S.I.F.T.E.R.

SCREENING IDENTIFICATION FOR TARGETING EDUCATIONAL RISK

In Children Identified by Hearing Screening or Who Have Known Hearing Loss

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USER'S MANUAL

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BACKGROUND: Many children are identified through hearing screening every year as having some degree of hearing loss. Other children with known hearing losses are mainstreamed into the regular classroom with little or no special education support. Determining whether or not these hearing problems are having an impact on a child's classroom performance is often very frustrating for the educational audiologist and school staff. In many districts the determination of educational significance is never made due to a lack of understanding of the potential negative effects that even a minimal, mild or fluctuating hearing loss may have on a child's learning.

The underlying purpose of the S.I.F.T.E.R. is to provide a valid method by which children with identified hearing problems can be educationally screened. Those who are identified as having significant educational difficulties could then be considered for formal assessment procedures as directed by school district criteria.

DEVELOPMENT: The S.I.F.T.E.R. originated from a rough teacher questionnaire first used in 1983 into its present form and went through tough "teacher testing" each year. In 1985-1986 a 40 question format (the S.I.F.T.E.R. Index) was field tested in a limited manner and data from 82 students was returned. This data allowed analysis of item effectiveness and content areas to be performed for the purpose of revision into a shorter format. A 15-question S.I.F.T.E.R. underwent national field testing during the 1986-1987 school year. Data from 530 students with hearing loss and 50 controls were returned and utilized for validation purposes. All items effectiveness and validation procedures were defined and directed by Dr. James Cangelosi, author of Measurement & Evaluation: An Inductive Approach for Teachers. Validation information and procedures for the Screening Instrument For Targeting Educational Risk are described below.

CONTENT VALIDITY: In 1985, a 40 item questionnaire was developed. A search of the professional literature determined that there were 7 primary areas in which hearing impaired children were at risk for developing problems: academics, attention, hearing, communication, emotional, social, class participation. An additional comments section was added to help distinguish children with hearing problems from those with other disabilities.

Five questions were developed in each of these 8 areas patterned after the questions in the Vineland Social Maturity Scale, the Burk's Behavior Rating Scale and the Walker Problem Behavior Checklist. No questions were used verbatim from these instruments. Following question development, one regular educational teacher, one special education teacher and one teacher of the hearing impaired reviewed the questions and wording was adjusted for further clarity. Several questions were slightly changed as recommended for clarification following teacher use of the 40 question format and also following use of the first revision of the S.I.F.T.E.R. in the 15 question format. Content validity of the 40 question format was maintained during the revision process by selecting questions with high item effectiveness that had identical intent as other questions. For example, 4 of 5 questions in the Hearing content area inquired about a student's ability to attend. Questions with identical intent were

also included in the Attention content area and tended to have significantly better item effectiveness, therefore, the Hearing questions were deleted.

Based on information from the professional literature, initial teacher review and two years of teacher criticism of content areas and question items it was felt that the final S.I.F.T.E.R. had good content validity for a screening device to be used to identify hearing impaired children having educational difficulties.

ITEM EFFECTIVENESS: The purpose of the length 40 item questionnaire was to generate data with which to perform item analysis and content area reliability tests. During the 1985-1986 school year teacher responses were collected for 82 kindergarten through fourth grade students who were suspect for hearing problems. Item analysis determined which of the 5 questions in each content area were most discriminating. Determinations of the reliability of the content areas defined which areas were most reliable and, based on this, the Hearing and Additional Comments areas were deleted and the Social and Emotional content areas were combined into one area titled School Behavior. Item effectiveness allowed the valid selection of 3 questions each content area to occur (only the most discriminating questions were included). The resulting questionnaire was entitled Screening Instrument For Targeting Educational Risk (S.I.F.T.E.R.). The wording of two questions was further adjusted based on comments received from users following national field testing of the S.I.F.T.E.R.

ACADEMICS		ATTENTION		COMMUN		CLASS PART		SCH BEH	
1.	.68	4.	.515	7.	.61	10.	.69	13.	.96
2.	.62	5.	.45	8.	.65	11.	.89	14.	.85
3.	.686	6.	.815	9.	.79	12.	.70	15.	.93

TABLE 1: Index of Efficiency for S.I.F.T.E.R. questions.

NATIONAL FIELD TEST POPULATION: It is important to realize the stratification of the field test population when considering which group of hearing impaired students the S.I.F.T.E.R. can be used with most reliably. Therefore, the following information about the 530 hearing impaired students in the field test population has been included:

Region of U.S.: West 28% Central 37% East 35%
Race: Caucasian 92% Black 4% Oriental 2.6% American Indian 1.3%
Education Status: In Special Education 40% Regular Education Only 60%
Grade: Kindergarten - 5 73.5% above or below grade 5 26.5%
Hearing Status: Known Loss 70% Screen Fail Only 30%
Degree of Loss: Faint 18% Mild 34% Moderate 18% Severe 3%
Unilateral 19% High Frequency 8%

Based on the above information the S.I.F.T.E.R. was felt to be most representative when used with Caucasian students, grade kindergarten through 5, with known hearing loss of faint to moderate degree who are educated in the regular education classroom only.

CONTENT AREA RELIABILITY: Coefficient alpha analysis was performed utilizing the data from 530 students with hearing loss and 50 controls. Alpha coefficients for each group were as follows:

GROUP	ACAD	ATTEN	COMMUN	CLASS PART	SCH BEH
ALL H.I.	.55	.55	.36	.48	.53
KNOWN LOSS	.54	.53	.37	.47	.52
SCREEN FAILS	.54	.48	.13	.64	.54
CONTROLS	.51	.60	.58	.47	.57
TOTAL	.55	.54	.36	.34	.53

Further analysis of the hearing impaired population by grade in school was performed. Coefficient alpha results for grades containing more than 15 students were as follows:

KNOWN HEARING LOSS GROUP

GRADE	ACAD	ATTEN	COMMUN	CLASS PART	SCH BEH
Kdgn	.56	.66	.57	.50	.56
1	.58	.53	.57	.48	.55
2	.58	.69	.60	.43	.40
3	.53	.48	.73	.32	.45
4	.55	.56	.19	.56	.58
5	.48	.52	.60	.50	.57
6	.61	.67	.69	.53	.57
7	.50	.55	.61	.55	.53

HEARING SCREEN FAILURE GROUP

GRADE	ACAD	ATTEN	COMMUN	CLASS PART	SCH BEH
Kdgn	.51	.51	.17	.51	.54
1	.59	.49	.61	.42	.59
2	.55	.63	.63	.43	.54

Based on coefficient alpha results it was felt that the S.I.F.T.E.R. was slightly more reliable for students with known hearing loss rather than those identified via hearing screening. Overall, the moderate reliability evidenced was felt to be suitable for a screening instrument.

SCORER RELIABILITY: To determine the scorer reliability of the S.I.F.T.E.R. two teachers each rated the performance of the same 10 students. Overall, the teachers rated the students consistently in the same direction but not always to the same degree. For example, if one teacher felt a student to be above average the other teacher would typically rate the student to also be above average but not always circled the identical number (i.e., number 4 compared to number 5). The resulting inter-rater reliability as determined by Pearson produce moment correlation for each content area was as follows: academics .36, attention .45, communication .62, class participation .33, and school behavior .53. It was felt that the low number of students with similar abilities used for the inter-rater reliability study resulted in enlarging the differences that did occur in the teacher ratings without regard to the consistency of the judgment direction.

SCORING GRID DEVELOPMENT: To be an effective screening device it was felt that some method to determine if a student had passed or failed S.I.F.T.E.R. screening was necessary. A scoring grid was developed via the contrasting group method utilizing data from the 50 control students and the 530 hearing impaired students. In brief, a frequency distribution was developed detailing how many students scored each possible number in each content area for both the controls and hearing impaired group. Breaks identifying low, middle and high performing students were determined.

The score that was midpoint between the mean low control performer and the mean low hearing impaired performer was determined. These midpoint scores for each content area became the cut-off scores between failing and passing students. the standard error of measure was also included in the scoring grid as the Marginal section to prevent possible failing students from not being considered.

#	ACAD	ATTEN	COMMUN	CLASS PART	SCH BEH
3	7	31	16	2	7
4	16	34	28	15	6
5	28	32	34	27	11
6	48	47	36	48	14
7	48	56	51	47	21
8	53	67	66	51	35
9	62	85	89	67	44
10	62	44	37	47	45
11	50	33	44	63	65
12	38	26	38	45	56
13	35	21	20	30	54
14	16	18	18	32	68
15	36	5	20	25	73

TABLE 2: Frequency distribution illustrating the number of scores chosen by teachers for each of the S.I.F.T.E.R. questions to reflect the behavior of 530 students, grades preschool through 12. Numbers underlined indicate the break in scores determining low, middle and high performance.

#	ACAD	ATTEN	COMMUN	CLASS PART	SCH BEH
3	0	0	0	0	0
4	0	0	0	0	0
5	0	2	0	0	1
6	1	0	0	0	0
7	0	2	2	3	0
8	3	4	4	1	0
9	3	7	7	2	0
10	2	7	2	3	3
11	10	4	6	6	5
12	6	8	8	9	5
13	11	5	7	11	3
14	2	5	4	7	8
15	12	6	10	8	25

TABLE 3: Frequency distribution of scores chosen by teachers of 50 normal hearing, average functioning children. There were 10 kindergarten, 10 first grade, 10 second grade, 10 third grade, 5 fourth grade and 5 fifth grade students. Underlined numbers represent demarkation between children with low, middle and high performance.

CONTENT AREA	HEAR.IMP	CONTROL	MIDPOINT	Standard. Error of Measure
Academics	4.4	9.6	7	2
Attention	4.0	7.0	6	2
Communication	5.5	8.4	7	3
Class Participation	4.6	7.0	6	2
School Behavior	5.6	8.8	7	2

TABLE 4: Mean scores of 530 low performers with identified hearing problems, 50 low performers with normal achievement and no hearing problems, the rounded midpoints between the two means utilized as cut-off scores in the S.I.F.T.E.R. and the standard error of measure.

HOW TO USE THE S.I.F.T.E.R.: It is suggested that school personnel utilize the S.I.F.T.E.R. for all mainstreamed hearing impaired students who do not receive frequent direct special educational services to insure that the student's school performance is not eroding from the effects of the hearing

loss. It is also suggested that the S.I.F.T.E.R. be used to educationally screen students who are identified following complete hearing screening procedures to determine if any educational difficulties that could be due to hearing problems are occurring. Following teacher's completion of the S.I.F.T.E.R., the educational audiologist, principal, speech clinician or any other educational designee can score the S.I.F.T.E.R.s. If the child fails in one or more content areas the school team may wish to review the student's progress and perform assessments as appropriate to district criteria.

It is hoped that this valid and useable educational screening tool will help identify children with educationally significant hearing loss in the schools. Not all children who fail hearing screening or have an identified hearing loss have educationally significant hearing problems. Conversely, the severity of the hearing loss as defined by an audiogram is frequently not a valid predictor of learning difficulties. Only by determining educational significance as well as hearing sensitivity can we adequately follow-up the learner with a hearing impairment.

Questions and comments can be directed to the author by contacting the Educational Audiology Association in care of Karen L. Anderson, Ph.D., or via email messaging to: karenlanderson@earthlink.net.