Pure perceptual cues and learned object knowledge influence selection of fit terms in Korean

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Korean speakers distinguish tight-fitting spatial relations from loose-fitting ones, encoding them in verbs, unlike other languages. While this issue has received much attention, it is unknown precisely how Korean speakers recognize these relations. In the present study, we explored whether Korean speakers utilize pure perceptual cues (e.g., relative motion between two objects or static visual one such as fit) or gradually learn that objects can have particular types of fit (e.g., connected lego blocks are tight fit) and rely on such acquired knowledge, by examining the effect of objects (familiar vs. abstract) and perceptual dimension (motion vs. fit) on Korean children’s as well as adults’ selection of fit terms.

Korean-speaking adults (n=32) and children (ages 3 to 6 years, n=64) were asked to describe scenes of containment and support relations, portrayed with familiar (Figure 1) or abstract objects (in a robot world, Figure 2). Each scene had a tight and loose version which differed in one perceptual dimension: type of relative motion or visual fit. For example, a scene of a flower being put into a vase had the flower stand up straight due to some material in the vase in the tight version, while the loose version had the flower fall to the side of the vase. In the corresponding abstract scene, the robot placed a rod into an open can and at the end of the event, the rod either stayed straight up or fell to the side. Each participant described both familiar-object (7 trials) and abstract-object scenes (4 trials), with the fit relation of each event alternating between trials. We expected that if acquired object-knowledge is influential, then selection of tight verbs would be greater in familiar than abstract-object condition and would also increase with age.

Logistic mixed models were used to predict tight descriptions with age, type (familiar, abstract), and visual fit (tight, loose) as factors. Participants produced more tight descriptions when the visual features suggested a tight relation (z=5.83, p<0.001). There was an interaction of type and age (z=2.01, p<0.04), where as participants got older, familiar objects elicited more tight descriptions than scenes with abstract objects. This suggests that learned real world object knowledge is indeed influential on selection of spatial terms. Interestingly, we also found an interaction of visual fit and cue-type (relative motion or visual cues) (z=2.5, p=0.02) in another logistic mixed model that was applied to the robot data only with cue-type, age, and fit as factors. While relative motion was sufficient to distinguish tight from loose (main effect of fit, z=4.07, p<0.001), static visual cues were stronger signals for the difference between tight and loose, and this pattern did not interact with age.

Together, these results provide the first demonstration that tight Korean language can be triggered by simple perceptual cues and the use of this knowledge does not change over language development. Children also learn that particular objects have particular spatial relations and future experimental work needs to consider the role of object associations in the processing of these relations.
Figure 1: Familiar Scenes: Tight self-standing flower (left), Loose resting flower (right)

Figure 2: Abstract Scenes: Robot putting rod into pot (self-standing rod shows tight relationship)

Figure 3: Proportion of tight descriptions by scene type, fit, and age.

Figure 4: Proportion of tight descriptions by cue type and fit for abstract scenes.