

Perceiving colour through the language lens: a systematic review of experimental work on linguistic influences in colour perception.

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Keywords: colour perception, systematic review, language and perception, language and cognition

We systematically review experimental papers published in the last twenty years on how language affects the perception of colour. This effect is often referred to as a Whorfian Effect as it originates in Whorf's theory of linguistic relativity (1956), showing how specific language terminology (for colours) can influence how speakers of that language perceive colours. The research into the interaction between language and colour perception has been carried out with a wide range of methods and experimental paradigms, which has resulted in contradictory findings. A structural overview of the methodology used in the experimental work on this topic, and its results, is still lacking. Such an overview can help us understand some of these contradictory findings and suggest ways forward in this domain. Therefore, we will review the state-of-the-art and identify methodological gaps and (in)consistencies in the experimental work on this topic. Our review considers almost 150 experiments on approximately 5000 participants. In order to structure the review, we group the experimental work into two main approaches taken: studies following the first approach aim to establish an effect of language on perception, and discover the extent to which it is, for example, an effect of specifically *linguistic* nature. In this 'illustrative' approach, studies investigate under which conditions a linguistic effect on perception is observed and under which it is not. For example, the extent to which, and conditions under which, different native language experiences affect how someone perceives a certain colour for which they do or do not have a colour term (Winawer et al., 2007). Other examples of such studies are those that engage in disturbing the ability of participants to access language, to shed light on the role of verbal retrieval during perception as necessary for such effects to arise, such as in studies using a verbal interference manipulation (Roberson & Davidoff, 2000). The second approach concerns studying the cognitive and neural mechanisms behind language-perception interaction for the domain of colour. Examples of studies in this 'mechanistic' approach are those that attempt to find neural correlates of linguistically-driven categorical perception of colour (Fonteneau & Davidoff, 2007), or those that aim to determine whether language affects perception at early or at late processing stages (Athanasopoulos et al., 2010). For each of the two approaches, we identify the main research questions that are being studied in the sample of papers, and we will review the methodological choices through which language-perception interaction has been studied. With this review, we aim to develop suggestions for future research about which manipulations and paradigms appear to be robust and fruitful to pursue, to render a clear picture on language-perception interaction. Further, we also aim to identify missing research questions in this field.

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