The development of similarity: Effects of perceptual information and linguistic labels

What makes things psychologically similar and different? How does linguistic and perceptual information affect similarity? And do relative contributions of linguistic and perceptual information change in course of cognitive development? Most theoretical proposals assume that linguistic labels affect similarity in a qualitative "all-or-nothing" manner: when the task is to make perceptual comparisons, linguistic labels do not matter, whereas when the task is to make conceptual comparisons, linguistic labels often overwrite perceptual information. We propose another theoretical alternative — a model of the label as a discrete attribute of an object. In other words, we suggest considering the label as an attribute of an entity that operates in a manner similar to other attributes. If this is the case, identically looking entities that have different labels should be considered more different than identically looking entities that have identical labels. At the same time, differently looking entities that have identical labels should be considered more similar than differently looking entities that have different labels. The model also predicts that the relative weight of labels decreases in the course of cognitive development. Predictions derived from the model were tested in a variety of similarity and categorization experiments with children and adults. In these experiments young children (4-5 year-olds), elementary and middle school children were presented with triads of pictures and were asked to make similarity judgments. Similarity of pictures within the triads was manipulated either (a) by systematic variation of distinct features or (2) by morphing one picture into another in a fixed number of steps and selecting triads with varying degrees of perceptual similarity. It was found that (1) labels contribute to similarity judgment in a quantifiable manner, (2) labels' weight decreased with age, (3) effects of labels are not likely to stem from purely linguistic properties of labels. We also conducted several experiments, pitting auditory (non-linguistic) features of a stimulus against visual features of the stimulus. It was found that for 3-4 year-olds auditory information is more salient than visual information, whereas for 5 year-olds and adults the reverse is true. To establish the generality of these findings, we designed, in collaboration with Sally Boysen, a study examining these developmental patterns in chimpanzees. In future experiments, we plan to examine (a) effects of phonological properties of linguistic labels (i.e., whether or not phonological similarity of labels contribute to perceptual similarity of entities) and (b) weights of auditory non-linguistic features of a stimulus vis-a-vis weights of perceptual features of the stimulus, and (c) changes in these weights in the course of cognitive development.