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ABSTRACT

An evaluation of children's ability to conceptualize auditory pattern contrasts was made. At the end of the 1968-69 school year, 56 kindergarteners, 31 first graders, 24 second graders, and four fourth graders were tested on their ability to conceptualize the sequential relationships of phonemes in both nonsyllabic and syllabic patterns. An auditory conceptualization test involving colored blocks to encode or represent the auditory patterns in three categories was developed by the investigators. Color was used to denote a repetition within a given pattern. The ability to judge sameness and difference and the concept of number to 4 were testing prerequisites. The categories tested were related to the nonsyllabic, simple syllable, and complex syllable levels. A descriptive analysis of the findings was presented. A wide range of scores was found for kindergarten, grade 1, and grade 2, and the problem of auditory perceptual function continued into grade 4. The authors concluded that curriculum planning should include special attention to developing auditory conceptualization. References are included. (WB)

CONCEPTUALIZATION OF AUDITORY PATTERNS

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CONCEPTUALIZATION OF AUDITORY PATTERNS

The authors have observed in years of clinical and classroom remediation of reading problems that there is a close correlation between reading disability and undeveloped auditory conceptualization. This has been observed at all age and grade levels, from elementary school to adult level. Their informal research indicated that although there is some indication of a maturational factor in auditory conceptualization, for a significant number of individuals full competency does not emerge simply on a maturational basis or under present educational methods. For example, intelligent adults who had been unable to learn how to read in spite of much tutoring often evidenced less auditory perceptual competency than some kindergartners.

Auditory perceptual competency provides a base from which students can grasp the logic of the English spelling and reading system. If oral pattern contrasts are not perceived, the representation of these units in corresponding graphic patterns has no tie to reality. Reading and spelling must then be learned more through rote memory of gross visual units than through an understanding of the structural relationship linking oral patterns and their corresponding graphic patterns.

This study was an attempt to gather formal data on the emergence of the ability to conceptualize auditory pattern contrasts.

Population

At the end of the 1968-69 school year, 56 kindergartners, 31 first graders, 24 second graders, and 4 fourth graders in a semi-rural California school district were tested on their ability to conceptualize the sequential relationships of phonemes in both non-syllabic and syllabic patterns. Socio-economic classes represented ranged from migrant workers to upper middle class. Some of the students had bi-lingual backgrounds.

Method

The test used in this study was an auditory conceptualization test developed by the investigators. (1) The test involves using colored blocks to encode or represent the auditory patterns in three categories. Since there is no constant color-for-sound association except to denote a repetition within a given pattern, the only prior learnings required are the ability to judge sameness and difference, and the concept of number to four. The test is given individually to each student, and can be completed in ten minutes or less.

The categories of the test are:

Category IA and IB

Non-syllabic level. Sequences of isolated sounds are given. In IA the Subject must indicate number of sounds heard, and whether they were the same or different. In IB he must indicate the pattern of the sameness and difference.

Category II

Simple syllable level. The Subject must conceptualize one consonant and one vowel as they shift in relationship and the consonant is repeated.

Category III

Complex syllable level. The Subject conceptualizes contrasts in syllable units as phonemes are added, substituted, omitted, shifted, or repeated.

Standardization data is still being gathered on the test, but informal norms to date show:

many four-year-olds can cope successfully with Category I; some children in kindergarten and first grade can handle Category II; some first graders are also successful with Category III;

from second grade on, individuals with a high degree of success on all three categories of the test are usually reading and/or spelling at grade level or above;

from second grade into the adult range, however, individuals reading and/or spelling significantly below grade level have consistently been found unable to handle all of one or more of the three categories.

Analysis of findings

Total Scores

The range of possible scores for the total test is 0 - 38.

The 56 kindergartners scored from 2-29, with 50% scoring above 18.

The 31 first graders scored from 9-36, with 50% scoring above 23.

The 24 second graders scored from 12-38, with 50% scoring 30 or above.

The 4 fourth graders scored from 29-38, with 2 scoring 30 or above.

Category IA

The range of possible scores was 0 - 16. No Subjects failed to score.

Kindergarten scores ranged from 2-16. Nearly 90% scored 8 or above. 50% scored 12 or above.

First grade scores ranged from 1-16. More than 90% scored 8 or above. 50% scored 13 or above.

Second grade scores ranged from 8-16. All scored 8 or above. 50% scored 14 or above.

Fourth grade scores were from 13-16. One at 13, and three at 16.

Category IB

The range of possible scores was 0 - 12.

Kindergarten scores ranged from 0-12. Nearly 30% scored zero. 50% scored 5 or above.

First grade scores ranged from 0-12. Nearly 20% scored zero. 50% scored 10 or above.

Second grade scores ranged from 0-12. Only one child failed to score. 50% scored 11 or above.

Fourth grade scores ranged from 6-12. One at 6, two at 9, one at 12.

The inter-relationship of the responses seemed to indicate that ability to conceptualize the patterns of IB was dependent on the ability to discriminate identities of isolated sounds in the sequences of IA. At all four grade levels, 97% of the students who scored 8 or above in IA were able to score in IB.

Categories IA and IB Combined

Since both Category IA and IB require Subjects to respond to sequences of isolated sounds, the scores can be combined to gain a total score which can be compared to the Subjects' performance on the syllabic sequences of Categories II and III.

The range of possible scores was 0 - 28 on IA and IB combined.

Kindergarten scores ranged from 2-26. 50% obtained scores of 18 or above.

First grade scores ranged from 9-28. 50% scored 20 or above.

Second grade scores ranged from 11-28. 50% scored 25 or above.

Fourth grade scores ranged from 22-28. Two at 22, one at 25, one at 28.

It will be noted that although a general maturational trend

is evident, a significant number of children have not attained full competency even in conceptualizing the identities of isolated sounds in sequence by the end of second grade. A spot check into fourth grade indicated a persistence of this dysfunction.

Categoty II

The range of possible scores was 0 - 3.

Kindergarten scores ranged from 0-3. Nearly 80% failed to score.

More than 20% evidenced conceptualization of the VC syllable.

Nearly 15% tracked the VC syllable plus the consonant shift to CV position.

Nearly 4% tracked the VC and CV syllables plus the repetition of the initial consonant for a CVC syllable.

First grade scores ranged from 0-3. Nearly 55% failed to score.

45% evidenced conceptualization of the VC syllable.

35% tracked the VC syllable plus the consonant shift to CV position.

25% tracked all three pattern changes.

Second grade scores ranged from 0-3. 20% failed to score.

Nearly 80% conceptualized the VC syllable.

70% tracked the VC syllable and the consonant shift.

Less than 65% tracked all three changes.

The four fourth graders tracked all three changes. (In subsequent testing of 60 fourth graders however, in a study to be reported on at a later date, full competency on simple syllables was not substantiated. Some failed to score, and there were decreasing proportions of students who scored on the three syllable changes, just as in the K-2 range above.)

95% of the kindergartners and 90% of grades 1, 2 who were able

to score in Category II had a total score in Combined Category IA, IB of 20 or more. This seems to indicate that a fairly high degree of conceptualization of isolated sounds in sequence is important to the conceptualization of syllable units.

However, it should be noted that 60% of kindergartners and 20% of grades 1 and 2 who scored 20 or more in Category I failed to score in Category II. Apparently, and this is important to note, while perception of isolated sounds in sequence appears to be important to conceptualization of syllable units, it does not predict or guarantee conceptualization of syllable units.

Category III

The range of possible scores was 0 - 7.

Kindergarten scores ranged from 0-2. Slightly more than 80% failed to score. The nearly 20% who did score tracked external additions.

First grade scores ranged from 0-6. 50% failed to score. Slightly more than 10% conceptualized an internal substitution as well as external additions.

Second grade scores ranged from 0-7. Less than 5% failed to score. More than 50% were unable to conceptualize beyond initial and final additions.

Scores for the four fourth graders ranged from 4-7. Although two could track all the pattern changes, the other two were unable to track phonemic omission, shift, and repetition in complex syllables.

Consideration of Category II and III together reveals that all children (K, 1, 2, 4) who scored in either Category II or III had scores in Categoty I of 10 or above. However, over 70% of the

kindergartners and 25% of the first and second graders who scored 10 or above in Category I failed to score in Category II and III. So again there is indication that ability to conceptualize isolated sounds in sequence does not predict ability to conceptualize syllable units.

Of equal significance, perhaps, is the evidence that less than 15% of first graders and only slightly more than 45% of second graders could demonstrate ability to conceptualize internal changes in syllables. Over 50% were limited, at best, to tracking changes at the beginning or end of the syllable unit.

Summary and Conclusions

It is possible to detect a lag in auditory perceptual function early in a child's school experience. In this study, in spite of the fact that the kindergarten program had included a "pre-reading" program designed to develop auditory discrimination, student performance on an auditory conceptualization test covered a very wide range. Auditory conceptualization ranged from a low of lack of ability at the non-syllabic level to judge sameness or difference of two or three isolated sounds, to a high of ability to track syllable contrasts involving an external phoneme shift, repetition, and addition.

In grades one and two the wide range in scores continued. Auditory perceptual function ranged from a low of unstable ability to conceptualize isolated sounds in sequence, to a high of ability to track syllable contrasts involving both external and internal phoneme changes such as addition, substitution, omission, shift, and repetition.

Ability to conceptualize patterns of isolated sounds in

sequence is apparently dependent on the ability to identify number and sameness/difference of isolated sounds in sequence. Furthermore, this study indicates that a fairly high performance in conceptualizing isolated sounds in sequence is important to the conceptualization of syllable units. However, the corollary is not true. Competency in conceptualizing isolated sounds in sequence does not predict or guarantee competency in conceptualizing syllable units. This information may help teachers to realize that there may be more of a problem than "not trying" or "not paying attention" when students evidence isolated letter/sound associations, but seem unable to integrate this knowledge in word attack. Such students may in fact lack the auditory perceptual judgment which would allow them to apply this knowledge to syllable units.

There is evidence of a maturational factor in the emergence of auditory conceptualization, but not for all students. A significant number of students do not develop this facility spontaneously, and dysfunction can persist into fourth grade and beyond.

However, in the authors' experience, auditory conceptualization can be taught in a relatively short period of time. This function can be stimulated and precipitated for kindergarten and primary children, and it can be brought in for individuals from intermediate to adult levels regardless of how long it has previously remained undeveloped. (2) (3)

Auditory perceptual function correlated highly with teacher evaluations of reading ability for the first, second and fourth grade students in this study.

Since, for a significant number of students, auditory conceptualization does not develop spontaneously, it would appear vital curriculum planning include special attention to developing

auditory conceptualization, to begin in kindergarten and continue into succeeding grades until auditory perceptual competency for complex syllable unit contrasts can be demonstrated by each student. This should include attention to internal as well as external syllable contrasts, as when a vowel is substituted or consonant relationships are shifted in CCVC and CVCC patterns.

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