The Interface between Language and Thought: Current directions.

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Keywords: Language; Categorization; Discrimination; Color; Number; Grammatical Gender; Emotional Expressions.

Motivation

The symposium showcases new research across a range of fields and using a variety of methodologies that address the complexities of the interactions between linguistic processing and cognition. Much recent research has demonstrated that language and cognition interact at a variety of levels (e.g. Roberson, Pak & Hanley, 2008), but also that there are limits to the possible effects of language on cognition (e.g.Majid, Boster & Bowerman, 2008). All six speakers and both moderators currently investigate this relationship in more than one area of cognition and bring a wide perspective to the topic. The symposium seeks both to illuminate and to broaden an ongoing debate within Cognitive Science as to the extent to which linguistic processing influences and interacts with perception and classification. The presented research also addresses the issue of the extent to which human categorization is flexible.

How giving two things the same label can increase, or decrease, their discriminability.

Robert L. Goldstone
Indiana University

A common result in the literature on how language affects perception is that objects become increasingly perceptually similar if they are assigned a common label. In a recent series of studies, we (Gureckis & Goldstone, under review) have found situations where objects that share a category label become less confusable if they belong to separate clusters within the category. The results show that learners are sensitive to multiple sources of structure including, but not limited to, object labels. A computational model is presented to account for the results whereby multiple levels of encoding (i.e., at the item-, cluster-, and category-level) simultaneously contribute to perception. Overall, the act of labeling objects has multiple perceptual consequences: dimension-wide attentional stretching/shrinking, stretching/shrinking of regions within a dimension, and fusing separate perceptual components.

Language for Number: The Limits of Numerical Cognition without Linguistic Input.

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University of Chicago, USA
Elizabeth Spelke,
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Harvard University, USA

Data from cross-linguistic and cross-cultural studies suggest that representations of *large exact* numbers may require access to a conventional count list. Because cultures that lack a conventional counting system differ in many ways from those that have these devices, however, the effects of language and culture are difficult to disentangle. In this talk, we examine deaf adults in Nicaragua who receive no conventional sign language input but still participate in a numerate culture. These adults' use of number gestures (i.e. finger configurations), as well as their nonverbal numerical cognition are consistent with the thesis that a conventionalized count list is critical to representing and using the system of exact integer concepts. Even adults who are well integrated into a numerate society do not spontaneously use exact integer concepts in communicative or cognitive tasks, in the absence of these linguistic devices.

Some limitations to the default role of language in perceptual categorization.

Jules Davidoff
Centre for Cognition, Computation and Culture
Goldsmiths, University of London, UK

In the human adult, there is now growing agreement that language networks are active in color comparisons. New evidence will be presented to confirm the absence of color categories in the monkey and for the involvement of language in other perceptual categorization tasks in the human. However, a reassessment is given of published data using the matching-to-sample paradigm. Varying the range of stimuli, new modeling data give a similar strong

tendency to divide the range of colored stimuli into two equal groups in Western (English or French) speakers and in a remote population (Himba). The boundary depended on the range of stimuli and hence overrides natural or language induced color categories. A distinctive stimulus (focal color) in the range affected the equal division though observers again made a boundary. Monkeys did not categorize the stimuli. Most important for the role of language, range differences did not affect the names given to the colors by either Western or Himba observers. Other experiments will be reported for which range differences are immaterial to color boundaries (categorization).

Integrating linguistic and perceptual information: How language informs the processing of emotional expressions.

Orly Fuhrman, Nathaniel Witthoft, *Lera Boroditsky
Stanford University

How do people integrate linguistic information with visual information? When does linguistic context interact with and inform perceptual processing? We examined the role of language in shaping the processing of emotional expression in faces. In classical theories of emotion processing, facial expressions of emotion are posited to be processed automatically, in a way that is not guided by context or cultural knowledge. Our results show that the processing of facial expressions can be informed by linguistic context. People integrate linguistic information with available perceptual information, and when a fruitful integration is possible, linguistic information can bias rather low-level aspects of the perceptual processing of facial expressions.

Mrs. Giraffe and Mr. Elephant: The influence of grammatical gender on German children's deductive reasoning about biological properties of animals.

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Henrick Saalbach & Lennart Schalk
ETH, Switzerland

In German, grammatical gender assignment is independent of the referent's biological sex (e.g., even a male giraffe is grammatically treated as feminine, and referred to by the female pronoun). We investigated whether grammatical gender affects German speakers' deductive reasoning about sex-specific biological properties. For this purpose, we tested German- and Japanese-speaking children and adults on a series of deductive reasoning tasks. The grammatical gender contributed more strongly than the animal's typicality (how typical the target animal was as a member of the animal category) for predicting German 5-year-olds' willingness to deduce the premise about sex-specific properties to the target animal, while they drew inference about non-sex-specific biological properties according to the animal's typicality. Japanese children's willingness to make deductive inference was predicted only by typicality of the target animal both for the sex-specific and non-sex-specific properties. Grammatical gender also influenced German adults' deductive inference of sex-specific biological properties. We discuss how grammatical gender interacts with universal constraints in German speakers' inference about sex-specific and non-specific biological properties.

How words affect visual processing.

Gary Lupyan
University of Pennsylvania

Through the association of verbal labels (words) with their visual referents, hearing a word like "chair" may modulate the visual system, temporarily turning it into a better "chair detector." I will present data showing that hearing a word enables participants to more effectively process stimuli that match the label - in parallel and throughout the visual scene- compared to baseline conditions in which participants have identical information, but do not hear the actual verbal label. These results provide strong evidence that verbal labels modulate visual processing at all levels: from attentional deployment, to selection, and even simple detection of briefly-presented stimuli. The effects appear to be automatic, transient, and sensitive to the strength of the association between the label and visual stimulus. The results are interpreted in light of the literature on top-down effects on visual processing. These findings provide a mechanism for recently-reported Whorfian-type effects in the visual processing of color.

References

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