Exponent®
Engineering & Scientific Consulting

Christian Hoyos, Ph.D.

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Professional Profile

Dr. Hoyos has expertise in human performance, visual perception, cognitive development, and information processing. At Exponent, Dr. Hoyos has applied this expertise to a variety of contexts including product liability and premises liability litigation, and the analysis of vehicular incidents.

Dr. Hoyos has also supported clients in the assessment and analysis of warning labels and user manuals for consumer and children's products. His research has investigated the cognitive mechanisms that underlie learning and reasoning, as well as the environmental factors that can facilitate information processing. He has extensive experience in human subjects testing with both children and adults and at Exponent, he has assisted clients in designing and executing user research studies.

Prior to joining Exponent, Dr. Hoyos received a Ph. D. in Cognitive Psychology from Northwestern University. While there, he conducted research on human cognition, examining how analogies and thinking about similarities supports learning in domains such as scientific reasoning, social development, and the processing of complex information and abstract concepts. He was awarded the National Science Foundation Graduate Research Fellowship in support of his work investigating reasoning, explanation, and other cognitive capacities in early childhood.

Academic Credentials & Professional Honors

Ph.D., Psychology, Northwestern University, 2017

M.A., Psychology, Northwestern University, 2012

B.A., Psychology, French Studies, Wesleyan University, 2011

National Science Foundation Graduate Research Fellow, 2012-2015

Certificate in Management for Scientists and Engineers, Kellogg School of Management, Northwestern University, 2015

Certificate in Cognitive Science, Northwestern University, 2014

National Science Foundation Graduate Research Fellowship-Honorable Mention 2011

Ronald E. McNair Scholar, Wesleyan University, 2010-2011

Walkley Prize for Excellence in Psychology, Wesleyan University, 2011

Scott Prize for Excellence in Romance Languages, Wesleyan University, 2011

Howard Hughes Fellow, Wesleyan University, 2010

Licenses and Certifications

Certified English XL Tribometrist (CXLT)

Certified Playground Safety Inspector (CPSI)

Professional Affiliations

Human Factors and Ergonomics Society 2017-present

Society for Research in Child Development 2011-present

Cognitive Science Society 2012-2016

Cognitive Development Society 2011-2016

Languages

Spanish

Publications

Aldugom M., Izen SC, Scully ID, Hoyos C, Cades DM. How does adaptive cruise control use impact driver behaviors, mental models, and trust and perception in the system? Advances in Human Factors of Transportation, 2025; 186:351-360.

Hoyos, C., Horton, W. S., Simms, N., & Gentner, D. (2020). Analogical comparison promotes theory-of-mind development. Cognitive Science, 44(9), e12891.

Krake, A., Jonas, R., Hoyos, C., Crump, C., Lester, B., Cades, D., & Harrington, R. (2020). Effects of training on learning and use of an adaptive cruise control system. SAE Technical Paper 2020-01-1033.

Hoyos C, Lester BD, Crump C, Cades DM, Young, D. 2018. Consumer perceptions, understanding, and expectations of Advanced Driver Assistance Systems (ADAS) and vehicle automation. In Proceedings of the Human Factors and Ergonomics Society Annual Meeting 2018 Sept; 62(1):1888-1892, Sage CA: Los Angeles, CA: SAGE Publications.

Hoyos C, Gentner D. Generating explanations via analogical comparison. Psychonomic Bulletin & Review 2017; 24(5):1364-1374.

Rabkina I, McFate C, Forbus KD, Hoyos C. Towards a computational analogical theory of mind. In: G. Gunzelmann, A. Howes, T. Tenbrink, & E. J. Davelaar (Eds.), Proceedings of the 39th Annual Conference of the Cognitive Science Society, pp. 2949-2954. Austin, TX, 2017.

Gentner D, Hoyos C. Analogy and abstraction. Topics in Cognitive Science 2017; 9(3):672-693.

Hoyos C, Shao R, Gentner D. The paradox of relational development: Could language learning be, temporarily, harmful? In: A. Papafragou, D. Grodner, D. Mirman, & J. C. Trueswell (Eds.), Proceedings of the 38th Annual Conference of the Cognitive Science Society, pp. 2507-2512, Austin, TX, 2016.

Hoyos C, Horton WS, Gentner D. Analogical comparison aids false belief understanding in preschoolers.

In: D. C. Noelle, R. Dale, A. S. Warlaumont, J. Yoshimi, T. Matlock, C. D. Jennings, & P. P. Maglio (Eds.), Proceedings of the 37th Annual Conference of the Cognitive Science Society, pp. 944-949, Austin, TX, 2015.

Presentations

Hoyos, C. 2018. Consumer perceptions, understanding, and expectations of Advanced Driver Assistance Systems (ADAS) and vehicle automation. Paper presented at the 62nd International Annual Meeting of the Human Factors and Ergonomics Society, Philadelphia, PA, October 1 – 5, 2018.

Hoyos C, Horton WS, Gentner D, 2017. Structural alignment across events promotes false belief understanding. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Austin, TX, April 6-8, 2017.

Hoyos C, Shao R, Gentner D. The paradox of relational development: Could language learning be, temporarily) harmful? Paper presented to the 38th Annual Conference of the Cognitive Science Society, Philadelphia, PA, Aug 10-13, 2016.

Hoyos C, Shao R, Gentner D. Language is a double-edged sword for relational reasoning. In C. Walker, Chair), The ontogeny and phylogeny of relational reasoning. Symposium presented at the International Conference on Thinking, Providence, RI, Aug 4-6, 2016.

Hoyos C, Gentner D. Explanation and analogy combine to support early learning. Poster presented at the Ninth Biennial Meeting of the Cognitive Development Society, Columbus, OH, Oct 9-10, 2015

Hoyos C, Shao R, Gentner D. Language in the development of relational reasoning: Friend or foe? Paper presented at the Ninth Biennial Meeting of the Cognitive Development Society, Columbus, OH,Oct 9-10, 2015.

Hoyos C, Horton WS, Gentner D. Analogical comparison aids false belief understanding in preschoolers. Poster presented to the 37th Annual Conference of the Cognitive Science Society, Pasadena, CA, July 23-25, 2015.

Hoyos C, Gentner D. Learning a basic principle of engineering through analogical comparison and self-explanation. In E. Klein, Chair), Theoretical frameworks informing educational practice: Learning through analogical processes. Symposium presented at the National Science Foundation's Eighth Annual Inter-Science of Learning Center Conference, La Jolla, CA, May 31-June 2, 2015.

Hoyos C, Gentner D. Learning about mental states through analogical comparison. In: C. Walker, Chair, Knowledge from nowhere: How thinking leads to learning in childhood. Symposium presented to the Biennial Meeting of the Society for Research in Child Development, Philadelphia, PA, March 2015.

Hoyos C, Horton WS, Gentner D. Comparing mental states aids children's false belief understanding. In. C. Hoyos & D. Gentner, Chairs), The role of comparison in social cognition. Symposium presented to the 36th Annual Conference of the Cognitive Science Society, Quebec City, Canada, 2014, July.

Hoyos C, Horton WS, Gentner D. The role of comparison processes in false belief understanding. Poster presented at the Eighth Biennial Meeting of the Cognitive Development Society, Memphis, TN, Oct 18-19, 2013.

Hoyos C, Gentner D. Learning via analogical comparison and self-explanation. Poster presented to the Third International Conference on Analogy, Dijon, France, Aug 6-8, 2013.

Hoyos C, Gentner D. Comparison and explanation in learning: Children's understanding of a basic engineering principle. Poster presented to the 35th Annual Conference of the Cognitive Science Society, Berlin, Germany, July 31-Aug 3, 2013.

Hoyos C, Gentner D. Learning about structural stability in construction: The role of instructive principles in comparison processes. Poster presented at the Biennial Meeting for the Society for Research on Child Development, Seattle, WA, Apr 18-20, 2013.

Hoyos C, Gentner D. Combining spatial alignment and explanation in learning about principles of spatial stability in construction. Poster presented at the National Science Foundation's Fifth Annual Inter-Science of Learning Center Conference, La Jolla, CA, Apr 21-23, 2012.

Hoyos C, Nuzzi L, Shusterman A. Left-right language predicts children's landmark use in a reorientation task. Poster presented at the Biennial Meeting for the Society for Research on Child Development, Montreal, Canada. March 31-Apr 2, Apr 21-23, 2012.

Peer Reviews

Developmental Psychology, Frontiers in Psychology, Learning and Motivation