Language and Categorical Perception of Color

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Do speakers of different languages perceive colors differently or is human color perception universal and independent of language? This question constitutes a classic debate in psycholinguistics. Although human color vision is fundamentally the same for all humans with normal vision, languages of the world divide the color spectrum in many different ways. Some languages are reported to use as few as two terms to describe the color spectrum1 while others use many more (2, 3). Berlin and Kay, 1969 (4) argued that there is a universal inventory of 11 basic color categories from which the 11 or fewer basic color terms of any given language are always drawn.

Recent fMRI (5), lateralization (6), training (7), interference (8), and cross-cultural studies (9, 10, 11) have all shown that adult human color perception is affected by the color terminology in one's language, and we may conclude that it really is language that gives us color categories. However, early infant studies appear to find evidence on the contrary.

Infant color categorization studies challenge the view that color perception is mediated solely by language providing evidence that even pre-linguistic infants are able to respond categorically to color (12, 13, 14). A recent study (15) used a target detection task using eye-tracking to examine infants' categorical perception of color. Their results showed that infants were able to fixate the target when the background color was from the same category. Additionally, infants were faster and more accurate at fixating the target when the target-background separation was between-category than when it was within-category. Franklin et al. claimed these results show that even pre-linguistic infants are able to respond categorically to color suggesting that human categorical responding to color is not solely language-mediated but there may be an innate basis for categorical perception or at least a pre-linguistic bias in color categorisation.

These recent findings (15-17) claiming infant categorical responding to color have recently been questioned (18, 19). It has been claimed that infants in Franklin and colleagues' studies were only tested on two pairs of colors and consequently their findings may be a reflection of a simple color preference by the infants for the target color.

With the present paper we contribute to this ongoing discussion about the origins of infant color perception. Previous studies (15) kept the color of the target constant (green) while the color of the background was either a different shade of green (within-category) or blue (between-category). In our study, we have tested 43 healthy infants (mean age: 253.21 days). Half of our participants were randomly assigned to one of two groups: The Green Target Group was only shown green targets displayed either on green or blue backgrounds while the Blue Target Group was only shown blue targets displayed either on blue (same category) or green backgrounds (different category). Additionally, to investigate the criticisms expressed in previous literature (18, 19) we investigated if infants show categorical responding across another color boundary, namely the blue–purple boundary.

Our results confirmed that infants not only respond categorically across the blue–green boundary but also across the blue–purple boundary canceling out the criticisms expressed in previous literature (18, 19). Infants were not only significantly faster but also more accurate in detecting the target when the background is from another category rather than from the same category. Together, these findings providing support against the idea that color perception is mediated solely by language and suggest innate origins for categorical perception of color that may (or may not) be further shaped with language acquisition.

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