

Auditory Comprehension and Verbal Expression in Recovering Alcoholics

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Research into the characteristics of alcoholism have shown it to be an extremely complex disorder. Farmer (1978) noted that the cardiovascular system, the central nervous system, the peripheral nervous system and the hepatic system are affected. Consequently, alcoholism and its effects can be of interest to aphasiologists for at least three reasons. First, cardiovascular system involvement suggests that alcoholics run a risk of cardiovascular accidents and aphasia. Second, alcohol abuse itself could lead to language disorders by directly affecting those neurophysiological mechanisms through which the cognitive processes important for language operate. Third, the interaction between prestroke alcohol abuse and poststroke aphasia rehabilitation is unknown. There has been little direct investigation of language disorders in alcoholism even though extensive literature exists documenting deficits in short-term memory, abstract reasoning, problem solving and perceptual-motor skills in chronic alcoholics and Korsakoff alcoholics (Becker, Butters, Hermann and D'Angelo, 1983; Eckardt, Parker, Noble, Paulter and Gottschalk, 1979; Jenkins and Parsons, 1979; Kleinknecht and Goldstein, 1972; Long and McLachlan, 1974; Page and Linden, 1974). The purpose of this investigation was to describe the auditory comprehension of spoken language and oral linguistic expression in recovering alcoholics during the first few weeks of sobriety.

METHOD

Nineteen males and two females who were admitted to two substance abuse treatment programs served as subjects. The mean age was 36.86 years with a range of 20 to 66 years. Each of the subjects were admitted to the substance abuse treatment center for alcohol addiction only, were native English speakers, passed the Revised Token Test pretest (RTT; McNeil and Prescott, 1978) and abstained from alcohol consumption during the evaluation period.

Three measures of language performance were obtained. The RTT, a word fluency measure and a verbal expression task were administered. The RTT was chosen because it has been shown to be a sensitive and reliable instrument with which auditory comprehension can be measured (McNeil and Prescott, 1978; Hageman, McNeil, Rucci-Zimmer and Carisky, 1982). The RTT was administered to each subject in the standard manner by a trained and reliable examiner. The word fluency measure was chosen because it is considered to be a sensitive measure of impaired word recall in brain-damaged persons. The word fluency measure required each subject to name all the words that he or she could recall beginning with the letters "s, a or f," with 60 seconds allowed for each letter. For the verbal expression task, the subjects were asked to describe the scene depicted by the "cookie theft" picture from the Boston Diagnostic Aphasia Examination (BDAE; Goodglass and Kaplan, 1983). Their responses to the picture were analyzed according to the procedures described by Yorkston and Beukelman (1980) which yields information about

rate of speech, number of content units and content units per minute. Seven of the subjects were tested four times at the following intervals: (1) 24 to 48 hours post admission (C-1), (2) 8 to 9 days post admission (C-2), (3) 15 to 16 days post admission (C-3), and (4) 22 to 23 days post admission. Due to requirements of the rehabilitation settings, 14 subjects were tested only at C-1 and C-2.

We were specifically interested in these questions.

1. Do recovering alcoholics show significant improvement in auditory comprehension across test times as measured by the RTT?
2. Do recovering alcoholics recall significantly more words across test times as measured by a word fluency task?
3. Do recovering alcoholics produce significantly more speech (syllables per minute), produce significantly more content words, produce significantly more content words per minute as measured by a picture description task across test times?
4. Are there significant correlations between age, years of reported drinking and the RTT overall mean score?
5. Are there significant correlations between syllables per minute, content units per minute, and total content units and the RTT overall mean score?
6. Is there a significant correlation between words recalled and RTT overall mean score?

RESULTS

The performance of the first seven subjects on the RTT overall score (OA) was compared across C1, C2, C3 and C4 test times. The overall RTT mean scores were 13.54 for C-1, 14.01 for C-2, 14.16 for C-3 and 14.43 for C-4. An analysis of variance for repeated measures (Steinmetz, Romano, and Patterson, 1981) was used to test for significant differences. The ANOVA yielded significant main effects (Table 1). The Tukey multiple comparison procedure (Hopkins and Glass, 1978) demonstrated that a significant change occurred from C1 to C2 ($p < .01$) and that changes from C2 to C3 to C4 were not significant.

Table 1. Summary table of Analysis of variance with repeated measures.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-ratio
Subtests	6.282	9	.698	17.077*
Conditions	2.552	3	.850	20.818*
Error	1.103	27	.04	
Total	9.938	39		

*significant $p < .01$.

The remaining 14 subjects' performance on the RTT was compared from C1 to C2. An ANOVA also revealed significant improvement in performance from C1

to C2 (Table 2). The Tukey Test (Steinmetz et al., 1981) showed that significant ($p < .01$) change occurred on the overall score and subtests III, IV, VI, VII, IX and X. In summary, the recovering alcoholics show improved auditory comprehension performance during the first 10 to 12 days after cessation of alcohol consumption but further significant improvement was not observed.

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 Table 2. Summary of the two-factor analysis of variance with repeated measures.

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-ratio
RTT Subtest and Overall Scores	20.946	10	2.095	4.46*
Condition One and Condition Two	6.543	1	.190	34.420*
Interaction	2.848	10	.2849	1.499

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 *significant $p < .01$.

The performance of the alcoholic subjects on the word fluency measure was similar to their performance on the RTT. The improvement in performance from C-1 to C-2 ranged from minus 6 percent to 77 percent. A t-test for dependent measures (Steinmetz et al., 1981) revealed this improvement to be significant ($p < .01$). However, it should be noted that not all subjects improved and that one actually performed poorer at C-2 than at C-1 and two subjects showed no improvement.

The subjects' verbal expressive performance on the picture description task was characterized by improvement at C-2 (Table 3). A t-test for dependent measures (Steinmetz, 1981) revealed that this improvement was significant ($p < .05$) for syllables per minute, content units per minute and total content units. If one considers these measures to represent both quantity measures of expressive language (e.g. syllables per minute) and quality measures of expressive language (e.g. total content units and content units per minute) then the quantity and quality of the alcoholic's verbal expression improved across C-1 to C-2.

We were also interested in whether the alcoholics' performance could be predicted. Table 4 shows the Pearson product-moment correlations (Steinmetz, 1981) obtained between age and years of reported drinking with measures of verbal output. The correlations were not significant.

Table 5 illustrates the correlations obtained between overall RTT mean scores and verbal output measures. The correlation between overall RTT mean scores at C-2 and total content units at C-2, $r = .60$ ($p < .05$), was significant. The other correlations were not significant.

Table 3. Summary of verbal output measures.

Test Condition	\bar{X}	Standard Deviation	Standard Error
Syllables Per Minute			
Condition One	117	35.26	9.4
Condition Two	155*	41.19	11
Content Units Per Minute			
Condition One	19.7	5.5	1.5
Condition Two	25.2*	6.7	1.8
Total Content Units			
Condition One	10	2.3	.62
Condition Two	14*	1.3	.33

*significant $p < .05$.

Table 4. Pearson product-moment correlations for age and years of drinking, with measures of verbal output.

	Syllables Per Minute		Content Units Per Minute		Total Content Units	
	C-1	C-2	C-1	C-2	C-1	C-2
Age	.22	.21	-.08	.40	.44	-.28
Years of Reported Drinking	.30	.22	-.14	.38	.41	-.29

Table 5. Pearson product-moment correlations between overall RTT scores and verbal output measures.

	Overall RTT for C-1	Overall RTT for C-2
Syllables Per Minute		
Condition One	.07	-.34
Condition Two	.13	-.25
Content Units Per Minute		
Condition One	-.0003	-.05
Condition Two	.36	-.10
Total Content Units		
Condition One	.24	.35
Condition Two	.03	.60*

*significant $p < .05$.

In summary, the alcoholics significantly improved auditory comprehension skills as measured by the RTT during the first 10 to 12 days post cessation of drinking. The subjects who were tested for up to a month showed no further improvement. These alcoholics also improved significantly on the word fluency measure during the first two weeks. Finally, quantitative and qualitative measures of verbal expression also revealed significant improvement over the first 10 to 12 days. However, significant correlations between measures of auditory comprehension and verbal expression were not found.

DISCUSSION

The purpose of this study was to describe auditory comprehension and verbal expression in chronic alcoholic subjects who were entering a substance abuse treatment program. A literature review showed that chronic alcoholics manifest certain neuropsychologic impairments. The results of this study support that notion.

The RTT was used to examine auditory comprehension. These chronic alcoholics did show significant improvement during the first 10 to 12 days of sobriety. However, that does not tell the entire story. At two days post cessation of drinking, the overall RTT mean score for these alcoholics was less than the 1st percentile for normals. At C-2 the group RTT overall mean score had improved to the 25th percentile. Immediately after admission their auditory comprehension was extremely poor and remained poor even after 10 to 12 days of sobriety. The typical alcoholic rehabilitation program uses many activities which require sophisticated listening and memory skills which the typical alcoholic does not appear to have, especially early in the treatment program.

To examine the verbal expressive abilities of these chronic alcoholics relative to other populations, it is useful to examine Table 6. The normal and aphasic subject data are taken from Yorkston and Beukelman (1980) and the alcoholic data were obtained in this investigation. The total number of content units produced by the alcoholics at C-1 was most like the low-moderate aphasic group and at C-2 it was most like the high-moderate aphasic group and the geriatric group. The number of syllables per minute as well as the number of content units per minute produced by the alcoholics was most like the mild aphasic group. Since there was no correlation between age and these expressive measures, the older alcoholics cannot be assumed to be causing this group finding.

Table 6. Comparison of verbal output measures for three populations.

Groups	Total Content Units X	Syllables Per Minute X	Content Units Per Minute X
Normal*			
Adult	18.0	202.9	41.9
Geriatric	14.7	193.2	33.7
Aphasic*			
Mild	16.4	120.8	18.7
High-Moderate	14.6	96.9	13.2
Low-Moderate	10.5	61.6	8.3
Alcoholic			
C-1	10.07	116.52	19.72
C-2	14.21	147.92	25.17
C-4**	13.42	153.3	13.40

*Yorkston and Beukelman (1980).

**Seven subjects.

The absence of significant correlations between expressive measures and the RTT, age, or years of reported drinking suggests that we cannot predict much about an individual alcoholic's performance. Treatment staff should be cautioned about making assumptions about a particular subject's ability to understand and remember spoken directions. Perhaps the best assumption that can be made now is that the alcoholic is probably not understanding and remembering much about treatment strategies, especially during the first two weeks of sobriety. Another point that speech pathologists may need to consider is the premorbid existence of alcoholism in aphasic patients. The impact of alcoholism upon recovery after a stroke requires investigation.

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