

JADARA

Volume 20 | Number 1

Article 5

October 2019

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Recommended Citation

Getz, M., & Vernon, M. (2019). Brain Damage in Deaf Vocational Rehabilitation Clients. *JADARA*, 20(1). Retrieved from <https://repository.wcsu.edu/jadara/vol20/iss1/5>

BRAIN DAMAGE IN DEAF VOCATIONAL REHABILITATION CLIENTS

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There are no published data on the prevalence of brain damage in deaf clients seeking vocational rehabilitation. Nor is there an understanding of how this might be measured or what the implications of brain damage are on the rehabilitation process.

This lack of knowledge is ironic because it has been well established that brain damage is widespread among deaf youth (Shaver & Vernon, 1978; Vernon, Griffin & Yoke, 1981; Vernon & Hicks, 1980; Vernon & Hess, 1983). Schein (1975) noted that 10.5 to 17.0 percent of students in programs for the hearing impaired in the United States had brain damage. These figures excluded those who had cerebral palsy and mental retardation.

The implications of brain damage in children and adults is significant relative to both education and work. For example, it results in learning disabilities, behavioral disorders, mental retardation, aphasia, and other problems. In fact, the leading causes of deafness in younger working-age people are also major etiologies of brain damage, e.g., meningitis, rubella, prematurity, complications of Rh factor, and certain genetic syndromes (Vernon, Griffin & Yoken, 1981). The present research examines the prevalence of brain damage in deaf vocational rehabilitation clients. Implications of this prevalence and issues in its measurement are discussed.

METHOD

Clients

Fifty-four deaf clients were randomly selected from among all deaf clients on whom psychological evaluations had been done who were served by the Maryland Division of Vocational Rehabilitation (DVR) during the years 1981 and 1984. This research was done independently, i.e., there were no grant funds available, thus, the necessity to randomly sample from the total population rather than test and analyze the entire population. Each client was administered a Bender-Gestalt, Wechsler Performance scale, and a Draw-A-Person test by the second author.

The Bender-Gestalt protocols were scored using the Pascal and Suttell Technique (Pascal & Suttell, 1951).

The Bender-Gestalt Test is commonly used by psychologists to determine visual, motor, and perception disorders (Shulberg, 1967). Data obtained by Hertzog, Bortner & Birch (1967) justifies the use of the Bender-Gestalt for the screening and detection of certain forms of brain damage.

RESULTS

Prevalence of Brain Damage

The Bender-Gestalt scores of deaf vocational rehabilitation clients indicate significantly more brain damage to be present among these persons than in the general population (Table 1). For example, deaf clients who had attended high school had an average Bender-Gestalt score of 52.72, compared to an average of 18.00 for a similar sample from Pascal Suttell normative population, using the Pascal Suttell scoring system in which the higher the score, the greater the pathology. Similarly, deaf adults with some college had a score of 38.28 versus a 12.70 for the general population of hearing adults with one or more years of college (Table 1).

These findings are consistent with earlier research on brain damage in deaf children. They indicate that many deaf adults have to not only contend with their deafness, but must also face a heightened probability of brain damage.

Another relationship examined was that between IQ and brain damage (Table 2). Results clearly indicate that among deaf clients with IQs below average there was significantly more brain damage than is present in deaf clients of average or better intelligence. In fact, for each IQ range below an IQ of 90 (i.e., the ranges of 80-89, 70-79, and 60-69), the prevalence of brain damage increased significantly (Table 2). In fact, there was a significant correlation between brain damage and IQ (Table 2).

A final question the research looked at was whether certain etiologies of deafness caused

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more brain damage than others. The data indicate no significant difference, e.g., meningitis causes no more or less brain damage than rubella based on Bender-Gestalt scores (Table 3). It is our clinical opinion that, if more in-depth psychoneurological testing had been done, significant differences would have been found between different etiological groups.

DISCUSSION

Despite its widespread use, the Bender-Gestalt is at best a screening instrument for the diagnosis of brain damage. However, the magnitude of the differences between Bender-Gestalt scores on deaf and hearing adults remains strong evidence of the high prevalence of brain damage in the deaf population. Thus, brain damage must be considered in providing comprehensive rehabilitation services to deaf people.

Such consideration should be done in several ways. First, initial psychodiagnostic evaluations of deaf clients should at least screen for brain damage. Second and ideally, the specific manifestations of the damage should be determined. This will require psychoneurological testing which is expensive and difficult to do with deaf clients. Third, symptoms due to brain damage should be remediated and/or circumvented in the rehabilitation program. Fourth, special care should be taken in interpreting IQ data if brain damage is known to be present.

The relationship between IQ and brain damage is interesting psychodiagnostically. In practical terms it means that the deaf client of below average IQ, in many cases, has to contend with the triple disabilities of deafness, low IQ, and brain damage. The brain damage may be manifested in a learning disability, a behavioral disorder, etc. Such symptoms are highly relevant to the client's rehabilitation. For example, certain learning disabilities preclude vocational training

requiring a strong emphasis on reading. Other such disabilities may affect spatial perception ruling out drafting or driving as occupations.

The finding in this study which showed no difference in the prevalence of brain damage as a function of cause of deafness is, in our view, invalid. We feel, based on other studies of these etiologies, that the failure to get differences is due to the crudeness of the Bender-Gestalt as a psychodiagnostic measure (Vernon, 1969). As indicated earlier, were more complete neuropsychological testing done, we feel that both qualitative and quantitative differences in psychoneurological functioning as a consequence of etiology of deafness would be revealed. We plan this study as the next step in our research.

SUMMARY

Based on Bender-Gestalt protocols scored by the Pascal Suttell system, it is clear that, as a group, deaf vocational rehabilitation clients have a significantly higher prevalence of brain damage than is present in the general population. The reason for this is that the major causes of sensorineural deafness are also leading etiologies of brain damage. With deaf clients of IQs below 90, the rates of brain damage escalate markedly as IQ declines. This finding is true in the general population, but perhaps to a lesser extent.

The implications for rehabilitation are important because brain damage is often associated with learning disabilities, behavioral disorders, attention deficits, and other conditions. These affect the vocational potential of the client.

It is suggested that the Bender-Gestalt be routinely used in psychological evaluations of deaf clients. When pathology is indicated by the resulting protocol, more extensive psychoneurological testing should be done in order to more specifically identify pertinent vocationally related behaviors.

TABLE 1
Significance of a Difference Test Using the Pascal-Suttell Scoring System
Between Deaf and Nonpatient Subjects

Education	n	Deaf		n	NonPatient		Critical Ratio
		M	SD		M	SD	
High School	43	52.7	24.8	271	18.0	9.4	9.07
College	11	38.3	23.7	203	12.7	8.8	3.57

Note: Critical ratios greater than 2.00 shows a significant difference at $p < .05$ between conditions.

Note: The data for the nonpatient condition are from *The Bender-Gestalt test: Quantification and validity for adults* (p. 19) by G. R. Pascal and B. J. Suttell, 1951, New York: Grune & Stratton.

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TABLE 2
Mean Scores Using the Pascal-Suttell Scoring System of Deaf Subjects With Different IQs

Group	I.Q.												F
	69 and below			70-79			80-89			90 and above			
	n	M	SD	n	M	SD	n	M	SD	n	M	SD	
Deaf	5	82.60	16.38	5	66.20	22.83	11	62.18	26.73	33	38.18	17.81	10.48

Note: F ratio shows a significant difference between IQ conditions at $P < .01$.

TABLE 3
Mean Scores Using the Pascal-Suttell Scoring System of Deaf Subjects With Different Etiologies

Group	Etiology									F
	Rubella			Genetic			Meningitis			
	n	M	SD	n	M	SD	n	M	SD	
Deaf	24	56.37	27.67	18	41.83	22.78	5	43.40	18.69	1.88

Note: All etiologies with $n < 3$ were omitted in an attempt to arrive at a more reliable analysis.

Note: Means of etiological conditions were found to be insufficient at $p < .01$.

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