

# **Psychosocial Characteristics of School-Age Children with Unilateral Hearing Loss**

D.M. Stein

*Division of Communicative Disorders  
University of Louisville School of Medicine*

This study examined selected aspects of psychosocial development in children with unilateral hearing losses. Parent and teacher ratings of behavior as well as an estimate of self-esteem were obtained on 19 children. Teacher judgments of academic performance also were obtained. Those children rated as having either below average verbal skills or a high proportion of negative behaviors were screened for speech and language deficits. The children in this study were rated by parents as having a high frequency of behavior problems, although ratings of self-esteem and academic progress were similar to those of normally hearing children. Most of the children with behavioral problems and/or below average academic performance scored poorly on a language screening test, suggesting the presence of an unidentified language-learning disability not necessarily related to hearing loss.

In the school-age population, the incidence of unilateral hearing loss is about one per thousand, an incidence similar to that for persons with severe-to-profound hearing impairment (Everberg, 1960; Tarkkanen & Aho, 1966). It has been fairly well established that individuals with unilateral hearing losses frequently have more difficulty than bilaterally normal hearing individuals in localizing sound and understanding speech in noisy environments and at distances, even when speech is directed toward the "good" ear (Bess, 1982; Giolas & Wark, 1967). Other potential educational, psychosocial, and vocational effects of being "one-eared" are not as well understood, however. A few studies have reported academic problems in children with unilateral hearing losses. These problems include a high rate of failure of one or more grades, lowered academic achievement in several areas, and the need for resource help (Bess, 1982; Boyd, 1974; Quigley & Thomure, 1968). Others (Bernero, 1982) have found no relation of practical significance between academic performance and unilateral sensorineural hearing loss.

---

D.M. Stein, Ph.D., is an Assistant Professor of Surgery, Division of Communicative Disorders, University of Louisville School of Medicine, Louisville, KY.

A related aspect of hearing impairment is the impact of hearing loss on psychosocial development. A hearing loss that can be isolating may trigger feelings of being less in control of one's environment. These feelings may be reflected in behavior, social adjustment, and development or maintenance of interpersonal relationships. Clinical experience and anecdotal discussions in the literature have confirmed the notion that many hearing-impaired adults and children who use binaural rather than monaural amplification feel more in touch with their environments, more at ease in communication, and more a part of the world of sound (Hodgson & Skinner, 1981; Ross, 1977).

One can hypothesize, therefore, that being "one-eared," even when one ear has normal sensitivity, also may affect the psychosocial adjustment of an individual. This notion is supported by Giolas and Wark (1967) who noted that their unilaterally impaired adolescents expressed feelings of embarrassment, annoyance, confusion and helplessness. Steer, Hanley, Spuchler, Barnes, Burk, and Williams (1961) reported that parental and teacher ratings of children with unilateral hearing losses were more negative compared to those of bilaterally normal or bilaterally hearing-impaired children. These studies did not identify typical behaviors, attitudes, or psychosocial characteristics of unilaterally hearing-impaired children.

The purpose of this study was to begin a systematic investigation of specific psychosocial characteristics, such as behavior and self-esteem, that can help clarify some of the possible effects of a unilateral hearing loss on classroom learning, social adjustment, development of peer relationships, and potentially, vocational achievement. Such data also might help account for the apparent contradictions regarding educational achievement and unilateral hearing impairment.

The primary questions asked were:

1. Is the behavior of children with unilateral hearing losses judged as being different from normally hearing children by parents and teachers, and if so, in what ways?
2. Do children with such losses judge themselves as being different from children with normal hearing?
3. If differences exist, do they relate to classroom performance or unidentified language-learning deficits as reported by teachers?
4. Which demographic or audiologic variables are related to the observed differences?

## **METHOD**

### **Subjects**

Children with unilateral hearing losses were identified from files at various cooperating clinics, agencies, and private practices in the Louisville area.

The following criteria were used in the selection of subjects: (a) age range between 5 and 12 years, (b) pure-tone average (500-2000 Hz) in the good ear no poorer than 15 dB HL (re: ANSI, 1969), (c) pure-tone average (500-2000 Hz) in the poorer ear no better than 30 dB HL (re: ANSI, 1969), (d) presence of the unilateral hearing loss for at least two years, and (e) enrollment in a regular classroom with no known or documented learning disabilities or other educational, mental, or physical handicaps that might affect school performance or psychosocial development.

Data were collected on 19 children living in an accessible geographical area and who met the criteria listed above. At the time of the initial collection of data, the children ranged in age from 5.6 years to 11.7 years with a mean age of 8.8 years. There were twelve males (63%) and seven females (36%). Four (21%) of the 19 were black. Fourteen (74%) of the 19 were from families in the two lowest socioeconomic categories as determined by a Two-Factor Index of Social Position (Hollingshead, 1957).

Hearing losses for the subjects are presented in Tables 1 and 2. Approximately two-thirds of the children had losses in their right ears. Fifteen (79%) of the losses were sensorineural, one was conductive (5%), and three were mixed (16%). Thirteen (68%) had severe-to-profound hearing losses. Also, in 13 cases, the hearing loss was either congenital or of unknown etiology. (An attempt was made to categorize the etiologies as either exogenous or endogenous. As with bilateral hearing impairment, an assumption was made that an "unknown" etiology may have been related to a recessive gene factor.)

All but two of the children were thought to be of average or above-average intelligence by both their teachers and parents. Three of the children (16%) reportedly wore hearing aids consistently at school and/or at home although most of the children (almost 71%) were seated preferentially in the classroom. Two of the three children wearing hearing aids were seated preferentially. One of the 19 children had repeated a grade.

**Table 1**  
Extent of Hearing Loss in the Affected Ear of the Experimental Subjects

Degree of Loss (PTA)	<i>n</i>			
Mild-Moderate (30-50 dB HL)	4			
Moderate (50-70 dB HL)	2			
Severe (71-90 dB HL)	6	}	68%	}
Profound (91 dB HL and greater)	7			
				84%

*Note.* One child in this group had a PTA of <30 dB HL, but had a severely sloping, high frequency loss >1000 Hz and was included in the study.

**Table 2**  
Suspected Etiologies of the Hearing Losses in the Affected Ear  
of the Experimental Subjects

Etiology		<i>n</i>	
Exogenous:	Surgical	1	
	Trauma	2	
	Infection	3	
Endogenous:	Congenital (? hereditary)	5	} 68%
	Unknown	8	

### Behavioral Measures

Ratings of behavior and social competency were obtained on each child using the Achenbach *Child Behavior Checklist (CBCL)* (Achenbach, 1981). The parent version of the *CBCL* is designed to record, in a standardized format, the behavioral problems and competencies of children aged 4 through 16 years as reported by their parents or parent-surrogates. The *Teacher's Report Form (TRF)* is designed to obtain teacher's ratings for many of the same behavior problems that parents rate on the *CBCL*. In each case, judgments are based on frequency of observation of specific behaviors. The ratings are converted to the *Revised Child Behavior Profiles (RCBP)* which consist of Social Competence scales and Behavior Problem scales. The normative data provided by the author on the selected Behavior Problem scales were derived through factor analyses of the parent version of the *CBCL* and are standardized for each sex at ages 4-to-5, 6-to-11, and 12-to-16 years. At this time standardized data are available for the *TRF* only for boys, age 6-to-11 years.

In order to rule out subtle learning problems with this population, teachers also completed the *Myklebust Pupil Rating Scale Revised (PRS)* (Myklebust, 1981) on each child. This frequently used standardized scale rates both verbal and non-verbal learning abilities. Of particular importance to this study were the Auditory Comprehension, Spoken Language, and Personal-Social sub-scales, which, when deficient, reflect probable learning disability and/or psychosocial problems.

### Measures of Self-Esteem

Self-esteem was estimated by administering the standardized *Piers-Harris Children's Self-Concept Scale (The Way I Feel About Myself)* (Piers, 1969) to children aged 7 years and older. The older children read and completed the scale independently. Each item was read to all the younger children orally and clarified, as needed, when a child was not understanding the vocabulary.

### Measures of Academic and Linguistic Skills

In an effort to clarify whether children who were rated poorly by teachers on the Myklebust *PRS* were, in fact, children with possible subtle and/or undiagnosed language-learning problems, the Advanced or Elementary version of the *Clinical Evaluation of Language Function Screening Test (CELF)* (Semel & Wiig, 1980) was administered to the children who scored more than one standard deviation below the mean on the Auditory Comprehension, Spoken Language, or Personal-Social sub-scales of the *PRS*.

In lieu of formal tests of intelligence and school achievement, not consistently available in the local school districts, teacher judgments of children's classroom performance and intellectual status were obtained using a Teacher's Information Sheet developed by Matkin and his colleagues (personal correspondence) (see the Appendix).

## RESULTS

### Behavioral Ratings

Analysis focused primarily on the ratings provided by parents and teachers on the *Child Behavior Checklist (CBCL)* and on the *Pupil Rating Scale (PRS)*. For the *CBCL*, higher ratings or scores indicate more prevalent behavior problems. For the *PRS*, lower ratings indicate a more deficient area.

A Total Behavior Problem Score was derived for each child from the *CBCL* and recorded on the *Revised Child Behavior Profile*. Each score, based on parent responses, provides a good index of differences between children whose reported behavior problems are in the "clinical" versus "normal" range (Achenbach & Edelbrock, 1983, p. 62). Eight of the 19 children (42%) in this study showed scores above the cutoff limits in the "normal" range established by the authors, suggesting excessive behavior problems in this group. Of these eight children, seven had T scores in the "clinical" range ( $T > 63$ ) for internalizing and/or externalizing behavior clusters, with externalizing behaviors being more prevalent. Examination of the selected sub-scales showed excessive ( $T > 70$ ) Social Withdrawal and Aggressive behaviors. One child of the 19 showed excessive internalizing behaviors but did not have a Behavior Problem Score in the clinical range.

Ratings on the *Teacher's Report Form (TRF)*, from which normative data are available only for boys, age 6-11 years, revealed only one of the 11 boys in that age range with high ratings ( $T > 70$ ) on four of the five selected sub-scales of interest. This child showed a prevalence of internalizing behaviors. It should be noted that his parent did not report excessive behavior problems in any area. Two other children were rated high on only one sub-scale.

Correlations between parent and teacher ratings of similar clusters (Social

Withdrawal and Aggressive), as well as internalizing and externalizing behaviors and total scores, were generally low with the exception of judgments of aggressive behaviors. Ratings by parents and teachers were not consistent for seven of the 19 (37%) children.

### Measures of Self-Esteem

Measures of self-esteem of the children ages 7 and above were obtained using the *Piers-Harris Self-Concept Scale*. On the average, children's ratings were at the 66th percentile. Statistical comparisons of these data with the standardization data reported by the authors did not reveal differences in either means or variances. Only two of the children had scores which suggested very low opinions of themselves. Interestingly, seven (37%) of the children had scores above the average range (>70th percentile).

### Measures of Academic and Linguistic Skills

Table 3 shows the average scores of the children on the *PRS* sub-scales. The means and standard deviations of the verbal scores are similar to those of the "Pass" group of the standardization sample reported by Myklebust. The Personal-Social mean is lower and significantly different ( $p \leq .01$ ) from the normals suggesting that these children, on the average, do have interpersonal and social adjustment problems. In fact, seven (37%) of the children scored below acceptable levels in this area; five of the seven also were rated by parents and/or teachers as having excessive behavior problems on the *CBCL*. Some of the comments offered by teachers suggested that these children had behavior and social problems in school although their classroom performance and grades were reportedly adequate.

**Table 3**  
Means and Standard Deviations of Scores on the Myklebust *Pupil Rating Scale Revised* of Experimental Subjects

Sub-Scale Measure	<i>M</i>	<i>S.D.</i>
Auditory Comprehension	12.95	8.00
Spoken Language	15.21	3.43
Personal-Social	23.26*	6.32

\*Significant at .01 level (two tailed)

Teacher ratings of the children's classroom performance (Table 4) for most areas were average. Two areas, however, seem to suggest less than average classroom performance; these were the areas of Peer Relationships and Emotional Stability. These findings are consistent with ratings on the

Personal-Social sub-scale of the *PRS*. In fact, correlations between sums of similar clusters on the two rating forms were quite high, with  $r$  values ranging from .74 to .85.

**Table 4**  
Means and Standard Deviations of Class Performance Ratings  
of Experimental Subjects

Items	<i>M</i>	<i>S.D.</i>
"Academic" Areas		
Attention	1.95	.78
Following Directions	2.11	.74
Reading	2.05	.78
Written Language	2.00	.75
Spelling	2.11	.81
Arithmetic	1.95	.62
Self-expression	2.00	.67
"Performance" Areas		
Attitude	2.05	.85
Group Participation	2.00	.58
Peer Relationships	1.84	.69
Emotional Stability	1.84	.60
Overall Rating	2.11	.66

*Note.* 1 = lower 25% of class  
2 = average  
3 = upper 25% of class

There also were strong negative associations between the Total Behavior Problem Score on the *Teacher Report Form* and each of the similar sub-scales and skill cluster sums on the *PRS* and the Information Sheet, with  $r$  values ranging from -.62 to -.84. As expected, these data show that better class performance is associated with fewer behavior problems.

In general, teacher ratings were consistent across measures suggesting that any of the tools would be useful in such assessments.

A total of eight children were referred for language screening on the basis of low scores on one or more of the sub-scales of interest on the *PRS*. To date, six of the eight children have been screened using the *CELF Screening Tests*. Five showed scores below the 50th percentile in the Processing area. Two of the six also showed lowered percentile ratings in the Production area. Five of the six children were judged by parents and/or teachers to have significant behavior problems in one or more behavior clusters of the *CBCL*. On the basis of teacher and researcher observations, the two subjects not tested yet are expected to have significantly poorer language skills as well.

One other child was seen for *CELF* testing because the teacher thought he was having memory problems. His score, too, was very low in the Processing area although his ratings on the *CBCL* and *PRS* were within the normal range.

### **Demographic Variables**

Analyses of variance of the data relative to the major demographic variables of age, sex, race, socioeconomic status, and ear with hearing loss did not reveal strong associations between any of these variables and the psychosocial measures.

## **DISCUSSION AND CONCLUSIONS**

In general, these results suggest that the children were performing adequately academically and had good opinions of themselves. However, despite these findings, they were viewed by their parents as having a high frequency of behavior problems with "acting out" behaviors being more prevalent. It should be noted that the parents were more likely to perceive problems with their children than were the teachers although teachers were sensitive to children's problems with their peers. The perceptions of acceptable levels of behavior in children apparently differ from parents and teachers and warrant further study.

The results also suggest that as many as eight of the youngsters (42%) may have difficulties relating to an as yet undiagnosed language-learning disability, rather than the hearing loss per se. Certainly, the relations among emotional development, language proficiency, and sensory deficits are not clearly defined. Perhaps, as Achenbach and Edelbrock (1983) have suggested, children with low ability and/or low performance behave differently in an effort to cope with their environments.

These data are not inconsistent with those of Bernero (1982) whose subjects were performing well academically, and Giolas and Wark (1967) and Steer et al. (1961) who observed more affective and behavioral problems with children with unilateral hearing loss.

The etiologies of the losses of the children with the apparent language and/or learning problems have been tentatively categorized as endogenous (i.e., hereditary or unknown), rather than exogenous. This is an unexpected finding in that reports in the literature suggest the opposite; that is, exogenous etiologies are more directly related to processing or learning problems (Meadow, 1980).

In view of the small number of subjects in this study, the data here can not account for all the differences found among previous studies. In addition, this sample was not a random one. Some of the parents who chose to participate may have done so because they noted problems with their children that school personnel had not yet identified. This might account for the



high proportion of suspected language and/or learning problems in this small group of subjects. Certainly, the data from a larger, more random, sample of children who are seen for more thorough linguistic evaluations, in addition to psychosocial and educational assessments, would help clarify the factors that contribute to the success, or lack of it, in a population of children with unilateral hearing losses.

### ACKNOWLEDGEMENTS

This paper is dedicated to the memory of Arlene M. Matkin, a consultant to this project, whose professional and personal friendship was greatly valued and will be sorely missed.

The author wishes to thank Drs. Noel Matkin and Lynne S. Cobb who served as stimulating consultants and valuable critics to this project. Additional thanks go to those audiologic colleagues in the Louisville community who helped in identifying and testing subjects. The time and effort of Barbara Lewis and Lou Ann Jones, who assisted in the collection of data, Dr. Shelley Cohen at the Jefferson County Board of Education, and the parents and teachers who donated their time also are greatly appreciated.

This study was supported by a grant from the Graduate School of the University of Louisville.

### REFERENCES

- Achenbach, T. *The child behavior checklist and child behavior profile*. Burlington, Vt.: University of Vermont, Child Psychiatry, 1981.
- Achenbach, T., & Edelbrock, C. *Manual for the child behavior checklist and revised child behavior profile*. Burlington, Vt.: University of Vermont, 1983.
- Bernero, R. *A study of the relationship between unilateral hearing impairment and academic achievement*. Unpublished doctoral dissertation, Gallaudet College, 1982.
- Bess, F. Children with unilateral hearing loss. *Journal of the Academy of Rehabilitative Audiology*, 1982, 15, 131-144.
- Boyd, S. *Hearing loss: Its educationally measurable effects on achievement*. Unpublished master's thesis, Southern Illinois University, 1974.
- Everberg, G. Further studies on hereditary unilateral deafness. *Archives of Otolaryngology*, 1960, 51, 615-635.
- Giolas, T., & Wark, D. Communication problems associated with unilateral hearing loss. *Journal of Speech and Hearing Disorders*, 1967, 41, 336-343.
- Hodgson, W., & Skinner, P. (Eds.). *Hearing aid assessment and use in audiologic habilitation* (2nd ed.). Baltimore: Williams and Wilkins, 1981.
- Hollingshead, A. *Two-factor index of social position*. Unpublished manuscript, 1957. (Available from Yale University, Department of Sociology, New Haven, Cn.)
- Matkin, N. Personal communication, 1983.
- Meadow, K. *Deafness and child development*. Berkeley: University of California Press, 1980.
- Myklebust, H.R. *The pupil rating scale revised*. New York: Grune and Stratton, 1981.
- Piers, E.V. *Piers-Harris children's self concept scale: (The way I feel about myself)*. Nashville, Tn.: Counselor Recordings and Tests, 1969.
- Quigley, J., & Thomure, F. *The relationship of hearing to learning*. Springfield, Il.: Division of Special Education Services, 1968.
- Ross, M. Binaural vs. monaural hearing aid amplification for hearing impaired individuals. In F. Bess (Ed.), *Childhood deafness: Causation, assessment and management*. New York: Grune and Stratton, 1977.
- Semel, E., & Wiig, E. *Clinical evaluation of language function — Elementary and advanced*

*screening tests*. Columbus, Oh.: Charles W. Merrill Publishing Co., 1980.  
 Steer, M., Hanley, T., Spuchler, H., Barnes, N., Burk, K., & Williams, W. *The behavioral and academic implications of hearing losses among elementary school children* (Project #PU240). Lafayette, In.: Purdue University, February 1961.  
 Tarkkanen, J., & Aho, J. Unilateral deafness in children. *Archives of Otolaryngology*, 1966, 61, 270-278.

**APPENDIX**

**TEACHER'S INFORMATION SHEET**

Child's Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 School District: \_\_\_\_\_ Teacher: \_\_\_\_\_  
 (signature)  
 School Address: \_\_\_\_\_

- I. Present Class Placement \_\_\_\_\_  
 Where does the child typically sit? \_\_\_\_\_
- II. Please indicate your impressions of this child's intellectual ability regardless of formal IQ scores.  
 Above average \_\_\_\_\_ Average \_\_\_\_\_ Below average \_\_\_\_\_
- III. Please indicate, by checking, your rating of this child's typical classroom performance.

	Top 25% of Class	Average Performance	Lower 25% of Class
Attention and Concentration			
Ability to Follow Directions			
Reading Skills			
Written Language Skills			
Spelling Ability			
Arithmetic Skills			
Ability to Express Self			
Attitude Toward Studies			
Group Participation			
Peer Relationship			
Emotional Stability			
Overall Evaluation of Progress			

IV. School attendance record:

Rarely absent \_\_\_\_\_ Occasionally absent \_\_\_\_\_ Frequently absent \_\_\_\_\_

V. Your impression of the child's general health:

Excellent \_\_\_\_\_ Good \_\_\_\_\_ Poor \_\_\_\_\_