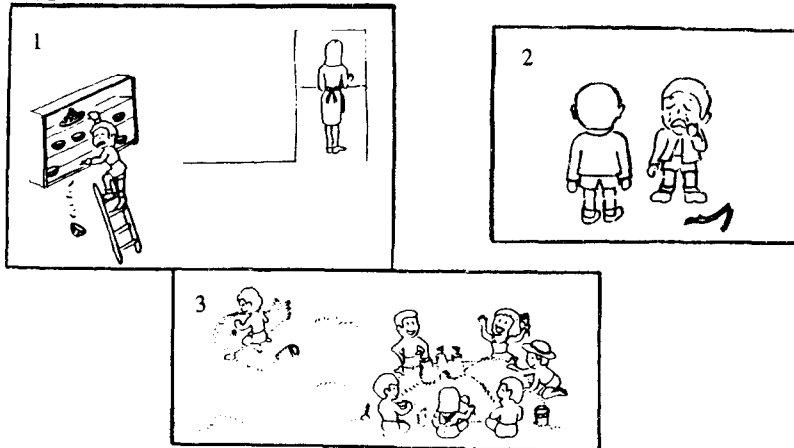


- (1996). Narrative styles of Japanese mothers and their children. Paper presented at the Growing Mind Conference, Geneva, Switzerland. ED 410 032.
- Minami, Masahiko, & McCabe, Allyssa (1991). Haiku as a discourse regulation device: A stanza analysis of Japanese children's personal narratives. *Language in Society*, 20, 577-600.
- (1995). Rice balls and bear hunts: Japanese and North American family narrative patterns. *Journal of Child Language*, 22, 423-445.
- Morris, Michael W. & Peng, Kaiping (1994). Culture and cause: American and Chinese attributions for social and physical events. *Journal of Personality and Social Psychology*, 67, 949-971.
- Rogoff, Barbara (1990). *Apprenticeship in thinking: Cognitive development in social context*. NY: Oxford University Press.
- Shweder, Richard A., Goodnow, Jacqueline J., Hatano, Giyoo., LeVine, Robert A., Markus, Hazel R., & Miller, Peggy J. (1997). The cultural psychology of development: One mind, many mentalities. Chapter 15 of *Handbook of child psychology*, Fifth Edition (W. Damon, Editor-in-Chief), Vol. 1: *Theoretical Models of Human Development* (R. Lerner, volume editor). New York: Wiley.
- Watanabe, Masako E. (1998) Styles of reasoning in Japan and the United States: Logic of education in two cultures. Paper presented at the American Sociological Association Annual Meeting, San Francisco.
- Yamada, Haru (1992). *American and Japanese business discourse: A comparison of interactional styles*. Norwood, NJ: Ablex.

### Appendix



## Distinguishing Count Nouns from Adjectives: Evidence from 14-month-olds' Novelty-Preference and Word-Extension

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### Introduction

What resources do infants recruit in the process of mapping their first words to meaning? How do they begin to establish relations between words and the objects and events they perceive in the world? Part of the answer seems to be that infants take advantage of the rich social and pragmatic contexts in which novel words are introduced. For example, by their first birthdays, infants spontaneously follow a speaker's eye-gaze or finger-pointing to discover the object or event of interest in a naming episode ("Look, that's an elephant!"). Infants' sensitivity to these social and pragmatic cues provide them with support when it comes to mapping a novel word to its meaning (Baldwin & Markman, 1996). In addition, during this period, infants' growing sensitivity to cues within the speech stream permits them to successfully parse the novel word from the ongoing speech stream (Jusczyk & Kemler Nelson, 1996; Morgan & Demuth, 1996; Werker, Lloyd, Pegg & Polka, 1996).

However impressive these early achievements, they are not (singly or jointly) sufficient for successfully mapping a novel word to its meaning. This is because many different words -- indeed many different *types* of words -- may be offered in a naming episode. Importantly, each type of word highlights a different aspect of the observed scene. For example, for speakers of English, count nouns ("Look, it's an elephant") typically refer to the named object itself and are extended spontaneously to other members of the same object kind (other elephants); proper nouns ("Look, it's Babar") refer to the named individual, but are not extended further; and adjectives ("Look, it's gray"), which refer not to the individual itself, but to a property of the named individual, are extended to other objects sharing that property. Thus, different types of words highlight, or bring to the foreground, different aspects of the very same observed scene.

Considerable research has documented that by the time they are two years of age, children are sensitive to many of these links and recruit them in the process of word learning (For a review, see Waxman, 1998). But a very important question remains: How do infants gain a toe-hold? Which of these links, if any, are available to infants at the onset of lexical acquisition? And how are these shaped over the course of development?

We propose that infants begin the task of word learning with a set of very broad, language-general expectations, and that these initially general

expectations are fine-tuned as a function of the infant's experience with the specific correlations in the language under acquisition. Early lexical acquisition is guided by a broad expectation that novel words (here we mean open class novel words – see Shi, Werker & Morgan, 1999 for a discussion), independent of their grammatical form, highlight commonalities among named objects. This general expectation supports the early establishment of a lexicon, and directs the infant's attention to just the sorts of regularities that will promote the identification of distinct grammatical forms.

We begin with a brief review of the evidence concerning an early relation between object naming, reference and categorization. We then describe two new experiments, documenting that by 14 months of age, infants spontaneously identify novel words in fluent infant-directed speech, that they have begun to distinguish novel words from various grammatical form classes (e.g., noun vs. adjective), and that they can recruit these distinctions in the task of word learning. These experiments also provide strong evidence that as infants begin to notice regularities between particular grammatical forms and meaning, they first identify the link between nouns and object categories.

## Background

Research in several laboratories confirms that naming has important consequences on infants' attention to objects. By 9 months, infants devote more attention to objects that are named than those that are un-named (Balaban & Waxman, 1997; Baldwin and Markman, 1989). Naming also has consequences on object individuation and categorization. By 10 months, naming distinct objects (e.g., ball, duck) with **distinct** names (e.g., *ball*, *duck*) promotes the process of object individuation (Xu, 1999). Conversely, naming distinct objects (e.g., a dog, horse, monkey, giraffe) with a **common** name (e.g., *animal*) serves to highlight commonalities among the objects and, in this way, promotes the formation of object categories (Balaban & Waxman, 1997; Waxman & Markow, 1995; Waxman, 1998). By promoting attention to objects as individuals and as members of categories, naming supports the discovery of additional, perhaps deeper, more stable, characteristics of the named entities.

The early link between object naming and categorization was first revealed by Waxman and Markow (1995). Twelve- to 13-month-old infants were familiarized to members of a given object category (e.g., four different animals); at test, they saw (a) a new member of the now-familiar object category (e.g., another animal) and (b) an object from a contrasting object category (e.g., a fruit). The results of this series of experiments revealed that, for infants who had just begun to establish a productive lexicon, novel words facilitate object categorization. When the familiarization objects were introduced in conjunction with a novel word (either a count noun or an adjective), infants successfully formed object categories (e.g., animal, vehicle). Those in a No Word control condition failed to do so.

This evidence for an early link between object naming and categorization reveals that infants reliably detected novel words in fluent speech and that novel words (either count nouns or adjectives) facilitated the formation of object categories. It is unlikely that infants learn this link on the basis of correlations in their existing, yet sparse, lexicons. Rather, it appears to be available from the onset, and to support infants' first efforts to establish word-to-world mappings, and in particular, to support the establishment of reference.

In a subsequent series of studies, the goal was to capture more precisely the scope of this early word-to-world link (Waxman, 1999). On the word side, the question was whether infants could distinguish between novel words presented as adjectives vs. nouns, and whether this distinction might have consequences for the formation of groupings other than object categories. On the world side, the question was whether infants initially link novel words specifically to object categories (e.g., *rhinoceros*, *animal*), or to a wider range of groupings (including, e.g., property-based commonalities (e.g., *gray things*, *lumpy things*)).

To address these possibilities, Waxman (1999) maintained the logic and design of Waxman and Markow's original paradigm, but shifted the focus from object categories to object properties, including color and texture. Thirteen-month-old infants were familiarized to four objects that shared a common property (e.g., purple cat, purple plate, purple spatula and purple bottle). As in previous work, these familiarization objects were presented in conjunction with either a novel noun, novel adjective or no word (This was a between-subjects factor). At test, all infants were presented with two objects, (a) an object with the now-familiar object property (e.g., a purple horse) and (b) an object identical to the first test object, except that it embodied a novel object property (e.g., a blue horse). We reasoned that if infants detect the property-based commonalities among the objects presented during familiarization, then they should reveal a preference for the object with the novel property at test (e.g., the blue horse).

The results indicated that infants were indeed sensitive to (at least some of) the distinctions between novel words presented as count nouns vs. adjectives. More provocatively, they recruited these distinctions in word learning. Infants hearing novel adjectives revealed reliable preferences for the test objects with novel contrastive properties (e.g., the blue horse). Infants hearing novel nouns or no novel words revealed no consistent preferences at test.

The elevated novelty-preferences in the Adjective condition, as compared to those in the Noun and No Word conditions, indicate that by 13 months, infants have begun to distinguish between novel words presented as count nouns vs. adjectives, and that this emerging distinction has consequences for object categorization. Novel words presented as adjectives highlight property-based commonalities among objects; novel words presented as nouns do not.

Taken together, the results of these two series of experiments yield some important insights about infants in the initial stages of building a productive vocabulary. During this active developmental period, infants' expectations for count nouns are more precise than their expectations for adjectives. They appear

to link count nouns specifically to object categories (as in Waxman & Markow, 1995), but not to object properties (as in Waxman, 1999). At the same time, infants have a more general expectation for adjectives. Novel adjectives appear to highlight commonalities underlying object categories (as in Waxman & Markow, 1995) as well as object properties (as in Waxman, 1999). Notice, then, that the more specific expectation that adjectives refer to properties of objects (and not to categories of objects) is a later developmental accomplishment. In fact, this later accomplishment may depend upon infants' prior establishment of count nouns and object reference.

### Current research aims

We have demonstrated that at 13 – 14 months of age, infants are beginning to distinguish among (at least some) grammatical forms, and that they recruit these emerging distinctions in the service of word learning. If this is the case, then there should be conditions under which infants would construe the very **same** set of objects (e.g., purple horses) either as members of an **object category** (horses) or as embodying an **object property** (purple), and that this should vary systematically as a function of naming. We therefore presented infants in all conditions with precisely the same sets of objects, and examined the influence of naming (with either a count noun or an adjective) on infants' construals.

A secondary goal was to bridge a methodological gap between research with infants and preschoolers. Novelty-preference tasks have been successful with infants, but are less than ideally suited for children beyond 18 months of age, who lose interest in such tasks. Word-extension tasks have been successful with toddlers and preschoolers, but often lack sensitivity with infants under 18-months, who often have difficulty choosing systematically among objects in forced-choice tasks. To bridge this gap, we developed a new method, which weds features of the novelty-preference procedure and forced-choice word-extension paradigms.

### Experiment 1. Object category vs. object color

In this experiment, we familiarize infants with objects that are members of the same object category and are painted in the same color (e.g., purple horses). We ask a) which commonalities (category-based, property-based, or both) infants abstract most readily during familiarization, and b) how this is influenced by the introduction of a novel word (count noun or adjective).

### Procedure.

Forty-eight 14-month-old infants were tested individually in a laboratory playroom. Infants were seated in an infant seat, across from the experimenter.

See Table 1 for a schematic description of the procedure and Table 2 for a summary of the instructions presented in each condition.

In the Familiarization phase, the experimenter introduced infants in all conditions (described below) to four objects, all from the **same object category** (e.g., horses or animals) and embodying the **same object property** (e.g., purple). These were presented in pairs, and infants freely manipulated each pair for 20s. Next, during the Contrast phase, the experimenter presented a new object (e.g., a brown rolling-pin), drawn from a contrastive object category and embodying a contrastive object property. In the Test phase, all infants were presented with one familiar object (e.g., a purple horse), and one novel object. For half of the infants in each condition (see below), this was a member of a novel object category, but embodied the now-familiar object property (e.g., a blue plate). This constituted a Category test. For the remaining infants, the novel object was a member of the now-familiar object category, but embodied a novel object property (e.g., a blue horse). This constituted a Property test.

Using these test objects, each infant completed a novelty-preference task, followed immediately by a word-extension task. Both tasks involved the same two test objects. To assess novelty-preference, the experimenter simply presented the two test objects to the infant for 20 s. We coded the duration of attention the infant directed towards each object during this period. If an infant devoted equal attention to the two objects, the novelty-preference score would be .50. To assess word-extension, the experimenter introduced a target object, drawn from the familiarization set (e.g. a purple horse). She then presented the two test objects and asked the infant to give her one (See Table 1 on next page). She repeated this word-extension task to observe infants' consistency of response. Each infant completed this procedure four times, with four different sets of objects, two basic level category sets and two superordinate level category sets.

Conditions. To examine the influence of naming on infants' attention to category- or property-based commonalities among objects, 24 infants were randomly assigned to either an Adjective or a Noun condition. Infants in both conditions heard infant-directed speech. The conditions differed only in the phrases used to present objects. See Table 2 on next page for the precise wording adopted in each condition.

### Predictions

Based on previous work, we predicted that infants hearing count nouns would focus primarily on the category-based commonalities, and not property-based commonalities, among objects. We expected that infants hearing adjectives would focus on both types of commonalities. (See Figures 1a and 1b for a graphic representation of the predictions.)

#### Noun condition:

(1) On the novelty-preference task, infants should show a strong novelty-preference on the Category test trials, because the novel object (e.g., purple

**Table 1. Familiarization, Contrast and Test Phase Objects.**

Set	Familiarization 1	Familiarization 2	Contrast Phase	Category Test	Property Test
Experiment 1: Color					
Basic:	2 purple horses	2 purple horses	orange carrot	purple horse vs. purple plate	purple horse vs. blue horse
Superordinate:	2 purple animals (bear, lion)	2 purple animals (elephant, dog)			
Experiment 2: Texture					
Basic:	2 rough horses	2 rough horses	smooth carrot	rough horse vs. rough plate	rough horse vs. smooth striped horse
Superordinate:	2 rough animals (bear, lion)	2 rough animals (elephant, dog)			

**Table 2. Introductory Phrases.**

Condition	Familiarization (1 & 2)	Contrast	Novelty Test	Word Extension Test
Noun	These are blickets. This one is a blicket and this one is a blicket.	Uh-oh, this one is not a blicket!	Look at these!	This one is a blicket. Can you give me the blicket?
Adjective	These are blickish. This one is blickish and this one is blickish.	Uh-oh, this one is not blickish!	Look at these!	This one is blickish. Can you give me the blickish one?
No Word	Look at these. Look at this one and look at this one.	Uh-oh, look at this one!	Look at these!	Look at this one. Can you give me one?

plate) is a member of a new object category and the familiar object (e.g., purple horse) is not. They should reveal no preference on Property test trials, because both test objects are members of the now-familiar object category (e.g., purple horse; blue horse).

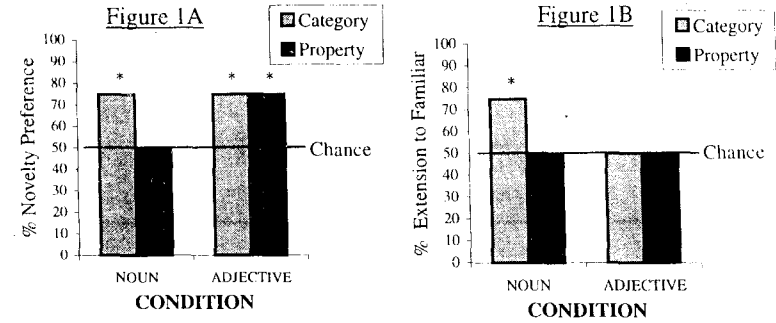
(2) On the word-extension task, infants presented with Category test trials should switch their preference, selecting the familiar (e.g., purple horse) over the novel object (e.g., purple plate). On Property test trials, these infants should perform at chance, because both test objects are members of the now-familiar target object category (e.g., purple horse; blue horse).

Adjective condition:

(1) On the novelty-preference task, infants should show novelty-preferences on both Category and Property test trials.

(2) On the word-extension task, on both Category and Property test trials, infants should extend adjectives equally to the familiar or novel object.

Figures 1A & B. Predictions for novelty-preference (A) and word-extension (B).



**Results**

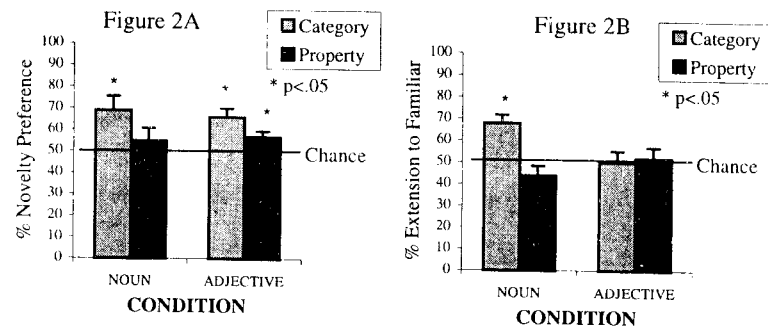
The results from the novelty-preference and word-extension tasks were consistent with these predictions. See Figures 2a and 2b. Infants hearing count nouns focussed specifically on the category-based commonalities among objects; those hearing adjectives displayed a more general pattern, focussing equally on category-based and property-based commonalities.

Novelty-preference: Consider first performance in the novelty-preference task (Figure 2a). As predicted, infants in the Noun condition revealed reliable novelty-preferences on the Category trials ( $M = .69$ ), but not on Property trials ( $M = .55$ ). This suggests that they attended primarily to the category-based commonalities among objects presented during familiarization. Also as predicted, infants in the Adjective condition revealed reliable novelty preferences on both Category ( $M=.66$ ) and Property ( $M=.57$ ) trials. This

suggests that they attended more broadly, focusing on both category- and property-based commonalities among objects.

**Word-extension:** See Figure 2b. An ANOVA with Condition (3) and Test-type (2) as within-participants factors, and Level (2) as a between-participants factor, revealed a main effect of Test-type,  $F(1,44)=4.97$ ,  $p<.05$ . Infants were more likely to select the familiar object on Category trials ( $M = .59$ ) than on Property trials ( $M = .48$ ). This was qualified by a cross-over interaction between Condition and Test-type,  $F(1,44)=6.32$ ,  $p<.02$ . As predicted, infants hearing nouns were more likely to select the familiar object on Category trials ( $M = .68$ ) than on Property trials ( $M = .44$ ), Fisher's LSD,  $p < .001$ . Infants hearing adjectives were equally likely to select the familiar object on Category ( $M = .50$ ) and Property trials ( $M = .52$ ).

Figures 2A & B. Novelty-preference (A) and word-extension (B) data for both category and property test trials.



**Individual analyses -- integrating novelty-preference and word-extension:** In a subsequent analysis, we considered the patterns displayed by individual infants, integrating their performance on the novelty-preference and word-extension measures. Averaging across all four stimulus sets completed by each infant, we tabulated the number of infants in each condition who a) preferred the novel object during novelty-preference ( $> .50$ ) and b) selected the familiar object during word-extension. For those infants who were presented with Category test trials, this pattern would indicate a systematic Category interpretation; for those who were presented with Property test trials, this pattern would indicate a systematic Property interpretation. This distribution of individual infants differed reliably from that expected by chance,  $X^2(3)=9.47$ ,  $p < .02$ . In the Noun condition, fully 6/12 (.50) infants displayed a systematic Category interpretation; not a single one displayed a systematic Property interpretation. In the Adjective condition, performance was more equally distributed across test-types, with 1/12 (.08) infants displaying a systematic Property interpretation and 3/12 (.25) infants displaying a systematic Category interpretation. The analysis

of individual infants echoes the main parametric analyses, suggesting that the patterns revealed in the current experiment are broadly representative of individual infants.

## Experiment 2. Object category vs. texture

Experiment 2 was identical to Experiment 1, with two exceptions. First, we extended the work to include the property of texture, rather than color. Second, we included a **No Word** control condition. See Table 1. The results of this experiment revealed the same patterns as in Experiment 1. They provide additional support for the prediction that nouns highlight category-based, and not property-based, relations among objects, but that infants' expectation regarding adjectives is more general.

**Novelty-preference.** Infants in the **No Word** control condition noticed both the category- and property-based commonalities among familiarization objects. This confirms that both types of commonalities were salient, even in the absence of a novel word. Infants in the **Adjective** condition revealed the same pattern as those in the **No Word** control, producing reliable novelty-preferences on both Category and Property test trials, as predicted. Infants in the **Noun** condition revealed a more specific pattern. As predicted, and as in Experiment 1, they revealed reliable novelty preferences on the Category test trials only. On Property test trials, where both test objects are members of now-familiar object category (e.g., horses), infants hearing nouns revealed no preference.

**Word-extension.** An ANOVA (conducted as in Experiment 1) revealed the same cross-over interaction between Condition and Test-type,  $F(1,82)=3.64$ ,  $p<.05$ , as in Experiment 1. In the **No Word** control condition, infants' tendency to select the familiar object did not differ as a function of Test-type (Category trials:  $M = .47$ ; Property trials,  $M = .44$ ). The same was true in the Adjective condition (Category trials:  $M = .43$ ; Property trials,  $M = .46$ ). However, in the **Noun** condition, infants revealed a very different pattern. As predicted, they were more likely to select the familiar object on Category trials ( $M = .55$ ) than on Property trials ( $M = .39$ ), Fisher's LSD,  $p < .02$ .

**Individual analyses -- integrating novelty-preference and word-extension:** Infants in the **No Word** condition revealed consistent category and property interpretations at a rate of 19%. Infants in the **Adjective** condition also revealed comparable rates of consistent category (31%) and property (38%) interpretations. However, infants in **Noun** condition were more likely to display systematic category interpretations (31%) than systematic property interpretations (6%).

## Summary

The primary goal of the two experiments reported here was to examine the conditions under which infant learners construe the very **same** set of objects (e.g., purple horses) either as members of an **object category** (horses) or as

embodying a salient **object property** (e.g., purple). Our chief concern was to uncover any influence of naming on infants' construals. We developed a new procedure, combining the advantages of novelty-preference and word-extension paradigms. Performance on these two measures was convergent, and together, they offer several insights into infants' expectations in word learning at a landmark developmental moment.

At 14 months, when most infants have begun to produce at least a few words on their own, and have established a modest receptive vocabulary, they reveal some rather sophisticated abilities. By this point, infants have already begun to distinguish between novel words presented as count nouns vs. adjectives in fluent, infant-directed speech. Moreover, infants actively recruit these emerging grammatical form distinctions in the context of word learning. They appear to link count nouns specifically to commonalities underlying object categories, and not to other purely property-based commonalities, including color (Experiment 1) and texture (Experiment 2). In contrast, their expectations regarding adjectives is less specific. Adjectives appear to highlight a wider range of commonalities, including those underlying object categories, as well as the property-based commonalities of color and texture. This provides evidence consistent with other recent work suggesting that infants' sensitivity to cues within the speech signal may be sufficiently rich to support an emerging distinction between (at least some) grammatical forms (c.f., Morgan & Demuth, 1996).

At an earlier point, perhaps around 9 months of age, we suspect that although infants would detect the presence of a novel word, they would fail to distinguish between words presented as nouns vs. adjectives. We have proposed that at this initial point, infants harbor a very general expectation that words (in general) highlight commonalities among objects (in general). This very broad expectation, coupled with infants' attention to named objects, sets the stage for the early establishment of reference. It also seems to be particularly helpful for the acquisition of words referring to individual objects and object categories.

From this very general beginning, infants build an initial lexicon and this sets the stage for noticing a correlation between particular kinds of words (e.g., based phrase position, stress, and other prosodic cues) and particular types of relations. We propose that at this point, infants first distinguish the nouns (from among the other grammatical forms), and notice that these are correlated with the commonalities underlying object categories. The evidence for a noun advantage in early lexical development is consistent with this view. In sum, we argue that an expectation linking count nouns and object categories emerges at about 13 to 14 months, that this expectation may be established earlier than those for other grammatical forms, and that it may support the emergence of other mappings (Snedeker & Gleitman, this volume; Waxman, 1999).

This developmental progression suggests that infants begin the process of word learning with certain very general expectations which set the stage for later, language specific expectations. Thus, the initial expectations are not only

general, but dynamic, evolving over the course of acquisition, as a function of experience with the language under acquisition.

### Further questions

Why are 14-month-old infants' expectations for count nouns more specific than their expectations for adjectives? One possibility is that the cues available in the speech input (e.g. prosody; morphology; structural position) that characterize nouns are more readily identified than those for adjectives. In the current experiments, we presented novel words in contexts that differed as a function of several of these cues. Another possibility is related to the issue of familiarity. Young word learners appear to have a conceptual or semantic priority to identify an object's kind before marking its properties (Au, 1990; Hall, Waxman & Hurwitz, 1993; Gelman & Taylor, 1984). Note that in the experiments reported here, infants were probably not familiar with the basic level names for most of the objects. This could be related to their tendency to extend adjectives, like count nouns, to object categories.

What is the most accurate description of infants' emerging distinction among grammatical forms? Although it is possible that infants distinguished count nouns specifically from adjectives, it is also possible that they made a broader distinction, between count nouns and other (as yet undifferentiated) grammatical forms. Future work may address this issue by examining infants' performance with additional grammatical forms (e.g., verbs, mass nouns) and additional kinds of commonalities among objects (e.g., objects involved in the same actions, or made of the same substances).

### Conclusions

We have documented the emergence of an early link between count nouns and object categories. This outcome converges well with most current theories of language acquisition to suggest that (1) the grammatical category noun may be established earlier, and via different mechanisms, than those for other grammatical categories, and (2) the acquisition of these other grammatical forms may be dependent upon the prior acquisition of nouns and the establishment of reference.

### References

- Au, T.K. (1990). Children's use of information in word learning. *Journal of Child Language*, 17(2), 393-416.
- Balaban, M. T. and S. R. Waxman (1997). "Do words facilitate object categorization in 9-month-old infants?" *Journal of Experimental Child Psychology*, 64(1), 3-26.
- Baldwin, D. A. and E. M. Markman (1989). "Establishing word-object relations:

- A first step." *Child Development*, **60**(2), 381-398.
- Bowerman, M. (1985). What shapes children's grammars? *The crosslinguistic study of language acquisition*. D. I. Slobin. Hillsdale, NJ, USA, Lawrence Erlbaum Associates, Inc. **1**: 1257-1319.
- Gelman, S. A. and Taylor, M. (1984). How two-year-old children interpret proper & common names for unfamiliar objects. *Child Development*, **55**(4), 1535-1540.
- Snedeker, J. and Gleitman, L. (this volume). Knowing what you know: metacognitive monitoring and the origin of the object category bias. *Proceedings of the 24<sup>th</sup> Boston University Conference on Language Development*. Somerville, MA: Cascadilla Press.
- Hall, D. G., S. R. Waxman, and Hurwitz, W. (1993). "How two- and four-year-old children interpret adjectives and count nouns." *Child Development*, **64**(6), 1651-1664.
- Imai, M. (1999). Constraint on word-learning constraints. *Japanese Psychological Research*, **41**(1), 5-21.
- Jusczyk, P. W. and D. G. Kemler Nelson (1996). Syntactic units, prosody, and psychological reality during infancy. *Signal to syntax: Bootstrapping from speech to grammar in early acquisition*. J. L. D. K. Morgan. Mahwah, NJ, USA, Lawrence Erlbaum Associates, Inc: 389-408.
- Morgan, J. L. and K. Demuth, Eds. (1996). *Signal to syntax: Bootstrapping from speech to grammar in early acquisition*. Mahwah, NJ, USA, Lawrence Erlbaum Associates, Inc.
- Shi, R., Werker, J.F., and Morgan, J.M. (1999). Newborn infants' sensitivity to perceptual cues to lexical and grammatical words. *Cognition*, **72**, B11-B21.
- Waxman, S. R. (1998). Linking object categorization and naming: Early expectations and the shaping role of language. *The psychology of Learning and Motivation (Vol 38)*, D. Medin. San Diego: Academic Press: 249-291.
- Waxman, S. R. (1999). "Specifying the scope of 13-month-olds' expectations for novel words." *Cognition*, **70**(3), B35-B50.
- Waxman, S. R. and D. B. Markow (1995). "Words as invitations to form categories: Evidence from 12- to 13-month-old infants." *Cognitive Psychology*, **29**(3), 257-302.
- Waxman, S. R., Senghas, A., & Benveniste, S. (1997). A cross-linguistic examination of the noun-category bias: Its existence and specificity in French- and Spanish-speaking preschool-aged children. *Cognitive Psychology*, **43**, 183-218.
- Werker, J. F., V. L. Lloyd, Pegg, J.E., Polka, L. (1996). Putting the baby in the bootstraps: Toward a more complete understanding of the role of the input in infant speech processing. *Signal to syntax: Bootstrapping from speech to grammar in early acquisition*. J. L. D. K. Morgan. Mahwah, NJ, USA, Lawrence Erlbaum Associates, Inc: 427-447.
- Xu, F. (1999). "Object individuation and object identity in infancy: The role of spatiotemporal information, object property information, and language." *Acta Psychologica*, **102**(2-3), 113-136.

## How Languages Influence Children's Categorization of Specific Objects

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### 1. Introduction

#### 1.1 The question

Children learn object names rapidly. Indeed, they often seem to learn the whole category from hearing a single object named (e.g., Markman 1989). This skill in learning object names is readily apparent in the novel noun generalization task. In this task, experimenters present children with an object and name it with a novel name, for example, "This is a dax." The experimenter then presents other test objects and asks the child which of these is called by the same name, for example, "Show me the dax." This is an interesting task because the naming event itself provides the child with few constraints on the class of things to which the name applies. Nonetheless studies show that two and three year olds systematically generalize the object name to a coherent category that depends on the kind of thing named (e.g., Jones et al. 1991, Markman 1989, Imai & Gentner 1997.) In this study, we examine the idea that the specific language a child is learning---English versus Japanese---influences how the child generalizes a novel object name.

Our comparison of English and Japanese derives in part from Lucy's (1992) proposed individuation continuum. This continuum orders kinds by the degree to which instances are considered as individuals. On one extreme of the continuum are animate entities; on the other extreme are substances, and in the middle are objects. Lucy proposed that different languages emphasize different points along this continuum. For example, English with its count/mass distinction is said to partition the continuum between objects and substances. That is, English speakers treat objects (e.g., dogs, cups) as countable individuals but substances (e.g., milk) as continuous masses. Japanese, in contrast to English, individuates animates but not in-animates. There are a number of aspects of Japanese that segregate animates from both inanimate objects and substances. These include the plural form for animates, the quantifier system, and "iru/aru" -- two forms of "to be" that are used in locative constructions, one for animates and the other for in-animates.

In one test of the implications of Lucy's proposal, Imai and Gentner (1997) compared Japanese-speaking and English-speaking children's generalizations of names for novel objects and novel substances. They found both similarities and differences across the two languages. In particular, English- and