NOTE

Input and word learning: caregivers’ sensitivity to lexical category distinctions*

D. GEOFFREY HALL, TRACEY C. BURNS and JODI L. PAWLUSKI

University of British Columbia

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ABSTRACT

Twenty-four caregivers and their two- to four-year-old children took part in a storybook reading task in which caregivers taught children novel labels (‘DAXY’) for familiar objects. One group (N = 12) received labels modelled syntactically as proper names (‘This is named DAXY’), and another group (N = 12) received the same labels for the same objects modelled syntactically as adjectives (‘This is very DAXY’). Caregivers took strikingly different approaches to teaching words from the two lexical categories. In teaching proper names, but not adjectives, caregivers flagged cases in which one word was paired with two objects; two words were paired with one object; and one word was paired with an inanimate object. In teaching adjectives, but not proper names, caregivers discussed meaning and offered translations. Caregivers’ distinctive strategies for teaching proper names and adjectives are congruent with recent findings about children’s word meaning assumptions, and with analyses of the semantics of these lexical categories. The findings indicate that parental speech could provide a rich source of information to children in learning how different lexical categories are expressed in their native language.

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INTRODUCTION

Human languages are built out of words from a small set of lexical categories, each of which is associated with a particular type of meaning (e.g. Pinker, 1996; Bloom, 2000). These lexical categories are expressed syntactically in different ways across the world’s languages, and so children must learn how they are realized in their native tongue. A growing body of evidence suggests that children accomplish this task early in development, because young preschoolers are adept at using syntactic cues signalling a novel word’s lexical category to draw appropriate inferences about what the word means. For example, preschoolers’ interpretation of a novel word for an object is affected by whether the word is modelled syntactically as a count noun (e.g. ‘This is an X’), a proper name (e.g. ‘This is X’), or an adjective (e.g. ‘This is an X one’). Their patterns of word extension suggest that they appropriately interpret count nouns as marking object categories; proper names as labelling individual objects; and adjectives as designating object properties (see Macnamara, 1982; Gelman & Taylor, 1984; Taylor & Gelman, 1988; Smith, Jones & Landau, 1992; Hall, Waxman & Hurwitz, 1993; Hall & Moore, 1997; Waxman & Markow, 1998; Hall, Quantz & Persoage, 2000; Hall, Lee & Bélanger, 2001; Imai & Haryu, 2001; Jaswal & Markman, 2001; Sorrentino, 2001; Mintz & Gleitman, 2002; Graham, Welder & McCrimmon, in press).

But how do children learn the syntactic markings of different lexical categories in their language? According to one well-known proposal, when children hear new words used to pick out entities in the world, they make default assumptions about the words’ meanings. Because children expect that different types of meanings will be linked to different lexical categories, they thus assign the new words to particular lexical categories. Children learn how these different lexical categories are expressed syntactically in their language by noting the sentence contexts in which these words appear in caregivers’ speech (for variations of this general proposal, see Pinker, 1996; Bloom, 2000; see also Macnamara, 1982; Markman, 1989). For example, there is evidence that children assume that words used to label unfamiliar objects (e.g. dogs) designate object categories (e.g. DOG) (e.g. Markman, 1989; Waxman & Kosowski, 1990; Golinkoff, Mervis & Hirsh-Pasek, 1994; Woodward & Markman, 1998). Because children expect that words marking object categories will be count nouns, they assign these words to the category, count noun. Moreover, English-speaking caregivers typically use count nouns when they label novel objects for their children (e.g. they use sentences like, ‘This is a dog’, where ‘dog’ is a count noun; see Ninio & Bruner, 1978; Ninio, 1980; Blewitt, 1983; Shipley, Kuhn & Madden, 1983; Callanan, 1985; Hall, 1994a). As a result, caregivers provide input to children that may be highly useful in learning how count nouns are expressed syntactically in their language (i.e. English).
What about other lexical categories? How, for example, do children learn how proper names (words that designate individual objects) or adjectives (words that mark object properties) are expressed in their language? As in the case of count nouns, children may be helped by making default assumptions about the meanings of words that caregivers use to pick out objects in the world. For instance, Hall and colleagues (Hall, 1991, 1994b, 1996; Hall & Graham, 1999; for review, see Hall, 1999; Bloom, 2000) have proposed that default assumptions could help English-learning children determine whether a novel ambiguous word is a proper name or an adjective. One assumption concerns the number of familiar objects to which the word is applied. Children are more likely to assume a novel word is a proper name if it is restricted to one object than if it is extended to two objects. In the case where the word is extended to two objects, children are more inclined to assume it is an adjective (Hall, 1996). A second assumption relates to the number of words of a particular category applied to a single familiar object. There is evidence to suggest that children are more likely to assume a novel word is a proper name if it is applied to an object that lacks a proper name than if it is applied to an object that already has another proper name. In contrast, children seem willing to assume a novel word is an adjective even if the labelled object has already received another adjective (Hall & Graham, 1999). A third assumption pertains to the animacy of the familiar object to which the word is applied. Children appear more inclined to assume a novel word is a proper name if it is applied to an animate object than if it is used for an inanimate object. An adjective interpretation of the word is more likely if it is applied to an inanimate object (Hall, 1994b; see also Macnamara, 1982; Gelman & Taylor, 1984; Litittschwager & Markman, 1993).

The preceding default assumptions could help children learn how proper names and adjectives are expressed in their native language if caregivers showed sensitivity to the assumptions when they labelled objects for children. Caregivers might show this sensitivity by not commenting on labelling cases that are in accord with the assumptions, and by drawing children’s attention to violations. For example, they might treat cases involving one adjective or one proper name paired to one animate object as being undeserving of special attention (e.g. one dog labelled either ‘spotted’ or ‘Fido’). They might also not single out for comment cases involving one adjective given to two objects (e.g. two dogs both labelled ‘spotted’), two adjectives applied to one object (e.g. one dog labelled both ‘spotted’ and ‘furry’), or one adjective given to an inanimate object (e.g. a chair labelled ‘spotted.’) However, caregivers might draw children’s attention to cases involving one proper name given to two objects (e.g. two dogs both labelled ‘Fido’), two proper names provided for one object (e.g. one dog labelled both ‘Fido’ and ‘Rover’), or one proper name given to an inanimate object (e.g. a chair labelled ‘Fido.’)
Caregivers might further aid children in learning proper names and adjectives by treating the words in ways that are appropriate to their distinctive semantics. Many philosophers of language have argued that the semantic role of a proper name is to designate an individual, independently of its properties, whereas an adjective serves to describe an individual’s properties (e.g. Kripke, 1980; Macnamara, 1986). If caregivers are sensitive to these fundamental semantic facts, they might teach proper names and adjectives in very different ways. For example, they might introduce proper names with no accompanying mention of the words’ meanings, since proper names are pure designating expressions. In contrast, they might take more care to discuss meaning when introducing adjectives, since adjectives have more descriptive content. In a related way, caregivers might tend not to attempt to define or translate proper names, but they might typically offer such definitions or translations for adjectives.

To date, there has been little investigation of the nature of caregivers’ input involved in the teaching of object words from lexical categories other than count nouns (though there have been investigations of the input associated with the teaching of verbs, e.g. Naigles & Hoff-Ginsberg, 1998). In this study, we examined the input that caregivers provide when they introduce novel proper names and adjectives to their children. Our first goal was to determine whether this input reflected a sensitivity to children’s interpretative assumptions associated with proper names and adjectives. We sought to determine whether parents were more likely to signal to their children that some uses of words were exceptional when the words were modelled as proper names but NOT when the same words were presented as adjectives. We focused on three cases: one word applied to two different objects; two different words applied to the same object; and one word applied to an inanimate object. Our second (and related) goal was to examine whether caregivers’ input showed a sensitivity to the distinctive semantics of words from these two lexical categories. We wondered whether caregivers offered different semantic information when they introduced novel words modelled as proper names than when they introduced the SAME words modelled as adjectives. Were they more likely to mention words’ meanings and more likely to define or translate words when teaching adjectives than when teaching proper names? If caregivers showed such behaviours when they taught proper names and adjectives, it would offer a partial explanation for how young children might learn the syntactic expression of these lexical categories in their native language.

Our objective in this research was to understand how caregivers introduce proper names and adjectives in general, not how they teach specific words. As a result, we developed a new methodology. We invited caregivers and children into the laboratory, where we introduced them to a puppet who was from another planet and who spoke another language. Participants were told that
the puppet had wanted to teach the children some of his words by using a book of object drawings, but unfortunately had fallen ill with a toothache and so could not speak. As a result, we told caregivers that we planned to show them the puppet’s words (e.g. ‘DAXY’) and the appropriate referent object drawings and ask them to teach the words to their children in whatever way seemed natural to them. All caregivers and children saw the same words and the same drawings, but we told half the caregivers that the words were proper names and showed them the words written syntactically as proper names (‘This is named DAXY’). We told the other half that the words were adjectives and showed them the words written syntactically as adjectives (‘This is very DAXY’).

We then examined how caregivers taught the words in the two conditions. We analysed caregivers’ speech to children on several different kinds of trials. On baseline trials, one word was paired with one animate object. We also included three kinds of test trials: (1) one word paired with two animate objects; (2) two words paired with one animate object; and (3) one word paired with one inanimate object. Relative to baseline trials, we predicted that parents who taught proper names would signal verbally to their children that the pairings on test trials were exceptional. In contrast, relative to baseline trials, we anticipated that parents who taught adjectives would not signal anything exceptional about the pairings on test trials. We also predicted that caregivers would show a sensitivity to the distinctive semantics of words from the two lexical categories. We expected that they would be more likely to talk about the words’ meanings, and more likely to offer a definition or translation of the novel words, if they were presented as adjectives than if they were presented as proper names.

**METHOD**

**Participants**

Twenty-four caregivers (all mothers) and their two- to four-year-old children were recruited from advertisements placed in local news media. The children ranged in age from 2;0 to 4;4. There were 10 boys and 14 girls. They visited the laboratory for one session lasting between 10 and 20 minutes. They received no remuneration for participating, although we provided reimbursement for parking or travel, and we offered children a small gift and a certificate of appreciation for their cooperation. Twelve dyads (children’s mean age = 3;2) were assigned randomly to the Proper Name condition, and twelve others dyads (children’s mean age = 3;2) were assigned to the Adjective condition. All had English as the sole or primary language, and all came from middle- and upper-middle class backgrounds.
Stimuli

The stimuli consisted of a puppet with a bandage wrapped around his head (to indicate a toothache) and a storybook. The storybook had 10 pages, each of which contained a black-and-white line drawing of one or two familiar animate or inanimate objects. At the bottom of each page (e.g. a drawing of a dog) was a typewritten sentence that indicated the label or labels to be introduced in conjunction with the drawing. In the Proper Name condition, these labels were always modelled syntactically as proper names (e.g. ‘This dog is named FEPPY’); in the Adjective condition, they were always modelled syntactically as adjectives (e.g. ‘This dog is very FEPPY’). Note that only one word (‘named’ or ‘very’) distinguished between the sentences used in the two conditions.

The first six pages of the storybook included the following: two baseline pages, in which one word was paired with one animal (1W-1O pages); and four test pages, two of which showed one label paired with two animals of a given kind (1W-2O pages); and two of which showed two different labels paired with one animal (2W-1O pages). See Figure 1 for an example of each of these pages. The familiar animal kinds we used were bear, cat, dog, horse, pig, and rabbit. The labels we used were BLICKY, DAXY, FEPPY, GORPY, JOOPY, PILKY, REVY, and ZAVY. (The use of the suffix ‘-y’ was meant to make the labels be plausibly either proper names, such as ‘Freddy,’ or adjectives, such as ‘furry.’) Within each condition (Proper Name, Adjective), different dyads saw different pairings of words to objects, but these pairings were matched exactly in the two conditions. The order of the six pages was counterbalanced across dyads within a condition, except that one example of each page type (1W-1O, 1W-2O, and 2W-1O) always appeared before a second example of any page type, and the first page was always a baseline 1W-1O page.

The last four pages of the storybook included the following: two additional baseline pages, in which one label was paired with one animal (A pages);1 and two test pages, in which one label was paired with one inanimate object (I pages). See Figure 2 for an example of both of these pages. The animal kinds we used were monkey and mouse, while the inanimates were chair and shoe. The labels we used were CULLY, LUMMY, SIFFY, and TOGGY. Within each condition (Proper Name, Adjective), different dyads saw different pairings of words to objects, but these pairings were duplicated exactly in the two conditions. Again, the order of the four pages was counterbalanced across

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1 The same mappings were used on both A pages and 1W-1O pages: one word was paired with one animate object. We use different terms for these pages to make our comparisons easier to follow: in the case of A pages, our interest was in the animacy of the object; in the case of 1W-1O pages, our interest was in the numbers of words and objects involved in the mapping. Not surprisingly, the results from the A pages and 1W-1O pages were identical; see Results.
dyads within a condition, except that one page of each type (A, I) always appeared before a second example of either page type.

We also used a Sony portable cassette tape recorder to tape-record the sessions for subsequent transcription.

**Procedure**

After an initial warm-up period in the laboratory waiting room during which the experimenter played with the child, the experimenter and participants entered a quiet testing room. The parent and child sat on one side of a small table, and the experimenter sat across from them. The experimenter introduced them to the puppet, Zork, and told them that Zork came from very far

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Fig. 1. Sample stimuli. The word ‘named’ was used in the Proper Name condition, and the word ‘very’ was used in the Adjective condition.
away and spoke using different words than they did. The experimenter said that Zork had wanted to teach them some new words, but that today he woke up with a toothache and now he couldn’t talk. At this point, the bandaged puppet groaned and made a sad face. The experimenter then asked the parent if she would be willing to try to help Zork out by teaching the child the new words on Zork’s behalf. When the parent agreed, the experimenter explained that she would see storybook pages containing drawings of objects along with Zork’s words. The experimenter instructed the parent first to interpret the new words, and then to discuss these words with their children in whatever way seemed most natural and appropriate to them (i.e. we asked them to ‘talk about them in any way you want’). The experimenter reassured the parent that these were unfamiliar words and that they should simply do their best to understand the words. In the Proper Name condition, the experimenter explicitly noted that the words were all proper names, words like ‘Jodi’ (or the experimenter’s name) and ‘Susan’ (or the parent’s name). In the Adjective condition, the experimenter explicitly noted that the words were all adjectives, words like ‘red’ or ‘furry.’ We provided these explicit directions to avoid

Fig. 2. Sample stimuli. The word ‘named’ was used in the Proper Name condition, and the word ‘very’ was used in the Adjective condition.
having the parents misinterpret the task (e.g. by thinking the labels were count nouns).

Parents were given the opportunity to ask questions before the task began. The experimenter then turned on the tape recorder, brought out the storybook, and placed it on the table in front of the pair. The experimenter opened the book to the first page, and then told the parent that it was okay to start talking. When parents finished discussing each page, the experimenter turned to the next. In this way, although the task was paced by the parents and children, the experimenter provided some structure to the testing session, and ensured that parents discussed the drawings in the appropriate orders. Any questions that the parent asked were answered obliquely with answers like ‘whatever you think’ or ‘whatever you want.’ Children received stickers at various points during the task as rewards for paying attention.

After the final trial, the experimenter turned off the tape recorder and explained the goal of the task to the parent, and gave the child a small gift. The entire session lasted between 10 and 20 minutes.

Coding

Tapes of each test session were transcribed by one individual and these transcripts were verified by a second individual. Each of the 10 trials of each transcript was then coded for the following.

1. Flagging. We coded caregivers’ speech associated with each page for whether it contained any remark that drew attention to the use of the puppet’s word(s) in association with the drawing(s) on the page. We coded for two different types of flagging.

a. Explicit flagging. We noted when a caregiver directly made a comment that indicated the usage was inappropriate (e.g. ‘funny,’ ‘weird,’ ‘silly,’ ‘strange,’ ‘wacky,’ ‘odd’). For example, on a 1W-2O trial in the Proper Name condition, a parent said, ‘Isn’t it funny that they have the same name?’ And on a 2W-1O trial in the Proper Name condition, another parent said, ‘It’s got two names. Isn’t that funny?’

b. Implicit flagging. We also noted when a caregiver questioned the usage in a more indirect way. For example, on one 1W-2O trial in the Proper Name condition, a parent said, ‘They both have the same name. Does that make sense?’ And on an I trial in the Proper Name condition, another parent said, ‘Did you know that this shoe has a name? Have you ever heard of a shoe having a name?’ In a few instances, parents implicitly flagged the usage by changing the words or changing the situation to signal that the given pairing was inappropriate. For example, on a 1W-2O trial in the Proper Name condition, one parent modified the wording to make the word-object pairings distinct: ‘There’s Big GORPY, and there’s Little GORPY.’ And on a 1W-2O
trial in the Proper Name condition, another parent treated the two (clearly distinct) cat drawings as depictions of the same cat.

For each page, we coded for whether the parent explicitly flagged, implicitly flagged, or did not flag the usage. (If a parent explicitly flagged and implicitly flagged any page, we coded that as an instance of the more direct type of flagging, explicit flagging.)

2. Semantics. We coded caregivers’ speech associated with each page for the information it conveyed about the word’s (or words’) semantics.

a. Mention of ‘meaning’. We noted whether a caregiver used the word ‘meaning(s)’ (or any form of the verb ‘to mean’: ‘mean,’ ‘means,’ or ‘meant’) in discussion of the word(s) on the page.

b. Translations. We coded caregivers’ speech associated with each page for whether it included an English translation of the word(s) on the page. We also coded for the number of different translations that the parents offered for the word(s). For example, on a 1W-2O page in the Adjective condition, a parent proposed that the novel word (for two cats) meant ‘friendly.’ This parent was coded as offering one translation equivalent. Also on a 1W-2O page in the Adjective condition, another parent proposed that the novel word (also for two cats) meant ‘friendly,’ or ‘furry,’ or ‘pretty,’ or ‘having three whiskers.’ This parent was coded as providing four translation equivalents.

All 24 transcripts (each containing 10 units of discussion, one per page) were coded by two independent coders. We computed the proportion of trials on which the two coders agreed for each coding category. For the flagging category, the coders agreed on 96% of the trials whether they involved no flagging, implicit flagging, or explicit flagging. The two coders agreed on 96% of the trials whether they contained a mention of ‘meaning.’ They agreed on 93% of the trials whether they contained a translation of the word(s); they agreed on 92% of the trials about the exact number of translations provided. In all cases, disagreements were resolved through discussion.

RESULTS

We used the coded data to test our predictions about caregiver input involved in teaching novel proper names and novel adjectives.

1. Flagging. Tables 1 and 2 contain a summary of these results. We divided our analyses into three parts.

a. Flagging on 1-word 2-objects trials vs. 1-word 1-object trials. The data for these analyses came from the first six pages of the story book. Recall that we predicted more flagging on 1W-2O trials than on 1W-1O trials in the Proper Name condition, but not in the Adjective condition. As predicted, caregivers in the Proper Name condition frequently flagged on 1W-2O trials (\(M = 0.63\); explicit: \(M = 0.38\); implicit: \(M = 0.25\)), but they never did so on 1W-1O trials. In the Adjective condition, caregivers rarely flagged on 1W-2O trials
### Table 1. Proportion of trials flagged (S.D.)

<table>
<thead>
<tr>
<th>Trial type</th>
<th>Condition</th>
<th>Proper name</th>
<th>Adjective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-word 1-object</td>
<td>Total</td>
<td>0·00 (0·00)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
<td>0·00 (0·00)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td>0·00 (0·00)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td>1-word 2-objects</td>
<td>Total</td>
<td>0·63 (0·38)</td>
<td>0·04 (0·14)</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
<td>0·38 (0·38)</td>
<td>0·04 (0·14)</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td>0·25 (0·34)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td>2-words 1-object</td>
<td>Total</td>
<td>0·50 (0·37)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
<td>0·13 (0·23)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td>0·38 (0·43)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td>Animate</td>
<td>Total</td>
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<td>0·00 (0·00)</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
<td>0·00 (0·00)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td>0·00 (0·00)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td>Inanimate</td>
<td>Total</td>
<td>0·46 (0·40)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
<td>0·25 (0·33)</td>
<td>0·00 (0·00)</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td>0·21 (0·40)</td>
<td>0·00 (0·00)</td>
</tr>
</tbody>
</table>

N = 12 per condition.

### Table 2. Number of flaggers (caregivers who flagged at least once)

<table>
<thead>
<tr>
<th>Trial type</th>
<th>Condition</th>
<th>Proper name</th>
<th>Adjective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-word 1-object</td>
<td>Total</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-word 2-objects</td>
<td>Total</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>2-words 1-object</td>
<td>Total</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
<td>3</td>
<td>0</td>
</tr>
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<td></td>
<td>Implicit</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Animate</td>
<td>Total</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>Explicit</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Inanimate</td>
<td>Total</td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

N = 12 per condition.
\(M = 0.04\); explicit: \(M = 0.04\); implicit: \(M = 0.00\) and never did so on 1W-1O trials. We computed a contrast score for each dyad to reflect the extent to which the caregiver flagged more 1W-2O trials (each flagged trial weighted +1) than 1W-1O trials (each flagged trial weighted −1). If caregivers flagged equally often on 1W-2O trials and on 1W-1O trials, then the mean value of this contrast score would be 0. We tested the significance of the mean contrast score within each condition using \(t\)-tests against a null hypothesis mean of 0. The contrast score was significant in the Proper Name condition, \(t(11) = 5.75, p < 0.0001\), indicating that caregivers flagged significantly more on 1W-2O trials than on 1W-1O trials. The contrast was not significant in the Adjective condition.

We followed up these analyses by classifying each caregiver as a flagger if she flagged (either explicitly or implicitly) at least one of the 1W-2O trials or at least one of the 1W-1O trials. In the Proper Name condition, there were 10 flaggers (explicit: \(N = 7\); implicit: \(N = 3\)) on the 1W-2O trials, but no flaggers on the 1W-1O trials, McNemar’s \(\chi^2 (1, N = 12) = 8.10, p < 0.005\). In the Adjective condition, there was one flagger (Explicit) on the 1W-2O trials, but there were no flaggers on the 1W-1O trials. This difference was not significant.

Finally, we compared the proportions of flagged trials between conditions. Caregivers flagged more 1W-2O trials in the Proper Name than in the Adjective condition, \(t(22) = 5.01, p < 0.0001\). There were also significantly more 1W-2O flaggers in the Proper Name than in the Adjective condition, \(\chi^2 (1, N = 24) = 13.59, p < 0.0001\). In contrast, no caregiver flagged any 1W-1O trials in either condition, and so no statistics were computed.

b. **Flagging on 2-words 1-object trials vs. 1-word 1-object trials.** The data for these analyses also came from the first six trials of the task. Recall that we predicted more flagging on 2W-1O trials than on 1W-1O trials in the Proper Name condition, but not in the Adjective condition. As predicted, caregivers in the Proper Name condition often flagged on 2W-1O trials (\(M = 0.50\); explicit: \(M = 0.13\); implicit: \(M = 0.38\)) but never did so on 1W-1O trials. In the Adjective condition, caregivers never flagged on either 2W-1O or 1W-1O trials. We computed a contrast score for each dyad to reflect the extent to which the caregiver flagged more 2W-1O trials (each flagged trial weighted +1) than 1W-1O trials (each flagged trial weighted −1). As in the previous analyses, we tested the significance of the contrast score within each condition using \(t\)-tests against a null hypothesis mean of 0. The contrast score was significant in the Proper Name condition, \(t(11) = 4.69, p < 0.001\), indicating that caregivers flagged more 2W-1O trials than 1W-1O trials. However, the contrast was not significant in the Adjective condition.

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[2] Explicit flaggers were those who flagged explicitly on at least one trial. Implicit flaggers were those who flagged implicitly on at least one trial. Any caregiver who flagged explicitly on one trial and implicitly on another was classified as an explicit flagger.
We next classified each caregiver as a flagger if she flagged (implicitly or explicitly) at least one of the 2W-1O trials or at least one of the 1W-1O trials. In the Proper Name condition, there were nine flaggers (explicit: $N = 3$; implicit: $N = 6$) on the 2W-1O trials, but no flaggers on the 1W-1O trials; McNemar’s $\chi^2 (1, N = 12) = 7.11, p < 0.01$. In the Adjective condition, there were no flaggers on either the 2W-1O or the 1W-1O trials; therefore, no statistic was computed.

Finally, we compared the proportions of flagged trials between conditions. Caregivers flagged many more 2W-1O trials in the Proper Name condition than in the Adjective condition; but because the mean was zero in the Adjective condition, we computed no statistic on the difference. There were also significantly more 2W-1O flaggers in the Proper Name than in the Adjective condition, $\chi^2 (1, N = 24) = 11.38, p < 0.001$, corrected for continuity. As noted earlier, no caregiver in either condition flagged any 1W-1O trials; thus, no statistics were computed.

c. Flagging on inanimate trials vs. animate trials. The data for these analyses came from the last four trials of the task. Recall that we predicted more flagging on I trials than on A trials in the Proper Name condition, but not in the Adjective condition. As predicted, caregivers in the Proper Name condition often flagged on I trials ($M = 0.46$; explicit: $M = 0.25$; implicit: $M = 0.21$) but never flagged on A trials. In the Adjective condition, caregivers never flagged on either I or A trials. We computed a contrast score for each dyad to reflect the extent to which the caregiver flagged more I trials (each flagged trial weighted +1) than A trials (each flagged trial weighted −1). As in the previous analyses, we tested the significance of this contrast score within each condition using $t$-tests against a null hypothesis mean of 0. The contrast score was significant in the Proper Name condition, $t(11) = 4.01, p < 0.005$, revealing that caregivers flagged more often on I trials than on A trials. The contrast was not significant in the Adjective condition.

We next dubbed a caregiver a flagger if she flagged (implicitly or explicitly) at least one of the I trials or at least one of the A trials. In the Proper Name condition, there were eight flaggers (explicit: $N = 4$; implicit: $N = 4$) on the I trials, but none on the A trials; McNemar’s $\chi^2 (1, N = 12) = 6.13, p < 0.05$. In the Adjective condition, there were no flaggers on either I or A trials, and so no statistic was computed.

Finally, we compared the proportions of flagged trials between conditions. Caregivers flagged many more I trials in the Proper Name condition than in the Adjective condition; but again, because the mean was zero in the Adjective condition, we computed no statistic on the difference. There were also significantly more I flaggers in the Proper Name than in the Adjective condition, $\chi^2 (1, N = 24) = 9.19, p < 0.005$, corrected for continuity. However, no caregiver in either condition flagged any of the A trials, and so no statistics were computed.
2. Semantics. Table 3 contains a summary of these results. We divided the analyses into two parts.

a. Mentions of ‘meaning’. As predicted, caregivers were much more likely to mention the word ‘meaning’ (or a variant of the word) in the Adjective condition than in the Proper Name condition. In the Adjective condition, caregivers frequently made a comment or asked a question about what the novel word or words meant ($M = 0.70$), but they never did so in the Proper Name condition ($M = 0.00$). Because the mean in the Proper Name condition was zero, we computed no statistic on this difference. In addition, all 12 caregivers mentioned ‘meaning’ at least once in the Adjective condition, but none did so in the Proper Name condition, $\chi^2 (1, N = 24) = 24.00$, $p < 0.0001$.

b. Translations. Also as predicted, caregivers were much more likely to offer a definition or translation of the novel word in the Adjective than in the Proper Name condition. Caregivers in the Adjective condition did so on most trials ($M = 0.77$), whereas those in the Proper Name condition rarely did so ($M = 0.04$), $t(22) = 7.67$, $p < 0.0001$. In addition, 11 caregivers offered a translation equivalent on at least one trial in the Adjective condition, but only three did so in the Proper Name condition, $\chi^2 (1, N = 24) = 10.97$, $p < 0.001$.

Our last prediction was also confirmed: the mean number of translations offered per trial was significantly higher in the Adjective condition ($M = 1.20$) than in the Proper Name condition ($M = 0.04$), $t(22) = 6.70$, $p < 0.0001$. (We excluded 2W-1O trials from these analyses, because it was difficult to determine which word(s) caregivers were translating on these trials.)

Finally, recall that the age range of the children in our sample was 2;0 to 4;4. Our rationale for including children throughout this range was to enable us to understand the nature of caregivers’ speech to children in the preschool period. Because our range was wide enough, we took the opportunity to examine whether there was any relation between children’s age and mothers’ tendency to use a particular strategy in our task. First, we correlated children’s age (in months) with the proportion of (1) 1W-2O trials, (2) 2W-1O trials, and

<table>
<thead>
<tr>
<th>Condition</th>
<th>Proper name</th>
<th>Adjective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean proportion of trials including mentions of ‘meaning’ (s.d.)</td>
<td>0.00 (0.00)</td>
<td>0.70 (0.29)</td>
</tr>
<tr>
<td>Number of caregivers mentioning ‘meaning’ at least once</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Mean proportion of trials including translation equivalents (s.d.)</td>
<td>0.04 (0.08)</td>
<td>0.77 (0.32)</td>
</tr>
<tr>
<td>Number of caregivers providing translation equivalents at least once</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Mean number of translation equivalents per trial (s.d.)*</td>
<td>0.04 (0.08)</td>
<td>1.20 (0.59)</td>
</tr>
</tbody>
</table>

$N = 12$ per condition.
* These numbers do not include data from 2W-1O trials.
(3) I trials flagged by their mothers in the Proper Name condition. None of
these three correlations approached significance. Second, we correlated
children’s age (in months) with the proportion of trials on which their
mothers (1) mentioned meaning, and (2) offered a translation equivalent in
the Adjective condition. We also correlated children’s age (in months) with the
mean number of translation equivalents per trial offered by their mothers in
the Adjective condition. Again, none of these three correlations approached
significance. Taken together, these results indicate that caregivers’ strategies
for teaching proper names and adjectives were not systematically related to the
age of their preschool children.

DISCUSSION

Previous research on how caregivers teach words to young children has
focused heavily on count nouns, terms that designate object categories. That
work has revealed that parents teach children count nouns in a way that is
remarkably consistent with children’s assumptions about the meanings of
these words (e.g. Ninio & Bruner, 1978; Ninio, 1980; Blewitt, 1983; Shipley
et al., 1983; Callanan, 1985; Markman, 1989; Waxman & Kosowski, 1990;
Golinkoff et al., 1994; Hall, 1994a; Woodward & Markman, 1998). As a
result, this input could be of use to children in learning how these words
are marked syntactically in their language. The goal of the current study was
to move beyond count nouns to examine the nature of input associated with
the teaching of object-directed words from two different lexical categories:
proper names (words that label individual objects) and adjectives (words that
mark object properties). The interest was in determining whether the input
could be useful to preschool children in their task of learning how these two
categories are expressed in their native language. Specifically, our question
was whether this input accords with (1) recent proposals about children’s
default assumptions about the meanings of words from these two lexical
categories (e.g. Hall, 1999), and (2) analyses of these words’ semantics (e.g.
Kripke, 1980).

We found that caregivers taught words using strategies that are consistent
with recent proposals about children’s assumptions about the meanings of
both proper names (e.g. Macnamara, 1982; Gelman & Taylor, 1984;
Liittschwager & Markman, 1993; Hall, 1994b, 1996; Hall & Graham, 1999;
Jaswal & Markman, 2001) and adjectives (e.g. Smith et al., 1992; Hall et al.,
1993; Waxman & Markow, 1998; Mintz & Gleitman, 2002). Specifically,
caregivers did not comment on labelling cases that involved one proper name
paired with one object, but they flagged cases that involved one proper
name paired with two different objects, or two proper names paired with the
same object. In contrast, caregivers did not flag any of those cases when they
involved adjectives. Caregivers also did not remark upon cases that involved
pairing a proper name with an animate object, but they flagged those cases that involved pairing a proper name with an inanimate object. In contrast, caregivers did not flag the use of an adjective for either an animate or an inanimate object.

The finding that caregivers commonly flagged three types of mapping for their children (one-proper-name-two-objects; two-proper-names-one-object; one-proper-name-one-inanimate-object) suggests that caregivers act in accordance with children’s previously-documented assumptions about these words. As a result, caregivers are in a position to help children identify these words in their language, and thereby, avoid mapping errors. Caregivers’ flagging also provides insight into how children might move beyond their default expectations to acquire mappings that violate their assumptions. After all, the three types of flagged mappings must ultimately be acquired in the course of language development. Children will learn that sometimes, one proper name may be applied to two or more people (e.g. there may be two people named ‘Darryl’); two or more proper names may be used for one person (e.g. one person may be both ‘Sarah’ and ‘Jessica,’ not to mention ‘Pumpkin’ and ‘Sweetie’); and a proper name may be used for an inanimate object (e.g. a train may be named ‘Thomas’). By flagging violations of children’s default expectations, caregivers offer children support for mastering those exceptional mappings.

Caregivers’ input was also congruent with analyses of the basic meaning distinctions between proper names and adjectives (e.g. Kripke, 1980; Macnamara, 1986). Specifically, parents who taught novel words as adjectives were more likely than those who taught them as proper names to mention what the words meant or to offer one or more definitions or translations of the words. These results suggest that caregivers furnish specific information to their children that may further assist them in learning words from these lexical categories.

Together, the findings suggest that caregivers tend to provide input to their children that is in harmony not only with children’s assumptions about proper names and adjectives but also with the characteristic semantic properties of these two types of words. To our knowledge, this is the first demonstration in the literature that caregiver input is structured in ways that could help children specifically in mastering object-directed words that are not count nouns. Our findings do not, of course, imply that such input is either needed or used by children in the course of learning proper names and adjectives. Further research will be required in order to support such claims. However, the results do suggest that children’s ability to learn words from these two lexical categories could be enhanced by the ways in which caregivers organize their speech in introducing these words.

Our findings leave open several questions for future research. One important question concerns the origin of the relation between caregivers’
word-teaching strategies and children’s default assumptions. We have proposed that parental strategies for teaching proper names and adjectives mesh with children’s pre-existing assumptions about these words. These strategies thus could help children learn how these lexical categories are expressed in their language. Yet our data do not themselves bear on the origin of the relation between input and assumptions. We can see several possibilities. One is that the default assumptions are unlearned, and that they lead caregivers to structure their speech in ways that promote effective learning. But it is also possible that the default assumptions are themselves built up on the basis of experience with parental input that is structured in a particular way. It is even conceivable that the influences are bi-directional. Finally, it is plausible in our view that there is no direct causal connection between parental strategies and children’s assumptions. For example, it is possible that children make certain assumptions about word meaning and that caregivers structure their input in specific ways, simply because they share an intuitive understanding of the task of learning the words of a human language. Our parental data do not allow us to adjudicate among these possibilities, but future studies of children’s earliest interpretations of adjectives and proper names, as well as of parents’ earliest uses of proper names and adjectives in child-directed speech should help to clarify this important issue.

A second question concerns children’s default assumptions. Because our data were derived from parental speech, our results do not reveal what children learned about the novel words introduced by parents in the task. Moreover, the data do not provide evidence about whether these children possessed the default assumptions in question. There was, however, some evidence to suggest children did make the proposed assumptions. This evidence came from children’s occasional spontaneous comments and occasional responses to parental questions. For example, on a trial in which the same proper name was applied to two cats (a 1W-2O trial), a mother of a boy (2;7) asked of the second cat, ‘Do we think his name is Feppy too?’ The child answered, ‘No!’ On a trial in which two proper names were applied to one bear (a 2W-1O trial), a mother of a boy (3;4) asked, ‘Is it funny that there’s two names?’ The child replied, ‘Yeah!’ The mother then asked, ‘Do you have two names?’ The child replied, ‘No! One name!’ And on a trial in which one proper name was applied to a shoe (an I trial), a mother of a girl (3;5) said, ‘This shoe is named Cully.’ The child then spontaneously commented, ‘Shoes don’t have a name!’ Comments like these suggest that preschoolers do operate with the three proposed default assumptions discussed in this research.

A final question for further research concerns the structure of parental input in more naturalistic settings. The method we used in this study enabled us to make an experimentally rigorous comparison of the input that parents provide when they teach novel words presented as either proper names or adjectives. Yet clearly this method did not involve a naturalistic assessment
of parent–child speech. In typical storybook reading situations, parents and children usually do not engage in the teaching of novel ‘puppet’ words that are unfamiliar to both parties. Word teaching presumably also rarely begins with a highly meta-linguistic prompt like the one we provided to parents, asking them to focus on proper names or adjectives. Moreover, it is likely that parents do not normally engage in teaching entire sets of words under conditions that violate children’s default assumptions about meaning. Nonetheless, in this constrained word-teaching task, we were able to identify several distinctive features of the input associated with teaching words from these two lexical categories – features that could assist young children in learning how they are marked syntactically in their language. It now remains for future work to discover whether these features also characterize caregivers’ speech in more spontaneous parent–child interactions.

REFERENCES


