"Mummy! Ball! Fish!": Why English-learning children produce nouns earlier than verbs

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Abstract
When English-learning children begin using words the majority of their early utterances (around 80%) are nouns. Compared to nouns, there is a paucity of verbs or non-verb relational words, such as “up” meaning “pick me up”. The primary explanations to account for these differences in use either argue in support of a ‘cognitive account’, which claims that verbs entail more cognitive complexity than nouns, or they provide evidence challenging this account. In this paper I propose an additional explanation for children’s noun/verb asymmetry. Presenting a ‘multi-modal account’ of word-learning based on children’s gesture and word combinations, I show that at the one-word stage English-learning children use gestures to express verb-like elements which leaves their words free to express noun-like elements.

Keywords: language development, child language, gesture, lexical acquisition, argument structure, cognition, socialization.

1. Introduction
Research investigating lexical development has largely focused on children’s early word production, and more particularly their word comprehension. Studies examining pre-speech communication and early gesture-speech development have noted that children’s first words regularly occur with gestures which tend to occur prior to speech (Bates 1976, Bruner 1978, Carter 1975, Dore 1975, Goldin-Meadow and Butcher 2000, Greenfield and Smith 1976, Zinobar and Martlew 1985). In addition, Kelly (2006) has shown that early construction development in English-learning children is influenced by their earliest communications evident in gestures and gesture + speech combinations.

One consistent finding in studies of early lexical development is that in young English-learner's one-word speech, there are a large number of nouns referring to objects, people, food, and body parts (Brown 1973, Nelson 1973). Compared to nouns, there is a paucity of verbs or non-verb relational words used to encode actions, events, and relations (Gentner 1982). Several explanations have been advanced in order to account for differences in use of nouns and verbs by young language-learners. The primary accounts for early lexical differences can be broken down into two distinct theoretical
positions that either argue in support of what I term the cognitive account, or provide evidence challenging this account. This paper seeks to add to accounts for the noun/verb asymmetry by examining gesture. It aims to determine whether gesture plays a role in young English-learning children’s early lexical development, specifically, in their development of grammatical categories of ‘noun’ and ‘verb’. In the following sections, I present the two current positions, and then propose an additional explanation for the noun/verb differences, based on children’s gesture and speech combinations. I term this the multi-modal account.

2. Background

Research into early lexical acquisition has often focused on accounting for the role of cognition in development, specifically, examining the role cognition plays in children’s early word learning, and how much of children’s early lexical acquisition can be attributed to cognitive development. Support for a cognitive account of lexical development has been challenged on the basis of linguistic specificity as well as different developmental trends across different input scenarios. I turn now to a brief explanation of the key positions in this debate.

2.1 The cognitive account

One primary difference between the two lexical categories of noun and verb may be the cognitive complexity associated with learning the meanings of nouns versus verbs (I refer to this as the cognitive account). This account of lexical acquisition has led to, and continues to fuel, a great deal of debate in child language acquisition. Gentner's (1982) research into the order and frequency of children's early use of noun and verb production was the impetus for many more studies aiming to find an explanation for the lexical patterns. Gentner's cognitive account of why verbs are slower to be learned than nouns focuses on the idea that verbs are cognitively more complex for children to acquire than nouns and this accounts for the difference in their acquisition across several languages. Gentner's data establishing the preponderance of nouns comes from several languages, as diverse as English, Japanese, German, Turkish, Kaluli, and Mandarin (Gentner 1982). The primary explanation for this account is based on the fact that the meanings encoded by nouns are easier to learn than the meanings of verbs because nouns refer to entities or things that children can observe for themselves. Referents of nouns are stable across space and time. They are static, individual entities that can be touched and located in space again and again. The referents of verbs, on the other hand are transitory in nature. Actions involve motion and changes in appearance, and they encode relations between things (Gentner 1982, Tomasello 1992) which, from a semantic perspective, are inherently more complex and abstract than the information encoded in nouns (Clark 1993). Verbs also contain information that extends beyond the action, such as the conflation of manner with the action, as in She rolled down the hill in which the verb rolled conflates action and the manner in which the action occurred.

There has been a great deal of support for Gentner's claim regarding the different cognitive pressures in learning nouns versus verbs (Golinkoff, Hirsch-Pasek, Mervis, Frawley, and Parillo 1995, Parisse and LeNormand ms., Tomasello 1992). For example, in a more recent study, Parisse and
LeNormand (ms.) compared the first words of young English-learners and young French-learners. Their findings suggest that children acquiring these languages use many more nouns than verbs – a use-frequency pattern that is not reflected in the input language the children receive because the input in French contained more verbs than nouns. These differences across the two languages are considered as strong evidence for cognitive origins in the development of these word classes.

Accounts of young English-learners' use of nouns compared to verbs have examined children's earliest word uses and also the frequency of verb versus noun uses in their talk. One area that has not been examined, until recently, is whether there are differences in use of nouns versus verbs between adults and older children who are proficient in their language use and already have the categories noun and verb, versus differences in the language use of adults. D'Amico, Betrovato, Casparini, Costabile, and Bates (2002) addressed this issue by testing noun and verb production during picture recognition tasks given to 68 Italian-speaking 5-year-olds and 84 adults. They found that for the 5-year-olds, action naming is harder than object naming, even for words that the children knew. This suggests that the noun-verb difference is not restricted to the first stages of lexical development, but is observable, at least for lexical retrieval in an experimental situation, long after children have begun to produce their first words. This finding indicates that the emphasis on the complexity of children's first words is only part of the story, and in reality the noun-verb difference is not isolated to children's earliest words; rather, the difference is attributable to the complexity of the actions being indexed by the verbs.

The above studies suggest that across a wide range of parameters, verbs are cognitively more complex than nouns, and that this complexity has implications for their onset of use in children's language, as well as their frequency of use.

2.2 Challenges to the cognitive account

Despite solid support for the claim that verbs are more cognitively complex than nouns, several researchers have suggested that this alone is not sufficient to account for the acquisition order of nouns and verbs, particularly when we look cross-linguistically. Beyond looking at the frequency of use, researchers have also examined the situations in which children use nouns and verbs. For example, Gelman and Tardiff (1998) found that young children (aged 12-18 months) use more nouns than verbs regardless of the activity that they are involved in, be it looking at picture books or playing with mechanical toys. However, older children (around 3 years) use more nouns when reading picture books and more verbs when involved in activities such as playing with mechanical toys (Gelman and Tardiff 1998, Tardiff, Gelman and Xu 1999).

Although Gentner (1982) examined cross-linguistic data (English, Japanese, German, Turkish, Kaluli, Mandarin) in developing her cognitive-based position, researchers have suggested that there is more to the issue of acquisition of nouns and verbs than implied by studies focusing on cognitive complexity alone. They argue that this order of acquisition and frequency of use is not a developmental universal constrained by cognitive parameters. Gopnik & Choi (1990) and Choi (1998) reported that the first words of Korean-speaking children include far more verbs than do those of English-speaking children. Also, the overall frequency of use of verbs is higher than the frequency of noun use. Au, Dapretto, and Song (1994) have reported a conflicting experimental result in which they found similar distribution across the two categories. However, in a study of Korean- versus English-
learning children's spontaneous utterances, Kim, McGregor, and Thompson (2000) found that children acquiring English had significantly more nouns than verbs in their first 50 words. At this stage, Korean children learned significantly more verbs than did English-learning children. Kim et al., attribute this difference to the input addressed to the children. Korean-speaking caregivers used significantly more verbs, and more salient cues to the category of the word than did English-speaking caregivers. Several of the researchers challenging the cognitive account suggest that the nominal bias emerges only in languages whose cultures tend to emphasize nouns (for example in languages and cultures where caregivers regularly label objects with nouns). They argue that these data suggest that both general socio-cultural and cognitive factors as well as language-specific factors shape the early lexicon.

Even in English, the noun-bias may not be as strong as was initially believed (Bloom Tinker and Margolis 1993, Vihman & McCune 1994). Researchers have noted that frequency counts of verb-use in English can be misleading because child-English encodes many relational concepts with forms that are not verbs (Gentner 1978, Choi 1999, Clark 2000) but are encoded by verbs in other languages, such as Korean (Clancy 1995) and Mandarin (Gelman and Tardiff 1998). English-speaking children do not always use verbs to talk about things that adults would use a verb for. For example, a child may say up when she wishes to be picked up or off when she wants something taken off (Gopnik and Choi 1993, 1995, Tomasello 1992).

Motivations for children's lexical development patterns and early use of a high number of nouns have been examined in terms of cognitive complexity, linguistic complexity, and adult input. Clearly, all of these aspects are extremely important in determining how a child will begin to express information about the world. While the research challenging the cognitive account indicates that children clearly are attuned to social, interactional, and linguistic cues beyond the constraints of cognitive complexity, they do not fully account for the differences in the use of nouns and verbs in English-speaking children's earliest utterances. Even if all the words encoding verb-like meaning in English were counted as verbs (to address Vihman and McCune's (1994) concern), there would be an imbalance between the number of noun object labels and the number of verb action labels. Any explanation regarding motivations for this difference in use must account for noun and verb use in children's earliest utterances. Since gestures occur prior to and often alongside young children’s earliest utterances, it seems that an examination of children’s early gestures might shed some light onto the issue of why English-learning children learn nouns before verbs. With this in mind, the following research question will be investigated: Does gesture play a role in young English-learning children’s early lexical development, specifically, in their development of grammatical categories of ‘noun’ and ‘verb’?

3. Methodology

3.1 Subjects
Data for this study is from an audio-visual corpus collected for roughly one hour weekly over an 18 month period in a daycare center in Santa Barbara. The study focuses on five children taped from around age 10-29 months together with their caregivers.
3.2  **Data coding**

The data were coded for several communicative strategies, including:

*Vocalizations* which may be words or proto-words (these are children's idiosyncratic but consistent attempts at producing adult words, for example one child in the corpus uses [mo] to indicate that she wants a drink).

*Gestures*, which are gestures directed at another individual – three gesture types were including:

  * **Point**: a movement of the index finger or outstretched hand toward an object.
  * **Gimme**: holding out an open palm as if to receive an object – the palm may be turned upwards or sidewards.
  * **Attention Focus**: holding out an object as if to show or transfer (give) it.

For each strategy coded, children initially looked at one of the present caregivers, engaged with them through eye contact, and then moved their gaze toward a target object and either gestured and/or vocalized.

Children's gestures and the subsequent caregiver responses were coded across each of the five children. For POINT and ATTENTION FOCUS gestures, a caregiver response was coded if a child used the gesture and the caregiver then altered the direction of her attention, for example, by moving her head and looking in the direction indicated by the child’s gesture. For a GIMME gesture a response was coded if the caregiver responded by giving or denying the child the target object. After having moved attention to the indicated direction the caregiver often acted upon the object highlighted by the gesture.

4. **Results and Discussion**

Results indicate that gesture does play a role in the lexical development of children learning English. They show that the interaction of gesture and word usage is mediated by caregivers who associate gestures with verb-type meanings and speech with noun-type meanings.

**Caregiver response across different gestures**

In examining caregiver responses to children’s gestures, several issues arise both relating to the gestures used and the specific caregiver responses. Caregivers consistently respond differently to different arm and hand configurations and this variance in responses then socializes children into using these different gestures to obtain different outcomes.

The results in Table 1 below indicate that when a child gestures, in most cases, the caregiver responds by carrying out an action, suggesting that children’s early gestures serve to elicit action from the interlocutor.

<table>
<thead>
<tr>
<th>Gesture</th>
<th>Percentage of action responses</th>
</tr>
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<tbody>
<tr>
<td>Point (N=111)</td>
<td>look at object (88%)</td>
</tr>
<tr>
<td>Gimme (N=76)</td>
<td>give child object (88%)</td>
</tr>
<tr>
<td>Attention Focus (N=52)</td>
<td>look at object (82%); <strong>take</strong> object 41%</td>
</tr>
</tbody>
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Table 1. Percentage of caregiver responses to child gestures
As Table 1 shows, the use of different gestures results in different outcomes for the child in terms of caregiver response. These are as follows:

**POINT**
When a child points at both proximal and distal objects, in 88% of cases the caregiver responds by directing her gaze toward the object the child is pointing at. She treats the gesture as though it is a call to action for her to look in the direction toward which the child is pointing. For example, when one child, Brailley, pointed to a container filled with food the caregiver directed her attention to where he was pointing. From the children’s earliest recorded uses of pointing, caregivers responded by looking in the direction of the point. This looking response was later used by caregivers upon hearing children’s use of the verb *look*, whether it was accompanied by a gesture or used alone. With the GIMME gesture uses we see a very different caregiver response.

**GIMME**
When a child reaches out a hand in a GIMME gesture, in 79% of instances the caregiver gives the child the object, interpreting this action as a request from the child for the object. For example, during a play session, one child, Fiona reached toward a picture on the wall using a gimme gesture and the caregiver responded by taking it off the wall and handing it to her. However, using a GIMME gesture did not always result in the child being given the object toward which they were gesturing. This is evident in most of the remaining 21% of GIMME gesture uses where the caregiver did not want the child to have the object in question. Eleven out of the 16 non-giving responses (69%) were accompanied by a clear indication that the caregiver interpreted the gesture as a request by the child to be given something but the request was refused. For example, in one instance Chera reached for hand cream the caregiver was using and was the caregiver interpreted this as a request and refused it saying: “It’s not for children. It has alcohol in it”. If these refusal responses are added to the total, the overall caregiver responses to GIMME gestures stand at 93% (71/76).

**ATTENTION FOCUS**
When a child holds an object up towards a caregiver in an ATTENTION FOCUS gesture, in 82% of instances the caregiver looks at the object. The caregiver therefore interprets this action type as though the child wants her to focus her attention on the object being proffered. Interestingly, the percentage of responses to ATTENTION FOCUS and POINT gestures is higher than responses to GIMME. Because the action of looking is easier than the action of giving, caregivers may respond to POINT and ATTENTION FOCUS gestures more readily than to GIMME ones. In 41% of ATTENTION FOCUS responses, the caregiver then takes the object from the child.

Although we have now established that caregivers treat early communicative gestures as though they are requests for action ‘addressed’ to the recipients of the gesture, we have yet to establish whether this occurs across a range of target referents.

*Children’s gestures across different target objects*
When the children used a gesture to highlight an object this was almost always a static object.
Throughout the database even though each child’s ability to communicate changes over time, they continue to use gestures to refer to the same type of targets. For example, at 12 months, when Chera was using gesture without speech, she used GIMME gestures to indicate food and continued to use this gesture type to indicate food at 30 months when she would combine the gesture with an utterance such as “I want more cheese”. The types of referents indicated by all five of the children include a range of objects such as: milk, toy, banana, spoon, diaper, cup, sock, bottle, cracker etc. These were the targets of the children’s gestures from the earliest recordings when none of the children were vocalizing beyond proto-words, all the way through to the latest recordings when the children all had multi-word utterance skills.

On the basis of the findings presented above indicating that caregiver responses differ across different gestures but remain consistent across the same gesture type over time, I propose an altogether different reason that may help explain early noun and verb asymmetry in the acquisition of English termed the multi-modal account.

An additional factor which accounts for the later production and smaller number of verb uses in the speech of children at the one-word stage, may be seen when we look across modalities. In doing so, we can find evidence that at the one-word stage, children use gestures to express verb-like elements while they use a word to express noun-like elements. I am not claiming here that there is a binary distinction between the information encoded in the gesture and the information encoded in the word. Certainly there is an overlap in the information conveyed by each modality, as is clear when we consider that in children's earliest gesture uses, the gesture has a target even without any use of a word. Each gesture is considered by the caregiver to be a unique action request. The child is pushed toward encoding the target in an additional way, i.e. with a noun, by the fact that the gesture adequately encodes the action request.

When children have the capacity to use one word and they wish to express information including a verbal action and a nominal object element they can use gesture to extend their communication. For example, in one instance, when one child Lette wants to draw the caregiver's attention to a new child in her playroom, she looks toward the child and points while saying, "Megan". In another instance, Chera reaches for her shoe while saying her name, "Yeya". These illustrations show that in their early communications children can use gestures to express the verb-type information of requesting the caregiver to direct her attention a certain way or to act on an object, and this allows their early words to primarily consist of nouns that are names of objects. This patterning, in which words (nouns) are treated by caregivers as though they are indicating objects, while gestures, like verbs, are treated as though they are being used to elicit actions, provides an additional explanation for why young English-learning children produce nouns earlier and more frequently than verbs in their one-word communications.

Through caregiver response, the gesture becomes a movement that has meaning. Caregivers respond more frequently to gesture and speech combinations than to use of either communicative strategy used alone (Kelly 2002). Through these dialogic interactions in which a child uses a gesture
and the caregiver subsequently responds, children learn that they can bring about actions by using gestures. They can also learn that gestures have an indexical function (Bates 1976) and that by using a specific hand shape, which the caregiver treats as being communicative, they can index a specific target entity. This behavior continues once children begin using words. As they develop, they learn that caregivers interpret these gestures as requests for action on or about an object which is being indexicalized by the gesture. They also learn to alter their hand shape and position to use these communicative tools for different outcomes, e.g. to get the caregiver look at an object versus to get the caregiver to give the child an object.

This means that from their earliest uses children can begin to learn that the information conveyed by their gestures is different from the information conveyed in their speech. Further, they can begin to learn, perhaps implicitly, to treat the information contained in gestures differently from information contained in speech. In doing so, they learn that there is a difference between a verb (and whatever else is combined with it) or between a noun and whatever is combined with it. In short, from children's earliest multi-element communications, what will end up being coded as an argument is treated differently from what will end up being coded as the verb.

5. Conclusion
The early use of nouns over verbs in young English-learning children is influenced by their uses of gestures prior to their production of single and multi-word utterances. Caregiver responses help children to learn to build their knowledge of gestures as eliciting actions and words as highlighting objects around their consistent gesture uses. The knowledge that they have about nouns and verbs when they begin to talk comes from their earlier gesture-based interactions. While this multi-modal approach accounts for why English-learning children produce nouns earlier than verbs, the use of gestures in carrying out verb-type work and object labels in carrying out noun-type work, is a consistent pattern shown only in English. However, if this claim regarding noun-verb patterning and gesture use holds in English, we would predict that there would be a different type of patterning when we look across languages that have been described as having verb-type words that outnumber noun-type words in children's earliest uses. For example, in Tzotzil (Brown 1998), Tzeltal (DeLeon 1997), Mandarin, and Cantonese (Gelman and Tardiff 1998, Tardiff 1996), and Korean (Choi 1998, 1999). In these languages it is possible that because children use a verb for specific actions they may use gestures for indicating the target of a verb. This remains to be seen in future research.

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