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Proceedings of the Annual Meeting of the Cognitive Science Society

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Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 42(0)

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Publication Date

2020

Peer reviewed

Color Categorization and Naming in Normal, Deficient, and Mixed Populations Using Agent Based Modelling

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Abstract

Humans make sense of the world by compressing and classifying perceptual information into discrete linguistic categories. A major consideration in linguistic categorization is that humans being social and cultural creatures have categories that are not just consistent internally, but across a linguistic community. Color naming represents an exemplary problem in cognitive science because of the unique interplay between perception, conceptualization, and language. In this study, we use an agent-based model to explore the link between perception and language in the context of color vision and its variations. Colorblindness is a congenital disorder that alters the color experience of those affected. Using a definitive identifier of colorblindness, the Just Noticeable Difference curve, we show that color vision deficiencies lead to impaired perceptual and linguistic categorization, without significant impact on social communication. The results provide insights into the color experience of the colorblind and how they cope with the language of color.