Adult offer, word-class, and child uptake in early lexical acquisition

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Abstract
How do adults offer new words from different parts of speech? This study examined the offers in book-reading interactions for 48 dyads (parents and children aged 2- to 5-years-old). The parents relied on fixed syntactic frames, final position, and emphatic stress to highlight unfamiliar words. As they talked to their children about the referent objects, events, or scenes, they also linked new words to other terms in the pertinent semantic domain, thereby presenting further information about possible meanings. Children attended to new words, often repeating them in the next turn, and, as they got older, they too related new words to familiar terms as they talked about their referents with their parents. These data add further evidence that interaction in conversation supports the process of language acquisition.

Keywords
interaction, lexical acquisition, repeats, uptake, word-class

How do adults introduce unfamiliar terms for objects, parts, properties, locations, and activities where the terms are drawn from different parts of speech? To what extent do they highlight such words in explicit introductions, using word order, say, as in ‘This is a lace’ (to introduce a term for a shoe-part, a noun), or ‘These are metal’ (to introduce a term for a property, an adjective)? Do they relate them to other terms already known, in implicit introductions like ‘Do you hear that dog barking?’ or ‘I want to find a bird that warbles’ (where barking and warbles are both terms for activities, both verbs)? And, do children provide any evidence of attending to new words, regardless of their word-class?

Do adults rely on the same structural devices to introduce new words across different word-classes? Or do they distinguish among them, favoring explicit introductions of the
unfamiliar term with nouns, but implicit ones with verbs, prepositions, and adjectives? That is, they could presuppose that children can infer what an unfamiliar word might mean, without highlighting, in the case of verbs, adjectives, or prepositions, word-classes whose syntax generally precludes their appearing in final position or receiving emphatic stress. The present study was designed to find some answers to these questions.

Previous analysis of parents’ spontaneous introductions of unfamiliar nouns to young children suggests that adults highlight them by using fixed frames to present them in final position. In fact, such offers accounted for the majority of direct adult offers in an analysis of five longitudinal corpora (Clark & Wong, 2002). Parents signaled their offers by relying on a limited number of deictic frames that placed the new noun in final, stressed position. Some typical examples are listed in (1) and (2):

(1) Father: That’s a pen. (Naomi, 1;8.6; Sachs 3:84)

(2) Mother: What is this? (pointing at a chair) Chair. (Allison 1;4.21; Bloom 1:86)

Frames like ‘That’s a _____ ’ provide children with a useful hint that a new noun is about to come up. Placing new words in utterance-final position could also highlight unfamiliar terms for child-addressees, by offering them directly, prominently marked by both word order and stress (Fernald & Mazzie, 1991; Grassmann & Tomasello, 2007). Yet children also hear and learn words other than nouns from the start. So the problem is one of identifying utterances that offer children unfamiliar non-nouns, namely verbs, adjectives, and prepositions. These introductions appear to be indirect in that the normal placement of the word in an utterance often fails to highlight it as new, unlike the utterances in (1) and (2).

Most of the 1446 adult utterances that Clark and Wong (2002) identified as offering new words in fact offered new nouns (84%). Among the remaining offers, 4% were adjectives, 5% verbs, and 5% prepositions. Typical examples of these, with the new word from the adult underlined and any follow-up child repeat in bold type, are shown in (3) to (5):

(3) An adjective
   Adam (3;8.0; Brown/Adam 36:1473+)
   Mother: what color is this? this is orange.
   Adam: orange? what color is dis?
   Mother: that is red.

(4) A verb
   Naomi (1;6.16; Sachs 2:653+)
   Naomi: doggie.
   Mother: what’s the doggie doing? is the doggie smelling?
   Naomi: doggie.

(5) A preposition
   Naomi (2;7.16; Sachs 68:338+)
   Naomi: one fell down on a tree.
   Father: he fell down from a tree.
   Naomi: he fell down from a tree.
Notice that in (3), the new adjective is introduced in predicate form, in final position, and can therefore carry utterance-final stress. The same holds for the new verb in (4). But the preposition in (5) is introduced as head of its phrase. This could be because it is presented as an embedded correction to Naomi’s choice of preposition, and so probably received contrastive stress. Adults, then, must be able to highlight terms that are not normally singled out by word order or stress.

Direct offers are those where adults highlight the new word being offered, regardless of its word class. Nouns can be highlighted as in (1) and (2); verbs and adjectives as in (3) and (4), and prepositions, at least when used contrastively to correct an earlier child utterance, as in (5). But when an offer is not highlighted, the addressee can ignore it or else rely only on inferences from context. For example, prenominal adjectives like *shaggy*, as in *the shaggy dog*, are hard to highlight except in corrective contexts, because they occur in prenominal position and do not carry stress. Much the same holds for transitive verbs, as in *The dog bit the postman*, where the verb precedes the direct object and so doesn’t receive sentential stress. Prepositions precede their noun phrases, as in *beside the stairs* or *above the window*, so they too are non-final, and, except in corrective cases, can receive no added stress. Intransitive verbs, though, as in *The piglets squealed when the boy picked them up*, can appear in clause-final position and so receive stress.

If adults prefer to make direct offers of unfamiliar terms, they should rely on whatever devices are available for each part of speech. For nouns, they should favor word order and stress, as in (1) and (2). Intransitive verbs can appear finally so adults could rely here too on word order and stress. And they might highlight transitive verbs with contrastive stress, with a question-answer format (as in (4)), where an initial general-purpose *do* is followed by a more specific verb, with contrastive stress, as in the hypothetical *What is the dog doing? He’s chewing the shoe*. The same strategy could perhaps be adapted to highlight prepositions, as in the hypothetical *Where’s the ball? It’s under the table*.

Adults also highlight new terms by placing them in the appropriate semantic domain, relating them to nearby terms that are already familiar (e.g., Callanan, 1990; Goodman, McDonough, & Brown, 1998; Rogers, 1978). They can use nearby words in contrast to the new one. An adjective like *shaggy* might be used alongside *smooth* or *short-haired* (for dogs); *winding* beside *straight* (for paths or streams); *chew* beside *bite* or *eat* (for people or animals); *squeal* beside *squeak, grunt*, or *call* (for animals) and *above* beside *on, over, high up*, or *on top of* (for spatial locations). Such contrastive uses would also help children assign unfamiliar words to the appropriate domain as they make inferences about possible meanings (Clark, 2002).

Do such options for adults change as children get older? In talking to younger children, parents may use more repeats of target words, perhaps as single words, until the children repeat the word to signal their attention to it (see Clark, 2007). With older children, adults will probably assume children will pick up the new word right away, so they should spend more time ‘placing’ each new word in context, talking about the relevant semantic domain, and perhaps asking children more test questions to make sure they have grasped the new meaning.

In this study, I focus on some of the characteristics of adult–child interactions in English as adults introduce children to unfamiliar words from different parts of speech. The general prediction is that adults will highlight new words. To do this, they will rely
on one or more devices, including phrase- or utterance-final word position, word stress, and linkage of new words to semantic neighbors. Children should attend to new words and indicate this by repeating them in subsequent turns within the relevant parent–child exchange. Earlier research showed that children repeat new words at consistently higher rates than they do new information (Clark, 2006, 2007). Adult offers should therefore be followed up by child repeats of new words, and both adults and children should contribute to linking new words to other terms already known within the pertinent domains.

**Method**

Parents were given the familiar task of looking at a picture-book with their children and talking with them about what was on each page. This is a common activity in everyday life, and involved a familiar mode of interaction for all the children. This task was chosen to elicit the kinds of conversational exchanges adults normally engage in with young children in order to look more closely at the information parents offer about new words (see, e.g., Murase, Dale, Ogura, Yamashita, & Mahieu, 2005; Tulviste, 2003).

**Participants**

Data were collected from 48 parent–child pairs, mainly from middle- to upper-middle-class families, with 12 children at each of the following ages: 2-year-olds (mean age 2;6, range 2;3–2;8); 3-year-olds (mean age 3;4, range 3;1–3;8); 4-year-olds (mean age 4;5, range 4;1–4;9); and 5-year-olds (mean age 5;4, range 5;0–5;8). Half the children in each age group were female, half male. About two-thirds of the participating parents were mothers and one-third fathers. The families who took part were typical of the ethnic mix found in the Bay Area of northern California.

**Procedure**

Each parent–child pair was seated at the end of a low table in a small room off a courtyard at the school. Parents were given a picture-book where just one picture was revealed, on the right-hand side, with each turn of a page. The pictures were centered on the page (20 cm × 13 cm), with a single word printed in a small box right at the bottom of the page. The parents heard the following general instructions, ‘We are really interested in how children respond to being read to. So please read this book to your child, just as you would at home. We’re going to record the session on videotape so we can transcribe it later,’ and, as an apparent afterthought, we added, ‘Oh, and if you can, use the words at the bottom of the pages,’ before they were shown where to sit for the recording-session so the book would be visible on camera.

**Materials**

The book was designed to facilitate the presentation of 16 words expected to be unfamiliar to most of the children. These words were drawn from four word classes – nouns, verbs, adjectives, and prepositions – and chosen because they did not appear in vocabulary lists for
preschool children. (The words and their accompanying pictures are given in the Appendix.)
The pictures children saw, bound as a book, were presented in one of three random orders
(three different versions of the book), counterbalanced over children within each age group.

The nouns served as a control condition in that the forms of noun-offers and the kinds
of uptake children display in spontaneous conversation have already been well docu-
mented (Clark, 2007; Clark & Wong, 2002). Responses to the new nouns in this study
were compared to those offered in spontaneous exchanges, and proved to be highly sim-
ilar; they therefore served as a baseline for the other three parts of speech. That is, the
kinds of offers parents favor for verbs, adjectives, and prepositions should also be just
the kinds most likely to be used in spontaneous exchanges as well. The comparability of
the data on nouns reduced the probability that parents were devising special strategies for
the specific task they participated in.

Transcription and reliability
Each picture-book session was videotaped to record the interaction between parent and
child, and to allow for the transcription and coding of all the speech used in conjunction
with each page in the book. Sessions were filmed with a Canon Optura-pi digital video
camera, on a tripod, set to look over the shoulders of parent and child at the book and to
capture speech centered on the book. Audio-recording was enhanced with a Canon
DM-50 shotgun microphone, switched to record in front of the camera. Films were tran-
scribed using MediaTagger (a program developed at the Max Planck Institute for
Psycholinguistics), with independent tiers for adult and child speech.

Reliability of the transcriptions was established by a second transcriber for 5% of the
tapes. Overall agreement was high (at or above 95%), and disagreements were resolved
by discussion before coding. The transcripts of all the speech from each adult–child ses-
sion were then coded for such features as use of the target word, use of the target word
as a single-word utterance, additional uses of the target word during the exchange, greater
stress on the target (relative to other words in the same clause: this was established at the
time of transcription), and children’s repeats of the target word in the turn after the adult
introduced it.

Results
Adults used the target words printed at the bottom of each page 95% of the time as they
‘read’ the picture-books to their children. They omitted them 10% of the time with
2-year-olds, 3% of the time with 3-year-olds, 4% with 4-year-olds, and 3% with 5-year-
olds. A few children already knew one of the target words, and some, mainly 4- and
5-year-olds, knew more than one. The analyses that follow are based on how adults pre-
sented each type of target word, and on how children responded.

In the exchanges between parents and children, parents typically took the lead but chil-
dren contributed more and more to the conversation about each picture as they got older.
Adults engaged their children with appeals to past experience (D you remember . . . ?),
allusions to shared knowledge (We did something like this . . . ), and general information
about the object or event in question. While 2-year-olds’ contributions were sometimes
minimal, mainly in the form of answers to adult questions, older children contributed
actively to each exchange, bringing up relevant information, and relating what was new to what they already knew.

**Adult offers of target words**

Did adults highlight the words they were asked to use in talking about each picture? And did they do so across all four word-classes? The short answer is ‘yes.’ They used a variety of devices, typically in combination, to introduce the words from each word-class. These devices included presentation frames, single-word uses, final position word order, added stress, multiple uses of target terms, and linkage to known words.

**Presentation frames.** When adults offered unfamiliar words, they did so using a small number of frames, with different ones favored for each word-class. Typical examples are given in (6)–(9), with the new word underlined. In many cases, adults would first solicit the child’s attention by asking a question such as ‘What’s that?’, ‘You know what that is?’, or ‘What do you see?’ (see Estigarribia & Clark, 2007):

(6) Noun frames
a. Adult (to child 2;6.5): You know what? This part of the sailboat is called a **[JIB]**
   2
b. Adult (to child 3;8.3): That’s a **[SPINE]**.

As predicted, noun-offers typically appeared in deictic frames, with *this* or *that*, and with the noun in utterance-final position with stress, as in (6). These frames are also favored for new nouns in spontaneous conversation (Clark & Wong, 2002). In fact, most of the adults were very consistent in how they introduced nouns, typically starting with the whole and moving to a part (as in (6a)) or starting with the set of items (e.g., birds, tools) and then taking up each subtype in turn. This is where children often contributed too, by, for example, offering any terms for bird or tool types they already knew. Overall, 75% of the parents of the 2- and 3-year-olds used the same ordering of information on at least three out of four occasions and often on all four, in their offers for nouns.

Verbs appeared to present a slightly more complex case. Adults generally introduced transitive verbs in *general question*+*specific answer* sequences, as in (7a), with contrastive stress added to the non-final verb in the answer clause. But they tended to present intransitive verbs directly, with stress on the verb in final position, as in (7b):

(7) Verb frames
a. Adult: What’s that owl doing?
   Child (2;6.14): He, that thing? (pointing to knitting)
   Adult: He’s **[KNITTING]** a sweater.
   b. Adult (to a child 2;7.9): The bird is— **[CHIRPING]** [followed by chirping noises]

That is, they took advantage of the fact that intransitive verbs can readily be used in phrase- or utterance-final position in English and hence with utterance-final stress, while with transitive verbs, they would opt for a question+answer format, in which they produced both question
and answer, with contrastive stress on the target verb in the answer. Again, they were consistent in their choices of offer-frames, with 75% of the parents of 2- and 3-year-olds nearly always (on three of four or all four occasions each) opting for the same frame across verbs.

They offered adjectives in predicative form, and tended to favor frames that presented the adjective in utterance-final position, hence with stress, as in (8):

(8) Adjective frames
   a. Adult (to child 2;6.5): He’s going s— up, up, up the mountain, very **STEEP**.
   b. Adult: Some things are rough ’n some things are—
      Child (4;7.26): Not rough.
      Adult: Not rough? Another word for ‘not rough’ is **SMOOTH**.

As in the case of transitive verbs, the introductions sometimes also made use of contrastive lexical information, as in *rough vs smooth* in (8b). Here 67% of the parents (8 of the 12 for both the 2- and the 3-year-olds) made use of final position in the predicate in first presenting new adjectives. Parents preferred to first present unfamiliar adjectives in predicate rather than attribute position by a ratio of 3:1 at age 2, and by 5:1 at age 3, thus maximizing final position stress on the new terms.

Finally, the frames favored for unfamiliar prepositions showed that adults added stress, often contrastive stress, and sometimes paused after producing the preposition as if it was in fact utterance-final, before they continued with the rest of the prepositional phrase, as in (9b), or followed the preposition on its own with a full prepositional phrase. In short, adults highlighted prepositions with extra stress (generally by placing them in phrase-final positions) even though they don’t normally occur in final position or carry stress in English:

(9) Preposition frames
   a. Adult: And what’s this?
      Child (2;8.16): Teddybear.
      Adult: Another teddybear and, they’re kinda sitting next to each other, they’re **BESIDE** each other.
   b. Adult: It’s under the umbrella or it’s—
      Child (4;7.26): In the sand.
      Adult: In the sand, it’s **BELOW**— the umbrella.

To sum up, the introductions adults favored incorporated several highlighting options: use of a small number of frames, placement of target words in final position, and use of final or emphatic stress. Here, 79% of the parents of the 2- and 3-year-olds were consistent in their introductions in three out of four or four out of four cases for unfamiliar prepositions.

The forms used with the two older groups were somewhat less consistent, for two reasons: first, the older children contributed more to the exchange for each page and often derailed the introduction of the new term by focusing on some other aspect of the target picture, and, second, older children knew some of the words in each of the word-classes examined.

Single-word uses. Adults also used single-word utterances for highlighting. The proportions of first uses that were single words are shown for each age in Table 1. They would introduce words to each age group by using them first on their own before embedding them
in a phrase or clause, but the four word-classes did not differ significantly overall, $F(3,176) = 2.38$, NS. To check whether adults made use of more single-word presentations for forms that would normally appear in final position, I also compared prepositions (canonically non-final since they are always the head of their phrase) with nouns (canonically final in a predicate), but the difference between them was not significant, $t(1) = 1.89$, NS.

**Final position.** Adults chose final position very frequently for all four word-classes in presenting new words to their children, $F(3,176) = 17.11$, $p < .0001$. They did this significantly more often for nouns, 66%, than for verbs, 52%, $t(1) = 2.26$, $p < .02$, or adjectives, 51%, $t(1) = 2.19$, $p < .03$, and significantly more often for verbs and adjectives than for prepositions, 27%, $t(1) = 4.57$, $p < .0001$, as shown in Table 2.

**Added emphasis.** Adults also made rather consistent use of stress to highlight target words when they introduced them, regardless of their position in the utterance. This did not differ overall with age, but adults tended to place stress on nouns, adjectives, and verbs more often than on prepositions, as can be seen in Table 3. And, in their offers to 4- and 5-year-olds, they used emphatic stress less often on verbs than they had for younger children. This could have been because the older children were in fact familiar with some of the verbs in question.

**Multiple uses.** Finally, adults typically used each new term several times as they talked about the relevant scene pictured on the page. Remember that they sometimes introduced the new word first on its own, as a single-word utterance, and then repeated it in a full phrase or clause. In addition, many of them used the new term several times in the course of talking about the scene on the relevant page.

The average number of uses for words in each word-class, for each age, is shown in Table 4. Interestingly, adults were more likely to repeat those parts of speech that are

### Table 1. Percentage of single-word uses in adult introductions

<table>
<thead>
<tr>
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<th>Nouns</th>
<th>Verbs</th>
<th>Adjectives</th>
<th>Prepositions</th>
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### Table 2. Percentage adult use of final position for each word-class, by age

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Table 3. Percentage adult use of added stress for each word-class, by age

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<tr>
<td>Mean</td>
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Table 4. Number of times adults produced target words by word class and age

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normally used in non-final position in phrases or clauses, and therefore without added emphasis – namely verbs, adjectives, and prepositions. This suggests that this type of repetition offers another way to highlight unfamiliar terms for young children.

Links to known words. When adults introduced new words, they consistently linked them to other terms from the same semantic domain, terms pertinent for talking about the scene depicted. In (10), for example, the parent offers the noun \textit{jib} in the context of other information about sailing:

(10) Adult (talking about a picture of a sailboat with two sails): Now this is the back sail [points], this is the front sail [points], and this [points at the front sail again] has a special word to describe it. D’you know what it is?
Child (3;6.20): \textit{I don’t know.}
Adult: It’s called a \textit{JIB}.

The semantic neighbor offered most frequently with \textit{jib} was the noun \textit{sail}, followed by the more specific \textit{front-sail}, \textit{mainsail}, \textit{back sail}, and, very occasionally, \textit{spinnaker}. They also produced a number of other sailing terms, as shown in Table 5, with more of these offered the older the child being talked to.

To give an idea of what adult usage looked like, the terms adults used have been divided into four or five tiers, depending on their frequency in parental speech. Larger print, along with the actual numbers within each age group, in Tables 5–8 indicates that more parents used that word or expression, with less frequent uses shown in successively smaller print-sizes. The patterns in Table 5 are representative of usage for that word-class as a whole. The noun \textit{jib}, for instance, first elicited general sailing terms,
with boat probably turning up the most often, then terms for other sails – main, main-sail, spinnaker (all local contrasts for jib) – and terms for other boat parts (rudder, bow), and then other elements of sailing (wind, gaff-rig, motor). Most of the contrasting terms here were nouns. The same pattern held for the other nouns adults introduced at each age.

In (11), for a picture of hands holding a piece of wood and a carving tool, the parent introduced a verbs, namely carve:

(11) Adult: This must be some wood [points], and he’s using that [points to tool], to carve it. So that’s another word for cut.
Child (4;9.0): Cut (the) wood!
Adult: Cut wood.
Child: Yeah.
Adult: CARVING is cutting wood.

For this verb, adults offered verbs like cut and shape as near neighbors as well as the more specific sculpt, scoop, shave off, and smooth out. Many adults also mentioned the instrument used – tool, knife, and chisel – as well as the material, namely wood. The range of terms used to each age-level with the verb carve is shown in Table 6.

When offering unfamiliar adjectives, many of them focused on other entities that the adjective could apply to. In (12), the parent introduces the adjective steep, applied to a picture of a man climbing a steep hill:

(12) Adult: They’re–, they’re– he’s climbing up a hill. It’s a STEEP hill because it goes . . . high! It goes high. It goes really high really fast. So it’s STEEP. Can you say steep? Steep.
Child (2;8.1):  Steep!
Adult:  Steep. Do you like steep hills? Do you remember—Do you know we walked up some steep hills this morning on our walk—when we were looking for rocks?

The most common neighbors here were the verb climb, the nouns mountain, hill, and slope (other referents that could be described as steep), and the adjective flat. Parents also often presented direct contrasts between steep and flat as they talked about surfaces one could walk on.

Table 7 summarizes the terms linked to steep. When used to 2- and 3-year-olds, this adjective was usually accompanied by the nouns hill and mountain, and the verb climb or climb up. Offers of neighboring adjectives, like flat, big, tall, high, and low, increased in number with age, perhaps reflecting children’s growing skill in using different dimensional adjectives (e.g., Clark, 1972; Ebeling & Gelman, 1994; Rogers, 1978), as well as their greater knowledge about physical properties of the terrain, and about activities like hiking and climbing.

Finally, the exchanges in (13) and (14) illustrate what parents typically did in introducing prepositions. They usually offered near-neighbors that were also close in meaning to the target term.

(13)  Adult (to child 2;5.13, for a picture of an umbrella and a ball on the beach):  This is a ball, BELOW... an umbrella. If you’re under something it means you’re BELOW it.
Okay so, the ball is where in—<repair> compared to the umbrella? You know?
Child: Under.
Adult: Under, and another word for under is... BELOW.

The most frequent neighbors offered here were the preposition under, the prepositional phrase on the ground (for the location of the ball), and the adjective low. But compared to the other word-classes, adults supplied remarkably few neighbors for prepositions. Where they could, they appeared to rely on near-synonyms with similar syntactic functions, but as Table 8 reveals, the number of related terms they used was rather limited compared to the networks of terms evoked by unfamiliar nouns, verbs, or adjectives.

With prepositions, the terms adults mentioned most frequently were those for the two entities being related in space. In fact, many adults produced only the two nouns for these and the target preposition for the target relation. However, with children aged 3 and older, parents sometimes offered contrasting relations in space as they tried to elicit a preposition, as in (15):

(15) Adult (to child 3;4.29, after both have looked at the picture and the child has identified both a ball and an umbrella): Now, where’s the ball? Up high, down low, around, above, below, the umbrella?
About one-quarter of the parents did produce a few related terms for below, mostly its opposite, above. They also produced the adjective pair high and low, and other prepositional pairs like up and down, or under and on top of, or over, all terms relevant to 4- and 5-year-olds’ knowledge of terms for spatial relations (Clark, 1972).

In summary, parents situate words from different word-classes rather differently when they link them to a semantic domain. They tend to link nouns to other nouns, and verbs to other verbs. But with adjectives, they focus more on terms for the kinds of entities the adjective can be applied to, and with prepositions, they focus almost entirely on the terms for the locatum and location (or figure and ground) that are being related. For all four word-classes, however, they go far beyond simple use of the target word alone.

On occasion, parents also appealed to past events as they were explaining what a new word referred to. For example, in (16) and (17), the adults use such a link when trying to explain what steep means:

(16)  Adult (having already used ‘It’s a steep hill,’ ‘It’s steep,’ ‘Do you like steep hills’): Do you rememb— Mm-hm. Do you know we walked up some steep hills this morning on our walk? When we were looking for rocks?

Child (2;8.11): Adult:

(17)  Adult: Oh. This hill is very— Remember when we were climbing those rocks? It was— steep.

Table 8. The preposition BELOW and its semantic neighbors

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-year-olds</td>
<td>UMBRELLA-18, (BEACH) BALL-16</td>
</tr>
<tr>
<td></td>
<td>ABOVE-1, UNDER-1, OVER-1</td>
</tr>
<tr>
<td>3-year-olds</td>
<td>(BEACH)BALL-35, UMBRELLA-28, ABOVE-13</td>
</tr>
<tr>
<td></td>
<td>UNDER-6, ON TOP OF-6, DOWN-4, CHAIR-4</td>
</tr>
<tr>
<td></td>
<td>ON-2, SAND-1, BEACH-1, LOW-1, SHOES-1, UNDERNEATH-1, LOW-1, UP-1,</td>
</tr>
<tr>
<td>4-year-olds</td>
<td>UMBRELLA-16, (BEACH) BALL-16</td>
</tr>
<tr>
<td></td>
<td>SAND-4, UNDER-4</td>
</tr>
<tr>
<td></td>
<td>HIGH-2, LOW-1, IN-1, DOWN-1, BEACH-1, UNDERNEATH-1, BESIDE-1, INSIDE-1, UP-1</td>
</tr>
<tr>
<td>5-year-olds</td>
<td>(BEACH)BALL-16, UMBRELLA-15</td>
</tr>
<tr>
<td></td>
<td>ABOVE-9, UNDER-4, BEACH-3, CHAIR-3</td>
</tr>
<tr>
<td></td>
<td>DOWN-2, ON-1, OVER-1, NEXT TO-1, ON THE SIDE-1, UP HERE-1, SHOES-1</td>
</tr>
</tbody>
</table>

Note: The numbers indicate how often parents used each neighbor of the target term within each age group.
Child (3;8.16): *No, no, it was— really— hard to get— up.*
Adult: Mm-hm.
Child: *'Cause it was steep.*
Adult: *'Cause it was steep, right. Very good.*
Child: *We saw a lizard.*

Appeals to experience like these present children with another route for linking new words to domains and terms they already know (see also Veneziano, 2001).

Finally, parents also offered further information to underline the meaning of the new term, as in the exchanges about sails in (18) and (19):

(18) Adult (having introduced the term *jib*, now pointing at the picture of the boat): There’s another sail that goes way out here, and it’s usually bright coloured, and when the wind’s blowing really really hard— It’s a neat sail. It’s called the spinnaker. So you’ve got the spinnaker, the *jib*, and the main.
Child (5;0.15): *Oh.*

(19) Adult (having introduced *jib* and having explained that it’s the front sail)
Child (4;8.1): *But what’s the back sail called?*
Adult: You wanna know something? I don’t know. It doesn’t say. It just says what the front sail is, in front. Maybe it’s called a mainsail. But I’m not that sure.
Child: *Or maybe it’s the sail of the country it is.*
Adult: Well that could be. It could be an American sail or an Australian sail. But the front one now is the *jib*.
Child: *Or a sail from Ja— Japan?*
Adult: It could be, ’cause you know different countries learn how to sail boats in different ways. So some countries the sails are square, and some countries there are two, and sometimes there are three. And, you know, people just kept experimenting and it had a lot to do with how the wind blows in some countries and how the water behaves in others.

In summary, parents typically do far more than just present children with an unfamiliar word. They link the new word to related terms in the relevant domain; they offer other terms that contrast with it directly, and they appeal to past experiences as they situate the word for their children. All these tactics appear designed to help children embed new terms into appropriate places in their increasing complex networks of lexical meanings.

**Child uptake**

In everyday conversation, children repeat unfamiliar terms they are offered directly about 50% of the time. In fact they repeat new words significantly more often than they repeat new information (Clark, 2007). So the extent to which young children take up unfamiliar terms is one measure of the attention they pay to those words when they are offered. Repeating the
target word in the next turn is one indication that children are attending to the adult’s utter-
ance: it suggests they have identified the probable referent in context (at the joint focus of
attention) and have made sufficiently good note of the word to try to reproduce it.

Other indications that children are attending include acknowledgments with a form like
uh-huh, mmh, yeah, or oh. These, though, suggest a lesser degree of attention, with children
registering that the adult has said something but without offering evidence that they have
taken in the term actually used. (This would not preclude their having taken it in, however:
they could have added it to their representations for comprehension without giving overt
evidence of having done so.) Another indication that they are attending is their contribution
of subsequent utterances relevant to the topic under discussion. Such comments suggest,
for example, that they have grasped which domain the new term belongs to.

Child repeats. The percentage of repeats, either as single words or embedded in longer
phrases, is shown by word-class and age in Table 9. As in earlier studies, children often
repeated the words highlighted by the adults in their offers. They did so more often as
they got older, with a rise from 38% at age 2 up to 69% of the time at age 5. The 4- and
5-year-olds in particular repeated the verbs, adjectives, and prepositions on average 69%
of the time overall, and repeated nouns only slightly less often, at 64%. Overall, chil-
dren’s rates of repetition in the present study matched those for new nouns, and their
repetitions appeared to have the same function – acknowledging the adult’s offer (Clark,
2007; Clark & Bernicot, 2008).

Other evidence of attention. Even when children didn’t repeat the target term offered,
they sometimes acknowledged it with forms like mh, uh-huh, or yeah. For the four terms
used in illustration earlier – jib, carve, steep, and below – 2-year-olds responded with an
acknowledgment in the next turn after presentation 22% of the time. The rest of the time,
they either repeated the target term, or said nothing at all. For 3-year-olds, the rate of
acknowledgments dropped to 15%, and from age 4 on, to 4%. In short, repeats were
much more frequent as immediate responses to the unfamiliar words (see Table 9).

To what extent did children’s follow-up utterances indicate that they had successfully
identified the relevant domain for the new word? Notice that the context, namely the
picture they were looking at, provided some help, but the picture on its own, while identi-
fying the general conceptual domain in question – a sailing-boat, someone carving
wood, someone climbing a hill, a beach scene – doesn’t automatically lead children to
retrieve whatever words they already know that might be the most pertinent for that
occasion. I therefore looked at the terms contributed first by the child rather than the
adult in exchanges that followed the introduction of jib, carve, steep, and below. Again,
these terms were representative of their word-class.

Two-year-olds tended to make only minimal contributions to the exchange. Five of
the 12 children labeled the picture of a boat as ‘boat,’ and one also contributed both ‘out-
side’ and ‘on water.’ Two tried to identify the activity in relation to carve, with ‘They’re
painting’ and ‘A spoon [the chisel] going over like dis.’ And five identified the ball or the
umbrella in the beach scene targeting below. (None of them contributed to the initial
discussion of the picture for steep.)

Three-year-olds did somewhat better. Eight of the 12 identified the boat as a ‘boat’ or a
‘sailboat,’ or, in one case, as a ‘ship.’ They asked about other sails, ‘Is this a front sail too?,”
Clark

identified the shape as a ‘triangle,’ and converted the new noun *jib* into a verb: ‘You’re jib-bing?’ For the activity of carving, two focused on the making of something, and two on the material affected (‘wood,’ ‘but it’s harder [than pla-doh]’). Five contributed ‘climb’ or ‘climbing’ in relation to *steep*, while two others contributed ‘hill’ and ‘hard to get up.’ Ten of them mentioned ‘ball’ and five ‘umbrella’ for the beach scene (target word *below*), and two mentioned ‘sand.’ They also introduced ‘high,’ ‘low,’ ‘down,’ and ‘on the sand.’

Four- and 5-year-olds made contributions much like those of the 3-year-olds for the picture of the boat (*jib*), usually identifying ‘a boat’ or ‘sailboat,’ and in a couple of cases adding the further terms ‘raft’ and ‘bow.’ In the case of *carve*, though, 5-year-olds contributed a greater range of verbs for the activity: ‘touch,’ ‘cut,’ ‘make,’ ‘chiseling,’ ‘hitting,’ ‘shaving,’ and ‘scratching,’ as against the 4-year-olds’ verbs: ‘make,’ ‘put,’ ‘cut,’ and ‘hammer.’ With *steep*, again, 4- and 5-year-olds made similar contributions. They used verbs like ‘climb,’ ‘climb up,’ ‘slip,’ ‘slip down,’ ‘pull down,’ ‘tie on’; nouns like ‘hill’ and ‘mountain,’ and qualified these as ‘hard,’ ‘rocky,’ ‘dirty,’ ‘thick,’ and ‘too high.’ Lastly, with *below*, there were contributions from nine 4-year-olds and ten 5-year-olds. They used ‘ball’ (or ‘beachball’), ‘umbrella,’ ‘sand,’ ‘down,’ and ‘under,’ and they listed the colors on the ball and umbrella.

In summary, from age 3 on, children contributed substantially to the talk about each picture, spontaneously labeling the referents depicted, and suggesting interpretations of what was happening. Younger children tended to follow the adult’s lead on what was happening in each picture, but by age 4, children began to offer elaborations and even alternatives as they pursued the topic for each page in the book.

**General discussion**

Parents flag unfamiliar words in picture-book reading sessions. They do this in several ways, exploiting strategies they also use in introducing new words in the course of conversation. They highlight words syntactically by using a small number of standard syntactic frames for each word-class. They favor final position in the phrase or clause for the new word, a position that receives clause- or utterance-final stress. And they add extra stress when the target word is not in final position. These strategies all contribute to highlighting the unfamiliar word, while offering clear clues to its word-class – as a noun, verb, adjective, or preposition (see also Clark, 1998; Clark & Wong, 2002; Hall, Burns, & Pawluski, 2003; Manders & Hall, 2002). The syntactic frames not only identify the word-class of the new word, but provide certain clues to the type of meaning it may therefore carry (see Fisher, Klingler, & Song, 2006; Kako, 2005, 2006).

<table>
<thead>
<tr>
<th>Age</th>
<th>Nouns</th>
<th>Verbs</th>
<th>Adjectives</th>
<th>Prepositions</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>2s</td>
<td>46</td>
<td>33</td>
<td>44</td>
<td>27</td>
<td>38</td>
</tr>
<tr>
<td>3s</td>
<td>42</td>
<td>54</td>
<td>52</td>
<td>52</td>
<td>50</td>
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<tr>
<td>4s</td>
<td>56</td>
<td>81</td>
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<td>67</td>
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<tr>
<td>5s</td>
<td>71</td>
<td>69</td>
<td>65</td>
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<td>69</td>
</tr>
<tr>
<td>Mean</td>
<td>54</td>
<td>59</td>
<td>54</td>
<td>53</td>
<td></td>
</tr>
</tbody>
</table>
Semantically, adults link new words to others that are already known to the children. For example, they connect new words to superordinate or subordinate terms in the same domain (see also Callanan, 1990; Shipley, Kuhn, & Madden, 1983). They offer contrasting information in the form of other terms from the same semantic domain, e.g., smooth vs rough for adjectives, or above vs below for prepositions (see Clark, 1987, 1990; also Shipley & Kuhn, 1983). And they invoke the vocabulary for the setting depicted on each page, effectively setting the scene linguistically for the picture by calling up relevant terms and expressions. This in turn provides children with information about when, as well as how, to use the new term (see Rogers, 1978; Wilkins, 2002).

Adult reliance on terms that collocate with the new word offers children information about how that word can be combined with others — adjectives with nouns, for instance, or verbs with nouns, and prepositions with nouns (see Bowerman, 2005; Goodman et al., 1998). This provides yet another source for inferences about possible meanings. Finally, adult uses of nouns with nouns, as in ‘a tern is a kind of bird’ or ‘awls are tools’ presents children with further hierarchical and perspectival information about lexical organization and use (Callanan & Sabbagh, 2004; Clark, 1997).

Children take up some of this information from an early age. For example, having just turned 2, they are able to make inferences about set-membership from single exposures to a statement that ‘an X is a kind of Y’ in a word-learning task where both X and Y are new words (Clark & Grossman, 1998; see also Clark, Gelman, & Lane, 1985; Waxman & Senghas, 1992). By age 3 (and probably earlier), they can make use of information about part of speech in interpreting new words shown with a referent-picture, correctly identifying a verb as referring to the action depicted, a mass noun as referring to the substance affected by the action, and a count noun as referring to the instrument used (Brown, 1957; see also Dockrell & McShane, 1990; Hall & Graham, 1999; Hall, Quantz, & Persoage, 2000). Finally, children make use of collocations, for example, between a known verb and an unfamiliar noun, to make inferences about the possible meaning of the unfamiliar noun (Goodman et al., 1998).

More generally, children can make use of positive information about language and language use to change their own developing systems. They are attentive to adult reformulations, where adults repeat child utterances with the errors repaired, and they often ratify such repairs directly by repeating the corrected form or phrase (Chouinard & Clark, 2003; Clark & Bernicot, 2008; Saxton, 2000; Saxton, Kulcsar, Marshall, & Rupra, 1998). Finally, of course, children are continuously exposed to new words in the general course of family conversations, regardless of age (e.g., Beals, 1997; Weizman & Snow, 2001).

**Conclusion**

These findings suggest that models of language acquisition need to take account of all the sources of information available to children. Models need to be able to characterize those inferences about probable meanings that are licensed in context as well as those licensed by what adults offer in conversation along with a new word: the kinds of linguistic information they supply about the referent object, action, property, or relation, and how they relate that information to other terms from the same domain. They also need to track children’s attention to new words, whether children acknowledge or ratify them.
after hearing them offered, and the extent to which children, in their turn, try to relate a new word to others they already know.

In short, children discover word meanings in the course of interaction. As Bowerman and Choi (2001, p. 505) pointed out, ‘Non-linguistic perceptual and conceptual predispositions . . . do not, then, shape children’s semantic categories directly, but only in interaction with the semantic structure of the language being acquired’ (emphasis added). But for children to become sensitive to the relevant semantic structure, they must interact with more knowledgeable speakers – parents, caretakers, and older siblings. While Brown (1968) proposed that interaction in discourse provided ‘the richest data for the discovery of grammar,’ the present findings support the view that interaction itself plays a vital role in children’s discovery of the basic elements in language as well – the meanings of individual words.

Appendix: Pictures and target words

Each version of the book used contained 16 pictures with one target word included on each picture-page. The pictures and the relevant target word (in italics) were:

1. Adjectives
   a. a curved-belly jug – smooth
   b. set of six colored crayons – purple
   c. a man walking up a hill – steep
   d. rocks in a riverbed – stony

2. Verbs
   a. human hands holding a piece of wood and an awl – carve
   b. cowboy on a moving horse – gallop
   c. an owl on a branch holding knitting needles and wool – knit
   d. a bird with its beak open – chirp

3. Prepositions
   a. two bears seated side-by-side – beside
   b. an umbrella leaning over a ball on sand – below
   c. a small ball with seven jacks scattered round it – among
   d. a ceiling fan above a bed – above

4. Nouns
   a. a barrel cactus – spine
   b. three different sea birds – tern
   c. a boat with sails – jib
   d. a hammer, an axe, and an awl – awl

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Notes
1 All utterances cited from the CHILDES Archive are identified by the corpus name, file number, and line.
2 Words set all in capitals indicate emphatic stress. Target words are underlined.

References


