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Contextual Constraints on Usage of Cognitive Words*

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The conversations of 36 4½- to 5-year-olds differing in race (black and white) and social class (professional and working class) and the adults with whom they spoke were tape-recorded during play and teaching time at preschool and dinnertime at home. Usage of cognitive words was analyzed for six levels of meaning that differed in depth of processing from reference to (1) perception and attention, (2) recognition, (3) fact recall, (4) understanding, (5) metacognition, and (6) evaluation of presuppositions. Although the rank order of usage was the same, children devoted less of their lexicon to the three higher levels of meaning than adults. Even in adults, perceptual references predominated. Use of higher-level meaning was less prominent in school and in the black working-class population. There were significant correlations between exposure to adult conversations with high-level meanings and child use of those meanings, and between the diversity of cognitive vocabulary in children and adults, but those correlations were smallest in the black working-class population.

There has been much interest in children's acquisition of an internal state vocabulary to describe (a) cognition, (b) affect, (c) perception, and (d) intentions and desires (e.g., Gearhart & Hall, 1982; Hall & Nagy, 1986). This interest is motivated by several assumptions. First, children's vocabulary in this domain determines to a large extent their

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understanding of inner states. Whereas many words label objective, publicly accessible, and permanent aspects of reality, words like *know* refer to transient, subjective experiences. Because the behavioral cues, particularly to the existence of cognitive states, are subtle, attention to those states and to the distinctions among them may be fostered by language. Second, acquisition of internal state vocabulary fosters self-awareness and metacognitive monitoring. Third, mastery of the internal state lexicon may also foster greater readiness for school because many academic skills require the cognitive monitoring that internal state language labels (e.g., Brewer & Lichtenstein, 1982; Flavell, 1978, 1979; Hall & Nagy, 1986; Palincsar & Brown, 1984). Fourth, situational variation exists in the function and use of internal state words and also populations vary in their usage of these words (Hall & Nagy, 1986). In this paper we propose a semantic analysis of these words, examine the context of their usage, and explore how that context constrains the development of knowledge of the internal state lexicon. We define context in terms of the age, social class, and ethnicity of the speaker and the situation in which conversations occur.

SEMANTIC ANALYSIS

Determining the Boundaries of Internal State Words

Any semantic analysis must begin with setting boundaries. Most internal state words are verbs with the experiencer as the subject that focus primarily on the internal state components. Some prototypical examples are as follows: (1) John *knows* the answer. (2) I *want* to leave. (3) I *like* chocolate.

Hall and Nagy (1986) suggest three criteria useful in distinguishing internal state words from other words. First, the key criterion is the extent to which the word meaning as a whole focuses on an internal state. Thus, perceptual words refer to the act or experience of perception rather than the content or object of perception. The word *red* describes the product of perception, but it does not describe an internal state. In contrast, the word *see* refers to the process or experience of perceiving. A second criterion is that internal state words refer to psychological rather than physical processes. Words like *see* and *hear* clearly refer to sensory experiences, but words like *relaxed* and *sore* refer more to the state of the person's body as opposed to psychological awareness. Third, internal states refer to transitory states and processes rather than long-term attributes such as

capacities, abilities, and traits. For example, the word *anger* refers to a temporary emotional state, but *optimistic* refers to a personality trait. Some words can be used in either way, such as *nervous* as in "He's a *nervous* person" versus "Tests make me *nervous.*"

A Semantic Analysis of Cognitive Words

Our analysis of the semantics of internal state words focuses on cognitive words. It was inspired by previous investigations of children's comprehension of words like *guess, know, remember,* and *forget.* Previous research has suggested that these words differ in three respects. One is the accessibility of knowledge. *Know, remember,* and *forget* imply that the individual once had access to the information, but in the case of *forget,* that information is inaccessible. *Guessing* may refer to situations where the information is unknown (Johnson & Maratsos, 1977; Johnson & Wellman, 1980; Miscione, Marvin, O'Brien, & Greenberg, 1978). *Pretend, guess,* and *know* capture a second distinction, among presuppositions of disbelief, uncertainty, and belief (e.g., MacNamara, Baker, & Olson, 1976; Shatz, Wellman, & Silber, 1983; Wing & Scholnick, 1986). Yet a third distinction is between *knowing* and *seeing,* and refers to the contents of the internal experience, that which is private and intangible versus publicly observable and tangible (Wellman & Estes, 1987).

There is evidence that 3-year-olds have begun to distinguish these different aspects of meaning. However, our knowledge of this development is incomplete for several reasons. First, the same word can be used to cover many distinctions. "I *know* that face" refers to recognition, but "*Knowing* is different from doing" refers to a metacognitive description. Second, the disparate facets of meaning have not been coordinated into a conceptual framework. We propose that cognitive words refer to a continuum of internal processing that proceeds from (a) the perceptual registration of an experience to (b) determining its familiarity to (c) embedding it in a factual network to (d) understanding interconnections among concepts to (e) commenting on how the processing is done to (f) making explicit one's presuppositions about the experience. Perhaps young children's early vocabulary refers to the more superficial rather than the deeper levels of processing. Adults may use a wider vocabulary to express the more abstract or deeper levels of cognitive processing, and they may even use words we ordinarily regard as perceptual in deeper ways. In addition, certain experiences in particular contexts may affect and foster different levels of usage.

CONTEXTUAL FACTORS

Speakers

Several investigations have pointed out the impact of context on the complexity with which language is used (e.g., Bennet & Woll, 1980; Cazden, 1970; Cole, Dore, Hall, & Dowley, 1978; Steffensen & Guthrie, 1980). The most frequently implicated contextual factors are the social class and ethnicity of the speaker (e.g., Deutsch, 1965; Jones & Wepman, 1966; Jordan, 1978; Seashore & Eckerson, 1940; Templin, 1957) and the setting in which language is used. In general, the higher the social class, the more diverse the child's vocabulary. But there are two important issues to be resolved: what social class indexes and how it achieves its effects. When social class and ethnicity are distinguished, as in some of the studies reported by Hall, Nagy, and Linn (1984), social class alone is not the determinant of lexical diversity. Professional-class whites and working-class blacks were generally the highest and lowest performers, respectively, with professional-class blacks and working-class whites falling in between. Proper analysis of the attributes of the speaker can facilitate more valid cross-group comparisons of language function and use. Speaker factors were incorporated into our investigation of cognitive words.

Situations

Jordan (1978) suggests that the degree to which the environment stimulates and encourages mental development is a more critical factor than either social class or ethnicity. Studies by Hall and Tirre (1979) and Hall et al. (1984) have involved comparisons of the spoken vocabulary of children and adults from various social class and ethnic groups with the vocabulary lists from several intelligence tests and word frequency lists. Middle-class and white samples were more likely to use spontaneously and hear words from standardized vocabulary lists. Hall, Nagy, and Nottenburg (1981) compared two social class and ethnic groups. Although there was no significant difference in the amount of use of internal state words at home, and teachers of the children were similar in their use of internal state words, the children differed in their use of internal state words at school. The data from this investigation clearly implicate situational differences in the amount of internal state word usage. Might it not also differentiate the level of word usage?

In summary, the aims of this investigation were to (a) characterize the levels of meaning of cognitive words and (b) investigate the way in

which three contextual variables—race, social class, and situation—affect cognitive word usage in general and at specific levels of meaning.

METHOD

The Corpus

The analysis of cognitive words was based on conversations directed to 36 children between 4.5 and 5 years of age. Portions of these conversations have been used in other analyses of internal state words (Hall et al., 1981, 1984). This new analysis differs in that more situations were included, affective words were excluded, and a new way of categorizing the lexicon was implemented.

In our analysis, data were drawn from the conversations of 8 professional-class white, 8 working-class white, 9 professional-class black, and 11 working-class black children. Their SES placement was based on the scale developed by Warner, Meeker, and Eells (1949). The working-class children were attending federally funded preschools, while most of the professional-class children attended private preschools. Each child was recorded in 10 different situations over a 2-day period. The analysis reported in this research was based on three situations: free play during school, a teaching activity at school, and dinner at home. These three situations differ in that the free play is a small-group situation that is child-dominated, but the directed activity is a large-group situation that is adult-dominated, and dinner, though adult-structured, involves a small group of speakers. Hence, the three situations vary in setting, number of speakers, and the influence of adults. In the school situations, the working-class blacks were in all-black classes with predominantly black teachers, whereas all other children were in integrated classes with an integrated teaching staff. The research worker who did the recordings was the same race as the child.

Audiotape recordings were obtained by having the child wear a vest with a wireless microphone sewn in, while the observer also wore a microphone clipped to his tie. The observer dictated context information. The tapes were then transcribed and the conversations were stored on computer tapes. The analysis reported in this paper consisted of the conversations of 36 children who were recorded at least once in each of three target situations.

Coding Scheme

The child's transcribed protocol was first coded in order to isolate cognitive words either spoken by the child or directed to the child by an

adult. A cognitive word referred to the processes of perceiving, attending, thinking, choosing, or deciding. Each word was categorized into one of the following six levels of meaning on the basis of utterance context:

Perception

The speaker reports the act of perception or draws attention to the speaker or the utterance, e.g., "*Watch* me draw." "I *heard* your story."

Recognition

These words designate the accessibility of some mental content. The speaker makes a judgment of familiarity or lack of it. "I've *seen* that before." "I *remember* his face."

Recall

The speaker refers to specific factual information that he or she recalls or uses a word in a "test question" to elicit factual information. Thus, when the speaker uses "Do you *know* his name?" or "Do you *remember* the last time we went to a museum?" to cue recall of specific facts, those cognitive words belong in this category.

Understanding

The speaker refers to conceptual relations, frameworks, or reasoning. "I *know* why he did that." "I *see* what you mean."

Metacognition

The focus is on awareness of mental acts. "*Pretending* can be fun." "I'm using my *imagination.*"

Evaluation

The speaker refers to presuppositions about the truth of statements. "He *guessed* the answer, but I *know* it."

This category system combines two perspectives: depth of processing and abstractness of content. Level 1 describes immediate sensory input, Level 2 describes relating the input to past experience to determine whether that input has been encountered before, Level 3 describes actual

Table I. Speakers' Average Frequency of Cognitive Internal State Words

	Situation and age					
	Home		School		Total	
Group[a]	Child	Adult	Child	Adult	Child	Adult
WPR	45.25	79.98	40.88	47.75	86.13	127.63
WWC	48.63	96.50	26.13	82.50	74.75	179.00
BPR	56.56	120.22	25.67	54.10	82.20	174.30
BWC	24.09	53.36	35.64	50.55	59.72	103.91

[a]WPR = white professional, WWC = white working class, BPR = black professional, BWC = black working class.

retrieval of past input, and level 4 describes the semantic network to which knowledge is referred. At Level 5 the speaker steps away from the act to describe awareness of the process, not the product of thinking, and at Level 6 the speaker uses the cognitive meaning to contrast or evaluate messages in terms of whether they imply true observations, contrary-to-fact propositions (e.g., *pretend*), or uncertain states (*guess*).

Two pairs of coders independently categorized the children's cognitive words for two protocols. They achieved over 90% agreement on the categories. Two of these coders then scored the remaining protocols.

RESULTS

Frequency

The conversations were analyzed for frequency and diversity of usage of cognitive internal state words (CISW; Table I). Both at home and at school, adult CISW usage is approximately double that for children. At home black working-class children use fewer CISWs than the other three groups, but at school this is not the case. At home black children in working-class families hear fewer adult CISWs and black children in professional-class families hear more CISWs than the other children. In school, the frequency of adults CISWs is relatively even except when addressing white working-class children, who hear more cognitive speech.

To assess the robustness of these patterns, scores based on the frequencies were entered into a mixed-design analysis of variance. Using

Table II. Average Number of CISWs at Each Level of Meaning for Children

	Level					
	1	2	3	4	5	6
Home	33.54	1.19	3.42	1.42	3.38	1.57
School	24.38	.35	1.62	1.54	3.34	.90

total frequency for a situation (play, directed activity, or dinner) as the baseline, proportional scores were computed for each speaker for the various levels of CISWs used. These scores were then arcsine transformed. Two separate analyses were done, one for children and one for adults. In each analysis, the grouping variables were SES and race, while the repeated measures were situation and level of meaning. Throughout this paper, we used a Greenhouse-Geisser correction for evaluating the significance of F ratios for repeated measures, and Newman-Keuls tests of differences between means. We will report differences significant at $p < .05$.

Child

Social class and ethnic group membership did not have a main effect on children's use of cognitive internal state words. There were, however, situation and meaning level effects of some complexity that varied across social class and ethnic groups. Children used significantly more words at home than in either school situation, $F(2, 64) = 62.75$. The overall means for the situations were these: Home = 42.36, Free Play = 16.08, Directed Activity = 12.36. At home children from black working-class families used significantly fewer CISWs ($M = 24.09$) than the other three groups, who were equal in productivity (BPR = 56.56, WWC = 48.63, WPR = 45.25). A different picture emerged in school. Working-class black children were as productive as all other groups except for the white working class, whose production was lowest (BWC = 25.98, WPR = 24.36, BPR = 18.12, WWC = 10.38). In directed activity, which is adult (teacher)-dominated, white children use significantly more words than black children (WPR = 16.50, WWC = 15.78, BWC = 9.66, BPR = 7.56).

The children used the different levels of meaning with different frequencies $F(5, 160) = 234.41$. Table II presents these data. Level 1

Table III. Social Class Differences in Children's Frequency of Usage of Cognitive Internal State Words at Each Level of Meaning

	Level					
	1	2	3	4	5	6
Professional	61.59	1.47	4.83	2.34	10.41	3.42
Working class	52.53	1.05	3.75	3.54	2.70	1.47

Table IV. Group Differences in Mean Frequency of Child Usage of Different Levels of Meaning of Cognitive Internal State Words

	Level					
	1	2	3	4	5	6
WPR	65.13	.12	5.37	1.62	11.49	2.37
WWC	57.00	2.01	5.13	3.87	4.62	2.13
BPR	58.44	2.67	4.13	3.00	9.45	4.32
BWC	49.26	.36	2.73	3.27	1.26	.99

meanings were used more frequently than all other levels. Usage of Levels 3 and 5 was also significantly higher than usage at Levels 2 and 6. The frequency of usage of the six levels varied between the social classes. As an inspection of Table III reveals, the children from professional-class families generally use more CISWs than those from working-class families, and that difference was statistically significant at Levels 1 and 5.

The difference in performance found at Levels 1 and 5 reflects an interaction of ethnic group membership, social class, and situation $F(10, 320) = 3.03$ (see Table IV). The black working-class children use significantly fewer CISWs than children in the other three groups. Additionally, at Level 5, children of professional-class families use more CISWS than working-class children.

Adults

Home. The adult speakers in the home differed from those at school, so we will present these data separately. At home, there was a significant impact of ethnic group–social class combinations, $F(1, 32) =$

Table V. Mean Adult Use of Cognitive Internal State Words in Different Contexts

	Situation[a]		
	Free play	Directed activity	Dinner
WPR	11.10	36.60	82.86
WWC	9.90	72.60	96.48
BPR	9.90	44.22	120.24
BWC	9.48	39.90	53.34

[a]The free play and directed activity were at school, and dinner was at home.

Table VI. Level Means for the Frequency of Adult Cognitive Word Usage at Home

	Group			
Level	WPR	WWC	BPR	BWC
1	47.38	63.00	69.33	34.82
2	.38	1.25	.67	.09
3	10.25	8.13	13.33	5.73
4	5.13	4.25	5.78	2.18
5	5.38	7.00	16.44	4.82
6	11.38	12.88	14.67	5.73

6.55 (see Tables V and VI). This speaker effect is accounted for by the low frequency of use of CISWs by black working-class adults and the very high frequency of use by black professional-class adults. Again these differences were most pronounced in the usage of Level 1 and 5 meanings, $F(5, 160) = 86.35$. At Level 1, the means of the white working-class ($M = 63.00$) and black professional-class adults ($M = 69.33$) are not significantly different from each other but they are higher than the means for the other two groups (WPR = 47.38, BPR = 34.82). At Level 5, the black professional-class adults were more productive ($M = 16.44$) than the other three groups (WPR = 5.38, WWC = 7.00, BWC = 4.82). The black working-class adults were the least productive of all.

School. There are two school situations, free play and directed activity. Adults used CISWs with different frequencies in these two contexts. As Table V indicates, adult usage of CISWs is greater during directed activity, which they, by design, dominate. There was a signif-

Table VII. Variety of Cognitive Internal State Words in Each Situation

	Situation[a]				
	FP	DA	School	DI	Total
Children					
WPR	4.75	4.75	4.75	7.62	10.00
WWC	3.62	4.00	3.81	8.12	9.25
BPR	5.11	3.22	4.17	8.22	11.00
BWC	4.64	3.18	3.91	4.46	6.60
Adults					
WPR	3.88	7.75	5.82	13.50	14.88
WWC	4.62	8.62	6.62	12.12	14.88
BPR	4.22	8.66	6.55	17.67	19.88
BWC	4.27	7.64	5.96	10.27	13.20

[a]FP = free play, DA = directed activity, School = average of FP and DA, DI = dinner, Total = number of different words in entire speaker corpus across all situations.

icant context × meaning level interaction, $F(5, 160) = 69.28$, as well as a context × meaning level × social class interaction, $F(5, 160) = 5.51$. Adults do not differ significantly in usage of CISWs in the free play context but in directed activity, adults addressing white working-class children use almost twice as many words as the other adults. The difference is widest between the adults addressing white working-class and white professional-class children.

Variety of Cognitive Words

Number of Different Words

The second performance measure was the number of *different* words that each speaker produced. Words that used the same stem but differed in tense or part of speech were considered equivalent. Two analyses of variance of the effects of ethnicity and socioeconomic status, and the repeated measure, setting, were performed, one for the child and one for the adult speakers. We begin with the child speakers.

Child. The variety of words used differed between the socioeconomic groups, $F(1, 32) = 4.55$, and across the three situations, $F(1, 32) = 33.60$. The effects of setting were dependent on the race of the child, $F(2, 64) = 4.72$, alone and in combination with socioeconomic status, $F(2, 64) = 5.99$. The means for the triple interaction appear in Table

VII. The pattern of child speech resembles the frequency data. At school, the four groups differ minimally within and between situations (M = 3.62–4.72 different words). At home the black working-class children produce the least varied lexicon (M = 4.46 different words). They alone produce as varied speech at home as at school, while the remaining three groups used significantly more varied cognitive words at home (M = 7.62–8.22 different words) than at school.

Adult. A similar analysis was performed on adult speech, but bear in mind that the adults at home are not the ones in the school setting. The variety of speech varied depending on the race and socioeconomic status of the child to which it was addressed, $F(2, 64) = 5.97$. In general, speech to children from black professional-class families was significantly more varied (M = 10.26 different words) than to children from black working-class families, while the speech to the two white groups was intermediate in variation. The socioeconomic status of the target child, in combination with the situation, also affected lexical diversity, $F(2, 64) = 5.97$. For children whose parents were professionals, regardless of their ethnicity, significantly more varied adult speech was heard at home (M = 15.70 words) than in directed activity (M = 8.35), whereas adult conversation was significantly more varied than in free play (M = 4.06). However, adult speech to working-class children showed as much diversity during directed activity (M = 9.13 different words) as at home (M = 11.05), so that parental speech was not more enriched than teacher speech. Working-class children, too, heard the least diverse CISWs during free play.

Correlations. In order to determine the amount of consistency in speech across situations, the variety of child speech across the three situations was correlated. These data appear in Table VIII. The size of the lexicon at home was significantly related to the size of the lexicon used in directed activity, $r(34) = .51$. The diversity of vocabulary was also significantly correlated with diversity during free play, $r(34) = .38$. But speech in free play and directed activity was minimally related, $r(34) = .20$. For adults, it is not surprising, since the speakers at home are not those in the school setting, that only the size of the lexicon used in free play is related to that used in directed activity, $r(34) = .35$.

There was also a strong relation between the speech the child heard and the child's own production. We intercorrelated four sets of adult measures, the total number of different words used across the entire protocol, and in each of the three situations with similar child measures, total variety and variety in the three settings. Since the speech directed to the child at home produces almost identical correlations as speech

Table VIII. Correlations in Speech Variety Across Different Speakers and Situations

Measures	WPR	WWR	BPR	BWC	All subjects
Child					
Free play and directed activity	.55	.10	.34	.08	.20
Free play and dinner	.64[a]	−.17	.83[b]	.34	.38[b]
Directed activity and dinner	.48	.39	.28	.22	.51[b]
Adult					
Free play and directed activity	.64[a]	.46	.61[a]	.01	.35[b]
Free play and dinner	.21	−.51	−.07	.37	−.03
Directed activity and dinner	.20	−.44	−.17	−.05	.03
Adult variety and child					
Play	.04	−.07	.51	.02	.30[a]
Directed activity	.63[a]	.43	.41	−.65[b]	.09
Home	−.24	.48	.51	−.38	.39[b]
Total variety	−.01	.58	.62[a]	.08	.51[b]

[a] $p < .10$.
[b] $p < .05$.

directed to the child across all situations, we will report only data on total variety of adult speech. The diversity of adult speech the child heard significantly predicted the overall variety of child CISWs, $r(34) = .51$. Adult diversity also significantly predicted child diversity at dinner, $r(34) = .39$, and in free play, $r(34) = .30$, $p < .10$, the two situations where the child is an equal partner in conversation, but not child diversity during directed activity.

Correlations were also computed for the four socioeconomic class × race combinations. Although the groups are very small, there were some significant differences in the consistency of child and adult speech across situations, and in the association of child and adult speech. The teachers of both groups of professional-class children were more consistent in their speech during the two school situations than the teachers of working-class children. The children in the professional-class groups were also more consistent in their speech variation between free play and home than the working-class children. The total variety of words directed to black working-class children was negatively correlated with their lexical diversity in directed activity, but this was not the case for the other three groups.

Level of Meaning

Developmental differences in the size of the internal state lexicon preclude direct comparison of the way in which internal state words are

Table IX. Percentage of the Lexicon at Each Meaning Level for Each Situation

	Setting			
Meaning level	Free play	Directed activity	Dinner	All settings
Child data				
1	77	75	72	74
2	1	2	2	2
3	10	13	15	13
4	8	8	10	9
5	13	6	16	12
6	7	6	7	7
Adult data				
1	73	62	49	61
2	0	2	2	1
3	15	19	17	16
4	5	6	14	8
5	8	23	32	21
6	9	12	11	11

used, because a greater predominance of meanings at one level may simply reflect a more varied vocabulary, in general. Therefore, scores were converted into proportions. The total variety of words within a given situation was the baseline. Thus, if a child produced eight different cognitive words, we determined the proportion of them used to express each level of meaning. Since a word could be used at different levels of meaning, those proportions were somewhat independent of one another. In the analyses, the proportions were converted into arcsines, but we will report the untransformed data to facilitate comprehension.

Developmental Differences. The first analysis included the entire population in order to determine whether the distribution of levels of meaning of CISWs differed between adults and children. An analysis of the three speaker variables—developmental level, socioeconomic class and ethnicity—and the repeated measure—meaning level—revealed that meaning level had an impact on usage, $F(5, 320) = 187.91$, which was qualified by the age of the speaker, $F(5, 320 = 12.86)$. Table IX shows that two levels of meaning produce significant age differences in usage. Adults devote less of their lexicon to perceptual meanings than children do ($M = .61$ vs. .74), and more of their lexicon to metacognitive meanings than children do ($M = .21$ vs. .12). However,

at each age, the greatest variety of words describes perceptions, and the next two most prominent categories are Levels 3 and 5. Level 2 is used the least.

Child. A second set of analyses included just the child data. For each situation, the total variety of words used was tabulated and then the proportion of words used at each level was calculated. For example, if a child spoke eight different words at dinner, four of which described Level 1, the child received a score of .5 for Level 1 usage. Similar computations produced scores for directed activity and free play. These data were used to determine the effects of socioeconomic status and race of the child and the two within-subjects variables, situation and level of meaning, upon the distribution of child speech. Speech distribution varied across situations, $F(2, 64) = 8.69$ and levels of meaning, $F(5, 160) = 217.85$. The distribution of speech among the levels of meaning also varied between the professional-class and the working-class children, $F(5, 160) = 4.76$. Working-class children devote more of their lexicon to perceptual descriptions than professional-class children ($M = .80$ vs. .67). Conversely, a smaller proportion of the vocabulary of working-class children describes metacognitive processes ($M = .09$) than in children from professional-class families ($M = .15$). Working-class children also devote less of their lexicon to words describing presuppositions than do professional-class children (.05 vs. .08).

There was also a significant interaction of the two speaker variables and situation with level of meaning, $F(10, 320) = 2.19$. To specify the source of the interaction, a socioeconomic status × race × situation analysis was done for each separate level of meaning. Three levels of meaning showed different patterns of usage in each setting (see Table X). First, the proportion of the lexicon devoted to discussion of recall of factual information (Level 3) is significantly higher at dinner ($M = .15$) than during free play ($M = .10$), with directed activity in an intermediate position ($M = .13$). Second, dinner also produces a significantly higher proportion of vocabulary directed to metacognitive meanings ($M = .16$) than during free play ($M = .06$), with free play in between ($M = .13$). Third, the two racial groups differed in the settings in which they used CISWs to focus on presuppositions of truth (Level 6). White children were less likely to evaluate truth status in free play ($M = .04$) than blacks ($M = .10$), but blacks were less likely to express words designating opinions and beliefs in directed activity ($M = .04$) than whites ($M = .10$). Levels 4–6 are the ones with the most advanced use of cognitive words. Children use more of their lexicon to discuss understanding,

Table X. Proportion of the Child Lexicon Used at Each Level Within Each Situation

SES:	Professional class				Working class			
Situation:	FP[a]	DA	DI	Total	FP	DA	DI	Total
White speakers								
Level 1	.69	.75	.70	.71	.80	.79	.68	.76
2	.00	.03	.00	.01	.06	.04	.04	.05
3	.19	.08	.19	.15	.08	.23	.20	.15
4	.05	.00	.08	.04	.13	.16	.09	.13
5	.21	.09	.16	.15	.13	.05	.22	.13
6	.05	.13	.08	.09	.02	.06	.07	.05
Black speakers								
Level 1	.72	.63	.59	.65	.86	.81	.84	.84
2	.00	.00	.01	.00	.00	.03	.03	.02
3	.08	.17	.13	.13	.08	.06	.11	.08
4	.05	.09	.11	.08	.08	.06	.10	.08
5	.17	.03	.25	.15	.03	.06	.05	.05
6	.11	.07	.07	.08	.09	.02	.07	.06

[a]FP = free play, DA = directed activity, DI = dinner.

metacognition, and beliefs at home (M = .33) than during discussions with their teachers (M = .20). Even spontaneous free play contains more of those meanings than directed activity (M = .28).

Adult. Since there were different adult speakers at home than at school, the data for each setting were analyzed separately, using the same dependent variable as in the preceding analysis of child speech, the proportion of different words devoted to a particular level of meaning. The analysis of the school data contrasted the effects of the two within-subjects variables, situation (free play vs. directed activity) and level of meaning, and the group variables of race and social class of the target child. In school, the distribution of speech differed between the situations, $F(1, 32) = 341.96$, across the levels of meaning, $F(5, 160) = 80.33$, and across combinations of the two variables, $F(5, 160) = 39.36$. Regardless of audience, more of the lexicon was used to discuss perceptual processes in free play (M = .73) than directed activity, but there were proportionally more Level 5 (metacognitive) words in free play (M = .23) than during teaching (M = .08). Table IX also shows the comparable data from the home situation. As in all previous analyses, speech was distributed unevenly across levels of meaning, $F(5, 160) = 88.28$. The proportion of perceptual discussions was even lower (M = .49) than at school, and metacognitive analyses was higher (M = .32).

Correlations. Our analysis was predicted on the assumption that Levels 4–6 express more advanced understanding of cognitive processes. In their protocols, 37% of the child lexicon expresses one of those three levels of meaning while adults use 57% of their vocabulary at those levels. Some adults devote more of their cognitive vocabulary to discussing those levels of meaning. Children who hear such adults also use more of their available cognitive vocabulary to express those three levels of meaning, $r(34) = .62$, $p < .05$.

DISCUSSION

Hall and Nagy (1986) subdivided uses of internal state language into semantic uses, in which the word directly refers to current internal processes, and pragmatic uses, in which the word is only indirectly related to internal experience. Contrast the meaning of *know* in "Jack *knows* the answer," where the verb refers to a cognitive state, with "You *know,* Jack could play shortstop," where the verb only calls attention to the propositional content of the sentence and not to the internal state. The current research refined this categorization and addressed three questions: (1) Are there developmental differences in levels of usage of cognitive internal state words? (2) Are there differences in levels of usage associated with the speaker's race and socioeconomic status? (3) Does the setting in which speakers operate affect levels of usage?

Developmental Issues. There were some expected developmental differences. It is not surprising that adults use CISWs more frequently and in a larger variety. Even though the conversations we recorded were ones in which adults were speaking to children and therefore may have tailored their speech to the children, adults devoted less of their discussion to perceptual meanings than children and more to metacognitive meanings. Proportionally, twice as much of the adult lexicon was recruited to express meanings at Levels 4–6 in those contexts (directed activity and dinner) that they structure and lead. Although most preschool children do use the range of cognitive levels, and important conclusion is that they do not use the deeper levels of cognitive word categories with abundance. However, this is just a preliminary finding. We have studied 4.5-year-olds in spontaneous speech in unstructured situations. We need a fuller examination of the age range to examine the origins and course of development. It is entirely possible that in situations that involve debates, arguments, and dramatic play, more of the higher-level speech might

arise. In addition, studies of comprehension may bring us closer to validating the stronger claims of our analysis, that the deeper levels of usage are more demanding conceptually (Hughes & Hall, 1987). This study is merely a preliminary investigation of the semantics of internal state words.

Another developmental finding of considerable interest was that there was a relationship between what the child heard and what the child produced. The diversity of what the child heard from adults was correlated with what the child produced. The variety of the child's lexicon at Levels 4–6 was correlated with the variety of the adult vocabulary at Levels 4–6 that the child heard. Unlike analyses of syntactic learning (e.g., Newport, Gleitman, & Gleitman, 1977), there did seem to be adult input to the child's learning of labels for cognitive states. This is not surprising because the child cannot invent a communicative vocabulary to refer to mental states, and the elusive private nature of mental states makes them hard to grasp. Language may be a decisive influence in shaping the child's theory of mind.

There are three ways that the relationship between adult and child language may have come about. First, the children may have imitated the adults they heard. Second, the children may simply have been constrained by the topics adults discussed so that when adults discussed their opinions, the children may have used words that signaled that they were offering opinions, too. These two explanations are consistent with relevant theory about the acquisition of meaning. There is considerable evidence that children's early language use is situation-specific. Children first learn language as limited routines with familiar others in familiar situations (Gearhart & Hall, 1982). So, children's early lexicon should be organized in terms of the familiar situations in which they and familiar persons use the words, and there should be considerable contextual constraint in word usage. This interpretation is compatible with Nelson's (1983) view that children initially represent words according to their roles and slots in episodes and only gradually construct a semantic system decontexted from personally experienced events. Similarly Litowitz (1977) suggests that children initially know words according to the particular situations and uses they have encountered and only gradually construct a system organized through taxonomic and modification relations. Since children as young as age 3 use cognitive words (Shatz et al., 1983), there is a third possible interpretation. At this point the child may be beginning to decontextualize. The child who hears a rich variety of words labeling cognitive states begins to realize that it is important to label those states and begins to make distinctions among them. One

parental style of teaching involves test questions that begin, "Do you *remember* . . . ?" Some parents use many qualifiers to soften assertions such as "I *think,*" "I *suggest,*" etc. The child may become sensitized to that style of speech and the cognitive states to which it refers. A more refined analysis of the sequence in which specific cognitive words are produced might provide more detail about the conversational stimuli that evoke the usage of cognitive words. We suspect that the production of CISWs is not merely an attempt to imitate and to respond to parent topics. We have some evidence that the influence is broad. Children are producing cognitive words in situations where adult influence is minimal. For example, they devote more of their lexicon to metacognitive words in free play than during teaching sessions. In addition the variety of words they produce at dinner and in free play is related to the overall variety of adult CISWs they hear, not just the variety of speech in that specific situation.

The child's exposure to a diversity of levels of word meaning within a domain might have consequences for cognitive and linguistic development. When the child hears the same word used at different levels of meaning, it enriches the meaning of the word and frees the word from one situational or meaning context. Moreover, children who possess this kind of knowledge are likely to understand that multiple levels of meaning exist in other domains. Once the levels of meaning are differentiated, the child may seek to relate these meanings to one another. In the domain of cognitive words, the search for the relation among meaning levels may alert the child to the way knowledge is organized. Awareness of knowledge organization is important for problem solving and for strategic deployment of memory processing.

Group Differences. The preceding discussion implies that there should be speaker differences in overall usage of cognitive words and also in the variety of words employed. In our data these differences are complicated. Only one group, the black working class, produced fewer and less varied words, and in only one situation, at home during dinner. Only the black working-class children produced fewer CIWSs at home than at school, and they were the only group in which adults at home did not produce more cognitive words than those at school. Our very small sample of children precludes any definitive interpretation of these data. Perhaps these differences reflect what these particular families discuss at dinner and how much they allow the child to act as a conversational partner. However, these findings are in harmony with previous research on group differences (cf. Hall & Tirre, 1979; Hall et al., 1981, 1984) and

extend them. Moreover, they validate Jordan's (1978) claim that the degree of environmental stimulation and encouragement of linguistic and cognitive development is more critical than group membership.

Context. There were also striking situational effects. Children's conversations with one another provide fewer and less varied CISWs than conversations with their parents. We had thought about subtitling this paper "Food for Thought" because of the high frequency of cognitive language produced at the dinner table. About a third of the child's CISW lexicon and over half of the adult lexicon is devoted to the higher levels of meaning in this setting. Perhaps this is not surprising since this is the setting in which the family recounts the happenings of the day to each other, evaluates it, and puts it into perspective. That reflective analysis may provide both the experience and labels for internal states. In contrast, in free play, which is child-dominated and devoted to action, not reflection, about a quarter of the adult and child reportoire is devoted to higher-level meanings and there is very little cognitive state language, except to coordinate the acts of pretending. Children in teaching settings show the least variety in usage of cognitive words, while teachers enrich their cognitive state language to include more higher levels of meaning. Teachers call upon children to perform cognitive activities, particularly recall, but they do not seem to elicit from children the labeling of deeper-level meanings that designate understanding or the act of processing.

CONCLUSION

We have investigated a refined categorization of cognitive words and described situational and population differences in usage of different levels of meaning. To be sure, there have been other investigations of children's understanding and use of internal state words (e.g., Johnson & Maratsos, 1977; Wellman & Johnson, 1979; 1982, Shatz et al., 1983). By and large, this research has dealt with the child's ability to distinguish among words like *know, guess,* and *think.* The assumption underlying this research is that such words have a single meaning. There have been few examinations of the context of speech, and therefore of the situational and speaker characteristics that might affect production. We have assumed, and our data support it, that internal state words are used to represent a continuum of internal processing. A word may be used at several levels of meaning. Use of those words varies across different situations. The tests of these assumptions are the core of the research

reported in this paper and represent a new beginning for this area of inquiry.

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