LEE A. HOLCOMB

PhD

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HUMAN FACTORS

EDUCATION

UNIVERSITY OF CALIFORNIA, DAVIS

PhD **Cognitive Psychology** **2026**
Dissertation: The Neural and Oculomotor Correlates of Covert Spatial Attention

MA **Cognitive Psychology** **2021**

SAN DIEGO STATE UNIVERSITY

BA **Psychology** **2016**

PROFESSIONAL PROFILE

Dr. Lee A. Holcomb is a cognitive psychologist and human factors scientist specializing in visual attention, eye movement behavior, and human perceptual performance. At Explico, Dr. Holcomb applies rigorous scientific methods to evaluate how people perceive, attend to, and respond to hazards and information in real-world environments, including driving behavior and accidents, warnings and product liability, industrial and occupational accidents, and trip-and-fall accidents.

Dr. Holcomb received his PhD in psychology from the University of California, Davis, where his research examined how visual attention and eye movement behavior relate to what people perceive in their environment. His work showed that people's eyes make small, involuntary movements that reveal where their attention is directed, even when they appear to be looking elsewhere. He also examined how individual differences in cognitive capacity affect these attentional processes, finding that a person's underlying cognitive abilities can meaningfully shape how reliably they detect and respond to their surroundings. This research has direct application to real-world questions about what a person could or should have perceived in a given situation, and how individual variability factors into that analysis.

AREAS OF EXPERTISE

- Human behavior and performance
- Visual perception and spatial attention
- Eye-tracking and oculomotor behavior
- Experimental design and protocol development
- Human performance measurement
- Psychophysics and behavioral testing
- Neurophysiological data collection and analysis
- Signal detection theory
- Usability and A/B testing
- Scientific communication and technical writing

HOLCOMB

PhD

EXPLICO

EXPERIENCE

Explico
2026 - Present — **Scientist, Human Factors**

Attention Lab, University of California, Davis
2019 - 2026 — **Visual Perception Researcher**

Alcohol Research Lab, San Diego State University
2016 - 2019 — **Mixed Methods Clinical Researcher**

RESEARCH EXPERIENCE HIGHLIGHTS

- Engineered a real-time closed-loop gaze-contingent stimulus system in Python using live eye-tracker input to control for retinal eccentricity and cortical magnification effects.
- Owned the research lifecycle for two multi-session experiments, including stimulus and analysis coding, neurophysiological and eye-tracking data acquisition, signal processing, and statistical analysis in MATLAB, Python, and R.
- Designed experimental paradigms for clinical populations including Alcohol Use Disorder, Binge Drinking, Fibromyalgia, and Cortico-basal Syndrome, collecting and analyzing EEG, MEG, fMRI, and behavioral data.
- Mentored six undergraduate researchers through literature review, data collection protocols, analysis methods, thesis development, manuscript development, and academic conference presentations.

RESEARCH METHODS AND TECHNICAL TOOLS

Experimental design; mixed methods; cognitive psychology; usability and A/B testing; behavioral testing; psychophysics; human performance; concept testing; eye-tracking; data visualization; user-centered design; Qualtrics; participant recruitment; qualitative observation; EEG; fMRI; MEG; skin conductance; Python; R; MATLAB; SQL; Unix/Linux scripting; Git; PsychoPy; Neurobs Presentation; FieldTrip; MNE; SPSS; causal inference; time-series analysis; hypothesis testing; t-tests; ANOVA; regression; signal detection theory; mixed-effects modeling; and machine learning classification.

PEER-REVIEWED PUBLICATIONS

Holcomb, L. A. & Mangun, G. R. (in preparation). The effects of microsaccades and covert spatial attention on event-related alpha power and the C1 ERP component.

Lim, G., Holcomb, L. A., et al. (in preparation). Decoding target validity in probabilistic cueing conditions using ERPs and alpha oscillations.

Abrera, L. A., Holcomb, L. A., et al. (in preparation). The effects of microsaccades and covert spatial attention: a deterministic role?

Holcomb, L. A., et al. (2019). Neural Oscillatory Dynamics of Inhibitory Control in Young Adult Binge Drinkers. Biological Psychology. https://doi.org/10.1016/j.biopsycho.2019.107732

Affan, R. O., Huang, S. H., Cruz, S. M., Holcomb, L. A., et al. (2018). High-Intensity Binge Drinking is Associated with Altered Spontaneous Neural Oscillations in Young Adult. Alcohol, 70, 51-60. https://doi.org/10.1016.j.alcohol.2018.01.002

Molnar, S., Beaton, L., Happer, J., Holcomb, L. A., et al. (2018). Behavioral and Brain Activity Indices of Cognitive Control Deficits in Binge Drinkers. Brain Sci, 8, 9. https://doi.org/10.3390/brainsci8 010 009.

Huang, S., Holcomb, L. A., et al. (2017). Altered Oscillatory Brain Dynamics of Emotional Processing in Young Binge Drinkers. Cogn Affect Behav Neurosci, 18, 43-57. https://doi.org/10.3758/s13 415-017-0551-7

PRESENTATIONS

Lim, G., Holcomb, L. A., et al. (2026, March). Decoding target validity in probabilistic cueing conditions using ERPs and alpha oscillations. Cognitive Neuroscience Society, Vancouver, BC.

Holcomb, L. A., et al. (2023, April). The effects of covert spatial attention and working memory capacity on early visually-evoked potentials. Cognitive Neuroscience Society, San Francisco, CA.

Holcomb, L. A., et al. (2022, April). The relationship between covert spatial attention and microsaccades. Cognitive Neuroscience Society, San Francisco, CA.

Renna, J., Holcomb, L. A., et al. (2022, April). Spatial Cueing Effects on ERP Masked Repetition Priming, Cognitive Neuroscience Society, San Francisco, 2022.

Woodruff, D., Holcomb, L., et al. (2019, April). Neural indices of hyperexcitability in individuals with fibromyalgia as a function of pharmacological treatment. Western Psychological Association Convention, Pasadena, CA.

Myers, A., Molnar, S., Holcomb, L., et al. (2018, June). Neural correlates of response inhibition in binge drinkers. Research Society on Alcoholism, San Diego, CA.

Holcomb, L. A., et al. (2016, November). Binge drinking and neural oscillatory dynamics underlying response inhibition. Society for Neuroscience, San Diego, CA.

Huang, S., Holcomb, L. A., et al. (2016, November). Binge drinking is associated with reduced EEG-based indices of emotional processing and memory retrieval. Society for Neuroscience, San Diego, CA.

Cruz, S. M., Huang, S., Holcomb, L. A., et al. (2016, November). Neurodynamics of decision making under conditions of high and low response conflict as a function of binge drinking. Society for Neuroscience, San Diego, CA.

Happer, J., Wagner, L., Beaton, L., Holcomb, L., et al. (2016, October). Attentional modulation of response inhibition in a go/nogo task: Spatio-temporal oscillatory dynamics in an aMEG model. International Conference on Biomagnetism, Seoul, South Korea.

Huang, S., Holcomb, L. A., et al. (2016, May). Neural dynamics of emotional memory as a function of binge drinking. Western Psychological Association Convention, Long Beach, CA.

Holcomb, L. A., et al. (2016, March). Neural oscillatory dynamics underlying response inhibition are affected by binge drinking. San Diego State University Student Research Symposium, San Diego, CA.

Huang, S., Holcomb, L. A., et al. (2016, March). Binge drinking is associated with reduced brain indices of emotional processing and memory retrieval. San Diego State University Student Research Symposium, San Diego, CA.

Cruz, S. M., Huang, S., Holcomb, L. A., et al. (2016, March). The effect of binge drinking on decision making under conditions of high and low conflict. San Diego State University Student Research Symposium, San Diego, CA.

DISSERTATION

The Neural and Oculomotor Correlates of Covert Spatial Attention. Committee: George (Ron) Mangun, Chair; Steven J. Luck; and Joy J. Geng.