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ABSTRACT

In this investigation of the relationships among selected aspects of normal language development, emerging metalinguistic skills, concepts about print, and literacy experiences, 19 children 3 years of age were given 4 tests of language development, 12 metalinguistic tasks measuring phonological awareness, word awareness and structural awareness, and 2 measures of literacy knowledge. Literacy experiences were described following an in-home parent interview. The results clearly demonstrated that 3-year-olds can make metalinguistic judgments and productions in strucured tasks, with overall metalinguistic performance improving with age. Specific metalinguistic tasks varied in difficulty and probably in developmental order. The major domains of metalinguistic awareness (phonological, word, and structure) were significantly intercorrelated and also correlated with overall linguistic skill. Literacy knowledge was positively correlated with overall metalinguistic skill and specifically with phonological awareness. The interview data revealed that while parents varied in the emphasis they placed on the various purposes of literacy, all of the children were highly involved with reading and writing, observing great amounts of literacy activity in their homes and participating in reading and writing themselves every day. (Author)

Language Development, Metalinguistic Skills and Emergent Literacy in Three-year-old Children

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Abstract

In this investigation of the relationships among selected aspects of normal language development, emerging metalinguistic skills, concepts about print, and literacy experiences, nineteen three-year-old children were given given four tests of language development, twelve metalinguistic tasks measuring phonological awareness, word awareness and structural awareness, and two measures of literacy knowledge. Literacy experiences were described following an in-home parent interview. The results clearly demonstrated that three-year-olds can make metalinguistic judgements and productions in structured tasks, with overall metalinguistic performance improving with age in months. Specific metalinguistic tasks vared in difficulty and probably in developmental order. The major domains of metalinguistic awareness (phonological, word, and structural) were significantly intercorrelated and also correlated with overall linguistic skill. Literacy knowledge was positively correlated with overall metalinguistic skill and specifically with phonological awareness. The interview data revealed that while parents varied in the emphasis they placed on the various purposes of literacy, all of the children were highly involved with reading and writing, observing great amounts of literacy activity in their homes and participating in reading and writing themselves every day.

In the past ten years there has been increasing theoretical and empirical interest in children's metalinguistic awareness, the ability to think explicitly about language, to manipulate structural features of language such as phonemes (speech sounds), words, and sentences, and to focus on the forms of language separately from the meanings. Metalinguistic awareness is a rather high level linguistic skill; it requires not only an ability to comprehend and produce language in a communicative way, but also an ability to separate language structure from communicative intent, an ability to use control processing to perform mental operations on structural features of language (Tunmer, Herriman & Nesdale, 1988). Metalinguistic awareness involves a number of different domains, which can be categorized as phonological, word, and structural awareness. Phonological awareness refers to the ability to manipulate the phonemes (speech sounds) of language, to segment words into their component phonemes and to synthesize phonemes back into words (and larger units). Word awareness involves awareness of words as language units and the ability to segment phrases and sentences into words, awareness that words are arbitrary labels associated with referents, and awareness of the term "word" and how to interpret it (Bowey & Tunmer, 1984). Structural awareness (also called syntactic awareness) means the ability to reflect on sentences and make judgements about their grammaticality and semantic well-formedness.

When do metalinguistic abilities develop and where do they come from?

The age at which the child's knowledge of language becomes metalinguistic has been argued in the theoretical and research literatures (for review, see Tunmer & Herriman, 1984). One view is that metalinguistic skills emerge at a young age concomitant with other processes of language acquisition, and that the acquisition of basic comprehension and production processes and the development of metalinguistic awareness interact and facilitate each other. This hypothesis, dubbed the *Interaction Hypothesis* (Smith & Tager-Flusberg, 1982) assumes that metalinguistic awareness serves an important role in both preschool language acquisition and in later aspects of language development such as the emergence of literacy. The second theory, called the *Autonomy Hypothesis* (Smith & Tager-Flusberg, 1982) views metalinguistic awareness as a distinctive type of linguistic functioning that develops independently from and later than basic linguistic comprehension and production but concomitant with the emergence of literacy. In this view metalinguistic skills are related to the development of concrete operational thought (in Piagetian terms) and of a general metacognitive control over information processing that occurs in middle childhood.

Both of these hypotheses have received some theoretical and empirical support having to do with time of onset and with other related abilities. Empirical evidence in support of the *Autonomy Hypothesis* comes from numerous studies which show that preschool children have great difficulty on tasks which require them to make explicit judgements about linguistic form, but that around the age of six to eight years normal children readily demonstrate a variety of metalinguistic skills that are intercorrelated. Further supporting evidence is offered by studies correlating children's performance on metalinguistic tasks with other kinds of metacognitive tasks, such as measures of nonverbal problem solving and Piagetian

operations (reviewed in Tunmer & Herriman, 1984). On the other hand, a number of observational records and several empirical studies clearly support the *Interaction Hypothesis*. Chaney (1988), Clark (1978), Slobin (1978), van Kleek and Bryant, (1983), and van Kleek & Schuele (1987) have offered numerous examples from spontaneous speech in which two and three-year olds perform metalinguistic acts; they monitor and repair their own speech mistakes, correct the speech of others, play with sounds and alliteration, rhyme and comment on it, observe odd or difficult pronunciations, segment beginning sounds, syllables or words, substitute words in sentences, invent new words by combining words or adding an ending, figure out word boundaries in sentences, etc. In addition to these observational reports, several investigators have successfully modified some experimental metalinguistic tasks to make them more accessible to young children (Chaney, 1989; de Villiers & de Villiers, 1972; Fox & Routh, 1974, 1984, Smith & Tager-Flusberg, 1982; Tunmer, Bowey & Grieve, 1983). These studies indicate that preschool children can make metalinguistic judgements when the demands of the tasks are not too great, that metalinguistic knowledge emerges gradually and in stages rather than abruptly, and that performance on metalinguistic tasks may be correlated with at least some measures of language development. Although both hypotheses have received some empirical support, the data in favor of the *Interaction Hypothesis* seems more compelling. One purpose of the present research is to continue to explore the interaction between metalinguistic awareness and language development in order to gain a better theoretical understanding of the language acquisition process and the ages and stages in which metalinguistic skills are acquired.

How are metalinguistic abilities related to early literacy?

Research has clearly demonstrated that metalinguistic abilities are intricately related to learning to read. (For reviews, see Gibb & Randall, 1988; Tunmer & Bowey, 1983). In brief, readers have better metalinguistic skills than nonreaders, and good readers excel over poor readers on metalinguistic tasks. Metalinguistic abilities of pre-reading children can predict later reading achievement, and training metalinguistic skills results in reading improvement which holds up over time (Lundberg, Frost & Petersen, 1988).

The various metalinguistic abilities may play various roles in the process of learning to read. Phonological awareness seems to be the most important meta-skill (James & Blachman, 1987), at least in the early stages of reading instruction, because awareness of phonemes is essential to learning the sound-letter correspondences needed to "sound out" new words. In order to profit from reading instruction, the child must first understand that spoken words can be broken up into sounds and syllable units (analysis) and that words are made up of different sounds put together (synthesis). Readers must be able to take a syllable such as "big," realize that it is made up of three segments, and observe that when "big" changes to "bag" that the change occurs in the middle sound. Significant research has shown that children who already have or who are taught phoneme segmentation skills (even simple rhyming skills) are at advantage in learning to read over children who lack phoneme awareness (e.g., Bradley & Bryant, 1985; Lundberg,

Frost, & Petersen, 1988). In later reading phonological awareness becomes very automatized, so that the reader may not even be aware that word analysis takes place; nonetheless, skill in phoneme recognition probably plays an important role in word recognition throughout the process of learning to read (Adams, 1990).

Word awareness has also been correlated with reading achievement (Evans, Taylor & Blum, 1979; McNinch, 1974). Being aware that words are separate from the things they refer to may enhance reading development because in reading the child must realize that word forms and word meanings are not the same (e.g., "Big" is a short word.) Awareness of word boundaries is important in reading because understanding of the orthographic conventions for word boundaries (white spaces before and after words) implies a prior knowledge that words are separate entities, even though they are not separated acoustically in speech. Chaney (1989) found that 5-year-old early readers had greater meta-awareness of function words ("a, an, my' or") than non-reading same-age peers. In may be that in the case of function words, the process of learning to read may increase awareness of small grammatical words that are usually out of conscious awareness; in other words, word awareness and concepts of print may overlap in their acquisition and facilitate each other.

Structural (syntactic) awareness has also been shown to be related to reading achievement (James & Blachman, 1987; Tunmer, Nesdale & Wright, 1987). Children with increased structural awareness demonstrate better paragraph comprehension than children with less structural awareness, possibly because they use their knowledge of grammar to monitor their ongoing comprehension. Structural awareness may also aid in word recognition, perhaps because grammatical knowledge allows children to use sentential context in combination with their phonological knowledge to decipher unknown words.

Since literacy is primarily a school-aged concern, little research has focussed on relationships between metalinguistic skills and the literacy knowledge and experiences of preschoolers. However, one current and ongoing investigation is exploring the relationships between phonological awareness, alphabet and sound-letter knowledge, concepts about print and invented spelling and word reading in mentally gifted 4-year-olds (Burns & Richgels, 1989). Preliminary results indicate that children who spelled inventively were more knowledgeable than nonspellers about sound-letter associations and phoneme segmentation, although the groups did not differ in knowledge of the alphabet or concepts about print. Although not all inventive spellers had learned to read words, about half could, while no non-spellers had mastered word reading. Burns and Richgels will be following these bright children to evaluate their emergent literacy (personal communication).

While many children receive informal literacy instruction and metalinguistic activities such as word games and rhyming prior to coming to school, the relationships among metalinguistic awareness, literacy knowledge and early literacy experiences have not been explored with normal children who are younger than school age. Based upon a belief that roots of literacy begin in the child's early home and school experiences, the second purpose of the current research is to examine the relationships among early

metalinguistic skills, knowledge about print concepts, and family literacy experiences in normal three-year olds. The plan is to follow the children into their school years to evaluate the effects of early knowledge and experience on eventual literacy.

EXPERIMENTAL DESIGN AND METHODS

1. Subjects: Nineteen three-year-olds (mean age 3.8) from a preschool in Redwood City participated. Each child was required to have normal overall language development, defined as a language quotient of at least 85 on the Preschool Language Scale, revised (Zimmerman, Steiner, & Evatt Pond, 1979). All of the subjects could be described as middle to upper-middle SES (family income above $40,000/yr).

2. Tasks and Procedures: The children were tested individually at their school by the experimenter, a trained examiner. All children first received the Preschool Language Scale in order to determine overall language ability, followed by the other tests of linguistic proficiency. The remaining metalinguistic and literacy tasks were presented in a randomized order across subjects, except that no child received two similar tasks on the same day. Testing sessions of 20-30 minutes were conducted over a period of 3 -6 weeks for each child. For purposes of establishing reliability, a trained observer independently scored approximately 1/3 of the data collected with each of the nonstandardized tasks.

Tests of Linguistic Proficiency

a. Overall estimate of language ability was made using the Preschool Language Scale (PLS), revised (Zimmerman, Steiner, & Evatt Pond, 1979), a standardized test. The subjects' total raw scores were entered into data analysis.

b. Articulation and Discrimination: Based on Wallach, Wallach, Dozier and Kaplan (1977) a task was designed to assess two aspects of phoneme knowledge: articulation of consonant sounds and auditory discrimination of similar phonemes. The child was presented with 22 sets of three pictures. Each set represented two words that are identical in their sounds except for their initial phonemes plus a foil item that begins the same as one of the other two words (e.g., goat-boat-ball; shoe-sheep-zoo). To ensure that the child knew the names of the items, the child named or repeated the names of the pictures. During this vocabulary precheck consonant articulation was assessed in initial and final word position. Following the precheck and articulation assessment, discrimination was examined by asking the child to point to the picture named by the examiner. Articulation and discrimination scores were the total numbers of correct items. The pictures that were introduced in this task were used again in other tasks requiring picture identification.

c. Word knowledge: The Peabody Picture Vocabulary Test (PPVT), revised Form M (Dunn & Dunn, 1981), standardized test, was used to measure receptive single-word vocabulary. Raw scores were used for data analysis.

d. Sentence Structure: A simple task of receptive and expressive grammatical knowledge was developed based upon work by Menyuk (1969) and Smith and Tager-Flusberg (1982). Following Menyuk's extensive work on sentence repetition by children as young as 3-years-old, a set of 14 basic sentence types were selected that appear regularly in the speech of young English-speaking children, regardless of dialect group. Short sentences of 3-7 words were devised that exemplified these structures and could be acted out using a toy family. The child was asked to repeat the sentences and then demonstrate comprehension by acting them out with the toys. Scores were based on the number of sentences correctly repeated and comprehended.

Tests of Metalinguistic Awareness: All metalinguistic tasks were preceded by demonstration and practice in order to increase the children's chance of success and decrease failures due to extraneous task variables. (For rationale see Bowey, Tunmer & Pratt, 1984). Except as noted, scores were computed as the number of correct items.

a. Phonological Awareness

1) Phonemes (Judgements and Corrections): Meta, a Martian puppet who is learning to speak English, needed help in pronunciation. Following demonstration and practice, 14 task pictures were presented to the puppet, who pronounced them correctly or incorrectly (e.g., pie/sie). The child's tasks were to judge the puppet's pronunciation as "right" or "not right" and to help the puppet by saying mispronounced words the right way. The child's own articulation pattern was taken into account, and misarticulated corrections were counted if they were corrected according to the child's own articulation pattern.

2) Initial Sounds (Identification and Production): The child was introduced to a puppet, Max, who likes words that start like his name. The child then heard 10 words and judged whether or not each began with /m/. Following judgements, he/she was asked to produce a word that starts with /m/ and one with /s/ (like puppet Sue).

3) Rhymes (Identification and Production): (Task modeled after Smith & Tager-Flusberg, 1982). The child met Jed, a puppet who likes words that rhyme with his name. The child was asked to judge 10 words as rhyming or not rhyming with Jed. Then the child met a second puppet named Hi and was asked to generate a word that rhymes with Hi.

4) Phonological Play: In this task, adapted from the literature on metalinguistic awareness in spontaneous speech, the examiner engaged the child in purposive mispronunciations (e.g., pancakes -> cancakes, panpakes, fannakes, banfakes) to assess the child's willingness and ability to manipulate speech sounds. This task was analyzed by counting the number of items out of seven in which phonological changes were produced by the child.

5) Phoneme Synthesis: Ten sets of three pictures (e.g., pig, soup, hat) were presented and the child pointed to the one spoken by the examiner in a segmented fashion (e.g., h - a - t).

b. Word Awareness

1) Word Segmentation: (Task modeled after Chaney, 1989 and Tunmer, Bowey, & Grieve, 1983). Once again the child's help was solicited in teaching Meta, the Martian puppet, to speak English. The child heard 12 series of 2 or 3 words spoken without pauses between words (e.g., balloontreeshirt) and was asked to say them word by word to the puppet, who repeated each word after the child. Test strings were made of nouns, verbs or adjectives, and all strings had a number of syllables unequal to the number of words. The child's ability to generate individual words was incorporated into this task; following the segmentation task the child was invited to teach the puppet five words of his/her own choosing.

2) Word Play: In this task, adapted from the literature on metalinguistic awareness in spontaneous speech, the child was encouraged to play with common nursery rhymes, substituting new words for the original words. For example: Mary had a little lamb, goat, hat, joke, banana, etc. One point was given for each real or nonsense word provided, and an additional point was given for giving a real word in the same form class (noun or verb) as the original (n=10).

3) Real-Nonsense Words: Following Smith & Tager-Flusberg (1982) the child was asked to judge 10 words as "real" or "not real" (e.g., jump, school vs sooch, wis).

4) Word-Referent Differentiation: Meta, the Martian puppet taught the child some "Martian" words, to determine whether the child was willing to re-label common things with new referents (task modeled after Smith & Tager-Flusberg, 1982). For example: Given a picture of a carrot, Meta named it a "gok," the picture was removed and the child was asked, "Can you eat a gok? Is a gok orange? Does a gok have wheels? Is a gok a toy?" Score was the number of questions answered correctly out of 12.

5) New Names: A second word-referent task calling for production involved the child in making up words for a new space language. The child selected an unusual object from a grab bag and was invited to explore its functions and name it (e.g., small tongs might be called a "blockgrabber"). This task was analyzed qualitatively and by counting the number of items named (n=10).

c. Structural Awareness

1) Morphemes (Cloze, Judgement and Correction): The morphemes tested were plural s, z and agent er. Once again the child was asked to help Meta, the Martian puppet, by correcting his words. The child was shown a picture and given a cloze sentence to complete. For example, presenting a picture of a child kicking, the examiner said: "This is a boy (girl) who knows how to kick. He is a good _____. The child completed the sentence as a model to the puppet, then judged the puppet's cloze responses as correct or incorrect and finally provided error correction if needed. The score was based on the number of correct cloze completions (n=16), morpheme judgements (n=16) and corrections (n=8).

2) Syntax (Identification and Production): Following Smith & Tager-Flusberg (1982) the child was asked to assist the puppet Meta by judging and correcting three word imperative sentences (Brush your teeth, Read my book vs Dog my pat, Hands wash your). During the investigation this task was modified to have two parts: a set of sentences in which the child heard a correct model before judgin-

puppet's sentence, and a second set in which no model was provided. The score was based on the number of correct judgements (n=16) and corrections (n=8) on both parts. For the six children whose data collection preceded the inclusion of part two, a dummy score, consisting of the mean score of the remaining13 children, was used in portions of the data analysis to equalize the number of items on the task and control for task difficulty.

Tests of Emergent Literacy: Print Awareness

a. Alphabet Concepts: First, the child was asked to sing or say the alphabet, sort magnetic letters, numbers, and shapes into three groups, and name the magnetic letters, numbers and shapes. The second part of this task explored print awareness of the child's own name and was adapted from Villaume & Wilson (1989). First the child was given plain white paper and requested to "show me how you write your name." Next the examiner requested: "Tell me how to write your name." The child was then presented a random array of magnetic letters in his/her name and asked to name the letters, arrange them so that they spell his/her name and tell what sound is made by each letter.

b. Book Concepts (Adapted from Burns, 1989): The child was shown a book and asked questions about the structure of the book (e.g., "Show me the front of the book."), the direction in which books are read (e. g., "Which way do I go when I read the story?"), and the nature of the marks on the page ("Use your finger; show me one letter.").

Home Literacy Environment: Parent Interview: The home interview was developed after the findings of Teale (1986), who conducted a systematic ethnographic study of the home literacy experiences of children from low-income families. The purposes of the interview were to discover the amount and types of literacy events that the children were involved in with their families and the purposes served by reading and writing in their homes. One-hour parent interviews were conducted by an expert interviewer who was knowledgeable about the purposes of the study but naive about the performance of individual children.

RESULTS AND INTERPRETATION

Prior to addressing the main issues, reliability was checked for all nonstandardized measures (all tasks except the PLS and PPVT). Inter-rater reliability was established by computing percentage of agreement for all items which called for binary (correct/incorrect) judgements by the examiner; this was the case for all tasks except alphabet concepts. The percentages of inter-rater agreement ranged from 90%-100% on the various tasks. The two tasks with lowest reliability (% of agreement = 90-91%) were examined for flaws which might produce reliability problems. The sentence repetition portion of the sentence structure task caused judgement difficulties when the child's repetition of a sentence contained some grammatical error but was correct as to the target structure. The book concepts task contained several items in which the child's response might be ambiguously interpreted. In future both of these

problems can be corrected by maintaining more specific criteria for judging the troublesome items. Alphabet concepts, scored on a 4-point scale, produced an inter-rater reliability coefficient of .94.

Two main issues underlay the data analysis. The first was to describe three-year-olds' metalinguistic abilities and explore any developmental trends in these abilities. The second main issue was to explore the relationships among language development, metalinguistic performance, and emergent literacy.

The Children's Metalinguistic Abilities

1. These three-year-old children were able to make many metalinguistic judgements and productions, refuting the claim that metalinguistic skills do not emerge until middle childhood.

In order to determine whether or not children had developed specific metalinguistic skills, criteria were needed for evaluating the children's performance. For each judgement task requiring the child to select among several choices (e.g., correct or incorrect, real vs nonsense) the one-tailed binomial test was used to establish a passing criterion that was unlikely to be met by guessing ($p < .03$). Since production does not have a known probability of correct response by chance alone, the binimial could not be used to establish criteria for passing production tasks. Instead, the binomial was considered as a baseline; that is, since production involves an unknown but presumably large number of possible answers, the probability of of a correct answer by chance would be very low; therefore, the criterion for success on any production task should not be stricter than the criterion for a similar judgement task. Next the means, standard deviations, distribution of scores, and confidence intervals using the t-distribution were computed, examined, and used to establish a criterion score for each production task. Table 1 gives the passing criterion and number of items on each metalinguistic task, the number and percentage of children who met the criterion for success on each task, and the mean percentage correct on each task. Out of a total of 18 tasks (with syntax A & B combined), the children passed from 5 to 18 tasks, wth mean and median at 12 tasks passed.

On the varous phonological tasks the children averaged from 47% to 95% correct. All of the children were highly successful in judging the correctness of phonemes and in synthesizing segmented phonemes, and all but one child reached criterion on correcting phoneme errors. Phonological play tended to have a bimodal distribution with about half the children excelling and about half producing zero, one or two examples of phonological changes (peanut -> beenut). The children had more difficulty in differentiating rhymes from nonrhymes (32% passing), or judging initial sound (16% passing). The childrens' ability to judge initial sound or rhyme was not very predictive of their ability to produce examples; two out of three children who could judge initial sounds did not produce an example, while half the children who could not judge initial sound (8/16) did produce an example; four out of five children who could judge rhymes also produced an example, as did four children who did not judge them successfully. Perhaps the children who produced rhymes and words with initial sound had learned examples by rote, even

though they had not really acquired the metalinguistic competence to evaluate these forms; this seemed especially probable in the case of initial sounds, which are often taught by example ("M is for mother").

On the various tasks of word awareness the children scored from 61% - 91% correct. Of the tasks examining the word as a unit of language, word segmentation seemed intuitively to be the most difficult, as it required children to hold several unrelated words in memory and repeat them back one by one for the puppet to repeat. In spite of this seeming difficulty, twelve children clearly were successful, accurately segmenting nine or more of the twelve items. Many of the children who were less successful appeared to have memory difficulties rather than segmentation problems; this was demonstrated by their production of one or two items from the word string and forgetting the remaining word(s). When asked to produce five words of their own choosing, 18 children produced four or five words, primarily nouns with a sprinkling of verbs and adjectives The few errors produced by these 18 children were nearly all compounds (e.g., tuna fish, raisin bread, Mickey Mouse) that are technically phrases but logical lexical units. The nineteenth child produced phrases. On word play, twelve children (63%) produced numerous words to alter nursery rhymes (Humpty Dumpty sat on a hat). More than half the children were able to differentiate real from nonsense words (58%).

Two tasks evaluated children's knowledge that words are separate from their referents. Thirteen children (68%) passed word-referent differentiation, while 17 children (89%) provided new names for unusual objects. It seemed easier for children to develop labels for unknown objects on this latter task than to acknowledge the possibility of alternate labels for known objects on the word-referent task. Qualitative analysis of the new names data revealed that 48% of the responses were the names of other objects that were similar in shape or in the shape of parts (e.g., a green rubber jar opener was called "turtle" or "stairs"), 24% were named for their perceived function (escargot tongs was called "wrist pincher," "snappers," and "can opener"), 6% were creative labels (e.g., "extoscope," "coholamous," "goney-goney," "mean donkey-mama"), 4% were proper names (e.g., Bambi, Tony), 4% were totally arbitrary assignment of known words (e.g., a wood file called "spoon") and 3% were named for a part of the object (e.g., "3-horn"). Errors comprised 10% of the responses, with 8% consisting of description of function without naming the object (e.g., "You could push on it").

On the structural awareness tasks, the children's performance ranged from 15% - 95% correct. On the morphemes task, it was expected that children would find cloze the least metalinguistically taxing and therefore the easiest, followed by judgement, and then correction. This did not prove to be the case. Instead, children's ability to judge morphemes was equal to, or, for three children, slightly better than their ability to complete cloze sentences. Morpheme corrections were slightly less accurate than judgements or cloze; twelve children reached the passing criterion and another four children just missed it, correcting five out of eight morpheme errors. On the syntax task sixteen children (84%) could judge the syntactic correctness of three-word imperative sentences following a correct model, and all but one (80%) could correct the sentences as well as they judged them. Many more children had difficulty judging

these kinds of sentences when no model was provided (38% passing), only one child successfully corrected them.

2. Overall metalinguistic performance improved with age in months ($r = .68$, $p = .001$), as did performance on these specific metalinguistic tasks: Rhyme judgement ($r = .47$, $p = .04$), word segmentation ($r = .58$, $p = .009$), word-referent differentiation ($r = .73$, $p = .0004$), new names ($r = .61$, $p = .006$), morphemes ($r = .59$, $p = .008$), and syntax ($r = .52$, $p = .02$). These data provide convincing evidence that metalinguistic abilities do not emerge suddenly but instead increase gradually during the language acquisition period.

3. The various tasks appeared to be fairly consistent in their general order of difficulty, which may be an indicator of developmental sequence. Two measures of difficulty, the number of children passing each task and the mean percentages of correct judgements, yielded a similar ordering of task difficulty. Examination of individual patterns of scores indicated a similar heirarchy of task difficulty; only rarely did a child pass a more difficult task but fail an easier task. Of the phonological awareness tasks, phoneme judgements, phoneme corrections, and phoneme synthesis were easiest, followed by judgement and production of rhyme and initial sounds and phonological play. Of the word awareness tasks, production of new names was easiest, followed by the remaining tasks: word-referent differentiation, judgement of real vs nonsense words, word play, and word segmentation. Of the structural awareness tasks, morpheme judgements and syntax judgements when a model was given were easiest, cloze completion was next, followed by morpheme corrections and syntax corrections after a model. Judging and correcting syntax without help from a model was much more difficult.

Relationships among Language Development, Metalinguistic Performance, and Emergent Literacy

Intercorrelations among age in months and scores on linguistic tasks, metalinguistic and print awareness domains, and overall metalinguistic performance are given in Table 2A, along with partial correlations computed after age effects were controlled (Table 2B). The performance domain scores were simply the average percentages correct on tasks of phonological awareness, word awareness, structural awareness, and print awareness. The overall metalinguistic performance score combined phonological awareness, word awareness, and structural awareness scores.

1. The linguistic measures (PLS, articulation and discrimination, vocabulary (PPVT), and sentence structure) were highly intercorrelated except for articulation and discrimination, which appeared to be relatively independent linguistic skills. Performance on the PLS, PPVT and sentence structure task also improved with age in months, while articulation/discrimination was not correlated with age. When the influence of age was controlled the intercorrelations among linguistic measures were reduced and only the correlation between PLS and PPVT remained significant. This indicates that the sentence structure task also measures a relatively independent aspect of language development.

2. Overall metalinguistic performance correlated very highly with each measure of language development except articulation and discrimination; with age controlled correlations between metalinguistic performance and PLS and between metalinguistic performance and sentence structure remained significant. Print awareness was also correlated with overall metalinguistic performance, even with age controlled. A multiple regression analysis with age in months and the four language development measures as independent variables and overall metalinguistic performance as the dependent variable revealed that only the PLS made a significant independent contribution to the variance in metalinguistic performance (beta coefficient = .83, $p < .05$). This indicates that overall proficiency in language development is the best predictor of overall metalinguistic performance, and that age and certain specific language skills (i.e., vocabulary, sentence structure), while related to metalinguistic performance, are much less strong predictors.

3. The major domains of metalinguistic awareness (phonological, word, and structural) were significantly intercorrelated and also correlated with the PLS, even with effects of age controlled. Word awareness was also correlated with sentence structure scores. Although correlations between specific linguistic skills and their corresponding metalinguistic domains (e.g., vocabulary with word awareness) might be expected, these were not significant. Followup stepwise regression analyses were performed with age and linguistic test scores as independent variables and each metalinguistic domain score as dependent variable; the PLS contributed most to the variance in phonological awareness, word awareness, and structural awareness, and sentence structure also made a contribution to word awareness scores. This provides additional support for the argument that metalinguistic abilities are strongly related to overall language development, but that one-to-one correspondences between skills are lacking. One last analysis considered possible connections between specific linguistic skills and metalinguistic skills in individual children. The data of children who scored 1 S.D. below the mean in articulation, PPVT vocabulary, or sentence structure were examined to see if lower functioning in linguistic tasks was related to lower metalinguistic abilities. For articulation this was clearly not the case; two of the poor articulators scored 1.5 S.D. above the mean and the third scored slightly below the mean on phonological awareness. Of the three children with lowest sentence structure scores, one scored more than 2 S.D. below the mean on structural awareness while the other two score at or just below the mean. The three children with lowest PPVT scores all scored at least 1 S.D. below the word awareness mean. These results are provocative; although it is clear that specific linguistic skills are not good predictors of metalinguistic counterparts, it is possible that deficient sentence structure and/or vocabulary are related to decreased structural awareness and/or word awareness in some children.

4. Print awareness was positively correlated with phonological awareness, a result which has been observed in older children and which has great implications for the eventual development of literacy.

5. The intercorrelations, mean raw scores and standard deviations for all of the individual tasks are given in Table 3. Based on previous research, one would expect moderate positive correlations among

metalinguistic tasks. Such was the case for some tasks, but not others, perhaps due to the small number of subjects. Of the phonological awareness tasks, rhyme correlated most highly with these other linguistic and metalinguistic tasks: PLS, PPVT, articulation (negative r), sentence structure, phonological play, morphemes, and syntax. Of the word awareness tasks, word segmentation correlated significantly with PLS, PPVT, sentence structure, initial sounds, word-referent differentiation, morphemes, and syntax. Both of the structural awareness tasks correlated well with other tasks: morphemes correlated with PLS, PPVT, discrimination, sentence structure, rhyme, word segmentation, word-referent differentiation, and syntax, and syntax correlated with PLS, PPVT, discrimination, sentence structure, initial sounds, rhyme, phonological play, phoneme synthesis, word segmentation, word play , real-nonsense, word-referent differentiation, new names, and morphemes. The two print awareness tasks measure similar concepts, but surprisingly were correlated only mildly. Alphabet concepts was related best to PLS, PPVT, phonemes, initial sounds, rhymes, word segmentation and morphemes. Book concepts was most related to PLS, sentence structure, rhymes, real-nonsense, word-referent differentiation, and syntax.

Literacy Experiences: Results of Home Interview

One focus of the interview was to learn about the literacy materials available in the children's homes. In Teale's (1986) observations of low income families, under 20% of families had adult books, magazines or newspapers in great supply (only the guide to TV programming was found consistently), and 36% of families had printed materials appropriate for and available to the children. Teale's families all had writing materials, but they were often hard to locate, and only 18% of families had a place for keeping paper and pens that was easily assessible to the child. In contrast, the middle to upper-middle SES families who participated in this pilot study all had many books, magazines, and newspapers both for adults and for the children. The adults described reading a wide range of materials: novels, professional literature, how-to books, literature about hobbies and special interests, religious materials, etc. An average of 4.3 magazines were subscribed to, and 16 of the 19 families took and read the newspaper daily, but only half the families used the TV guide. Literature for children was also abundant, including ABC books, picture books, storybooks, number books, nursery rhymes, stories with audiotapes, and kid's magazines. Every child had a place to keep her/his own books, and every family described an easy access to writing materials, with minor restrictions on the use of marking pens.

A second focus of the interview was to learn about the functions that literacy plays for these families and the ways that the child is involved in these functions. Teale (1986) found that in lower income families reading and writing functioned as components of social activities and rarely were engaged in for their own sake. This was not true for the middle/upper middle income families in this study. Although literacy was certainly used for social purposes, all of the families had at least one adult who read widely and for pleasure. Only three (14%) of Teale's families regularly engaged in adult-child book reading episodes; in contrast, all of the children in this study were regularly read to by parents, and sometimes siblings and grandparents; 63% were read to daily (or more often) and the remainder from 2 -

5 times per week. All children regularly asked to read with other family members, and all but one liked to look at books alone. All of the children enjoyed writing with pencils or crayons, eleven (58%) daily and the remainder several times each week.

Teale defined domains of activities mediated by literacy that directly relate to the purposes of reading and writing in people's lives. For most of these domains the child was involved as observer, but the domain Literacy for the Purpose of Teaching the Child did involve the child as participant in several families. Like the families studied by Teale, the families in this investigation engaged in similar activities, thereby providing many opportunities for the child to observe and participate in literacy in meaningful ways. The domains and examples were:

1) Daily Living: These activities involve the regular routines of everyday life, such as making shopping lists, paying bills, cooking, reading maps and street signs, writing out forms, etc. The child was frequently involved as a direct participant in literacy mediated activities such as cooking and reading street signs. Several parents reported that their children knew what the checkbook was for, and one child asked Santa to bring mommy more checks! Another child had her own appointment calendar like her mother's.

2) Entertainment: Many families read simply for pleasure. Literacy was also used in playing games, working crossword puzzles, and checking TV or movie listings.

3) School or Work-Related: Many families engaged in work-related reading or paperwork at home. Children also observed older siblings doing homework and several played school with them. Several children had opportunities to observe and/or use a computer at home or a parent's workplace.

4) Religion: One family reported a great amount reading related to Bible study, and six additional families engaged in some literacy-mediated religious activities (e. g., sending cards, reading Bible stories).

5) Interpersonal Communication: Every family engaged in some regular correspondence with distant relatives or friends and most children received some mail. Several children had begun to sign and send their own valentines.

6) Getting Information: Sometimes family members read to keep up with what is going on, either in the news (or sports) or in their professional fields. Another regular practice was to read for information about hobbies, interests, etc.

7) Literacy for the Purpose of Teaching the Child: Reading was done for the purpose of teaching the alphabet, how to care for books, and to increase language development.

In summary, all of the children in this study were highly involved with reading and writing, observing great amounts of literacy activity in their homes and participating in reading and writing themselves every day. The domains of literacy were similar to those found by Teale, but the child was more likely to be involved as a direct participant. Although not every parent loved to read, and the parents varied in the emphasis they placed on the various purposes of literacy, every family valued reading and writing for its own sake and were clearly communicating this belief to their children.

SUMMARY AND DISCUSSION

All of the children in this group were able to make some judgements and productions that demonstrated they are learning to think about the forms of language as well as the meanings. The children varied in their metalinguistic skills, with some three-year-olds already very sophisticated in their metalinguistic judgements and metalinguistic use of language. These findings, taken in conjunction with those of Smith & Tager-Flusberg (1982) make it clear that metalinguistic skills do not emerge suddenly after the age of six to eight years, but rather are developing early in the preschool years. The finding that overall metalinguistic performance improved with age in months even among three-year-olds and that certain skills (e.g., phoneme judgements and corrections, phoneme synthesis, morpheme and syntax judgements) were already well developed in the youngest subjects are strong indicators that the years from two to four-years-old may be a very active period of metalinguistic learning.

Overall metalinguistic skill as well as domains of metalinguistic abilities (phonological, word, structural) were highly related to and predicted by overall language comprehension and production, supporting the findings of de Villiers & de Villiers (1972) and Smith & Tager-Flusberg (1982) that linguistic and metalinguistic development are related in the preschool years. Several results indicate that the nature of this relationship cannot be simple. First of all, specific linguistic skills (articulation, vocabulary, sentence structure) were not predictive of their metalinguistic category counterparts (phonological awareness, word awareness, structural awareness) but were instead related to a variety of metalinguistic tasks. It can be argued that the metalinguistic categories are not really unitary variables, since the individual tasks measure different aspects of awareness (e.g., phonological awareness tasks included phoneme correctness, rhyme, initial sound, etc.). It is also possible that types of linguistic knowledge need not be content-specific in facilitating the metalinguistic domain, but rather act as a databank that provides opportunities for development of related metalinguistic concepts. Examination of the intercorrelations among individual tasks indicates that specific linguistic tasks may predict performance on specific metalinguistic tasks (e.g., sentences structure correlated highly with rhymes, word-referent differentiation and morphemes), but it seems foolhardy to speculate too much about specific task relationships until additional subjects are added to the data sample. Another possibility to be explored in future is that individuals who lack certain linguistic skills (vocabulary, sentence structure) may have poorer related metalinguistic skills. However, it was clear that having good speech sound articulation is not necessary to the development of phonological awareness.

Specific metalinguistic tasks varied in difficulty and probably in developmental order. Although comparison with other research is difficult due to differences in methodologies, the heirarchy of task difficulty was partially predictable from data and research syntheses reported by other authors. In the phonological domain the literature (Adams, 1990; Tunmer & Herriman, 1984) would predict this ordering of tasks (from least to most difficult): 1) Tasks involving monitoring and correcting speech errors (e.g., phoneme judgements and corrections); Knowing nursery rhymes/having an ear for the sounds

of words (phonological play); 2) Comparing the sounds of words for rhyme or alliteration (judgement of rhyme; initial sound); 3) Sound Blending (phoneme synthesis). The fact that phoneme pynthesis was very easy for the children was probably due to task methodology, using pictures that children could use to compare their internal blending. This implies that phoneme synthesis is a level 1 task when the task itself is not too taxing in cognitive control requirements. Phonological play was more difficult for the children than expected, and seemed to require an analysis of the sounds of words, as in level 2 tasks.

The three aspects of word awareness have been hypothesized to develop in this order, although their development may overlap: 1) awareness of words as language units (first word substitution play and later the ability to segment phrases and sentences into words); 2) awareness that words are arbitrary labels associated with referents (with use of nonsense labels easier that switching of common names); 3) interpretation of the term "word" (Bowey & Tunmer, 1984). This heirarchy would predict this order of word task difficulty (from least to most difficult): 1) word play; 2) word segmentation; 3) new names; 4) word-referent differentiation; 5) real-nonsense differentiation. The data did not support the prediction that the three aspects of word awareness were developmentally ordered; in fact, word-referent differentiation and real-nonsense differentiation were a bit easier than word play and word segmentation. However, it did seem that within one aspect of word awareness tasks could be developmentally ordered. new names was easier than word-referent differentiation, hypothetically because it did not require the child to relinquish labels already well known. In word segmentation, children could parse out one word from a string more easily than they could recall and segment the whole string. In word play, few children had any difficulty playfully substituting words, but may have received part scores if their choices switched word classes (e.g., verb to noun). Regarding knowledge of the term "word" nearly all children could produce words upon demand, but differentiating real from nonsense words was more difficult. Based on these data, it appears that the three aspects of word awareness may develop simultaneously in children, and the developmental order of tasks within one aspect is influenced both by task difficulty and conceptual development.

Research on structural awareness (Bialystok, 1986b) has shown that judging correctness is easier than correcting errors and that morpheme tasks are easier than tasks involving syntax. Cloze tasks are presumed to be easiest, requiring a minimal amount of metalinguistic awareness. The model presented in the literature was partially supported and extended by the data. The data did find that judgement tasks were easier than correction tasks, but that cloze was intermediate in difficulty. Although overall syntax judgements were more difficult that morpheme judgements, the morpheme and syntax tasks were equal in difficulty if the child was first provided a model of the sentence to be evaluated. (On the morphemes task, the child provided the model by saying the correct word in the cloze procedure prior to hearing the puppet's word; on the initial part of the syntax task, the child heard the examiner say the target sentence). However, judging and correcting syntax without an external model of correctness was clearly more difficult. To be successful would require holding the scrambled sentence in memory, mentally

unscrambling it and comparing the new version against an internal model of correctness. This type of task not only requires an ability to focus on form, but also a high level of cognitive control (Bialystok, 1986b).

Much of the interest in metalinguistic awareness is due to its strong predictive relationship with reading achievement. Whether the metalinguistic skills of these three-year-olds are predictive of their eventual reading achievement will be explored as they enter school several years from now. What can be concluded about the relationships among language development, metalinguistic skills and emergent literacy at this stage in their development? As has previously been found for older children, language development, metalinguistic awareness and print concepts were significantly intercorrelated. Print awareness was most strongly related to phonological awareness, a relationship which has been found to be causal in previous research (Tunmer, Herriman, & Nesdale, 1988). The two best predictors of a kindergartener's eventual reading success are knowledge of letters and phoneme awaress (Adams, 1990); one explanation for this is that letter knowledge and phoneme awareness give children a headstart in learning the alphabetic principle when reading instruction begins. The data presented here indicate that knowledge of the alphabet was related to three phonological tasks: phonemes, initial sounds, and rhymes; it seems likely that the three-year-olds who scored highly on these tasks are well on their way to literacy. Although the interview data did not reveal factors which might predict eventual reading ability of the children, it was clear that all of the children are being provided enormous amounts of experience with literacy at home.

In conclusion, the results demonstrate that three-year-old children are able to make numerous metalinguistic judgements and productions, and that there is a significant relationship between their performance on metalinguistic tasks and their overall language development. The data clearly support the *Interaction Hypothesis*, which theorizes that metalinguistic skills emerge at a young age concomitant with other processes of language acquisition, and that the acquisition of basic comprehension and production processes and the development of metalinguistic awareness interact and facilitate each other. The results further show that the metalinguistic abilities of three-year-olds, in particular their phonological awareness are signficantly related to their knowledge about print. The next phase of the research will examine the effects that home environment and socio-economic class have on children's language development, metalinguistic awareness, and emergent literacy.

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Table 1. Number and percentage of children passing each metalinguistic task.

	Metalinguistic Tasks					
	Phoneme Judgements	Phoneme Corrections	Initial Sd. Identification	Initial Sd. Production	Rhyme Identification	Rhyme Production
Criterion/total number of items	10/14	6/8	8/10	1/1	8/10	1/1
Number & percent of children meeting criterion	19 (100)	18 (95)	3 (16)	9 (47)	6 (32)	9 (47)
Mean percent correct	95	92	58	47	61	47
	Phonological Play	Phoneme Synthesis	Word Segmentation	Word Play	Real-Nonsense	Word-Referent
Criterion/total number of items	5/7	6/10	9/12	8/10	8/10	9/12
Number & percent of children meeting criterion	8(42)	19 (100)	12 (63)	12 (63)	11 (58)	13 (68)
Mean percent correct	53	95	61	69	79	79
	New Names	Morpheme * Judgement	Morpheme Cloze	Morpheme Correction		
Criterion/total number of items	8/10	12/16	12/16	6/8		
Number & percent of children meeting criterion	17 (89)	18 (95)	15 (80)	12 (63)		
Mean percent correct	91	93	88	73		
	Syntax A (with model) Identification	Syntax A (with model) Production	Syntax B ** (no model) Identification	Syntax B ** (no model) Production		
Criterion/total number of items	6/8	3/4	6/8	3/4		
Number & percent of children meeting criterion	16 (84)	15 (80)	5 (38)	1 (8)		
Mean percent correct	94	75	63	15		

*On Morpheme Judgements, 18 children reached criterion on both "er" and "plural" parts of the task. The nineteenth subject reached criterion for plurals, but not for "er."

** For all tasks except Syntax B (no model), the N = 19. For Syntax B (no model) N = 13.

Table 2A. Intercorrelations, means and standard deviations for age in months, linguistic tasks, metalinguistic performance categories, print awareness and overall metalinguistic performance.

	Age	1	2	3	4	5	6	7	8	9
Age	1.00									
1. PLS	.70***	1.00								
2. PPVT	.76***	.80***	1.00							
3. Discrimination/Artic	.03	-.14	.00	1.00						
4. Sentence Structure	.49*	.61**	.60**	-.23	1.00					
5. Phonological Awareness	.53*	.73***	.60**	-.28	.44	1.00				
6. Word Awareness	.67***	.75***	.71***	.03	.70***	.69***	1.00			
7. Structural Awareness	.61**	.71***	.54*	.05	.60**	.59**	.80***	1.00		
8. Print Awareness	.48*	.66**	.52*	-.44	.39	.73***	.56**	.50*	1.00	
9. Metalinguistic Average	.68***	.83***	.70***	-.08	.65**	.85***	.94***	.89***	.67**	1.0
Mean	44.6m	60.6	45.1	90.7%	69.7%	76.5%	76.8%	80.1%	60.4%	77.7
SD	4.0	8.5	10.7	7.3	15.1	13.2	14.4	11.1	16.5	11.5

Table 2B. Intercorrelations among linguistic tasks, metalinguistic performance categories, print awareness, and overall metalinguistic performance when age is partialled out.

	1	2	3	4	5	6	7	8	9
1. PLS	1.00								
2. PPVT	.57**	1.00							
3. Discrimination/Artic	-.23	-.04	1.00						
4. Sentence Structure	.42	.41	-.28	1.00					
5. Phonological Awareness	.59**	.34	-.37	.23	1.00				
6. Word Awareness	.53**	.41	.01	.57**	.52*	1.00			
7. Structural Awareness	.52*	.15	.04	.45*	.40	.67**	1.00		
8. Print Awareness	.52*	.27	-.52**	.20	.63**	.36	.30	1.00	
9. Metalinguistic Average	.66**	.37	-.14	.50*	.79***	.88***	.81***	.53*	1.00

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 3. Intercorrelations among age, linguistic tasks, metalinguistic tasks, and print concepts.

	Age	1	2	3	4	5	6	7	8	9	10
Age	1.00										
1. PLS	.70***	1.00									
2. PPVT	.76***	.80***	1.00								
3. Discrimination	.21	.31	.32	1.00							
4. Articulation	-.03	-.21	-.07	-.02	1.00						
5. Sentence Structure	.49*	.60**	.60**	.38	-.32	1.00					
6. Phonemes	.47*	.29	.34	-.03	.00	-.11	1.00				
7. Initial Sounds	.22	.45*	.15	.35	-.19	.26	.20	1.00			
8. Rhymes	.47*	.69***	.59**	.20	-.57**	.57**	.36	.72	1.00		
9. Phonological Play	.24	.52*	.44	.47*	-.30	.36	.33	.49*	.57**	1.00	
10. Phoneme Synthesis	.18	.51*	.27	.09	.04	.34	-.08	.33	.15	.42	1.00
11. Word Segmentation	.58**	.69***	.54*	.37	-.28	.49*	.27	.53*	.31	.36	.39
12. Word Play	.05	.28	.27	.69***	-.15	.52*	-.12	.42	.43	.71***	.28
13. Real-Nonsense	.35	.36	.52*	.14	.07	.22	.15	.01	.38	.18	.22
14. Word-Referent	.73***	.55**	.53*	.47*	-.20	.69***	.04	.32	.42	.17	.10
15. New Names	.61**	.37	.46*	.23	.45*	.22	.43	.06	.18	.16	-.07
16. Morphemes	.59**	.66**	.51*	.48*	-.15	.64**	.22	.28	.48*	.32	.33
17. Syntax	.52*	.66**	.48*	.49*	.02	.46*	.28	.44	.47*	.55*	.46*
18. ABC Concepts	.44	.57**	.48*	.35	-.45*	.37	.51*	.48*	.55*	.55*	.25
19. Book Concepts	.32	.55**	.34	.12	-.43	.46*	-.15	.18	.56*	.22	.26
Total Possible				22	35	28	22	10	10	10	12
M	44.6	60.6	45.1	21.5	30.4	19.5	20.6	5.8	6.1	9.5	7.4
SD	4.0	8.5	10.7	1.0	4.1	4.3	4.2	2.4	1.9	.8	4.5

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 3 (cont.). Intercorrelations among age, linguistic tasks, metalinguistic tasks, and print concepts.

	11	12	13	14	15	16	17	18	19
1. PLS									
2. PPVT									
3. Discrimination									
4. Articulation									
5. Sentence Structure									
6. Phonemes									
7. Initial Sounds									
8. Rhymes									
9. Phonological Play									
10. Phoneme Synthesis									
11. Word Segmentation	1.00								
12. Word Play	.15	1.00							
13. Real-Nonsense	.03	.17	1.00						
14. Word-Referent	.54*	.31	.41	1.00					
15. New Names	.11	.13	.26	.34	1.00				
16. Morphemes	.54*	.41	.13	.67**	.37	1.00			
17. Syntax	.51*	.53*	.49*	.58**	.54*	.70***	1.00		
18. ABC Concepts	.56**	.18	.18	.38	-.09	.44	.30	1.00	
19. Book Concepts	.25	.20	.58**	.64**	.00	.40	.50*	.29	1.00
Total Possible	12	10	10	12	10	40	24	47	25
M	7.4	7.0	7.9	9.5	9.1	34.8	16.4	28.4	15.1
SD	4.5	3.3	1.6	2.0	1.6	4.2	3.5	10.3	3.5

* $p < .05$ ** $p < .01$ *** $p < .001$