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Sublexical Influences on Lexical Development in Children[1]

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Abstract. Previous experimental research has found that adults and infants are sensitive to the likelihood of occurrence of sequences of segments, or probabilistic phonotactics, in the ambient language. One hypothesis that emerges from this finding is that probabilistic phonotactics, a sublexical factor, may influence rate of lexical acquisition. Preliminary results are reported from a study involving 21 typically developing preschool children. Children participated in a multi-trial word learning task involving eight nonwords of varying phonotactic probability. Each nonword was paired with a picture of an unusual object having no apparent corresponding label in English. Referent and item identification tasks were used to monitor lexical acquisition during learning and retention trials. Results indicated that high probability nonwords were learned with fewer exposures than low probability nonwords across both test measures. This finding suggests that sublexical representations influence lexical development in children.

Introduction

Children rapidly acquire a large number of words without the benefit of direct instruction (Dollaghan, 1985; Heibeck & Markman, 1987; Jusczyk & Aslin, 1995; Rice & Woodsmall, 1988). This ability has been termed *fast mapping* (Carey & Bartlett, 1978) or *quick incidental learning* (QUIL; Rice, 1990). Researchers have proposed a number of underlying mechanisms or language learning devices to account for this robust ability to learn novel words. Past proposals have focused on pragmatic or syntactic cues that children may use to identify the meaning of a novel word (Akhtar & Tomasello, 1996; Baldwin, 1991, 1993a, 1993b; Brown, 1957; Soja, 1992; Tomasello & Barton, 1994; Waxman & Kosowski, 1990). Alternatively, constraints or biases have been proposed to narrow possible semantic interpretations of newly encountered words. Proposed constraints include whole-object, taxonomic, and mutual exclusivity (Golinkoff, Mervis, & Hirsh-Pasek, 1994; Markman, 1989, 1994; Markman & Hutchinson, 1984; Markman & Wachtel, 1988; Merriman & Bowman, 1989; Waxman & Kosowski, 1990). These accounts all focus on how children determine the meaning or referent of a novel word. Less attention has been devoted to identifying the processes that influence acquisition of the form of a novel word. It is possible that sublexical, or phonological, factors may affect lexical acquisition. In particular, the probability of the phonological sequence may facilitate acquisition of the novel word. We first consider the role of phonotactic probability in language processing generally, and then explore the evidence supporting the influence of sublexical factors on lexical acquisition.

Phonotactic Probability and Language Processing

One observation that has emerged from the study of language structure is that certain sequences of segments are more likely to occur. Experimental psycholinguistic research has found that adult speakers are sensitive to this likelihood of occurrence or *phonotactic probability* (Vitevitch & Luce, 1998, 1999; Vitevitch, Luce, Charles-Luce, & Kemmerer, 1997). Adults recognize high probability nonwords faster than low probability nonwords (Vitevitch & Luce, 1998, 1999). This finding suggests that adults learn the likelihood of occurrence of sounds in the ambient language and that high phonotactic probability may play a role in the recognition of spoken words. The facilitory effect of high phonotactic probability appears to be dependent on the lexicality of the stimuli and the task. For example, an inhibitory effect of high phonotactic probability has been documented in recognition tasks involving real words and in lexical decision tasks using both real words and nonwords (Vitevitch & Luce, 1998, 1999). To account for the stimuli and task dependent nature of this effect, two types of representations have been proposed:

sublexical and lexical (Vitevitch & Luce, 1998, 1999). Sublexical representations presumably contain information related to phonotactic structure. For this type of representation, it is assumed that high phonotactic probability facilitates processing because common sound patterns are more readily activated. In contrast, lexical representations are seemingly organized into neighborhoods based on similarity of form (Luce & Pisoni, 1998). For this type of representation, it is hypothesized that high phonotactic probability inhibits processing because of the correlation between phonotactic probability and neighborhood density (Vitevitch, Luce, Pisoni, and Auer, 1999). Specifically, words composed of common sound patterns will tend to be similar to many other lexical entries. In this way, words composed of high probability phonological sequences will tend to reside in *high density neighborhoods*. This high density may create competition among lexical items. In any given task, it is thought that one type of representation will dominate processing leading to the inhibitory or facilitory patterns observed. For instance, nonwords are assumed to lack lexical representations leading to sublexical dominance in processing. Under these conditions, facilitory effects of high phonotactic probability have been reported (Vitevitch & Luce, 1998, 1999). The evidence from experimental psycholinguistic research seems to indicate that adult speakers represent phonotactic probability. Furthermore, the phonotactic probability of a word or nonword may influence performance when sublexical representations dominate processing.

Infants, like adults, appear sensitive to the phonotactic probabilities (density) in the ambient language. Jusczyk, Luce, and Charles-Luce (1994) demonstrated that 9-month-old infants listen longer to high probability (density) than low probability (density) sound sequences. This preference indicates that infants learn the distribution of sounds in the ambient language and may have form based representations of words without semantic knowledge (Jusczyk et al., 1994). The implication of this preference for language processing and learning is unclear. One possibility is that phonotactic probability (density) aids the infant in determining which sound sequences are likely to form words in their native language (Jusczyk et al., 1994; Luce & Pisoni, 1998). This hypothesis suggests the high probability (density) preference is indicative of sublexical facilitation of language processing and learning. A second possibility is that infants listen longer to high probability (density) sound sequences because these sequences are more difficult to discriminate from other sound sequences. This second hypothesis assumes that the high probability (density) preference results from lexical inhibition of language processing and learning. At issue here is the dominant type of representation in this listening task. Taken together, it appears that 9-month-old infants represent phonotactic probability (density), but the locus of the effect of phonotactic probability (density) and the influence on language learning are unclear in this group. Given the difficulties in investigating learning in young infants, evidence from older infants and children may provide insights into the representational structure of young language learners.

Research with older children suggests the presence of both sublexical and lexical representations (Gathercole, Frankish, Pickering, & Peaker, 1999; Kirk, Pisoni, & Osberger, 1995; Messer, 1967; Pertz & Bever, 1975). The presence of lexical representations can be inferred from the finding that hearing impaired children are less accurate recognizing high probability (density) than low probability (density) words (Kirk et al., 1995). This finding indicates an inhibitory effect of high probability (density) typically associated with lexical dominance in processing. The presence of sublexical representations is supported by the findings from metalinguistic and memory research. Children and adolescents show metalinguistic awareness of sublexical structure (Messer, 1967; Pertz & Bever, 1975). In terms of memory, children recall more high probability (density) than low probability (density) nonwords (Gathercole et al., 1999). The finding of a facilitory effect of high probability (density) for nonwords supports the conclusion that sublexical representations presumably dominate processing in this memory task. These results appear to indicate that young children may have two types of representations and that different representations may dominate processing depending on the task and stimuli used. However, the dominant representation in lexical acquisition remains unclear.

Sublexical Influences on Lexical Acquisition

Given that a novel word has not been encountered previously, it can be considered similar to a nonword. Based on this assumption, novel words presumably do not have a lexical representation and sublexical processing may dominate tasks involving novel words. As a result, one would expect sublexical representations to influence word learning leading to a facilitory effect of high probability (density). Past research supports the hypothesis that sublexical factors may influence lexical acquisition (e.g., Leonard, Schwartz, Morris, & Chapman, 1981; Schwarz & Leonard, 1982; Storkel & Rogers, in press).

Research related to sublexical influences on lexical acquisition typically has examined the effect of phonological development on lexical acquisition. The question addressed is whether or not the child's *phonological inventory*, the sounds the child produces, influences lexical acquisition. Correlational studies indicate that the phonological characteristics of infant babbling are highly similar to the phonological characteristics of the child's first spoken words (Oller, Wieman, Doyle, & Ross, 1975; Vihman, Ferguson, & Elbert, 1987). This same association between the lexicon and the phonological inventory has been documented in children with advanced language development and children with delayed language development (Paul & Jennings, 1992; Stoel-Gammon & Dale, 1988; Thal, Oroz, & McCaw, 1995; Whitehurst, Smith, Fischel, Arnold, & Lonigan, 1991). In addition, experimental studies indicate that children more readily learn to *produce* novel words composed of sounds in their phonological inventory (known sounds) than those composed of sounds out of their phonological inventory (unknown sounds). In contrast, these same studies show that children learn to *comprehend* novel words composed of known sounds or unknown sounds at equivalent rates (Leonard et al., 1981; Schwarz & Leonard, 1982 but see also Bird & Chapman, 1998). Taken together, the findings seem to support the presence of phonological selectivity in lexical acquisition. Children appear to learn words composed of known sounds more readily than words composed of unknown sounds, although this influence is asymmetrical affecting primarily production. This suggests that sublexical representations play a role in lexical acquisition. The research documenting phonological selectivity has focused almost exclusively on children who produce fewer than 50 words. It is proposed that a developmental change occurs in lexical acquisition at this 50-word threshold resulting in a rapid increase in rate of lexical acquisition (Behrend, 1990; Bloom, 1973; Dore, 1978; Gopnik & Meltzoff, 1986; Mervis & Bertrand, 1994). For this reason, it is unknown if phonological selectivity continues to govern word learning in children beyond the 50 word stage.

There is evidence to suggest that sublexical representations influence lexical acquisition in children with productive lexicons greater than 50 words. Storkel and Rogers (in press) examined the effect of phonotactic probability (density) on lexical acquisition in typically developing 7-, 10-, and 13-year-old children. Results showed that 10- and 13-year-old children learned more high probability (density) nonwords than low probability (density) nonwords. This finding supports the claim that sublexical representations influence lexical acquisition. In contrast, 7-year-old children showed no consistent effect of probabilistic phonotactics on lexical acquisition. It was unclear if the cause of this null result related to methodological considerations or to differences in representations and processing in the youngest group of children. Also of note, the difference between high probability and low probability nonwords was small, although statistically reliable. The methods used may have attenuated the effect of phonotactic probability. Word learning was only examined in a comprehension task at one point in time. One possibility is that phonotactic probability may have a greater effect on learning the form of the novel word rather than the referent. Additionally, phonotactic probability may have a greater influence initially following limited exposure, and the effect of phonotactic probability may be attenuated as a lexical representation is formed.

The initial hypothesis that high phonotactic probability may facilitate lexical acquisition in children is based on the underlying assumptions that children are sensitive to the likelihood of occurrence of sound sequences and that sublexical representations may influence lexical acquisition. Past research provides evidence that children do learn the distributional regularities of the ambient language. In addition, sublexical representations do appear to influence lexical acquisition at least during acquisition of the first 50 words (i.e., 12-18 months) and in older children (i.e., 10- and 13-year-old children). What remains less clear is the influence of sublexical representations, specifically phonotactic probability, on word learning in preschool children. In addition, it is unknown how phonotactic probability influences the learning of forms versus referents and how this influence changes over time. The purpose of the current study was to extend previous findings by examining the influence of phonotactic probability, a sublexical factor, on lexical acquisition in preschool children using multiple measures of learning over the course of learning. It was predicted that preschool children would learn high probability nonwords with fewer exposures than low probability nonwords, due to the hypothesized dominance of sublexical representations. Furthermore, it was predicted that phonotactic probability would affect learning of both forms and referents, but the effect would be greater for form learning. Finally, it was expected that the difference between high and low probability words would decrease with greater exposure as learning approached ceiling.

Method

Participants

Twenty-one typically developing monolingual preschool children (*M* = 4; 3, range = 3; 2 - 5; 10) were recruited by public announcements to participate in a multi-trial novel word learning task. Speech, language, hearing, and cognitive development were screened using a parent questionnaire related to medical history; the *Goldman-Fristoe Test of Articulation* (GFTA; Goldman & Fristoe, 1986); the *Peabody Picture Vocabulary Test - Revised* (PPVT-R; Dunn & Dunn, 1981); and a hearing screening (ASHA; 1985). Eligible children were required to score at the 32nd percentile or above on the GFTA (*M* =71; range 36 - 99) and the PPVT-R (*M* = 73, range 39-99).

Stimuli

The left-hand columns of Table 1 display the stimuli used in the multi-trial nonword learning task. Eight consonant-vowel-consonant (CVC) nonwords of varying phonotactic probability were chosen for the nonword learning task. Phonotactic probability can be decomposed into 2 measures: positional segment frequency and biphone frequency. *Positional segment frequency* is the likelihood of occurrence of a given sound in a given word or syllable position. *Biphone frequency* is the likelihood of occurrence of a given sound preceding or following another sound. These frequencies were computed using a 20,000 word on-line dictionary and were weighted for word frequency. High phonotactic probability was operationally defined using a median split of all legal CVC nonwords (median positional segment frequency = 0.1152; median biphone frequency = 0.0030). The four high probability nonwords had a mean positional segment frequency of 0.1639 (range 0.1157-0.2123) and a biphone frequency of 0.0055 (range 0.0036-0.0066). The four low probability nonwords had a mean positional segment frequency of 0.0849 (range 0.0595-0.1072) and a biphone frequency of 0.0010 (range 0.0004-0.0018). The four high probability nonwords were also high density (*M* = 13; range 12-18). In complement, the four low probability nonwords were also low density (*M* = 5; range 2-6). Phonemes were not repeated in the same word position across the eight nonwords to decrease the confusability among items. All nonwords were composed of early acquired sounds having a 75% level of acquisition of 3; 6 or younger (Table 5; Smit, Hand, Freilinger, Bernthal, & Bird, 1990). Mean age of phoneme acquisition using this 75% criterion was 3-years for both high and low probability nonwords. In addition, data from the GFTA was used to determine that the participating children accurately produced the phonemes used in the nonwords.

In an attempt to equate semantic and conceptual factors, two nonsense object referents were selected from the same semantic category (Storkel & Rogers, in press). A nonsense object was defined as an object that had no corresponding single word label for adults. Objects were adapted from children's stories or were invented. The right-hand columns of Table 1 contain a description of the chosen objects. Each referent was arbitrarily paired with a high or low probability nonword. This pairing of referents and nonwords was counterbalanced across participants.

Scenes from multiple children's stories by Mercer Mayer (1993) were combined and adapted to incorporate the nonsense objects. The resulting story contained three story episodes with each episode containing the eight nonsense objects. Each story episode featured a common routine such as selecting objects to take on an outing, using objects in a competition, or hiding objects. The story pictures were 8 x 11 color drawings, mounted on a solid background, and placed in a storybook. The narrative was created so that exposure sentences were identical for each nonword within a semantic category. See the appendix for an example of the story narrative. The first story episode provided one exposure to the eight nonwords. The second and third story episodes each provided three massed exposures to the eight nonwords (refer to the appendix). A female speaker recorded two versions of the story, corresponding to the different pairings of forms and referents for counterbalancing.

Form Characteristics		**Referent Characteristics**		
High PP	Low PP	Category	Item 1	Item 2
w @ t	n aU b	Toys	punch toy (Geisel & Geisel, 1958; p. 53)	cork gun (Geisel & Geisel, 1958; p. 45)
h ^ p	g i m	Horns	orange trumpet downward orientation (Geisel & Geisel, 1954; p. 50)	yellow hand-held tuba (Geisel & Geisel, 1954; p. 50)
p i n	m OI d	Candy Machines	red candy + 1 shoot (invented)	blue candy + 2 shoots (invented)
k oU f	j e p	Pets	green gerbil with antenna (DeBrunhoff, 1981; p. 132)	purple mouse-bat (Mayer, 1992, p. 43)

Table 1. The phonetic transcription of the high and low probability nonword stimuli and their corresponding referents. Referents were invented or adapted from published children's stories.

Procedures

Children participated in three sessions approximately 1-week apart. In the first session, entry testing consisting of the parent questionnaire, GFTA, PPVT-R, and the hearing screening was completed. In addition, children were required to accurately repeat the nonwords. The purpose of the nonword repetition task was to ensure that all children could accurately produce the nonwords. In the second session, children participated in the multi-trial nonword learning task. Children listened to the first story episode via desktop speakers while viewing the accompanying picture book. The investigator pointed to the appropriate main character to help the child follow the dialogue. Recall that story episode 1 provided one exposure to each of the eight nonwords. Following this first exposure, nonword learning was assessed using two tasks: referent identification and form identification. In the *referent identification task*, the child heard a word presented over the speakers and was asked to select the correct picture referent from a field of three choices. The choices included the target, the foil from the same semantic category, and an unrelated foil presented in the story. In the *form identification task*, the child saw one picture and heard three choices for the name of the object. The examiner pointed to a colored square as each form choice was played over the speakers. The child then pointed to the square corresponding to his or her response. Foils were selected in the same manner as in the referent identification task. Prior to testing with the nonword targets, each task was explained and each child was required to provide accurate responses to three known words to demonstrate understanding of the task. This series of story listening and testing was repeated for story episodes 2 and 3. Recall that story episodes 2 and 3 provided three exposures to each nonword. In this way, nonword learning was tested following 1, 4 and 7 cumulative exposures in both referent and form identification tasks. Approximately 1-week after this initial learning phase, children returned for a third session to examine retention of the nonwords using both referent and form identification tasks.

Results

The current study was designed to examine the effect of phonotactic probability across different levels of exposure as revealed by two measures of learning (referent identification vs. form identification). Data collection for this project is ongoing and the results reported here are preliminary. At the outset of this project, it was predicted that children would learn high probability nonwords more rapidly than low probability nonwords. This finding would support the hypothesis that children encode phonotactic probability and that sublexical representations influence lexical acquisition. Further, it was hypothesized that stronger evidence for the effect of phonotactic probability would be found in the form identification task than in the referent identification task. This finding would seem to suggest that sublexical representations are particularly important in learning the form of a novel word. Finally, it was predicted that the difference between high and low probability nonwords would diminish with increasing exposure as learning approached ceiling or maximum performance. To provide evidence related to these predictions, the effect of phonotactic probability and exposure will be considered for each measure of learning, in turn.

Analysis

The proportion of correct responses for all four nonwords in a given phonotactic probability condition (high, low) was computed for each participant at each test point. These aggregated accuracy scores for each task (referent identification, form identification) were then submitted to a repeated measures analysis of variance (ANOVA) with the factors Exposure (1, 4, 7, Retention) and Phonotactic Probability (high, low). The purpose of this analysis was to examine the effect of phonotactic probability on nonword learning across three levels of exposure. In addition, qualitative comparisons were made between the results for referent identification and those for form identification.

Referent Identification

All 21 children were able to successfully complete the training component of the referent identification task. The results of the ANOVA showed a significant main effect of Exposure ($F(3, 60) = 4.933$; $p < 0.01$) and Phonotactic Probability ($F(1, 20) = 4.401$; $p < 0.05$). The interaction of Exposure x Phonotactic Probability failed to reach significance at this time ($F < 1$). Figure 1 displays mean proportion of correct responses across children for high and low probability nonwords at each exposure. Proportions between 0.29 - 0.38 are not significantly different from chance (exact binomial, $p \leq 0.05$). As seen in Figure 1, high probability nonwords were learned more rapidly than low probability nonwords as predicted. Responses to high probability nonwords were significantly above chance following 4 and 7 exposures. In contrast, low probability nonwords were not responded to with greater than chance accuracy until 7 exposures. As predicted, the difference between high and low probability nonwords gradually decreased across exposures. Following 4 exposures, the greatest difference between high and low probability nonwords was observed (51% vs. 38%). Following 7 exposures, the difference in response accuracy between high and low probability nonwords was minimal (56% vs. 52%).

Form Identification

Two of the 21 children were unable to complete the training component of the form identification task. The results for form identification are based on the remaining 19 children. The ANOVA analysis showed a significant main effect of Exposure ($F(3, 54) = 3.362$; $p < 0.05$) and Phonotactic Probability ($F(1, 18) = 6.840$; $p < 0.05$). The interaction of Exposure x Phonotactic Probability failed to reach significance at this time ($F < 1$). Figure 2 displays the mean proportion of correct responses for high and low probability nonwords for each cumulative exposure. Proportions greater than 0.38 or less than 0.28 differ significantly from chance (exact binomial, $p \leq 0.05$). Results from the form identification task complement the results from the referent identification task. Inspection of Figure 2 shows that high probability nonwords were acquired more readily than low probability nonwords. Responses to high probability nonwords were significantly above chance after 4 and 7 cumulative exposures. In contrast, responses to low probability nonwords were not above chance until retention testing. In addition, the

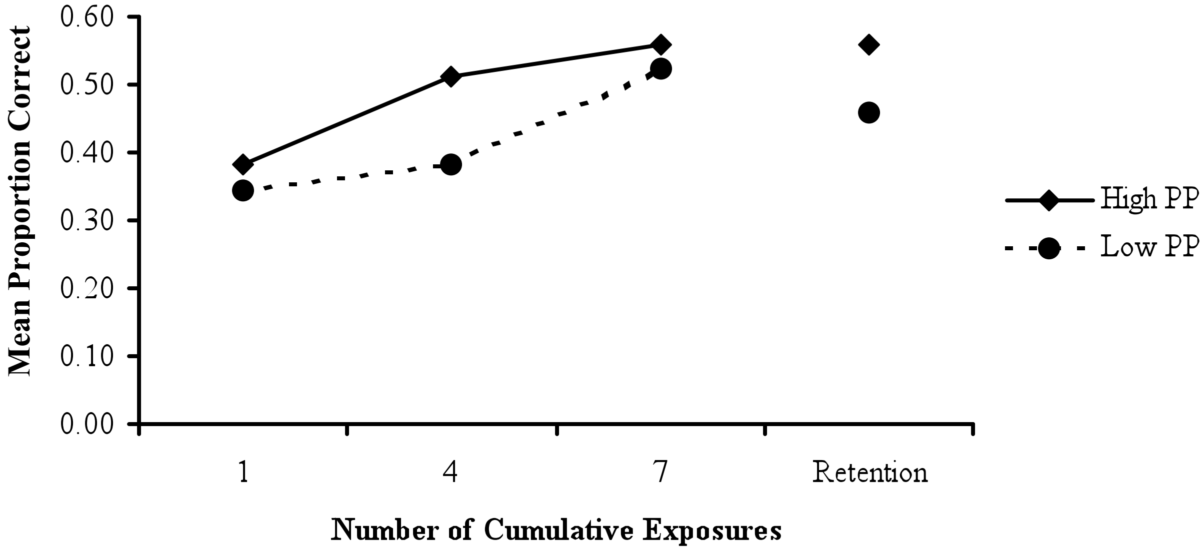

Figure 1. Mean proportion of correct responses in the referent identification task for high probability and low probability nonwords following 1, 4, and 7 exposures and retention. Note that proportions greater than 0.38 or less than 0.29 differ significantly from chance (exact binomial, $p \leq 0.05$).

difference between high and low probability nonwords varied over time. The difference between high and low probability nonwords initially increased with 4 exposures (difference of 0.12) and 7 exposures (difference of 0.21) and then decreased at retention testing (difference of 0.11).

Discussion

The current study examined the effect of phonotactic probability on lexical acquisition over time as evidenced by two measures, referent and form identification. Preliminary results indicated that high probability nonwords were learned with fewer exposures than low probability nonwords. This effect was observed in both referent and form identification tasks across all test points. Although observed at all test points, the difference between high and low probability nonwords was more pronounced at specific test points and varied across referent and form identification tasks. In the referent identification task, a substantive difference between high and low probability nonwords was observed after 4 exposures only. For the form identification task, differences between high and low probability nonwords were observed after 4 and 7 exposures and at retention testing. In both tasks, the differences between high and low probability nonwords ultimately decreased across learning and retention phases. The implications of these findings for theories of lexical acquisition will be considered, in turn.

Sublexical Influences on Lexical Acquisition

The current findings provide further evidence that children learn the likelihood of occurrence of sound sequences in the ambient language and that this representation of phonotactic probability may influence language learning. The observed facilitory effect of high phonotactic probability supports the initial hypothesis that sublexical representations may play a role in lexical acquisition. It is possible that other phonological variables, such as prosody, word length, and syllable structure, may influence lexical acquisition. For example, words with more likely stress patterns, as in the dominant trochaic pattern of English, may be easier to learn than words with less likely stress patterns. Furthermore, the influence of sublexical representations in lexical acquisition may have more global consequences for language acquisition. The learning advantage of high probability words over low probability words facilitates the creation of dense lexical neighborhoods. These dense lexical neighborhoods

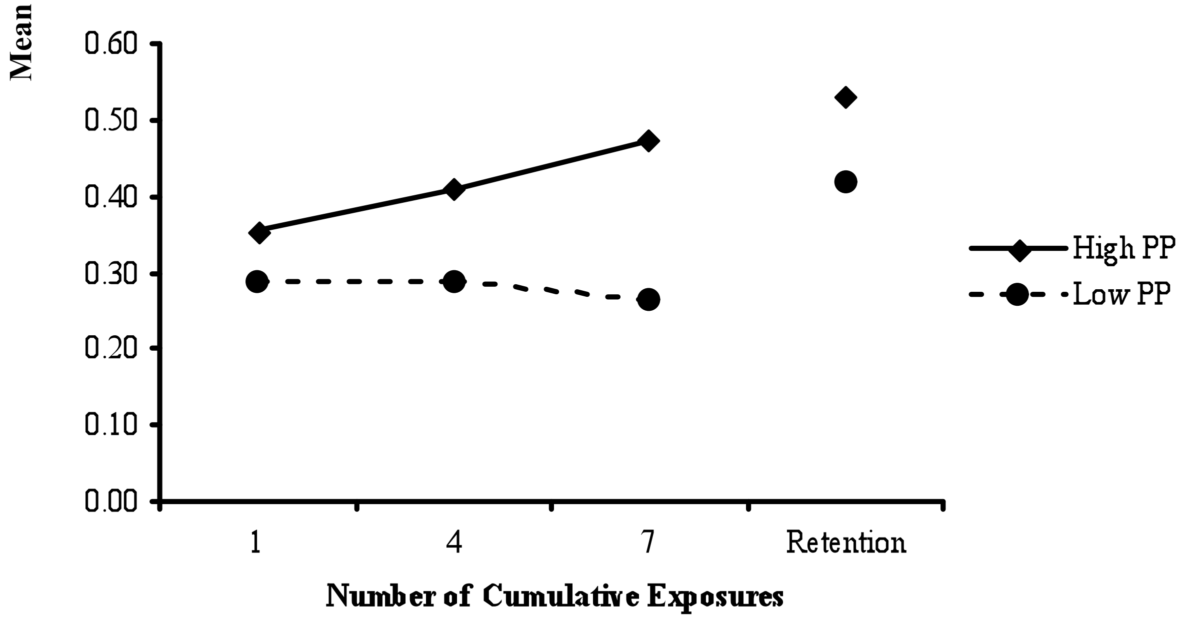

Figure 2. Mean proportion of correct responses in the form identification task for high probability and low probability nonwords following 1, 4, and 7 exposures and retention. Note that proportions greater than 0.38 or less than 0.28 differ significantly from chance (exact binomial, $p \leq 0.05$).

may highlight the relevant contrasts in the language supporting development in other areas, such as word recognition and productive phonological knowledge (Charles-Luce & Luce, 1990; 1995).

Form vs. Referent Learning

The current study provides evidence that sublexical representations influence both referent and form learning. Recall that the previous studies of phonological selectivity showed only an effect on the child's ability to learn to produce a novel word. Measures of comprehension failed to show evidence of phonological selectivity. The current results suggest that phonotactic probability influences both form and referent learning. It is possible that sublexical representations play a role in both lexical and conceptual learning. The effect of phonotactic probability on form learning suggests that sublexical representations may support the formation of lexical representations or the connection between sublexical and lexical representations. In addition, the effect of phonotactic probability on referent learning replicates the findings of Storkel & Rogers (in press) using a different method and a different age group. The implication of these referent identification results is that sublexical representations may have consequences for acquisition of the link between conceptual knowledge and word forms.

Effect of Phonotactic Probability over Time

We initially hypothesized that a nonword would eventually form a lexical representation and achieve ‘word’ status during learning. When a lexical representation is firmly established for a nonword, sublexical processing presumably becomes less influential than lexical processing. In addition, the sensitivity of the learning task to further changes in representations and processing diminishes as the unknown word becomes “known.” Given this hypothesis, we predicted that phonotactic probability should be highly influential initially after minimal exposure. The current results support this prediction. The advantage for high probability words was observed after minimal exposure and began to dissipate with further exposure. Additional changes in representations and processing may be observed if other more sensitive psycholinguistic tasks were employed in conjunction with the word learning paradigm. That is, once the word becomes “known” other changes in representations and processing for the newly learned word might be revealed in a word recognition or production task.

Conclusions

The current study provides evidence that children learn the distributional regularities of the ambient language. Moreover, sublexical representations appear to support lexical acquisition leading to an advantage of high probability words over low probability words. Sublexical representations seem to have a robust effect on word learning influencing the acquisition of both the form and the referent.

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Appendix: Sample Narrative

Version 1

Story episode 1 "What about the pets?" asked Little Sister. "We'll take them with us" said Big Brother. "I'll get [jep]. Little Sister said, "I'll get [koUf].

Story episode 2 "I can make our pets do more tricks than you," said Little Sister. "Uh-uh," said Big Brother. Big Brother made [jep] do tricks. He made [jep] roll-over. He made [jep] jump up and down. Next, it was Little Sister's turn. Little Sister made [koUf] do tricks. She made [koUf] roll-over. She made [koUf] jump up and down.

Story episode 3 "Let's hide our pets," said Big Brother. "I'll hide [jep]. Don't make any noise [jep]." Little Sister looked and looked for [jep]. "Here he is!" Little Sister said, "I'll hide [koUf]. Don't make any noise [koUf]." Big Brother looked and looked for [koUf]. "I found him."

Version 2

Story episode 1 "What about the pets?" asked Little Sister. "We'll take them with us" said Big Brother. "I'll get [koUf]. Little Sister said, "I'll get [jep].

Story episode 2 "I can make our pets do more tricks than you," said Little Sister. "Uh-uh," said Big Brother. Big Brother made [koUf] do tricks. He made [koUf] roll-over. He made [koUf] jump up and down. Next, it was Little Sister's turn. Little Sister made [jep] do tricks. She made [jep] roll-over. She made [jep] jump up and down.

Story episode 3 "Let's hide our pets," said Big Brother. "I'll hide [koUf]. Don't make any noise [koUf]." Little Sister looked and looked for [koUf]. "Here he is!" Little Sister said, "I'll hide [jep]. Don't make any noise [jep]." Big Brother looked and looked for [jep]. "I found him."