Phonological Awareness: Normally Developing and Language Delayed Children

Conscience phonologique: enfants dont le développement est normal et enfants atteints de retard de langage

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Abstract

This study compared 15 normal and 13 language delayed four- and five-year-old children on a range of tasks of phonological awareness. The tasks differed in the degree of explicit linguistic analysis that was required. The language delayed group always performed below the level of the normal children, and there were significant group differences on several tasks. A significant interaction effect reflected the greater difficulty language delayed children experienced with tasks that required the most explicit analysis.The tasks used in this study could be used in intervention research with language delayed children. They can also be used in therapy and classroom activities to enhance linguistic awareness skills thought to be critical for oral and written language development.

Résumé

Cette étude a comparé 15 enfants normaux et 13 enfants atteints de retard de langage, tous âgés de 4 et 5 ans, relativement à une variété de tâches de conscience phonologique. Celles-ci variaient pour ce qui concerne le degré d'analyse métalinguistique requise. Le rendement du groupe d'enfants atteints d'un retard de language a été inferieur à celui du groupe d'enfants normaux, et d'importantes différences ont été notées entre les groupes pour ce qui est de plusieurs tâches. L'important effet d'interaction reflétait les difficultés plus grandes rencontrées par les enfants atteints de retard de langage dans les tâches exigeant une analyse métalinguistique plus élaborée. Les tâches utilisées dans cette étude pourraient être utilisées en thérapie et en classe pour améliorer la conscience linguistique jugée essentielle au développment du langage oral et écrit.

Metalinguistic awareness, as a phenomenon, has been generating a great deal of interest in the last few years. The term refers to the ability to reflect upon the form of language rather than its meaning, or according to Read (1978), the ability to think about language and comment on it. Much of the work in this area has suggested that language awareness and language analysis skills emerge in middle childhood, that is, around age seven, after oral language development is thought to be nearly complete (Bruce, 1964; Liberman, 1973; Read, 1978). Some researchers have related the acquisition of linguistic awareness to exposure to written language (Tunmer & Herriman, 1984).

Some studies, however, suggest that linguistic awareness may begin to develop at a much earlier age (Fox & Routh, 1975; Rubin, Mallory, Farndale, Howe & Ramdeholl, 1990; Smith & Tager-Flusberg, 1982; Zhurova, 1973). For example, at least some degree of linguistic awareness may develop along with oral language and can be demonstrated in children as young as three and four years of age. Clark (1978) discusses linguistic awareness in terms of a continuum starting from the least explicit, for example self-corrections which are seen in children as young as two years, and becoming progressively more explicit, to include such behaviours as the use of linguistic terms to identify segments of language, such as sentences, words, and individual sounds. Rubin et al. (1990) examined the performance of normally developing three to six-year-olds on a variety of tasks based on the continuum of explicitness proposed by Clark (1978). These tasks measured the children's spontaneous ability to revise, judge, correct, identify, repair, manipulate, and explain errors in the phonological form of words. The data supported a developmental continuum, along the proposed hierarchy, and showed that even the three-year-olds could make some correct judgements and repairs. Results also indicated that some phonological analysis tasks at age 5 predicted performance on written language tasks at age 6.

To date, most of the work on early linguistic awareness has been done with normally developing children. Because of the possible relationship between oral language development and language awareness (Clark, 1978; Smith & Tager-Flusberg, 1982) it may be useful to know how language delayed children compare to their peers on linguistic analysis tasks. Some level of awareness of the components of language seems to be critical in order to recognize errors, either in one's own speech or in others. Clinically, children are

often seen who are able to produce specific phonemes correctly but are unable to monitor their speech to ensure that they use these phonemes appropriately. Perhaps if these children were able to analyze the individual components of language, that is, to have more awareness of linguistic forms, they would be more sensitive to, and more able to correct, their errors. Many clinicians use tasks that have high metalinguistic demands as part of their therapy. For example, a child who reduces consonant clusters (e.g., "kool"/school) might be asked, "What do you need at the beginning?". In order to respond appropriately, saying the sound [s], the child must first be able to isolate and identify specific components of language such as a single phoneme.

Some researchers have found differences between normally developing and language delayed children on tasks requiring linguistic awareness. In one study, language delayed children did not perform as well as the control children on tasks of word, syllable, and phoneme awareness (Kamhi, Lee, & Nelson, 1985), all of which required relatively explicit degrees of language analysis. In another study, language delayed children performed more poorly than the control children on judgements and repairs of sentences with syntactic errors, but not sentences with semantic or phonological errors (Kamhi and Koenig, 1985). In fact, both groups performed quite poorly on phonological repairs, having a success rate of approximately 25%. Kamhi & Koenig, (1985) stated that this poor performance on phonological repairs may have occurred because sentences with semantic, syntactic, and phonological errors were presented in mixed order and because the children may have been attending more to the semantic and syntactic changes in the sentences than to the phonological ones. Consequently, they suggest that "a better focused phonological judgment task might reveal significant differences in the two groups' ability to correct phonologic errors" (Kamhi & Koenig, 1985, p. 206).

The current study attempted to improve the design of Kamhi and Koenig's (1985), and provide a "better focused" analysis. First, unlike the Kamhi and Koenig study, only phonological awareness was tested. Further unlike the Kamhi and Koenig study, the stimuli used in this study contained both word initial and word final targets so that errors could be analyzed by word position. In order to ensure that the children were making judgements based on the sound structure, all the errors created non-words (not all of the Kamhi and Koenig stimuli created non-words). Kamhi and Koenig used an oral presentation in their task. This type of presentation could lead to some confusion for subjects because they have to know exactly what is wrong and remember what the error word is supposed to be. The visual representation used in the current study helped reduce this possible source of subject variability. Further, Kamhi and Koenig's examination of judgements and repairs was extended by using additional tasks reflecting a broader range of language analysis abilities. This provided data to help determine if the developmental continuum found previously for normally developing children would also apply to children with delayed oral language.

In doing a controlled study in this area, it is important that linguistic awareness abilities be examined as independently of other influences as possible. Lundberg et al. (1988) suggest that one way to do this is to conduct linguistic awareness testing before formal written language instruction, for example, in Kindergarten classes. While the use of Kindergarten children does not account for the variations in preschool literacy experience found by Wells (1986), it does limit the amount of formal written language instruction to which the children have been exposed.

Linguistic awareness deserves to be investigated further, not only because it is in itself an interesting phenomenon, but also because of its relationship to many language-based tasks. It has been demonstrated, for example, that early linguistic analysis skills are highly correlated with later reading ability (Ball & Blachman, 1988; Blachman, 1984; Bryant & Bradley, 1983; Elkonin, 1973; Fox & Routh, 1983; Lewkowicz, 1980; Lundberg, Frost, & Petersen 1988; Rubin et al., 1990; Stanovich, Cunningham, & Cramer, 1984). It has also been demonstrated that early oral language difficulties are related to later reading and writing problems (Aram & Nation, 1980; Hall & Tomblin, 1978; Rubin & Dworkin, 1985; Vellutino, 1979), indicating that children with both delayed oral language and poor linguistic analysis skills will frequently demonstrate difficulties with written language as well. Empirical evidence suggests that language analysis skills can be improved through training (Ball & Blachman, 1988; Bradley & Bryant, 1983; Lewkowicz, 1980; Lundberg et al., 1988; Morais et al., 1986).

Clinical observations suggest that language delayed children can improve their language analysis skills through training, however, to date no empirical studies have been done with this population. This is disturbing given the difficulties with phonological awareness that these children experience and the possible effects of these problems on their oral and later written language development. If language delayed children's linguistic awareness abilities can be described along a developmental hierarchy, as shown with normals, then that hierarchy could guide intervention. As some evidence with normals suggests, such intervention might be important in preventing early reading difficulties and may possibly affect oral language development. A defined hierarchy of tasks would provide an intervention or teaching sequence. Measurements could then be made of the effectiveness of this intervention in modifying either one, or

both, of language awareness and general language development.

The purpose of this study is to measure the linguistic analysis ability of young language delayed children and compare them to normally developing children. Linguistic awareness will be tested using a combination of the tasks developed by Rubin et al. (1990), with modifications, and an adaptation of a task from Zhurova (1973). The first goal is to replicate the findings with normal children that linguistic awareness can be measured in 4 and 5-year-old children and that it occurs along a developmental continuum of different levels of explicitness. The second goal is to compare the performance of normal and language delayed children on these tasks. It seems probable that, like aspects of oral language development, the development of linguistic awareness skills will be delayed for the language delayed group.

Method

Subjects

The subjects were 28 four and five-year-old children from Junior and Senior Kindergarten classes in the Peel Board of Education in Ontario. The children were divided into two groups: one group of 15 had normally developing language skills; the other group of 13 had been diagnosed by qualified speech-language pathologists as language delayed. The language delayed children were first identified through a language sample. In further testing they all scored below the first percentile for their age on the Structured Photographic Expressive Language Test- II (Werner & Kresheck, 1974), which examines the use of syntactic and morphological structures. Five of the language delayed children also scored below the tenth percentile for their age on the Test of Auditory Comprehension of Language-Revised (Carrow-Woolfolk, 1985),which tests language comprehension, and four children had standard scores of less than 90 on the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981) which examines vocabulary knowledge. The language delayed group was matched with the normal group for age, socio-economic background, and exposure to the same classroom curriculum. None of the children had received any formal instruction in reading. Teacher reports of the children's general abilities and overall performance in various areas indicated that all children were regarded as having normal intelligence. Information obtained from the Ontario Student Records, including the community health hearing and vision screening results, indicated that all subjects had normal hearing and vision, no history of major physical or emotional problems, and were monolingual speakers of English. The normal group consisted of 5 four-year-olds and 10 five-year-olds (X= 64 months); the delayed group consisted of 3 four-year-olds and 10 five-year-olds (X=62 months). There was no significant difference in age between the two groups, $t(26)= 0.77$, $p>0.05$. The normal group had 8 boys and 7 girls, and the delayed group had 7 boys and 6 girls.

Procedures

Each child participated in an individual testing session lasting approximately one-half hour. The sessions were audiotaped, but responses were also transcribed on line. All responses were scored by the same examiner according to strict pre-determined criteria. Feedback was given only on example items. Linguistic analysis tasks were adapted from those used by Rubin et al. (1990), Catts and Kamhi (1986), and Zhurova (1973). Tasks two, three, and four were discontinued if the child gave completely incorrect responses for the first five items.

Task One: Judgements, Repairs, Identifications, Explanations of Repairs

Fourteen 3"x5" coloured photographs depicted fourteen sentences of up to 8 words in length that ended with a familiar CVC noun (e.g., "Here are some little toys"). Ten of the sentences ended in a non-word created by changing the place and manner of one phoneme (e.g., "foys" for "toys"). Manipulations were made on five word-initial and five word-final phonemes. Contrasting pairs of sounds (e.g., f/t) were substituted in both initial and final position (e.g., "foys"/"toys" and "pof"/"pot"). In order to preserve similar vowel length in both words, the voicing feature was maintained. The 14 sentences and the phoneme contrasts are listed in the Appendix. Each of the sentences was presented orally with the appropriate picture. Children were asked to judge if the examiner said something "silly", then repair the error, identify the error, and explain how they fixed it. The following is an example of the procedure for Task 1.

Directions: "I'm going to show you some pictures. I want you to listen carefully. Tell me if I say something silly and then help me fix it. Okay?" *Present stimulus sentence and picture.

Judgement: "Did I say something silly, yes or no?" If "yes," go to Repair; if "no," go to next item.

Repair: "Can you fix the silly part?" If correct, go to Identification; if incorrect, go to next item.

Identification: "Now listen again. This time say the silly part." Repeat stimulus; if correct, go to Explanation of Repair; if incorrect, go to next item.

Explanation of Repair: " *'Foys'* is silly and *'toys'* is right. What did you do to fix *'foys'* ?" Repeat from * for each stimulus item.

Judgements, repairs, and identifications were scored as correct or incorrect. Explanations of repairs were scored according to how many phonemes or letter names were identified (e.g., A score of 2 points for: "foys has /f/ and toys has /t/" or "I took away F and added T"; A score of 1 point for: "it had F"). Each item could have a score of (0), (1), or (2). Percentage correct was calculated for each child at each level.

Task Two: Manipulations, Explanations of Manipulations

Ten 3" x 5" coloured photographs depicted 10 common CVC nouns (see appendix). Each of the stimulus words was presented orally with the appropriate picture. An example item was provided. Children were asked to manipulate a phoneme to make the word "silly" and then to explain how they made it silly. The following is an example.

Directions: Present picture. "This is a bird. I can say it in a silly way; 'fird'. You say it." (response) Present next picture. "This is a glass. I can say it in a silly way; 'glap'.You say it." (response) "Now it's your turn."

**Manipulation:* Present picture. "Say 'bed.' (response) Now say it in a silly way." (response)

Explanation of Manipulation: "'Bed' is right and (child's response) is silly. What did you do to make 'bed' silly?" Repeat from * with all stimulus items.

Manipulations were scored as correct if the child changed the initial, medial, or final phoneme, deleted the initial or final phoneme, or added a phoneme to make a consonant cluster. Deletion of the medial phoneme, a vowel, was not possible. Incorrect responses included no response, saying the same word, making a silly gesture, changing more than one phoneme, or saying an unrelated word. Percentage correct was calculated for each child. Explanations of manipulations were scored the same way as explanations of repairs in Task 1.

Task Three: Rhyming

Ten 3" x 5" coloured photographs depicted ten common CVC nouns (see appendix). Each of the stimulus words was presented orally with the appropriate picture. An example item was provided. Children were asked to provide a rhyme for the stimulus item. The following is an example.

Directions: "We're going to play a different game now." *Example 1:* Touch your nose. "What's this?" (response) "Right, my nose. I can say nose, pose, cose. Those all rhyme. Can you think of something else that rhymes with nose, pose, cose?" (response) If correct, go to next example; if incorrect or no response, continue. "What about toes? Nose, pose, cose, toes." *Example 2:* Touch your leg. "What's this?" (response) "Right, my leg. I can say leg, meg, seg. Those all rhyme. Can you think of something else that rhymes with leg, meg, seg?" (response) If correct, go to first item; if incorrect or no response, continue. "What about deg? Leg, meg, seg, deg."

**Rhyme:* Present picture. "Say 'pen.'" (response) "Can you think of something that rhymes with pen?" Repeat from * with all stimulus items.

Rhymes were scored as correct if the initial phoneme was changed or deleted or if a consonant was added to make a consonant cluster. The children who misarticulated the stimulus item were given credit only if they made a change from their own production. Percentage correct was calculated for each subject.

Task Four: Phoneme Segmentation

Ten monosyllabic non-words, taken from Kamhi and Catts (1986) and consisting of two, three, and four phonemes (see appendix), were presented in random order. Six small blocks of the same colour and size, a visual/tactile aid, were placed in front of the child. Each of the non-words was presented orally. The child was asked to segment the word into individual phonemes, moving one block for each phoneme as it was said. The following is an example.

Directions: "Now we're going to play a block game. Here I'll show you." *Example 1:* "I can say 'at.' Now I'll show you how many parts it has." Repeat "at" moving one block for each phoneme as it is said. "Okay it's your turn. Say 'at.'" (response) "Say it again and show me how many parts it has."(response) If correct, go to example 2; if incorrect, model "a-t" while moving blocks. *Example 2:* "I can say 'fat.' Now I'll show you how many parts it has." Repeat "fat" moving one block for each phoneme as it is said. "Okay, it's your turn. Say 'fat.'" (response) "Say it again and show me how many parts it has." (response) If correct, go to first item; if incorrect, model "f-a-t" while moving blocks.

**Phoneme Segmentation:* "Say 'wug.' Now say it again and show me how many parts it has." Repeat from * with all stimulus items.

Segmentation was scored as correct if the child moved one block for each phoneme as it was said. The number of initial phonemes and final phonemes segmented correctly also was recorded. Percentage correct was calculated for each subject on each measure: complete segmentation, initial phoneme segmentation, final phoneme segmentation.

Table 1. Group means and standard deviations on linguistic awareness tasks.

		Judge	Repair	Identify	Explain Repair	Manip	Explain Manip	Rhyme	Segment	Initial Seg	Final Seg	Isolate
Normal	*X*	89.53	84.66	74.66	4.33	82.00	0.00	78.00	26.66	48.00	45.33	92.66
	SD	13.29	13.55	32.26	16.78	25.12	0.00	33.84	21.93	36.09	37.77	7.03
Language	*X*	77.38	66.15	40.00	0.00	36.15	0.00	21.53	0.00	4.61	2.30	93.07
Delayed	*SD*	26.79	28.14	37.19	0.00	39.48	0.00	39.33	0.00	16.64	8.32	10.31

Task Five: Initial Phoneme Isolation

After completion of the phoneme segmentation task, the items on which the initial phoneme was not segmented were readministered. Children were asked to isolate the initial phoneme by producing it in isolation ("w") or repeating the first phoneme in a word ("w-w-wug"). The following is an example.

Directions: "What's the first sound in your name?" (response) "You can say 'p-p-peter'; 'p' is the first sound."

**Initial phoneme isolation:* "What's the first sound in 'wug'?" If correct, go to next item; if incorrect, continue. "Say 'w-w-wug.'"(response) "'W' is the first sound." Repeat from * for each stimulus item.

Responses were scored as correct if the child was able to segment the initial phoneme with blocks (w-u-g), produce the sound in isolation ("w"), or repeat it ("w-w-wug"). Percentage correct was calculated for each child.

Results

In order to determine if the two groups performed differently overall and if the tasks were distributed along a developmental continuum, a two-way analysis of variance was conducted with language ability as the grouping factor and linguistic awareness level as the repeated factor. Results revealed a significant group effect, $F(1, 26)=25.86$, $p<0.001$, and a significant task effect, $F(15, 390)= 90.31$, $p<0.001$. A significant interaction effect was also obtained between group and task, $F(15, 390)=7.99$, $p<0.001$, indicating that, although the normals performed better than the language delayed group overall and the tasks were graded in difficulty, there were differences between groups on the degree of difficulty of the various tasks. Group means in percentages were calculated for most of the linguistic awareness tasks and are presented in Table 1.

Explanations of Repairs and Explanations of Manipulations were so low for everyone that the mean percent correct scores for the groups were very similar. However, there were differences between groups in the type of explanation given for these two tasks. Responses were scored for degree of explicitness and for any attempt made to explain the change by referring to phonemes or letter names (e.g., "it rhymes," "it sounds different," "I changed the T"). Children could mention two phonemes (4 points), one phoneme (2 points), make some explicit attempt (1 point), give an unrelated answer (0 points), or make no attempt (0 points). Scores for this scoring procedure are shown in Tables 2 and 3.

Groups performed similarly on isolation of the initial phoneme, which was so easy that everyone did very well. However, the number of trials required to isolate the phoneme independently was different for the two groups. For this task, children were able to produce the initial phoneme alone immediately (4 points), in less than 5 trials (3 points), in more than 5 trials (2 points), only on repetition (1 point), or were unable to isolate the phoneme (0 points). Results of this scoring procedure for the two groups are

Table 2. Number of children in each group at each score based on degree of explicitness.

Type of Explanation of Repair				
Score	(4)	(2)	(1)	(0)
Normal	1	0	3	11
LD	0	0	0	13

Table 3. Number of children in each group at each score based on degree of explicitness.

Type of Explanation of Manipulation				
Score	(4)	(2)	(1)	(0)
Normal	1	1	5	8
LD	0	0	1	12

Table 4. Number of children in each group at each score; based on the number of trials.

	Isolation of Initial Phoneme				
Score	(4)	(3)	(2)	(1)	(0)
Normal	8	5	0	2	0
LD	1	3	1	8	0

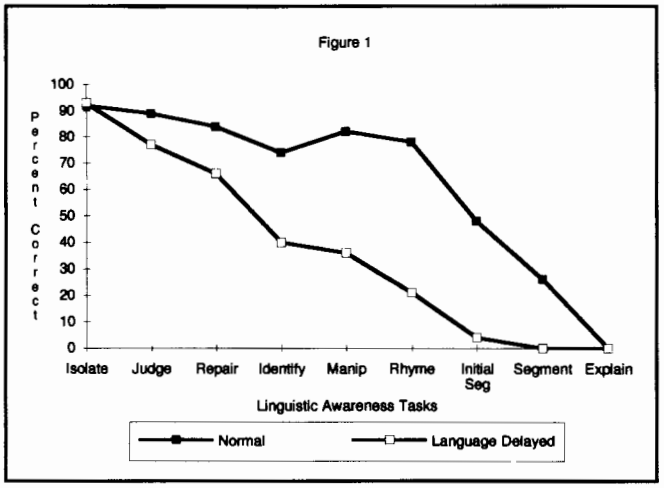
given in Table 4.

Eight of the normal children could answer immediately in contrast to only one of the language delayed children. Eight of the language delayed children could isolate the sound only on repetition, even after 10 trials; only 2 of the normal children needed to be given a direct imitation for more than 5 trials. Percentages were not calculated for Type of Explanations of Repairs, Type of Explanations of Manipulations, or Number of Trials required to isolate the initial phoneme because the numerical scores were used to code types of response rather than an actual percentage correct.

The performance of the normal and language delayed groups on all tasks is compared graphically in Figure 1. In general, the normal children perform better than the language delayed group, but their graph has a different configuration. Figure 1 shows that the normal children perform at a high level until they reach the segmentation task, whereas the language delayed group begins to drop off at the level of identification of errors, and their performance decreases steadily as tasks require more explicit levels of analysis.

In order to determine if there were significant differences between the normal and language delayed groups on each of the tasks, *t*-tests were calculated using group means and the separate variance estimate. Table 5 shows that significant differences were found between groups on Repairs, Identifications, Manipulations, Type of Explanations of Manipulations, Rhymes, Segmentation (specifically segmentation of the initial phoneme and segmentation of the final phoneme), and also on the Number of Trials required to isolate the initial phoneme. No significant differences were found on Judgements, Explanations of Repairs, Type of Explanations of Repairs, Explanations of Manipulations, and Initial Phoneme Isolation ($p>0.05$).

Figure 1. Linguistic awareness tasks.



Discussion

This study compared the performance of normal and language delayed children on a range of tasks measuring linguistic analysis ability. For both groups, the results generally support the findings of Rubin et.al. (1990) showing the same hierarchy of task difficulty. The language delayed children performed significantly below the normals on all the tasks except Judgements and Isolation of the initial phoneme (two tasks on which both groups did quite well), and Explanations of Repairs and Manipulations (on which both groups did poorly).

The results in this study are consistent with previous findings for normally developing children (Rubin et al., 1990), but overall the subjects in this study performed at a

Table 5. *T*-tests on group means of normal and language delayed groups on linguistic awareness variables.

Variable	*t*	*DF*	*p*	
Judgement	1.48	26	0.156	NS
Repair	2.16	26	0.045	*
Identification	2.61	26	0.015	*
Explain Repair	1.00	26	0.334	NS
Type Expl Repair	1.70	26	0.110	NS
Manipulation	3.60	26	0.002	*
Explain Manip	0.00	26	1.000	NS
Type Expl Manip	2.23	26	0.040	*
Rhyme	4.04	26	0.001	**
Segmentation	4.71	26	0.001	**
Initial Seg	4.17	26	0.001	**
Final Seg	4.29	26	0.001	**
Isolation	-0.12	26	0.905	NS
Trials (#)	3.71	26	0.001	**

* $p<0.05$
** $p<0.001$
NS not significant

slightly lower level. This might be explained by the fact that the Rubin et al. subjects came from a university affiliated school which emphasized educational research. Generally, the family background was academic, highly verbal, and literate. The present sample was taken from a suburban school board with a wider range of socio-economic backgrounds and, therefore, probably represents the general population more accurately. Results are also consistent with previous studies of linguistic awareness in language delayed children (Kamhi & Koenig, 1985; Kamhi, Lee, & Nelson, 1985). The fact that the language delayed subjects performed as well as normals in judging sentences with phonological errors supports the results of Kamhi and Koenig (1985). However, in contrast to Kamhi and Koenig, the normal subjects in this study performed significantly better than the language delayed subjects on repairs. Furthermore, both groups in this study performed better on making phonological repairs than either of the groups in the Kamhi and Koenig study. These differences in results are probably due to the fact that, in this study, sentences contained only phonological errors, whereas in the Kamhi and Koenig study, sentences included either phonological, syntactic, or semantic errors. It seems likely that, given the tightly constrained nature of the errors, the subjects in this study were better able to focus their attention on the phonological structure of the words in the sentences and that this helped both groups achieve a better performance. Finally, the marked decrease in performance for the language delayed subjects, relative to the normal subjects, on the tasks that required more explicit degrees of linguistic analysis supports results obtained by Kamhi, Lee, and Nelson (1985). They found that language delayed children had significantly poorer performance than normal control groups on word, syllable, and phoneme segmentation tasks.

In comparing the performance of the two groups of children on a series of linguistic awareness tasks, the question of differences in intelligence or cognitive abilities arises: Could differences in performance be attributable to differences in cognitive abilities? Results on two of the tasks suggest that, while there may be significant cognitive differences between the two groups, both groups demonstrated a basic level of understanding of the tasks. This is consistent with the perceptions of average intellectual ability from the teachers' reports of general classroom performance. The groups did not differ significantly on the judgement task, indicating that all of the children understood the task and were able to respond accurately. Results for the Manipulations task also showed evidence that the language delayed children understood the instructions. They knew they had to say something in a silly way, although they often did not key in to the nature of the manipulations in the examples. Instead, children gave absurd or silly responses ("a bouncing bed"), or produced the word with silly facial movements. This seems to indicate a lack of sensitivity to phonological structure or decreased linguistic awareness of phonological structure rather than an inability to understand the task due to cognitive limitations. It still may be the case that other cognitive differences are contributing to group performance differences. This issue needs further study.

The manipulation task revealed another difference between the two groups. The language delayed group not only manipulated fewer phonemes correctly than the normal group, but also demonstrated a different pattern in their phonological manipulations. The normal group tended to rhyme (pin/kin) for manipulations, while the language delayed subjects who responded correctly often avoided substituting a phoneme and instead just deleted or added a phoneme (pin/ pi/ pint). This may be why the language delayed group found manipulation easier than rhyming, unlike the normal children in this study and in the Rubin et al. (1990) study in which the scores for manipulations and rhymes were quite similar. It is also possible that because of their generally heightened phonological awareness, the normal group found rhyming, a commonly occurring phenomenon, more automatic than the language delayed group, and therefore it was easier for them. This may help explain some discrepancies between the current findings and those of Rubin et al. regarding the hierarchy of the tasks. The normals followed the same pattern as normals in Rubin et al., with Identifications (75%) about the same as Manipulations (82%) and Rhyming (78%). The language delayed subjects, however, found Identifications (40%) and Manipulations (36%) about the same, and both were somewhat easier than Rhyming (21%), possibly for the reasons discussed above.

Perhaps a more meaningful way to conceptualize the results is not to consider each of the tasks as reflecting a discrete skill but as clusters representing different levels of language analysis ability. The normal children were close to ceiling on the Isolation, Judgement, Repair, Identification, Manipulation, and Rhyming tasks indicating that they had already acquired the necessary level of linguistic awareness to perform them. Their performance decreased on the more explicit tasks of Complete, Initial, and Final Phoneme Segmentation. A different pattern was obtained with the language delayed group who performed at a high level only on Isolations, Judgements, and Repairs. Although they performed significantly lower ($p<0.05$) on Repairs than on Isolations and Judgements, their performance on these three tasks is relatively good compared to all the remaining tasks. Their next performance level includes Identifications, Manipulations, and Rhyming, all of which require a degree of explicit awareness that the language delayed group obviously has not mastered. Their lowest level of performance occurs on the most explicit analysis tasks, Complete, Initial, and Final Phoneme Segmentation.

The specific components of these tasks that contribute to the hierarchy of difficulty still need to be determined more precisely. The exact location along the continuum of the ability to identify errors is subject to interpretation. Identification of errors was included in the study initially because it was thought to represent the next most explicit stage of development after the ability to repair an error. A further examination of Clark's work (1978) suggests that, in fact, her use of "identification" does not refer to errors but to identifying specific linguistic segments. If this is the case, then it may be more like the task of initial phoneme isolation used in this study. This distinction may explain the differences between normal and language delayed subjects on the task of independently isolating the initial phoneme.

Another consideration with respect to the Identification of Errors task is that performance may have been affected by some confusion with the directions. Children were asked to "say the silly part." They often did say the word that was silly, but they said it the right way. An improvement in the directions might have been to say, "say it the silly way I did." This alteration in directions will be addressed in future research.

Turning to the more explicit tasks, the groups did not differ significantly when attempting to explain their repairs or their manipulations because this was extremely difficult for all the subjects. Examining the type of explanations given by subjects, however, revealed that children in the normal group were more likely to give responses with some explicit reference to the sounds of language. It is possible that providing an example item might have improved the overall quality of explanations. As with explanations, groups performed similarly on isolating initial phonemes or repetition of initial phonemes (w-w-wug), but this time the task was very easy for all subjects. The normal children, however, required significantly fewer trials than the language delayed children to isolate the phonemes independently, even though all of the subjects were able at least to repeat the phoneme. Isolation of the initial phoneme through repetition was easier than initial phoneme segmentation with blocks which in turn was easier than phoneme segmentation of a complete word. Initial phoneme repetition (w-w-wug) and then initial phoneme segmentation (w-ug) appear to be intermediate steps or precursors to complete phoneme segmentation (w-u-g) supporting previous recommendations that these techniques be used in early language analysis training (Blachman, 1984; Lewcowicz & Low, 1979; Yopp, 1988; Zhurova, 1973).

Support for training in linguistic awareness skills can be garnered from anecdotal as well as empirical evidence (Ball & Blachman, 1988; Lundberg et al., 1988). The only language delayed child who could do any phoneme segmentation and could tell the first sound in a word without a model for repetition was a child who had been receiving therapy from a speech-language pathologist familiar with linguistic awareness principles. One of the normals who did well on phoneme segmentation commented after the task, "My aunt gave me a book about all this." One cannot discount the possibility that children in both groups may have had incidental exposure to language analysis tasks.

Conclusions

The results of this study support several conclusions. First, the replication of previous findings adds support to the notion that some degree of linguistic awareness emerges during the preschool years that can be measured and quantified in 4 and 5 year olds by using appropriate tasks. Second, the data seem to validate a hierarchy of linguistic analysis tasks going from least to most explicit. Finally, language delayed children appear to perform in accord with the same hierarchy of explicitness that describes normals but they performed less well overall.

These results have important implications for language delayed children especially within the education system. Simple tasks, such as rhyming and phoneme segmentation, could be used as screening measures to determine which children have problems with linguistic analysis. The hierarchy of tasks can give some indication as to where the child performs and what the next developmental level would be. That level could be targeted in linguistic awareness training. In order to minimize the overall distance between normal and language delayed groups, instruction should focus specifically on the levels that show the greatest differences between groups, such as manipulations and rhyming.

The experimental tasks outlined here, and other similar activities, could easily be incorporated into any type of classroom curriculum or language therapy to encourage the development of linguistic awareness. The general language experiences and literacy exposure in a whole language classroom may well help to develop linguistic awareness. Tasks such as rhyming, phoneme manipulation, and phoneme segmentation can easily be incorporated into meaningful games and activities with large or small groups or individuals. Similar to the way Staab (1990) incorporates phonics instruction within a literature based activity, rhyming can be made more salient when reading a poem, playing a rhyming game, singing, or listening to children's music. The importance of combining all necessary approaches to facilitate literacy for language delayed children has been

addressed in a comprehensive work by Adams (1990). An example of one such approach is Clay's model of reading recovery (Clay, 1990), which suggests that for low functioning children, individual work on specific target skills should take place within the context of reading and writing. This same kind of preventative approach could be applied to the earlier stages of awareness of sounds in words orally or in print. When reading a pattern book, such as *Brown Bear*, the rhyming could be pointed out explicitly to help the children for whom it is less salient and to increase their ability to notice rhyme themselves. Children could have fun making silly names, using phonological manipulations, for the characters in their favourite books, for their classmates, or for things they saw at the zoo. This type of contextual approach fits naturally into the integrative approach discussed by Adams (1990), Trachtenburg (1989), and others, for teaching the rules of written language within a meaningful context. Further exploration is necessary in order to fully understand all the issues related to phonological awareness, including understanding its relationship to language development and the effectiveness of intervention using this hierarchy of tasks.

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Appendix

Stimulus Items

Task One: Judgements, Repairs, Identifications, Explanations of Repairs

1. Here are some little *foys.*	foys/toys
2. On the chair, there's a *doz.*	doz/dog
3. The girl is at her house.	———
4. The lady's folding the *keet.*	keet/sheet
5. On the table, there's a *knike.*	knike/knife
6. The man will chew the *zum.*	zum/gum
7. The kids are playing with a ball.	———
8. At the window, there's a *shat.*	shat/cat
9. On the stove, there's a *pof.*	pof/pot
10. The man's putting a sock on his *koot.*	koot/foot
11. The girl's on her *bishe.*	bishe/bike
12. The girl's reading a book.	———
13. On the table, there's a cup.	———
14. Here's a *fik.*	fik/fish

Task Two: Manipulations, Explanations of Manipulations

1. bed
2. pipe
3. cake
4. fan
5. comb
6. face
7. shoes
8. tub
9. pin
10. soup

Task Three: Rhyming

1. pen
2. cap
3. feet
4. coat
5. phone
6. ship
7. tape
8. soap
9. pail
10. bag

Task Four: Phoneme Segmentation

1. wug
2. ap
3. zan
4. polt
5. kI
6. sput
7. fɛ
8. kɛst
9. pIv
10. yob