



Summary statement

I'm a detail-obsessed, data-hungry, number-crunching, pixel-pushing research scientist in hot pursuit of concepts, methods, metrics, and tools that help penetrate the intricacies of human attention, motivation, and action. My overall approach is "problem-aimed, solution-focused": from **synthesizing** perspectives and outcomes in the scientific literature to reveal gaps and opportunities for future exploration; to **crafting** protocols and experiments that yield fresh looks on competing theories; to **applying** statistical techniques from one domain to data collected from another; to **building** software and interfaces that help researchers and end users sift through big-deal data to discover answers to questions they didn't know they could ask. Extensive training in psychology, physiology, statistics, clinical neuroscience, computer science, and behavioral design lets me take a "Swiss army knife" approach to untangling complex ideas—translating them into straight-shooting insights in a way that's persuasive, passionate, and personal.

Professional employment history

2016.03– 2017.06	Omada Health Behavioral Researcher & Designer
2013.02– 2015.09	National University of Singapore Postdoctoral Research Fellow in Computer Science (Advisor: Ye Wang)
2009.06– 2013.01	Beth Israel Deaconess Medical Center & Harvard Medical School Postdoctoral Research Fellow in Neurology (Advisor: Gottfried Schlaug)

Education

2003–2009	The Ohio State University Ph.D., Psychology (Summer 2009; Advisor: Julian F. Thayer; Co-Advisor: John J. Sollers, III) M.A., Psychology (Winter 2006; Advisor: Mari R. Jones)
1999–2003	University of Delaware B.A., Psychology (Honors, with Distinction; Advisor: Robert F. Simons) Minors: Biology, Cognitive Science, Music

Grant support

2015	Mind and Life Institute (Francisco Valera Research Award) Rhythm-induced trance: Using repetitive auditory stimulation to facilitate states of absorption and promote insight (US\$15,000 direct) Role: Collaborator (PI: Michael J. Hove)
2013–2014	Agency for Science, Technology and Research (A*STAR) A cloud-based therapy delivery system that uses music to enhance limb function and speech production in patients with neurological impairments (SG\$152,000 direct) Role: Collaborator (PIs: Ye Wang and Gottfried Schlaug)
2012–2013	Harvard NeuroDiscovery Center Neural mechanisms of motor timing in Parkinson's disease (US\$36,700 direct) Role: PI

Fellowships, honors, and awards

2013.10	Travel Award, 3rd World Parkinson Congress
2013.06	Trainee Abstract Travel Award, Organization for Human Brain Mapping [11% acceptance]
2011.06	Invited Fellow at the inaugural <i>Exploring the Mind through Music</i> symposium, Rice University
2008.04	2nd prize, oral presentation, Rocky Mountain Bioengineering Symposium
2006–2009	Caroline B. Monahan Fund for Experimental Research Support in the Music Cognition/Perception Area within the Department of Psychology (OSU)
2003–2004	Ohio State University Fellowship

Peer-reviewed publications (downloads available at <http://robjellis.net/pubs.html>)

1. Tracy, L.M., Jarczok, M.N., **Ellis, R.J.**, Bach, C., Hillecke, T.K., Thayer, J.F., Koenig, J. (2017). Heart Rate Variability and Sensitivity to Experimentally-Induced Pain: A Replication. *Pain Practice*. DOI: 10.1111/papr.12652
2. Sepah, S.C., Jiang, L., **Ellis, R.J.**, McDermott, K., & Peters, A.L. (2017). Engagement and outcomes in a digital Diabetes Prevention Program: three-year update. *BMJ Open Diabetes and Research Care*, DOI: 10.1136/bmjdr-2017-000422.
3. Sachs, M.E., **Ellis, R.J.**, Schlaug, G., & Loui, P. (2016). Brain Connectivity Reflects Human Aesthetic Responses to Music. *Social Cognitive and Affective Neuroscience*, DOI: 10.1093/scan/nsw009.
4. Williams, D., Jarczok, M.R., **Ellis, R.J.**, Hillecke, T.K., Thayer, J.F., & Koenig, J. (2016). Two-Week Test-Retest Reliability of the Polar® RS800CX™ to Record Heart Rate Variability. *Clinical Physiology and Functional Imaging*. DOI: 10.1111/cpf.12321
5. Koenig, J., Falvay, D., Clamor, A., Wagner, J., Jarczok, M.N., **Ellis, R.J.**, Weber, C. & Thayer, J. (2016). Pneumogastric (vagus) nerve activity indexed by heart rate variability in chronic pain patients compared to healthy controls: A meta-analysis. *Pain Practice*, 19, E55–E78.
6. **Ellis, R.J.**, Ng, Y.S., Zhu, S., Tan, D.M., Anderson, B., Schlaug, G., & Wang, Y. (2015). A validated smartphone-based assessment of gait and gait variability in Parkinson's disease. *PLOS ONE*, 10(10), e0141694, DOI:10.1371/journal.pone.0141694.
7. **Ellis, R.J.**, Zhu, B., Koenig, J., Thayer, J.F., & Wang, Y. (2015). A careful look at ECG sampling frequency and R-peak interpolation on short-term measures of heart rate variability. *Physiological Measurement*, 36, 1827–1852.
8. **Ellis, R.J.**, Duan, Z. & Wang, Y. (2014). Quantifying auditory temporal stability in a large database of recorded music. *PLOS ONE*, 9(12), e110452. DOI:10.1371/journal.pone.0110452.
9. Koenig, J., Jarczok, M.N., **Ellis, R.J.**, Warth, M., Hillecke, T.K., & Thayer, J.F. (2014). Lowered parasympathetic activity in apparently healthy subjects with self-reported symptoms of pain: Preliminary results from a pilot study. *Pain Practice*, DOI: 10.1111/papr.12177.
10. Koenig, J., Jarczok, M.N., **Ellis, R.J.**, Bach, C., Thayer, J.F., & Hillecke, T. (2014). Two Week Test-Retest Reliability of the Cold Pressor Task as Measure of Pain Tolerance and Threshold. *Pain Practice*, 14, E126–E135.
11. Koenig, J., Jarczok, M.N., Warth, M., **Ellis, R.J.**, Bach, C., Hillecke, T.K., & Thayer, J.F. (2014). Body mass index is related to autonomic nervous system activity as measured by heart rate variability—A replication using short term measurements. *The Journal of Nutrition, Health & Aging*, 18, 300–302.

12. Koenig, J., Jarczok, M.N., **Ellis, R.J.**, Hillecke, T.K., & Thayer, J.F. (2013). Heart rate variability and experimentally induced pain in healthy adults—A systematic review. *European Journal of Pain*, *18*, 301–314.
13. Suh, S., **Ellis, R.J.**, Sollers, J.J. III, Thayer, J.F., Yang, H., & Emery, C.F. (2013). The effect of anxiety on heart rate variability, depression, and sleep in chronic obstructive pulmonary disease. *Journal of Psychosomatic Research*, *74*, 407–413.
14. **Ellis, R.J.** Bruijn, B., Norton, A.C., Winner, E., & Schlaug, G. (2013). Training-mediated leftward asymmetries during music processing: a cross-sectional and longitudinal fMRI analysis. *NeuroImage*, *75*, 97–107.
15. **Ellis, R.J.**, Koenig, J., & Thayer, J.F. (2012). Getting to the heart: Autonomic nervous system function in the context of evidence-based music therapy. *Music and Medicine*, *4*, 90–99.
16. **Ellis, R.J.** Norton, A.C., Overy, K., Winner, E., Alsop, D.C., & Schlaug, G. (2012). Exploring the influences of age and musical training on brain activation during music processing. *NeuroImage*, *60*, 1902–1912.
17. **Ellis, R.J.**, & Jones, M.R. (2010). Temporal context and choice reaction time. *Attention, Perception, & Psychophysics*, *72*, 2274–2288.
18. **Ellis, R.J.**, & Thayer, J.F. (2010). Music and autonomic (dys)function. *Music Perception*, *27*, 317–326.
19. **Ellis, R.J.**, & Jones, M.R. (2009). The Role of Accent Salience and Joint Accent Structure in Meter Perception. *Journal of Experimental Psychology: Human Perception and Performance*, *35*, 264–280.
20. **Ellis, R.J.**, & Simons, R.F. (2005). The impact of music on subjective and physiological indices of emotion while viewing films. *Psychomusicology*, *19*, 15–40.

Peer-reviewed conference papers

1. **Ellis, R.J.**, Xing, Z., Fang, J., & Wang, Y. (2015). Quantifying lexical novelty in song lyrics. *Proceedings of the 15th International Conference on Music Information Retrieval*, pp. 694–700.
2. Zhu, S., **Ellis, R.J.**, Schlaug, G., Ng, Y.S., & Wang, Y. (2014). Validating an iOS-based Rhythmic Auditory Cueing Evaluation (iRACE) for Parkinson’s disease. *Proc. 22nd ACM International Conf. on Multimedia*, pp. 487–496.
3. Cai*, Z., **Ellis, R.J.**, Duan, Z., Lu, H., & Wang, Y. (2013). Basic Exploration of Auditory Temporal Stability (BEATS): A novel rationale, method, and visualization. *Proceedings of the 14th International Conference on Music Information Retrieval* (pp. 568–573). [* student mentee]
4. **Ellis, R.J.**, & Barbieri, R. (2011). A point process approach for analyzing gait variability dynamics. *Conf Proc IEEE Eng Med Biol Soc.*, Aug., 7739–7742.
5. **Ellis, R.J.**, Sollers III, J.J., Edelstein, E.A., & Thayer, J.F. (2008). Data transforms for spectral analyses of heart rate variability. *Biomedical Sciences Instrumentation*, *44* [ISA Vol. 472].

Book chapters

1. **Ellis, R.J.** (2014). Rhythmic auditory entrainment. In W.F. Thompson (Ed.), *Music in the Social and Behavioral Sciences: An Encyclopedia*. New York: Sage.
2. **Ellis, R.J.** (2011). Music at the heart of the matter. In J.P. Finley (Ed.), *Teaching Heart Auscultation to Health Professionals*, pp. 82–95. Toronto: Hospital for Sick Children.

Invited talks

1. **Ellis, R.J.** & Thayer, J.F. (2012, November). Workshop—Heart Rate Variability: Evaluation and Validity. Mozart & Science 2012: Music in Medicine and Therapy; Krems, Austria.
2. Loui, P., & **Ellis, R.J.** (2010, October). Modulating mechanisms of auditory function: A tDCS–ERP study. Boston NeuroRehab Group; Boston, MA.
3. **Ellis, R.J.** (2009, May). Music on the brain: A brief history of music cognition, from Pythagoras to iPods. Pacific University; Forrest Grove, OR.
4. **Ellis, R.J.** (2009, February). The pulse of music and the pulse of the heart: An exploration of tempo and cardiac response. Beth Israel Deaconess Medical Center and Harvard Medical School; Boston, MA.

Conference talks (selection)

1. **Ellis, R.J.**, Bruijn, B., Norton, A.C., Winner, E., & Schlaug, G. (2013, June). A cross-sectional and longitudinal analysis of functional asymmetries mediated by musical training. Organization for Human Brain Mapping; Seattle, WA. [*“Interactive Poster” selectee*]
2. **Ellis, R.J.**, Citi, L., & Barbieri, R. (2011, August). A point process approach for analyzing gait variability dynamics. IEEE Engineering in Medicine and Biology Society; Boston, MA.
3. **Ellis, R.J.** (2010, January). The heart of the music: what cardiac activity reveals about emotional responses, attentional demands, and physiological health. Northeast Music Cognition Group; New York, NY.
4. **Ellis, R.J.**, Jones, M.R. (2009, August). Temporal context and choice reaction time. Society for Music Perception and Cognition; Indianapolis, IN.
5. **Ellis, R.J.**, Sollers III, J.J., & Thayer, J.F. (2008, November). The pulse of music and the pulse of the heart: The effect of tempo on cardiovascular response. Auditory Perception, Cognition, and Action Meeting; Chicago, IL.
6. **Ellis, R.J.**, Sollers III, J.J., Edelstein, E.A., & Thayer, J.F. (2008, April). Data transforms for spectral analyses of heart rate variability. Rocky Mountain Bioengineering Symposium, Copper Mountain, CO. [*2nd prize, oral presentation*]
7. **Ellis, R.J.** & Jones, M.R. (2007, July). The role of accent salience and joint accent structure in meter perception. Society for Music Perception and Cognition; Montreal.

Conference posters (selection)

1. Sepah, S.C., Jiang, L., **Ellis, R.J.**, McDermott, K. Peters, A.L. (2017, June). The relationship between program engagement and weight loss in the first year of a digital Diabetes Prevention Program translation. American Diabetes Association Scientific Sessions; San Diego.
2. **Ellis, R.J.**, Zhu, S., Schlaug, G., & Wang, Y. (2013, October). A smartphone-based Interactive Rhythmic Auditory Cueing Evaluation (iRACE) for gait impairments. World Parkinson Congress; Montreal. [*Travel Award selectee*]
3. **Ellis, R.J.**, & Schlaug, G.S. (2011, June). Redefining extent thresholds for conjunction analysis. Organization for Human Brain Mapping; Quebec City.
4. **Ellis, R.J.**, Sollers III, J.J., & Thayer, J.F. (2009, May). The pulse of music and the pulse of the heart: Musical tempo and cardiac change. American Psychological Society; San Francisco, CA.

5. **Ellis, R.J.**, & Jones, M.R. (2005, November). The role of meter in the generation of temporal expectancies. 4th Annual Auditory, Perception, Cognition, and Action Meeting; Toronto.
6. **Ellis, R.J.**, & Simons, R.F. (2002, October). The effects of sound on emotion during picture viewing. Society for Psychophysiological Research; Washington, D.C.

Developed research tools and downloads (see more at <http://robjellis.net/projects.html>)

1. ***iBEATS*** — An Interactive and Balanced Evaluation of Auditory Temporal Stability in a set of 1M audio files, with options for filtering, thresholding, and previewing audio.
2. ***LyricFind corpus*** — 275,000 lyrics of American pop songs in bag-of-words format, made available to the research community with the kind support of LyricFind, a world leader in legal lyrics distribution.
3. ***vis*** — A suite of brain image visualization tools for the SPM software package: histograms, box plots, scatter plots, quantile–quantile plots, and Bland–Altman plots.
4. ***imcalc*** — A collection of useful operations with batch functionality: pairwise operations; binarizing and summing multiple masks; statistic transformations (*t*-to-*z*, *r*-to-*p*, Fisher *z*).

Student mentoring

National University of Singapore: Department of Computer Science pre-doctoral Internship
Zhouhong Cai, Hang Guo, Zekun Li, Bilei Zhu, Jiakun Fang

Beth Israel Deaconess Medical Center: Medical student Research Internship
Bente Bruijn

The Ohio State University: Undergraduate Research Assistantship
Jamie Bressler, Rocio Cardenas, Bradley Havelka, Benjamin Turner

Ad-hoc reviewing

Cognition and Emotion • *Cognitive Psychology* • *Frontiers in Auditory Cognitive Neuroscience* • *Frontiers in Behavioral Neuroscience* • *Int. Journal of Sport and Exercise Psychology* • *Mind, Brain, and Education* • *Music and Medicine* • *Music Perception* • *Perception* • *PLoS ONE* • *Psychological Research* • *Psychomusicology* • *Psychophysiology* • *Scientific Reports*