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REPORTS

LONELY?? WHISPER!!

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COGNITIVE PERCEPTUAL STRATEGIES AND LONELINESS IN OLD AGE

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Forbes (1984) used a community sample of elderly subjects for a study of the effects of hearing loss on social well being. Subjects with scores on the Revised UCLA Loneliness Scale above or below one standard deviation from the sample mean received a battery of audiological tests, including the SSW (EC tape). The two extreme groups on the UCLA Scale were compared on both peripheral and central audiological measures. No significant differences in C-SSW scores, reversals, or response biases were found. Although central auditory dysfunction was not a strong predictor of loneliness high frequency hearing loss was.

In the following item analysis of that study, the error rates on individual SSW spondaic words were compared for subjects with word discrimination scores of 96% or better. These included 11 subjects high on the UCLA Scale and 15 low. Mean ages were 74 and 71, respectively. Mean SSW errors were 14.9 for the lonely group and 9.4 for the not-lonely group. Such scores are not unusual for geriatric subjects (Arnst, 1982). The two groups were statistically indistinguishable for age, for all traditional SSW measures, for SRT and WDS. The lonely subjects had significantly more hearing loss at 2kHz, which may or may not confound the interpretation.

For the item analysis, predictors of differences in spondaic errors between the two groups were sought from among 38 measures of linguistic, phonetic and alignment characteristics of the spondaic words (Rudmin, 1984a; 1984b). The analysis of the 40 leading spondaic words was carried out separately from the 40 lagging.

Results showed that leading spondaic words were significantly more difficult for the lonely subjects 1) if the onset of the competing monosyllable was closely aligned, 2) if the competing monosyllable started with an /l/, and 3) if the spondaic word was uncommon. The lagging spondaic word was more difficult for the lonely subjects 1) if it started with a phoneme other than /m/ and 2) if the pause beween the competing and noncompeting halves of the spondaic word was brief. Thus, the lonely subjects were sensitive to the acoustic phonetic characteristics of the spondaic words and were not to be hurried in making use of semantic linkage.

The not-lonely subjects, on the other hand, appeared to be sensitive to characteristics that hindered semantic linkage of one half of the spondaic word with the other half. They had significantly more difficulty on leading spondaic words 1) if the spondiac word was not predictable when given only the non-competing half and 2) if the pause between the two halves was long. None of the predictor variables was significant for the lagging spondaic word errors of the not-lonely subjects.

Given the equivalent and unremarkable SSW scores of these two groups, it would be difficult to argue that the lonely group was dysfunctional or suffered neuropathology. Further, the lonely group was similar to normal adults in their sensitivity to alignment and phonetic characteristics of SSW spondaic words (Rudmin, 1984a). Rather, the not-

lonely subjects were "abnormal" in their sensitivity to semantic characteristics. Thus, the results might best be interpreted in terms of cognitive perceptual strategies, following Day's (1970) notion of stimulus-bound and language-bound subjects. It would seem that not-lonely elderly persons have come to rely more on semantic linkage within speech and less on actual speech acoustics. If deafened, they probably would be more successful speech readers than would elderly people who rely on the speech acoustics.

Three interesting questions follow from this study. First, can semantic cognitive perceptual strategies of speech perception be developed through instruction and training? Second, if so, would that improve the social well-being of aged individuals? Three, would such changes in cognitive perceptual strategies be detectable in SSW item error patterns?

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Diagnostic-Rehabilitative Approach: A Case of Attention Deficit and Language Problems.

by
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Our purpose is to share the case of "J", a lad age 10-6 referred by a physician because of an attention deficit and "language problems". We routinely combine audiological and psychological procedures and hope to demonstrate here how such teamwork may result in constructive and comprehensive remedial strategies. The SSW (Katz, 1986) figured prominently in the formulation.

CASE HISTORY

Until adopted by upper middle class parents at age 19 months, J's life had been highly stressful. It had included neglect, frequent hospitalization for middle ear infection and sustained immobility because of a full leg cast. He had many allergies and wore glasses to correct myoplia. Recently a psychiatrist prescribed dexadrine to control his restlessness.

Although expected at his age to be in grade 5, J was in a self contained grade four level specific learning disability class. Until the psychotropic medication had been prescribed, J had been a behavior problem at school and became easily overwhelmed in a group. We were further informed that reading and spelling were weak and that "phonics" was especially so. His speech articultion was poor and he received remedial speech training at school. He also had a word retrieval problem. A complete medical checkup had been conducted prior to our assessment and J was diagnosed as being physically healthy.

FORMULATION

Clinically the boy's choice of toys and behavior in our playroom was immature and yet, when on task he seemed overly worried about how well he did. Attention when working one-

to-one was fine, but J acted very impulsively - several times reaching out and seizing testing material without permission. He had a low self esteem when tested projectively. Essentially normal pure tone hearing sensitivity was noted for both ears with a mild dip at 6000 Hz in the right ear. This is not atypical for a youngster who has classroom learning problems and has had a high incidence of middle ear pathology along with conductive hearing losses in the early pre-school years (Katz, 1985).

Audiometric Results

Speech thresholds agreed with pure tone findings and live voice speech discrimination ability was 100% in quiet under earphones and in a sound field unaided. J's speech discrimination was retested with a competing backgorund noise (+5 S/N with speech at 50dBSL). We observed a significant drop in his test scores, R=72% and L=64% (NU AUDITORY TEST #6) and in a sound field 72%. Type A tympanograms were obtained for both ears.

SSW

The 8CN were as follows:

RNC	RC	LC	LNC	LNC	LC	RC	RNC
0	2	4	1	1	10	1	0

Results of the SSW suggested a central processing problem. This was demonstrated by the large number of errors for the LC condition, resulting in a Type A pattern. J gave a total of 24 reversals even though he was reinstructed at the end of the first half of the test. The large number of reversals exhibited by J suggested that he would have difficulty placing acoustic stimuli in correct sequential order - as required in spelling.

The Type A SSW pattern has been found to be associated with severe spelling and writing problems (Lucker, 1983). The basic difficulty has been proposed to lie in poor sound-symbol matching. Our testing showed that J was a fairly typical member of the Type A Group. The significant Ear and Order Effects were nullified by the Type A pattern.

WISC-R

IQ testing using the Wechsler Intelligence Scale for Children - Revised (WISC-R; Wechsler, 1974) showed an average Full Scale IQ, but there was a 15 point spread between the Verbal and Performance IQ - in favor of Performance (Non-Verbal) abilities. Moreover, superimposed on the profile was a clear pattern signifying high distractibility (Kaufman, 1979). Distraction was not only to acoustic stimuli as noted from our testing on the Flowers Auditory Test of Selective Attention (15 correct out of 32 test items below the tenth percentile for age and grade level) (Flowers, 1973) but also to "internal interference" as reflected in J's motor-impulsiveness.

One component in the WISC-R distractibility pattern was a tendency for a writing symbol-encoding task to be marginally weak (25th percentile rank). This shows symbol matching difficulty, consistent with the sound-symbol weaknesses suggested by the SSW. J's poor score in number repetition led us to suspect also short term memory problems (9th percentile rank). He could recall but 4 digits forward and 3 backwards. His expressive vocabulary level was equivalent to grade 3.7, a 1 1/2 year delay. Lastly, Verbal Comprehension was markedly better (Grade 5.4) than the latter although J's answers were often quite vague.

PPVT-R

The Peabody Picture Vocabulary Test - Revised (Dunn & Dunn, 1981) which samples vocabulary in storage resulted in a grade score closely allied to the WISC-R expressive vocabulary findings. Receptive vocabulary was at a grade 3.3 level - a 2 year delay. Clearly, something seemed to be interfering with the accurate recording or storage of words.

WRAT

When tested by the Wide Range Achievment test (WRAT: Jastak, 1978) J's recognition of single words

reached a grade 3.9 level - equivalent to the 21st percentile rank. His strategy was to use a phonics approach plus guessing. Reading was assessed using the Gray-Oral Paragraphs (Gray, 1983). J could hardly navigate his way at a grade 3 level. He frequently substituted alternate words for the words in the text, which in turn, resulted in loss of sentence comprehension.

Spelling performance on the WRAT was at a grade rating of 2.1. This was equal to the 1st percentile rank for his age and of course was very, very low. As suspected, in congruence with the SSW results sound symbol associations were indeed difficult even to the extent that J misspelled the first letter of his name as "g". Pencil control itself was somewhat weak (as indicated by WISC-R symbol matching). The boy's stategy in spelling was to guess at the word for the visual configuration (e.g., woeke = watch) or using phonic equivalents (e.g., cote = cut) for the consonants and then guessing. In any event, it was worthy of note that the ceiling on the major portion of his language abilitites seemed to closely correspond to receptive and expressive vocabulary levels, as mesured by the PPVT-R and WISC-R. Indeed, much of the picture that emerged to this point strongly reminded us of pro files of hearing-impaired children - although with J this was most emphatically not a hearing impairment.

READS

The Reading Evaluation and Diagnostic Screen - READS (Shapiro, 1983a) is a standardized instrument. It measures memory for repeating letters sequentially and measures sound synthesis by having clients repeat multisyllabic words. There is a short section consisting of matching letters to their sounds. These indices are highly correlated with reading and spelling processing (Shapiro, 1983b; Mistal & Shapiro, 1983). J's scale score on the auditory memory section of the test was in the 1st percentile rank. His sequencing of letters broke down consistently when given more than three letters. Sound synthesis for complex words was nine words correct out of a total of 26. At his age such a score was far below the 1st percentile rank. It appeared that in addition to a very weak memory, sound synthesis was even more problematical. The SSW apparently does not assess that particular function (Brunt, 1965).

Speech Immitation

We still were not certain, if J's processing difficulties with speech were input dependent rather than speech-motor based. To examine this further the psychologist presented nine speech sounds to be imitated while shielding his mouth. J correctly reproduced 7 of the 9 sounds. The two sounds missed were "woo woo" (rounded lips) and "eeth, eeth" (tongue to incissors). The two incorrect sounds were then repeated with full mouth view. Once J saw how the mouth was to be set, his output became flawless. This informal testing bolstered our belief that J's difficulties with sound reproduction were hearing rather than motor output based.

DIAGNOSIS

The information gathered showed a high risk history, essentially normal hearing except for pure tone responses dipping in the 4-8 K Hz range, deterioration of speech understanding in noise and high distractibility. The SSW profile suggested sound-symbol difficulties and left ear inferiority under competition. Rapid sound synthesis was very poor and auditory sequencing memory weak. The combination of these diagnostic symptoms explained the feeble receptive and expressive vocabularies, poor reading, limited spelling and classroom behavior problems. In attempting to categorize the problems one could say that a mild developmental receptive aphasia was apparent along with phonological and memory encoding difficulties.

REHABILITATION

Whisper™

One likely factor interfering with vocabulary growth, was J's reduced ability to comprehend speech when in noise. We have had extensive clinical and experimental experience with a specialty hearing aid, the Whisper ITE high frequency emphasis auditory trainer (Shapiro & Mistal, 1985; 1986). The problems that J was experiencing suggested its consideration. We placed a trial unit in his right ear and then conducted a Baseline - Test - Baseline - evaluation design.

Discrimination in noise. J's sound field discrimination in noise improved from 72% in the initial unaided condition to 92% in the aided condition. When the Whisper device was removed speech discrimination ability dropped 12%. Although J did not receive any formal auditory training or intensive listening experience we noted an instantaneous improvement in his discrimination scores. The boy spontaneously remarked that the words were easier to hear. Interestingly, other youngsters who have tried the Whisper device have made similar comments and parents and classroom teachers have noted an improvement in aural attention.

Rapid sound synthesis and auditory sequential memory. We next applied the same clinical testing design to assess the Whisper's effects on rapid sound synthesis and auditory memory using the READS (Shapiro. 1983a). During this phase an untrained indepedent observer scored an alternative READS answer sheet simultaneously with the examiner. The interrater agreement for repetition of complex words was 89% and for letters-in-sequence, agreement was 100%. In raw score terms and in baseline corrected form (i.e., base of 26 items) improvement with the Whisper in complex word repetition was 67% - the child said 6 more words correctly. (15 out of 26). When the Whisper was removed J's score fell by 50% - only 10 out of 26 words were then properly repeated.

The increase in auditory sequential memory was of a lesser magnitude on this 26 item subtest. The pretest baseline of 50% increased by 23% with the ITE Whisper aid. When it was removed performance dropped by 14%. While the memory task did not show significant improvement, more items were correct because the letters appeared to be heard more clearly. Because the improvement in auditory memory span was less than that of rapid sound synthesis, auditory memory span may have built-in neurological storage limits which are relatively unresponsive regardless of input clarity.

Classroom and other forms of management. We shared our Findings of J's problems with his mother, teachers and physicians. We proposed the following remediation: 1) preferential classroom seating with his right ear toward the teacher, 2) fitting with an ITE high frequency emphasis Whisper auditory trainer on a trail basis; we believed this would help his speech reception and synthesis. Since he actively relied on lip-reading to supplement the speech signal, 3) we advised the teacher to seek his attention first and then to maintain eye contact with him during conversation, 4) reduction of classroom noise where possible, and 5) setting task demands prior to presentation of the material.

Because of the articulation weakness we suggested that speech therapy continue and that further vocabulary development exercises be inaugurated. Vocabulary development would proceed best if a "hands-on" approach was used. This was to assist a better link up of words with their visual referants - a problem identified by the SSW Type A pattern.

Verbal comprehension was J's stronger language suit and sound synthesis the weaker. Thus, his teachers were to try to have his read "for meaning" rather than for "sounding-through" words. To reduce the memory load, we suggested that he be given readers with shorter sentences.

For spelling, our counsel was to have J learn to use a word processor with a visual display. The word processing program should contain an active dictionary function. Thus, if he remembered a few beginning letters of a word on the visual display it would increase his chances of guessing correctly. Eventually an association of the full printed word to the sounded word should link up.

We have noted that a close association exists also between properly devloping syntax (word order) and short term auditory memory. Because J was so weak in memory we suggested that proper word order could likely be helped by using a color-coded system. For example, blue being a signal for a noun, yellow for a verb, white for an article and so forth.

Finally, as we are dealing with a whole person whose self-esteem was poor, we recommended a teaching style emphasizing firmness but with understanding. That approach defines behavioral boundaries in a postive way.

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The Whisper units are available from:

LISCOR c/o RR #1
ARVA, Ontario Canada NOM 1CO

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