Interpreting Adjectives

How Do Children Interpret Adjectives?

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Abstract
In language acquisition studies, children’s extension of novel adjectives has been shown to be constrained by grammatical rules. Here we demonstrate that children also show non-linguistic biases (they are biased to interpret an adjective as referring to emotion rather than to texture), that this bias is seen both in their interpretation of novel adjectives \(flep\) and real adjectives \(\text{happy and fuzzy}\) and this bias is enhanced in certain grammatical contexts (when verb is \textit{feels}) relative to a neutral context (verb is \textit{is}).

Children (87 boys, 90 girls; 2 to 5 years of age) were shown a friendly monster. Its target attribute was ostensively defined using a novel adjective, an emotion adjective, or a texture adjective. The child’s task was to find another monster (from a set of 4 that varied both in texture and emotion) with the matching attribute. With a novel adjective, 3s, 4s, and 5s were more likely to choose the monster with matching emotion than with matching texture (2s were equally likely to make either choice). This bias persisted when real adjectives were used: with an emotion adjective, none of the children chose the matching texture; with a texture adjective, 2s and 3s were equally likely to choose texture as emotion.

Introduction
In language acquisition studies, researchers have investigated how children interpret words (e.g., adjectives) by ostensively defining a novel word (e.g., “This monster is very \textit{flep}.”), and asking them to choose another object that is the same (e.g., Markman, 1992; Hall, Waxman, & Hurwitz, 1993; German, Sutton, & Hall, 2001).

Children’s extension of novel words has been shown to be constrained and to respect grammatical rules. This prior research has demonstrated linguistic constraints (grammatical or semantic context). Here we demonstrate that children also show non-linguistic biases (they are biased to interpret an adjective as referring to emotion rather than to texture), that this bias is seen both in their interpretation of novel adjectives \(flep\) and real adjectives \(\text{happy and fuzzy}\) and this bias is enhanced in certain grammatical contexts (when verb is \textit{feels}) relative to a neutral context (verb is \textit{is}).

The current study was motivated by two questions: First, are children biased to interpret a novel adjective as referring to emotion or to texture? One might argue that the bias, if any exists, would be for emotion, because children have been found to be precocious in understanding emotion (e.g., Harris, 1989). On the other hand, one might argue that the bias would be toward texture, because texture is an automatically detected sensory quality, whereas emotion is a state that must be inferred from available cues.

Second, what does children’s extension of novel adjectives tell us about their understanding of real adjectives that are (potentially) a part of their vocabulary? The assumption is that novel adjectives reveal the same principles that apply to real adjectives, but, to our knowledge, there are few data examining this assumption.
Method

Participants
The design required 48 children (24 boys and 24 girls) in each of four age groups: 2s, 3s, 4s, and 5s (N = 192). At the time of this analysis, we were short five 2-year-old boys, four 5-year-old boys, and six 5-year-old girls. Thus, the data reported here come from 177 children (87 boys, 90 girls). All the children were enrolled in child care in Vancouver, B.C., and were fluent in English.

Stimuli
Each monster was made from a piece of pale yellow, textured material (smooth, fuzzy, bumpy, wrinkled) and each had one of four prototypical emotional facial expressions (happy, sad, angry, scared) printed on pale yellow paper. There was a total of twenty monsters (4 sample monsters, 16 response-set monsters). Figure 1 shows an example of the display for one trial; it consists of one sample monster and response set of 4 monsters. On each trial, one of the response set monsters had the same facial expression as the sample monster; another had the same texture as the sample monster; the other two had both different facial expressions and textures than the sample monster; none of the response set monsters shared any attributes (facial expressions or textures).

Procedure
Each child was randomly assigned to one of three adjective conditions. In the Novel Adjective condition, the target attribute was specified by a novel adjective (“flep, dax, blank, gorp”). In the Emotion Adjective condition, the target attribute was specified by an emotion adjective (“happy, sad, angry, scared”). In the Texture Adjective condition, the target attribute was specified by a texture adjective (“fuzzy, smooth, bumpy, wrinkled”). Within each of these conditions, each child was randomly assigned to either the is (“This monster is very X.”) or the feels (“This monster feels very X.”) verb condition.

On each of four trials, the child was first shown a sample monster, and then asked to choose, from a response set of 4 other monsters, the one that matched the sample. The child was then given time to choose the matching monster. Responses were not corrected; all were mildly praised.

In all three adjective conditions, both verbs (is, feels) worked for either matching attribute (e.g., happy, fuzzy). Thus, whether the bear commented, “This monster is very X,” or “This monster feels very X,” neither the matching texture nor the matching emotion were more correct based on the verb used.

Scoring
A conservative scoring method was used. A child was given credit for systematically choosing an attribute if he or she chose the monster with the matching attribute (i.e., emotion or texture) on at least three out of the four trials. If a child chose randomly, the probability of choosing consistently on 3 or 4 of the 4 trials was .051; thus, of our 177 children, 9 would pass this criterion by chance. Of the 177 children in our sample, 129 passed this criterion. In setting the criterion at 3/4, we exceeded chance by a wide margin, but also gave the youngest children opportunity to pass it.

Results
A repeated measures ANOVA (alpha = .05) was calculated with 3 levels of adjective (novel, emotion, texture), 2 levels of verb (is, feels), age (4 levels) and sex (2 levels).
There was a significant main effect for Choice, $F(1, 128) = 10.50, p = .002$. Children were significantly more likely to choose emotion (.45) than texture (.29). The Choice x Age interaction was not significant ($p = .69$), and indeed the preference for emotion over texture occurred for each age. LSD tests showed that the emotion bias was significant ($p = .004$) for the 3s.

There was also a significant Adjective x Choice interaction, $F(1, 128) = 10.50, p = .002$ (Figure 2). In the Novel Adjective condition, ($p = .01$) children were significantly more likely to choose emotion (.42) than texture (.22). In the Emotion and Texture Adjective conditions, the choices tended to correspond to the adjective given, but, in addition, the proportion of (correct) emotion choices (.81) in the Emotion Adjective condition was significantly ($p = .03$) greater than the proportion of (correct) texture choices (.66) in the Texture Adjective condition. These results again suggest an emotion bias.

The age x adjective x choice interaction was also significant, $F(1, 128) = 10.50, p = .002$ (Figure 3). LSD comparisons indicated that, in the Novel Adjective condition, for 2s and 3s the proportion of emotion choices did not differ significantly from texture choices. The proportion of emotion choices increased significantly ($p < .04$) with age, but there was no increase in texture choices. In the Emotion Adjective condition, the proportion of emotion choices was significantly greater than texture choices for each age group. In the Texture Adjective condition, for 2s and 3s the proportion of texture choices did not differ significantly from emotion choices. The proportion of texture choices increased significantly ($p < .001$) with age, with the 4s and 5s making only texture choices.

Finally, although the adjective x verb x choice interaction was not significant ($p = .89$), we were interested in whether the verb (is, feels) had any effect (Figure 3). LSD comparisons indicated that in the Novel Adjective condition, children who heard “feels very X” were significantly ($p = .03$) more likely to make an emotion choice than a texture choice. There were no significant differences between “is” and “feels” in the other conditions.

Discussion

Two-year-olds chose randomly among the four monsters, except in one condition: when they were explicitly given an emotion adjective (happy, angry, sad, scared), they chose on the basis of emotion, although less than half of the time. Thus, the emotion bias is present but small. Interestingly, it did not occur for 2s in the novel adjective condition where an emotion bias would have occurred simply by picking the monster with a

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1 This analysis is a minor violation of the independence assumption given that if, for example, a child chose the matching emotion at least 3 times, he or she could not have chosen the matching texture. However, the opposite was not also true (i.e., failing to choose the matching emotion did not determine that the child chose the matching texture; the child could have chosen a distracter) the two independent variables were not entirely dependent.
matching facial expression. Instead, the emotion bias was evident only when an emotion adjective was presented.

The similarity of the results in the Novel and Texture Adjective conditions raises the possibility that the 2s did not know the meaning of the texture adjectives and thus treated them as novel adjectives. But it is also possible that for 2s did have some understanding of texture adjectives, but their bias toward emotion overrode their understanding of the texture adjective.

Three-year-olds showed an emotion bias in all conditions. In the novel adjective condition, 3s were more likely to choose on the basis of emotion. With an emotion adjective, 3s never chose texture, but overwhelmingly chose (correctly) emotion. With a texture adjective, 3s still sometimes chose (incorrectly now) emotion.

Four- and five-year olds continued to manifest the emotion bias. By this age, children understood both sets of real adjectives, and therefore in the emotion and texture adjective conditions, their responses were simply correct. In the novel adjective condition, however, they overwhelmingly chose emotion over texture.

These results occurred both when the experimenter said “the monster is X” and said “the monster feels X,” but feels enhanced the emotion bias, although feels is as appropriate with texture as emotion. The source of this association of feels with emotion is not clear, but presumably stems from children more often hearing the adjective feels used in connection with emotion than with texture.

Our results support and extend German and Hall’s (2001) study in which children (4 and 5 years) were presented with a neutral sentential frame (… is zav) or an emotion frame (… is feeling zav). The findings suggested that 4- and 5-year-olds were interpreting the novel adjective as an adjective and that they were sensitive to the sentential frame such that when the frame ruled out a pattern interpretation (i.e., one cannot feel striped) they reliably made a facial expression interpretation. The current study suggests that even without a sentential frame to guide children’s interpretation of the novel adjective, they are biased to do so, though this bias is accentuated by feels.

References


**Figure 1.** The stimuli for one trial. Notice that one of the response set monsters has the same facial expression as the sample, and that one has the same texture; the other two have different facial expressions and textures from the sample monster; none of the response set monsters shared any attributes with each other.

**Figure 2.** In the Novel Adjective condition, more children chose the emotion than texture. The proportion of (correct) emotion choices in the Emotion Adjective condition was significantly greater than the proportion of (correct) texture choices in the Texture Adjective condition. These results suggest that children have an emotion bias in interpreting adjectives and understand emotion adjectives better than texture adjectives.
Figure 3. In the Novel Adjective condition, 2s showed no bias in interpreting the novel adjective. The older children in this condition showed a bias (ns for 3s; p < .04 for 4s and 5s) to interpret the novel adjective as an emotion adjective. In the Emotion Adjective condition, even the 2s were significantly more likely to make an emotion choice than a texture choice. In the Texture Adjective condition, although the 2s were as likely to choose the matching emotion as matching texture, 3s were more likely to choose texture (p = .09), and 4s and 5s were significantly more likely (p < .05) to do so. Thus, even when they heard a texture adjective, some of the younger children made an emotion choice in the Texture Adjective condition, but by 4 years, the bias is no longer present.

Figure 4. For children in the Novel Adjective condition, there was no significant difference between the proportion of emotion choices and texture choices when *is* was used (“This monster is very flep”). But when *feels* was used (“This monster feels very flep”), the proportion of emotion choices was significantly greater (p = .03) than texture choices. In the Emotion Adjective condition, there was no effect due to the verb, but there was a floor effect (no texture choices). In the Texture Adjective condition, although texture choices were significantly more frequent than emotion choices, there was also a nonsignificant trend to make more emotion choices for *feels* than for *is*. 