, Lexington, KY, 2021
Virginia Commonwealth University, 2022
FBI, 2022

3-6 Latent Print Examiner conferences a year to talk about transformative activities

Professional Memberships
The Psychonomic Society

Ad Hoc Reviewer:
Psychological Review, Journal of Experimental Psychology: Human Perception and Performance, Perception and Psychophysics, Cognitive Psychology, Memory & Cognition, Psychological Science, Journal of Experimental Psychology: Learning Memory & Cognition, National Science Foundation Grant Review, Romanian National Funding Agency

RESEARCH INTERESTS

My research areas and grants fall into three main categories: perceptual learning and visual expertise with latent print examiners; changes in visual processing with normal aging; and face recognition and memory studied with behavioral and electrophysiological methods. While these three areas may seem disparate, they are all related in to visual expertise, and we use a common set of mathematical tools to bridge the areas. These include linear systems modeling, state-trace analyses, independent component and factor analyses, as well as machine learning algorithms such as support vector machines.

Expertise in Latent Print Examiners

When fingerprint experts attempt to determine whether a latent print matches an inked print, they rely on years of apprenticeship and training in order to identify the features that allow them to judge that the two prints come from the same source with high probability. With support from the National Institutes of Justice, we are currently studying these experts to determine the visual features they are relying on when making these judgments. We are using eyetracking techniques to address how they acquire information from the images, and then we use machine learning algorithms like support vector machines and independent component analyses to recover the feature alphabet that experts choose to use to support this task.

Changes in Visual Temporal Processing with Normal Aging

Normal aging produces deficits in visual, auditory and tactile temporal processing. I am a co-PI on a grant from NIA with Larry Humes (PI) and Jim Craig (coPI). We are measuring temporal processing in tasks such as backward masking, temporal order and gap detection tasks in all three modalities. The goal is to determine whether deficits in one modality are related to changes in other modalities as we age.

Brainwave Data for Perception and Memory Tasks

Perceptual stimuli produce a response in the brain that can be measured by placing electrodes on the surface of the scalp. I maintain an active EEG recording lab with a new 32 channel system. Our experiments have addressed the role of internal noise in face perception, as well as the role of configural processing in fingerprint experts. We are also using this equipment to gather data for an online Virtual EEG project with funding from NSF. A grant from DARPA/ONR supports the application of these tools to the study of visual expertise. I am also a co-PI on a grant with Brian O'Donnell (PI) to address temporal processing in persons with schizophrenia using electrophysiological recordings.

Mathematical Modeling of Visual Information Processing

The processing of a perceptual stimulus is not instantaneous. The sensory response tends to be extended in time, and the nature of this temporal delay affects how the stimulus is processed. This research line uses quantitative models to address the interactions between lower-level sensory processes and higher-level perceptual and information processing mechanisms. We measure the temporal properties of the sensory response, which are signatures of the underlying neural pathways that subserve the processing of a particular task. In this research line I have addressed the processes that underlie character recognition, binocular summation, localization and identification, and temporal inhibition. Articles based on this research appear in The Psychological Review, Journal of Experimental Psychology: Human Perception and Performance, Perception & Psychophysics, Vision Research and The Journal of Mathematica Psychology.