NOTE

Comparison, basic-level categories, and the teaching of adjectives*

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ABSTRACT

We tested 24 caregivers of preschool children to determine whether their strategies for teaching novel adjectives are consistent with children’s demonstrated abilities to learn these words (e.g. Waxman & Klibanoff, 2000). On each of four trials, caregivers had to select one of two cards, both of which showed a familiar object bearing an unfamiliar property. On the within-basic card, the object was accompanied by a second object from the same basic-level category; on the across-basic card, this second object came from a different basic-level category. Caregivers’ task was to choose the card that would be more helpful to teach a novel adjective for the unfamiliar property. If the second object differed from the first in terms of a novel target property, caregivers (N = 12) stated a strong preference for the within-basic card. If the two objects agreed in terms of the novel property, caregivers (N = 12) indicated a clear preference for the across-basic card. The findings offer new insight into the speed and efficiency of lexical development, by revealing that word teachers, like word learners (cf. Waxman & Klibanoff, 2000), are sensitive to the conditions under which certain contrasts (in property or in basic-level category) are effective in promoting the successful acquisition of novel adjectives.

INTRODUCTION

A growing body of research has begun to address the question of how young

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children learn adjectives (e.g. ‘white’, ‘spotted’, ‘furry’), words that label properties of objects (e.g. Gelman & Markman, 1985; Taylor & Gelman, 1988; Waxman, 1990; Waxman & Kosowski, 1990; Smith, Jones & Landau, 1992; Hall, 1994a; Waxman & Markow, 1995; Hall, 1996; Prasada, 1997; Mintz & Gleitman, 1998; Akhtar & Montague, 1999; Waxman, 1999; Hall, Quantz & Persoage, 2000; O’Neill, Topolovec & Stern-Cavalcante, in press; Graham, Welder & McCrimmon, in press). One recurrent finding in this work is that basic-level categories (e.g. dog, rather than poodle or animal) play an important role in acquiring these words (e.g. Rosch, Mervis, Gray, Johnson & Boyes-Braem, 1976). For example, preschoolers are more successful in learning a novel word for an object property if the word is applied to an object from a familiar basic-level category (e.g. a cup) than to one from an unknown basic-level category (e.g. a garlic press; Markman & Wachtel, 1988). In addition, when children as young as 1; 9 hear a novel adjective for an object (e.g. a car), they learn to extend it appropriately to another object that bears the same property when given choices from within the same basic-level category (e.g. two other cars), but not when given choices from a different basic-level category (e.g. two horses) (e.g. Waxman & Markow, 1999; Klibanoff & Waxman, 2000).

Recently, Waxman & Klibanoff (2000) have demonstrated that basic-level categories play an important role in children’s ability to extend a novel adjective to the appropriate property beyond the basic-level. These researchers discovered that, in learning to extend adjectives broadly, preschool children benefit from the chance to compare two objects with respect to the property in question. Waxman & Klibanoff (2000) gave three-year-olds the chance to make one of two kinds of comparison. One involved seeing a contrast between one object that had the property in question and a second object that lacked it. The other kind of comparison involved seeing multiple exemplars of the target property – two objects that had it. The authors found that the opportunity to make both kinds of comparison helped children extend a novel adjective appropriately to the target property shown on objects outside the basic-level category. However, the usefulness of making these two kinds of comparison depended on the basic-level categories from which the initial pair of objects were drawn.

After seeing a contrast between the target property and another property, children extended a novel adjective appropriately when the two initial objects were drawn from the same basic-level category, but not when they were taken from different basic-level categories. For example, children extended a novel adjective intended to label a property like transparency appropriately if they learned that a transparent plate was ‘blickish’ and that an opaque plate was ‘not blickish’. They failed, however, to extend it appropriately if they learned that a transparent plate was ‘blickish’ and that an opaque toothbrush was ‘not blickish’. On the other hand, after seeing multiple exemplars of the
target property, children extended the novel adjective appropriately when the two objects came from different basic-level categories, but not when they came from the same basic-level category. For instance, children extended an adjective intended to label a property like transparency appropriately if they learned that a transparent plate was ‘blickish’ and that a transparent toothbrush was ‘also blickish’. They did not extend accurately if they learned that a transparent plate was ‘blickish’ and that another transparent plate was ‘also blickish’.

Waxman & Klibanoff (2000) discussed their research in the context of findings from the literature on the process of comparison, a process that is generally straightforward when it involves objects that are similar, varying along a single salient dimension. In such cases, both adults and children typically find it easy to identify relevant dimensions of similarity and difference between objects (e.g. Kemler, 1983; Smith, 1984; Gentner & Markman, 1994; Goldstone & Medin, 1994). In Waxman & Klibanoff (2000), the comparison in the contrast condition involved a variation along a single salient dimension only when the objects came from the same basic-level category (where the dimension was the property, e.g. transparent vs. opaque); however, in the multiple exemplars condition, the comparison involved a variation along a single salient dimension only when the objects came from different basic-level categories (where the dimension was the basic-level category, e.g. plate vs. toothbrush). In these two circumstances, then, children’s ability to perform an effective comparison was strongest; and as a result, they were most successful in identifying the relevant property, in mapping a novel adjective to it, and in extending the adjective appropriately.

A number of previous studies have documented that caregivers’ strategies for teaching nouns (e.g. ‘dog’, ‘animal’) closely mirror children’s interpretative biases associated with learning these words. For example, caregivers tend to offer a basic-level count noun when they teach a new word for an object (e.g. Ninio & Bruner, 1978; Ninio, 1980; Blewitt, 1983; Shipley, Kuhn & Madden, 1983; Callanan, 1985; Hall, 1994b), consistent with children’s tendency to interpret such labels as naming basic-level categories of whole objects (e.g. Markman, 1989). Caregivers also tend to introduce a count noun for an object part after providing a basic-level count noun as an ‘anchor’ (e.g. Ninio & Bruner, 1978; Ninio, 1980; Shipley et al., 1983); this behaviour accords well with children’s tendency to interpret a novel count noun as naming a part of an object only if they already know a basic-level count noun for the (whole) object (e.g. Markman & Wachtel, 1988). In addition, caregivers use different linguistic patterns to introduce a superordinate-level count noun for an object, as opposed to a basic- or subordinate-level count noun (e.g. Callanan, 1985), and children tend to interpret these distinctive patterns in appropriate ways (e.g. Callanan, 1989).

Waxman & Klibanoff’s (2000) findings raise the question of whether the
input that caregivers provide in teaching novel adjectives is consistent with children’s interpretative dispositions in acquiring these words. Do caregivers appreciate the conditions under which certain between-object contrasts will be salient and promote the learning of new adjectives? If caregivers elect to teach a novel adjective by using two objects that contrast in terms of the target property, they should choose objects from the same basic-level category. In contrast, if caregivers choose to teach the novel adjective by using two objects that agree in terms of the target property, they should select objects from different basic-level categories. Understanding whether caregivers’ teaching strategies accord with these predictions is important for advancing our understanding of the process by which children learn adjectives.

To investigate whether caregivers’ strategies for teaching novel adjectives complement preschoolers’ abilities to learn these words, we designed a study that included two conditions, each based on an experiment reported in Waxman & Klibanoff (2000). On each trial of the Contrast condition, caregivers saw two cards. Each card showed a pair of objects that differed with respect to a salient novel surface property. For example, one object (Target 1) had blue and red spots on it and the other (Target 2) had yellow and green stripes on it. The two cards differed only in terms of the basic-level categories from which the objects were drawn. On the within-basic card, both objects were from the same basic-level category (e.g. two different airplanes); on the across-basic card, the objects were from different basic-level categories (e.g. an airplane and a car). On each trial of the Multiple Exemplars condition, a different group of caregivers also saw two cards. Each card again showed a pair of objects, but in this case the objects agreed in terms of the salient novel surface property. For example, both objects (Target 1 and Target 2) bore blue and red spots. The cards again differed only in terms of the basic-level categories from which the objects were drawn. On the within-basic card, both objects were from the same basic-level category (e.g. two different airplanes); on the across-basic card, the objects were from different basic-level categories (e.g. an airplane and a car).

Caregivers’ task in each condition was simple: to select the card (i.e. within-basic or across-basic) that would be more effective in teaching their children the meaning of a novel adjective (e.g. ‘zavish’) for the novel surface property (e.g. blue and red spots) shown on one of the objects (i.e. Target 1) on each card. We also asked them to explain their choices after they made them. Note that, in both conditions, the two cards afforded exactly the same opportunity to teach the novel adjective. In the Contrast condition, both cards showed one object bearing the target property and one object that bore a contrasting property; in the Multiple Exemplars condition, both cards showed two objects bearing the target property. Thus, if caregivers focused only on the presence of the target property on each card, they should have
shown no preference for one card over the other in either condition. If, however, caregivers were sensitive to the conditions under which certain contrasts are salient and support the acquisition of novel adjectives, then they should have made different choices in the two conditions. They should have been more likely to select the within-basic card in the Contrast than in the Multiple Exemplars condition. In addition, they should have shown a preference for the within-basic card in the Contrast condition but a preference for the across-basic card in the Multiple Exemplars condition.

METHOD
Participants
The participants were 24 primary caregivers of two- to four-year-old children. Twelve caregivers were assigned randomly to each of two conditions, Contrast (mean child’s age = 3; 4) and Multiple Exemplars (mean child’s age = 3; 5). In each group, 10 caregivers were mothers (or grandmothers) and 2 were fathers. Caregivers were from primarily middle- to upper-middle-class backgrounds. They were recruited from advertisements placed in community centres, libraries, and local news media. They visited the laboratory in a university psychology department, along with their children, who took part in another, unrelated study. Children received a small gift and a certificate of appreciation. Caregivers received no payment for their participation but were reimbursed for parking expenses.

Stimuli
Familiarization phase. For the familiarization phase of the task, we used (1) a card showing a baby bottle with a novel coloured pattern on it; and (2) two pairs of cards, one pair in the Contrast condition and the other in the Multiple Exemplars condition. The pair in the Contrast condition consisted of (1) a within-basic card, showing a red square (Target 1) and a blue square (Target 2); and (2) an across-basic card, showing a red square (Target 1) and a blue circle (Target 2). The pair in the Multiple Exemplars condition consisted of (1) a within-basic card, showing a red square (Target 1) and another red square (Target 2); and (2) an across-basic card, showing a red square (Target 1) and a red circle (Target 2). The basic-level noun for the object (i.e. ‘square’ or ‘circle’) was always typed beneath it. The familiar adjective for the salient property (i.e. ‘red’ or ‘blue’) was always typed beneath the noun. Note that Target 1 was the same on all cards and appeared to the right of Target 2 on all cards.

Test phase. For the test phase of the task, we used eight pairs of cards, four in the Contrast condition and four in the Multiple Exemplars condition. All eight pairs consisted of a within-basic card and an across-basic card, both of which showed two line-drawn familiar objects bearing a colourful novel
pattern. The within-basic card showed two objects from the same basic-level category (but different subordinate-level categories); the across-basic card showed two objects from different basic-level categories. For the four pairs used in the Contrast condition, both the within-basic and across-basic cards showed objects that differed in terms of the pattern; for the four pairs used in the Multiple Exemplars conditions, both the within-basic and across-basic cards showed objects that agreed in terms of the pattern. The basic-level noun for each object (e.g. ‘plane’, ‘car’) was always typed beneath it, and the novel adjective for the property (e.g. ‘zavish’, ‘blickish’) was always typed beneath the noun. Every pair in the Contrast condition was matched to a pair in the Multiple Exemplars condition in terms of the superordinate level category to which all objects belonged: vehicle, furniture, animal, and musical instrument.

Figure 1 shows a schematized sample pair of cards from each condition. An
example of a pair of cards from the Contrast condition was the following: the within-basic card showed a propeller plane with blue and red spots (Target 1) and a jet plane with yellow and green stripes (Target 2). The across-basic card showed a propeller plane with blue and red spots (Target 1) and a car with yellow and green stripes (Target 2). An example from the Multiple Exemplars condition was the following: the within-basic card showed a propeller plane with blue and red spots (Target 1) and a jet plane with blue and red spots (Target 2). The across-basic card showed a propeller plane with blue and red spots (Target 1) and a car with blue and red spots (Target 2). Note that Target 1 was the same on all cards. For these two pairs of cards, the novel label for Target 1 was always ‘zavish’. In the Contrast condition, the novel label for Target 2 was ‘blickish’ and in the Multiple Exemplars condition, it was ‘zavish’. See Table 1 for a complete list of stimuli.

**Table 1. Complete list of stimuli**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Novel adjectives (Target 1, Target 2)</th>
<th>Target 1</th>
<th>Target 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Within-basic</td>
<td>Across-basic</td>
</tr>
<tr>
<td>Contrast</td>
<td>zavish, blickish</td>
<td>blue/red</td>
<td>yellow/green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>spotted</td>
<td>striped</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLANE</td>
<td>PLANE</td>
</tr>
<tr>
<td>riffish, lummish</td>
<td>pink/green star-covered</td>
<td>yellow/purple</td>
<td>yellow/purple</td>
</tr>
<tr>
<td></td>
<td>CHAIR</td>
<td>striped</td>
<td>striped</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHAIR</td>
<td>TABLE</td>
</tr>
<tr>
<td>tuppish, pockish</td>
<td>blue/green cross-hatched</td>
<td>green/brown</td>
<td>green/brown</td>
</tr>
<tr>
<td></td>
<td>DOG</td>
<td>striped</td>
<td>swirl-covered</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DOG</td>
<td>RABBIT</td>
</tr>
<tr>
<td>feppish, wuggish</td>
<td>orange/blue wavy</td>
<td>green</td>
<td>green</td>
</tr>
<tr>
<td></td>
<td>DRUM</td>
<td>‘v’-covered</td>
<td>‘v’-covered</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DRUM</td>
<td>HORN</td>
</tr>
<tr>
<td>Multiple Exemplars</td>
<td>zavish, zavish</td>
<td>blue/red</td>
<td>blue/red</td>
</tr>
<tr>
<td></td>
<td></td>
<td>spotted</td>
<td>spotted</td>
</tr>
<tr>
<td>riffish, riffish</td>
<td>pink/green star-covered</td>
<td>pink/green</td>
<td>pink/green</td>
</tr>
<tr>
<td></td>
<td>CHAIR</td>
<td>star-covered</td>
<td>star-covered</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHAIR</td>
<td>TABLE</td>
</tr>
<tr>
<td>tuppish, tuppish</td>
<td>blue/green cross-hatched</td>
<td>blue/green</td>
<td>blue/green</td>
</tr>
<tr>
<td></td>
<td>DOG</td>
<td>cross-hatched</td>
<td>cross-hatched</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DOG</td>
<td>RABBIT</td>
</tr>
<tr>
<td>feppish, feppish</td>
<td>orange/blue wavy</td>
<td>orange/blue</td>
<td>orange/blue</td>
</tr>
<tr>
<td></td>
<td>WAVY</td>
<td>wavy</td>
<td>wavy</td>
</tr>
<tr>
<td></td>
<td>DRUM</td>
<td>DRUM</td>
<td>HORN</td>
</tr>
</tbody>
</table>
Procedure

Caregivers were tested individually in a quiet room of the laboratory and their children were present during the task but did not participate. Caregivers were assigned randomly to either the Contrast or the Multiple Exemplars condition. They were told that the purpose of the study was to learn about how parents teach new words (adjectives) to their children.

Familiarization phase. The purpose of this phase was to acquaint caregivers with the task. The experimenter told the caregiver that she or he was going to see pairs of cards with object drawings and unfamiliar words on them. The caregivers were told that the unfamiliar words would be adjectives, words like ‘red’, ‘furry’, and ‘shiny’. Caregivers then heard that the novel adjectives would be used to describe the unfamiliar coloured patterns shown on the objects. At this point, the experimenter showed the caregiver an example, bringing out the card with a drawing of a baby bottle bearing a colourful novel pattern. The experimenter said, ‘Here’s a bottle. “Toggish” is an adjective that names the pattern on the bottle.’

The experimenter then produced a pair of cards as a practice to help explain the task itself. In the Contrast condition, she showed the within-basic and across-basic cards for that condition; in the Multiple Exemplars condition, she showed the within-basic and across-basic cards for that condition. The left-right placement of the two cards was random. The experimenter asked caregivers to think about teaching their children the familiar adjective, ‘red’. The experimenter pointed with both hands simultaneously to Target 1 on each card, which was always a red square. The experimenter then told the caregiver that the task was to choose the card – within-basic or across-basic – that would be more helpful to teach the adjective, ‘red,’ so that the child would succeed in learning its meaning. The experimenter repeated (or paraphrased) the instructions if needed, but offered no other guidance.

Test phase. The procedure was the same in the two conditions, except for the fact that the pairs of cards differed. The experimenter began by telling caregivers that they would now see pairs of cards, as in the familiarization phase, but the cards would contain familiar objects that bore unfamiliar coloured patterns. The experimenter said that she would always state the novel adjective to be taught on each trial to describe the unfamiliar property and that she would point with both hands simultaneously to the appropriate object on each card. Caregivers were then told that they would be asked to choose the card – within-basic or across-basic – that would be more helpful to teach the adjective so that the child would succeed in learning what it meant.

On the first trial, the experimenter placed the first pair of cards in front of the caregiver, stated the novel adjective (e.g. ‘zavish’), and pointed sim-
ultaneously to one object on each card (Target 1) that bore the property. For example, she said, ‘These planes are zavish. These are zavish planes’. No reference was made to Target 2. The left-right placement of the within-basic and across-basic cards was counterbalanced across trials for each caregiver and was the same for corresponding caregivers in both conditions. The experimenter then said, ‘Which of these two cards would be more helpful to teach the word ’zavish’ so that your child would succeed in learning its meaning?’ The parent was thanked for making a choice, and the pair of drawings was removed. No feedback was provided. The same procedure was followed on trials 2, 3 and 4. After the fourth and final trial, the experimenter asked caregivers to explain why they chose the cards that they did, and to write down their answers on a sheet of paper provided by the experimenter. The order of presentation of the four pairs of cards was counterbalanced across participants and was the same in both conditions. The novel adjectives were ‘zavish’, ‘blickish’, ‘riffish’, ‘lummish’, ‘tuppish’, ‘pockish’, ‘feppish’ and ‘wuggish’.

RESULTS

Our hypothesis was that caregivers would show sensitivity to the conditions under which certain contrasts (in property or in basic-level category) are effective in promoting the learning of novel adjectives. This hypothesis led to two predictions. First, caregivers should have shown a greater tendency to select the within-basic card in the Contrast condition than in the Multiple Exemplars condition. Second, caregivers should have shown a systematic tendency to select the within-basic card in the Contrast condition, and a systematic tendency to choose the across-basic card in the Multiple Exemplars condition.

The results supported both predictions. Turning to the first prediction, we began by focusing on the mean proportions of choices of the within-basic card in the two conditions. We submitted these means to a one-way ANOVA. The result was significant, $F(1, 22) = 13.50, p < .005$, with the mean higher in the Contrast condition ($M = 0.79$, s.d. = 0.30) than in the Multiple Exemplars condition ($M = 0.31$, s.d. = 0.34). The difference between conditions was also significant when we treated items, rather than participants, as a random effect, paired-$t$ (3) = 7.67, $p < .005$. Finally, we explored the consistency of caregiver’s teaching choices across the four trials. We classified any caregiver as a Within-basic Chooser if she or he chose the within-basic card on 3 or 4 out of 4 trials. Comparing the numbers of Within-basic Choosers in the two conditions, we found significantly more in the Contrast condition ($N = 9$) than in the Multiple Exemplars condition ($N = 2$), $p < .01$ by Fisher’s exact test.

We then turned to the second prediction. We first compared the propor-
tions of drawing selections in each condition to the chance proportion (i.e. \(0.50\), because there were two options). In the Contrast condition, the proportion of choices of the within-basic card was significantly above chance, \(t(11) = 3.39, p < 0.01\), 1-tailed. In contrast, in the Multiple Exemplars condition, the proportion of choices of the across-basic card was significantly above chance, \(t(11) = 1.92, p < 0.05\), 1-tailed. We then focused on the consistency of caregivers’ choices across the four trials. Recall that we defined a Within-basic Chooser as a caregiver who chose the within-basic card on 3 or 4 out of 4 trials; the chance probability of this occurrence is \(0.3125\). We now defined an Across-basic Chooser as a caregiver who chose the across-basic card on 3 or 4 out of 4 trials; the chance probability of this occurrence is also \(0.3125\). There were 9 Within-basic Choosers in the Contrast condition, significantly more than would be expected by chance, according to the binomial theorem, \(p = 0.002\). In contrast, there were 7 Across-basic Choosers in the Multiple Exemplars condition, significantly more than would be expected by chance, according to the binomial theorem, \(p = 0.05\).

Finally, we studied caregivers’ explanations for their choices in the two conditions. Many of these explanations revealed that caregivers were aware of the conditions under which certain contrasts (in terms of property or basic-level category) promote the learning of adjectives. Caregivers in the Contrast condition often mentioned that it would be easier to teach the adjective using the within-basic card because that card would allow them to align the objects in terms of the relevant property, making the mapping of adjective to property more straightforward. One caregiver said, for example, ‘I chose the two dogs with different patterns thinking it would be easier because the only thing different was the pattern.’ Nine of the 12 caregivers in this condition offered such explanations. In the Multiple Exemplars condition, caregivers often mentioned that they chose the across-basic card because that card would allow them to align the objects in terms of the common property, making the mapping of an adjective to the property more straightforward. One caregiver in this condition said, for example, ‘Different objects with the same pattern will emphasize the pattern as opposed to the object’. Six of the 12 caregivers in this condition provided such comments. See the Appendix for further examples of caregivers’ explanations from both conditions.

### Discussion

The goal of this study was to determine whether caregivers possess strategies for teaching novel adjectives that are consistent with preschoolers’ demonstrated abilities to learn these words. Previous studies have discovered a clear concordance between caregivers’ teaching strategies and children’s learning biases in the arena of noun learning (e.g. Ninio & Bruner, 1978; Ninio, 1980;
Blewitt, 1983; Shipley et al., 1983; Callanan, 1985; Hall, 1994b); such findings shed light on the speed and efficiency of the acquisition of nouns (e.g. Woodward & Markman, 1998; Bloom, 2000). It has been unclear, however, whether such synchrony between caregivers and children extends into the realm of adjective acquisition. In this experiment, we found that caregivers’ stated adjective teaching preferences were strongly related to children’s previously documented capacities to learn these terms. If two objects differed in terms of a novel property, such that Object A possessed it but Object B lacked it (Contrast condition), caregivers indicated a strong preference to teach a novel adjective for the property on Object A using two objects from the same basic-level category. If, however, the two objects agreed in terms of the novel property, such that they both possessed it (Multiple Exemplars condition), caregivers stated a clear preference for two objects from different basic-level categories. Moreover, caregivers in both conditions provided explanations for their preferences that often revealed an awareness of the conditions under which certain contrasts are salient and support the successful acquisition of adjectives.

Our findings provide evidence of agreement between caregiver and child in the domain of adjective learning, because they are entirely consistent with recent findings about the conditions under which preschoolers successfully acquire the meanings of these words (Waxman & Klibanoff, 2000; see also Waxman & Markow, 1998; Klibanoff & Waxman, 2000). To learn a novel adjective (e.g. ‘zavish’) naming an unfamiliar property (e.g. colourful stripes) shown on one object (e.g. a plane), children benefit from the chance to compare the object to a second object. However, if the second object differs from the first in terms of the property, children learn the adjective only if the two objects come from the same basic-level category. If the second object agrees with the first in terms of the property, children learn it only if the two objects are drawn from different basic-level categories (Waxman & Klibanoff, 2000). These findings are consonant with results from the literature on the process of comparison, in which it has been shown that both children and adults are more effective at identifying relevant dimensions of similarity and difference between objects if the objects vary primarily along one salient dimension (e.g. Kemler, 1983; Smith, 1984; Gentner & Markman, 1994; Goldstone & Medin, 1994).

Our results suggest that caregivers who teach adjectives may tend to seek to provide between-object comparisons that support the effective learning of these terms. This suggestion, in turn, raises the question of whether caregivers regularly have the chance to offer these sorts of comparisons to children. Children’s daily lives are filled with multiple instances of particular object categories (e.g. blocks, balls, shoes, cups) and multiple instances of particular properties (e.g. red things, blue things, furry things, smooth things), and so it is plausible that the opportunity for caregivers to make the
favoured kinds of comparisons does commonly arise. Children’s picture books also often depict multiple instances of object categories as well as multiple instances of object properties; and in an informal study of a number of children’s picture books (from local bookstores and libraries), we found that the authors of these books often – though not always – provided the favoured types of comparisons in the design of their volumes.

Even if caregivers do encounter opportunities to offer the kinds of between-object comparisons that best support adjective learning, do they take advantage of these chances? In other words, is the real-world input to children consistent with the findings of this study, as well as the studies by Waxman and colleagues (e.g. Waxman & Klibanoff, 2000)? We think it is plausible that the favoured kinds of comparisons do occur in everyday word learning, given the mounting evidence that lexical development often takes place through cross-situational observation – through hearing words used multiple times in multiple contexts (e.g. Gleitman, 1999; Fisher, Hall, Rakowitz & Gleitman, 1994; Pinker, 1994; Akhtar & Montague, 1999). A useful starting point for investigating whether caregivers do make use of the preferred comparisons in teaching adjectives would be to conduct a laboratory-based interactive study involving object arrays (or picture books) with entities varying in basic-level category and property. If caregivers offered the preferred comparisons when they taught children adjectives in such structured tasks, then this finding could serve as a basis for further investigation of whether caregivers also do so in more unstructured, naturalistic settings.

Finally, the findings from this study raise questions about the origins of children’s adjective-learning capacities. Consonant with preschoolers’ learning abilities, caregivers in our study indicated preferences to provide within-basic comparisons in contrastive learning situations and across-basic comparisons in contexts involving multiple instances of a novel property. This discovery leaves open the question of where this convergence between caregiver and child originates. One possibility is that parents’ teaching preferences reflect a fine-tuning to their children’s pre-existing interpretative dispositions. Alternatively, it is conceivable that children’s learning capacities are shaped by the kinds of teaching experiences provided by their caregivers. Of course, it is also possible that both kinds of influences occur simultaneously, in a process of adjustment of both caregiver-to-child and child-to-caregiver. Finally, it is possible that neither influence is occurring – that caregivers’ teaching strategies and children’s learning preferences simply reflect independently arising constraints on the understanding of what constitute effective comparisons for the purposes of acquiring adjectives. The current data do not allow us to adjudicate among these possibilities, but they nevertheless mark an advance in understanding lexical development. By revealing that word teachers, like word learners, are sensitive to the conditions under which certain contrasts (in property or in basic-level
category) promote adjective learning, the results offer new insight into the
efficacy of the learning of words from this lexical category.

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APPENDIX

CONTRAST CONDITION:
1. ’I chose the two dogs with different patterns thinking it would be easier because the only thing different was the pattern’.
2. ’I consistently chose the card which had the same object (for example, two planes) and different adjectives because I believe that if the adjective is what I am to teach, then the similarity of object will not be a factor. It will be nullified and the adjective will have permanence. To choose different objects in the same card would confuse the learning – too many variables would be involved’.
3. ’The difference on the card chosen is only in the subjects’ colouring’.
4. ’I chose the left card because it shows two different airplanes. I could show X that each plane was different and use separate adjectives to describe them’.

MULTIPLE EXEMPLARS CONDITION:
1. ’Different objects with the same pattern will emphasize the pattern as opposed to the object’.
2. ’By choosing the picture in which the pattern is shown in two different objects, rather than two objects of the same type (e.g. chair, airplane), X would focus on the pattern, rather than the objects associated with the pattern’.
3. ‘I chose the left card because the items were different. I think it would be easier to teach about ‘riffish’ because both items were ‘riffish’ but the items were not the same’.

4. ‘I chose the card with two different objects so she will fixate more on the pattern than the objects. (That is, the pattern can be on different things and still be the pattern)’.