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ASSESSMENT OF SCHOOL FUNCTIONING AMONG ISRAELI ARAB CHILDREN WITH HEARING LOSS IN THE PRIMARY GRADES

THE STUDY examined school functioning of Israeli Arab children with hearing impairment (HI) who were included in regular education classrooms, in comparison to their classmates with normal hearing (NH). Ninety-three children (60 NH and 33 HI), grades 1–6, participated. Teachers evaluated the children using the Arabic version of the Screening Instrument for Targeting Educational Risks (SIFTER; Anderson, 1989); they also reported children's achievement levels in Arabic and mathematics. Results demonstrated that the HI children's functioning was lower than that of the NH children. Children with unilateral and minimal hearing losses had lower functioning than those with more severe hearing loss. As grade level increased, functioning decreased among HI children. Use of the SIFTER was beneficial in detecting children with difficulties. Regular, ongoing SIFTER use and appropriate follow-up on the results may better enable each child to perform optimally in class.

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In Israel today, 80% of children with hearing loss are included in the regular education classrooms, 15% attend a special class located in a regular school, and only 5% attend special schools (Zandberg, 2005). The current predominance of individual inclusion results from two trends: recent intensive efforts to implement the Special Education Law (Al-Yagon & Margalit, 2001), which calls for maximum inclusion, and recent technological developments in sensory aids and assistive listening devices (hearing aids, cochlear implants, FM systems) that have substantially improved use of the auditory channel. As a result of these technological developments, many children with hearing loss who previously could not use their residual hearing functionally have recently become likely candidates for auditory rehabilitation, with the prospect of acquiring spoken language. Consequently, education systems are now including these children in regular classes of children with normal hearing where spoken language is the mode of communication.

The full inclusion of the child with hearing loss in the regular school offers many advantages. For one, such children attend school close to home, with other children from their neighborhood (Plaut, 1994). In addition,

children with hearing loss gain exposure to spoken language and social interactions with their peers with normal hearing, which enhances their level of speech and language as well as their academic and social performance (Cambra, 2002; Luckner, 1991).

Nevertheless, full inclusion may raise several difficulties. First, the classroom's acoustic conditions may not be suitable to the needs of the child with hearing loss (Crandell & Smaldino, 2000; Nelson & Soli, 2000; Smaldino & Crandell, 2000; Sorkin, 2000). Second, teachers often lack knowledge concerning the implications of the hearing loss for the child's performance, such as awareness about the child's special needs or familiarity with technologies such as FM systems (Luckner, 1991; Ross, 1991). Third, the child may experience difficulties in the regular class, where spoken language is the mode of communication, because of the adverse effects of hearing loss on children's functioning in various domains such as communication skills, academic achievement, and social behaviors (Bess, 1985; Bess, Dodd-Murphy, & Parker, 1998; Bess, Klee, & Culbertson, 1986; Blair, Peterson, & Viehweg, 1985; Davis, Elfenbein, Schum, & Bentler, 1986).

Debate has arisen in the literature over the effect rendered by degree of hearing loss on children's various areas of functioning. Some studies reveal no relationship between degree of hearing loss and functioning (e.g., Saur, Popp-Stone, & Hurley-Lawrence, 1987), whereas others link children's greater hearing loss with poorer performance (Anderson, 1991; Bess, 1985; Culbertson & Gilbert, 1986). Anderson (1991) reported that even children with minimal or unilateral hearing loss demonstrated more academic and social difficulties than children with normal hearing. Blair and colleagues (1985) found that children with mild to moderate hearing loss evidenced at least a 1-year delay in language development. Likewise, in their study of children with unilateral loss, Bess and colleagues (1986) showed that 33% failed in school and had to repeat a class, and 40% exhibited behavioral difficulties. To explain these difficulties, Anderson (1991) asserted that this relatively minimal hearing loss causes such children to miss parts of peers' utterances. This leads to impaired socialization and self-esteem, and thus to behavior problems.

Behavioral difficulties may be expected to intensify as children with hearing loss grow older. The increasing academic and social demands of the higher grade levels pose more complex challenges, and researchers have reported greater gaps between children with and without hearing loss as grade level increases (Anderson, 1991; Bess et al., 1998; Blair et al., 1985; Cambra, 2002). Thus, an acceptable level of performance at a certain age does not ensure adequate performance in later years, a finding that suggests the importance of monitoring performance in the different domains regularly over the course of a child's school years (Anderson, 1999; Bess et al., 1998; Dancer, Burl, & Waters, 1995; Wray, Flexer, & Vaccaro, 1997).

In summary, research implies that children with hearing loss are at risk educationally, accentuating the need to assess their functioning within the school environment. Administration of a screening tool may provide an effective means of identifying those children who are included in regular education classrooms and exhibit difficulties in particular domains. The identified children can then be referred for a full assessment in those domains.

Anderson (1989) developed the Screening Instrument for Targeting Educational Risks (SIFTER) as a screening tool to detect children whose hearing loss may affect their school performance. Research on the SIFTER in the United States has demonstrated its usefulness in the initial diagnosis of a child's hearing loss and as a tool to monitor performance from year to year. Specifically, studies have indicated the effectiveness of the SIFTER in three areas: detecting school difficulties among children of various ages with only a mild or unilateral hearing loss (or both), as well as children with conductive hearing loss; evaluating children's performance with an FM system; and assessing the efficacy of intervention (Anderson, 1999; Bess et al., 1986, 1998; Richards, Flexer, Brandy, & Wray, 1993; Wray et al., 1997). Also, research on use of the Hebrew version of the SIFTER in Israel has indicated its effectiveness in detecting school difficulties among second-grade Hebrew-speaking children with various degrees of hearing loss, including children with unilateral or mild hearing loss (Most, 2004). The population in Israel, however, also includes Israeli Arabs, who comprise 30% of individuals with hearing loss between the ages of 3 to 21 years who are taught in various educational settings, such as individual inclusion or group inclusion within a regular or special school. These individuals attend schools where Arabic is the primary language, and 42% of them are individually included in regular classrooms. To meet their needs, it is important to evaluate these students' functioning in the regular classroom.

The present study aimed to assess the performance of Israeli Arab children with hearing loss who were included in the regular classroom, relative to the performance of their classmates with normal hearing, using the Arabic version of the SIFTER questionnaire. The effect of degree of hearing loss and grade level on classroom performance was also examined.

Method

Participants

The study participants consisted of 93 Israeli Arab children in grades 1 through 6 who attended five regular elementary schools in northern Israel. The sample included 33 children with hearing loss and 60 children with normal hearing from the same classrooms who had no known problems. All of the children's parents were hearing, and all of them used spoken Arabic to communicate. Table 1 shows the distribution of the children with and without hearing loss among the different grade levels.

Each of the children with hearing loss was included in a regular class with normally hearing children but received remedial lessons from teachers after school hours. Hearing loss ranged from minimal to severe, as Table 2 shows. Ten of the children had conductive hearing loss, and 23 had sensorineural hearing loss. Only 18 of the 33 children (54%) used sensory aids: 16 used hearing aids and 2 had cochlear implants. About half of the children with hearing loss (n = 17) had learning difficulties in addition to the hearing loss, according to teacher reports.

Table 1
Distribution of Study Participants by Hearing Status and Grade Level

	Normally hearing		*Hearing impaired*		*Total*	
Grade	*n*	*%*	*n*	*%*	*n*	*%*
1st	4	6.7	2	6.1	6	6.5
2nd	12	20.0	6	18.2	18	19.4
3rd	10	16.7	5	15.2	15	16.1
4th	14	23.3	8	24.2	22	23.7
5th	4	6.7	3	9.1	7	7.5
6th	16	26.7	9	27.3	25	26.9
Total	60	100.0	33	100.0	93	100.0

Note. Percentages may not total 100.0 because of rounding.

Table 2
Distribution, by Level of Hearing Loss, of Study Participants With Impaired Hearing

Level of hearing loss	*Degree (dBHL)*	*n*
Minimal	16-25dB	7
Mild	26-30dB	2
Moderate	31-50dB	14
Moderate-severe	51-70dB	7
Severe	71-90dB	3

N = 33.

Instrument

The Screening Instrument for Targeting Educational Risk (SIFTER) questionnaire was used to assess children's performance in the schools. Anderson (1989) designed the SIFTER to screen children's functioning in the classroom and to identify those students educationally at risk, possibly as a result of hearing problems. The SIFTER is a written questionnaire completed by the child's teacher. The teacher rates the child in comparison to the other children (i.e., the average child) in the class. The questionnaire includes 15 questions divided into five domains of 3 questions each: academics (e.g., "What is your estimate of the student's class standing in comparison to that of his/her classmates?"), attention (e.g., "How distractible is the student in comparison to his/her classmates?"), communication (e.g., "How do the student's vocabulary and word usage skills compare with those of other students in his/her age group?"), class participation (e.g., "How often does the student volunteer information in class discussions or in answer to the teacher's questions?"), and school behavior (e.g., "Does the student demonstrate any behaviors that seem unusual or inappropriate compared to other students?"). The teacher evaluates each question on a 5-point scale ranging from below average (1) to above average (5). Low scores indicate lower or less acceptable class functioning, whereas high scores indicate preferred or superior levels of class functioning.

The sum of the three scores in each content domain reflects the child's functioning in that domain. The summed scores for each domain can be plotted on a chart that indicates passing, marginal, or failing performance. Anderson (1989) suggests that a child who fails a specific domain be considered for further evaluation in that domain. Children who score in the marginal category should be monitored for future difficulties. The SIFTER is brief and can be completed fairly quickly. It has been an accepted and widely used instrument in the field of educational audiology since 1990 (see, e.g., Bess et al., 1998; Dancer et al., 1995; Richards et al., 1993; Wray et al., 1997). Information on its validity and reliability can be found in the SIFTER manual.

For the present study, a bilingual speech-and-language therapist translated the SIFTER from English to Arabic. In order to establish its con-

tent validity, a different bilingual speech-and-language therapist translated the Arabic translation back to English. The questionnaire needed no cultural adaptations.

Procedure

Participants were recruited through Shema, a nonprofit association in northern Israel that serves school-age children (aged 7–18 years) with hearing loss. Shema supports children and their teachers during school hours and in extracurricular activities. This organization receives the name of any child who fails the routine hearing screening test administered to all first graders nationally. For the present study, children were recruited from that list who were enrolled in general elementary schools in the Israeli Arab educational sector. One of two graduate students who collected the data approached teachers who had been teaching one of these listed children with hearing loss for at least 6 months. It should be noted that only those children with hearing aids were formally known to the teachers as having hearing loss. In cases in which a child did not wear a hearing aid, teachers were not necessarily aware that the student was a child with a hearing loss until he or she was identified as such by the researcher, when the teacher was approached with a request for cooperation in completing the SIFTER.

The graduate students distributed the SIFTER questionnaire to each teacher and requested an evaluation of the child with hearing loss based on the teacher's knowledge of the child. In addition, they asked the teacher to report the child's achievement levels in Arabic and mathematics. Achievement levels are based on homework, papers, examinations, and other schoolwork.

Data collection also included the gathering of background information provided in the Shema files regarding each child's hearing loss (degree and type), use of sensory aids, mode of communication, and additional difficulties.

The graduate students also asked the teachers to complete the SIFTER questionnaire and provide the Arabic and math achievement levels for two children with normal hearing from the same class as the child with hearing loss. The children with normal hearing were selected randomly from the class roster: the name listed above and the name listed below the name of the child with hearing loss, provided that these children were known to have no additional difficulties according to the teacher's report. In case in which the randomly selected child with normal hearing had additional difficulties, another child was randomly selected.

Following receipt of parental consent, the children's SIFTER results were shared with Shema for educational and rehabilitational purposes.

Results

Because the present study was the first administration of the SIFTER's Arabic version, reliability for each the five domains was evaluated. The five coefficients of internal consistency (Cronbach alpha) were high: .84 for academics, .82 for attention, .93 for communication, .88 for participation, and .82 for behavior.

Table 3 presents data on the SIFTER performance and academic achievement levels in Arabic and math of the two hearing-status groups. As the table shows, the children with normal hearing scored significantly better than the children with hearing loss in all the SIFTER domains. The achievement levels in both Arabic and math of the children with normal hearing were also significantly higher than those of the children with hearing loss.

Each child's scores in the five domains were plotted on a chart to ascertain a passing, failing, or marginal score in each domain. Table 4 presents the number and percentage of students in each of the two hearing-status groups (normally hearing and hearing impaired) that qualified for each of these three screening categories for each of the five domains. As the table shows, differences emerged between the two groups in all five domains. Chi-square

Table 3
Study Participants' SIFTER Performance, by Hearing Status and Test Domain

	Hearing impaired (n = 33)		*Normally hearing (n = 60)*			
	M	*SD*	*M*	*SD*	*df*	*t (p < .001)*
SIFTER scores						
Academics	3.23	1.01	4.27	0.79	91	5.45
Attention	2.78	1.03	4.03	0.84	91	6.36
Communication	2.77	1.13	4.11	0.83	51.6	5.97
Participation	2.93	1.00	4.17	0.85	91	6.32
Behavior	3.75	0.97	4.56	0.73	52.4	4.21
Total	3.09	0.87	4.23	0.71	91	6.82
Academic achievement levels						
Arabic	72.18	26.53	87.95	13.15	40.83	3.21
Mathematics	75.30	24.43	88.52	15.50	46.49	2.81

Notes. SIFTER, Screening Instrument for Targeting Educational Risks (Anderson, 1989). SIFTER scoring was on a 5-point scale ranging from below average (1) to above average (5).

Table 4
Distribution of Study Participants Into Screening Categories for the Five SIFTER Domains, by Hearing Status

		Hearing impaired (n = 33)			*Normally hearing (n = 60)*		
		Fail	*Marginal*	*Pass*	*Fail*	*Marginal*	*Pass*
Academics	*n*	*7*	*11*	*15*	*1*	*7*	*52*
	%	(21.2%)	(33.3%)	(45.5%)	(1.7%)	(11.7%)	(86.7%)
Attention	*n*	7	10	16	1	3	56
	%	(21.2%)	(30.3%)	(48.5%)	(1.7%)	(5.0%)	(93.3%)
Communication	*n*	15	7	11	3	10	47
	%	(45.5%)	(21.2%)	(33.3%)	(5.0%)	(16.7%)	(78.3%)
Participation	*n*	8	8	17	1	4	55
	%	(24.2%)	(24.2%)	(51.5%)	(1.7%)	(6.7%)	(91.7%)
Behavior	*n*	3	6	24	1	0	59
	%	(9.1%)	(18.2%)	(72.7%)	(1.7%)	(0.0%)	(98.3%)

Notes. Percentages may not total 100.0 because of rounding. SIFTER, Screening Instrument for Targeting Educational Risks (Anderson, 1989). SIFTER scoring was on a 5-point scale ranging from below average (1) to above average (5).

analyses revealed significant differences ($p < .001$) between the percentage of children with normal hearing who passed and the percentage of children with hearing loss who passed in all five SIFTER domains: $\chi^2 = 19.64$ for the academic domain, $\chi^2 = 24.74$ for attention, $\chi^2 = 25.16$ for communication, $\chi^2 = 17.96$ for participation, and $\chi^2 = 15.20$ for behavior.

Table 5 shows the Pearson product-moment correlations between the SIFTER scores in the different domains and the children's achievement levels in Arabic and math. As can be seen, high positive correlations emerged. Higher SIFTER scores correlated with higher grades in both subjects.

To evaluate the effect of severity of hearing loss on the SIFTER scores as well as on the children's Arabic and math achievement levels, the children with hearing loss were divided into two subgroups: 13 children with either a mild or unilateral hearing loss and 20 children with moderate to severe hearing loss. Table 6 provides the means, standard deviations, and *t* values of these two subgroups' SIFTER scores in the five domains and the subgroups' achievement levels in Arabic and math. As can be seen, significant differences emerged between the two subgroups in the SIFTER domains of communication and participation and in the total score. Surprisingly, children with mild or unilateral hearing loss scored lower than those with moderate to severe hearing loss. In the attention domain, the two subgroups also revealed a tendency toward a significant difference ($p < .06$). In the academic and behavior domains as well as their Arabic and math achievement levels, the two subgroups did not differ significantly.

To investigate the teachers' evaluations as a function of the child's hearing status and grade level, the whole sample was divided into three subgroups according to grade level: first and second graders, third and fourth graders, and fifth and sixth graders. A two-way analysis of variance (ANOVA) was conducted with hearing status (hearing impaired/normally hearing) and grade-level subgroup (1st + 2nd; 3rd + 4th; 5th + 6th) as the independent variables and the SIFTER domain scores and achievement levels in Arabic and math as the dependent variables. Table 7 presents the means, standard deviations, and *F* values for this analysis. As can be seen from the table, a significant main effect emerged for hearing status for all the SIFTER domains and for the Arabic and math achievement levels. Also, a significant main effect emerged for grade level for the academic domain of the SIFTER and for the Arabic and math achievement levels. A significant interaction also emerged between hearing status and grade level in all the SIFTER domains except behavior. The interaction of Arabic and math achievement levels was not significant. Inasmuch as the interaction effect was expressed similarly for the different domains, Figure 1 presents only the total SIFTER scores. The figure shows that the different

Table 5
Pearson Product-Moment Correlations Between SIFTER Ratings and Academic Achievement Levels in Arabic and Mathematics

SIFTER domains	*Arabic*	*Mathematics*
Academics	.69	.65
Attention	.64	.61
Communication	.61	.61
Participation	.69	.63
Behavior	.68	.57
Total	.73	.68

Notes. SIFTER, Screening Instrument for Targeting Educational Risks (Anderson, 1989). SIFTER scoring was on a 5-point scale ranging from below average (1) to above average (5).
$N = 93$.
$p < .01$.

Table 6
SIFTER Performance and Arabic and Math Achievement Levels, by Hearing-Loss Subgroup

	Children with moderate to severe hearing loss (n = 20)		*Children with mild or unilateral hearing loss (n = 13)*		
	M	*SD*	*M*	*SD*	*t*
SIFTER scores					
Academics	3.47	0.96	2.87	1.01	1.70
Attention	3.05	1.00	2.36	0.95	1.97*
Communication	3.10	1.10	2.26	1.01	2.22**
Participation	3.22	0.98	2.49	0.89	2.16**
Behavior	3.88	0.91	3.54	1.06	1.00
Total	3.34	0.83	2.70	0.81	2.19**
Academic achievement levels					
Arabic	78.70	22.95	62.15	29.38	1.81
Mathematics	79.60	25.05	68.69	22.79	1.26

Notes. SIFTER, Screening Instrument for Targeting Educational Risks (Anderson, 1989). SIFTER scoring was on a 5-point scale ranging from below average (1) to above average (5).
*$p < .06$. **$p < .05$.

grade levels in the group with normal hearing had similar SIFTER scores, whereas the different grade levels in the group with hearing loss had different SIFTER scores. Among students with hearing loss, the youngest subgroup (first and second graders) received higher teacher evaluations than their counterparts in the third and fourth grades and the fifth and sixth grades. No significant differences emerged between the third- and fourth-grader subgroup and the fifth- and sixth-grader subgroup.

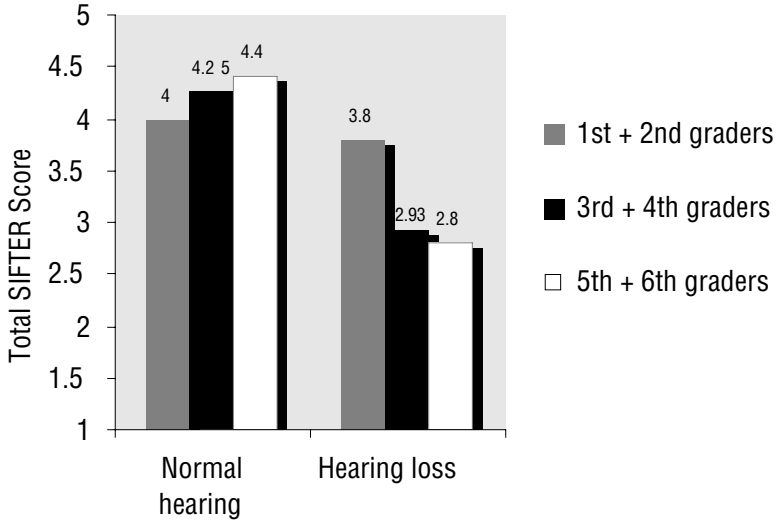
Examination of the SIFTER scores and academic achievement levels using *t* tests to compare children with and without sensory aids did not reveal significant differences. Also, examination of the SIFTER scores and academic achievement levels among children with hearing loss using *t* tests

Table 7
Data Used in Support of an Analysis of Teachers' Evaluations as a Function of Child Hearing Status and Grade Level

		Grade-level subgroups				*Hearing status subgroups*			*Classroom*
Student assessment		*1st + 2nd graders (n = 24)*	*3rd + 4th graders (n = 37)*	*5th + 6th graders (n = 32)*	*Grade-level effect F(2, 87)*	*Normally hearing (n = 60)*	*Hearing impaired (n = 33)*	*Hearing status effect F(1, 87)*	*x status interaction F(2, 87)*
SIFTER scores									
Academics	*M*	4.17	3.78	3.83	3.48**	4.27	3.23	25.29****	5.82***
	SD	(0.92)	(1.01)	(1.05)		(0.79)	(1.01)		
Attention	*M*	3.67	3.65	3.45	1.27	4.03	2.78	35.02****	4.47**
	SD	(1.01)	(1.04)	(1.21)		(0.84)	(1.03)		
Communication	*M*	3.60	3.59	3.71	0.61	4.11	2.77	36.42****	5.14***
	SD	(1.03)	(1.24)	(1.14)		(0.83)	(1.13)		
Participation	*M*	3.71	3.74	3.74	0.18	4.17	2.93	35.13****	4.78**
	SD	(1.08)	(1.06)	(1.14)		(0.86)	(1.00)		
Behavior	*M*	4.46	4.17	4.25	1.60	4.56	3.75	40.65****	5.75***
	SD	(0.98)	(0.93)	(0.83)		(0.73)	(0.97)		
Total SIFTER	*M*	3.92	3.79	3.80	1.24	4.23	3.09	40.65****	5.75***
	SD	(0.90)	(0.93)	(1.00)		(0.71)	(0.87)		
Academic achievement levels									
Arabic	*M*	90.79	82.92	75.37	6.01***	87.95	72.18	12.72****	1.88
	SD	(15.83)	(18.77)	(72.75)		(13.15)	(26.53)		
Mathematics	*M*	92.08	88.05	72.75	12.21****	88.52	75.30	8.85****	2.98
	SD	(13.35)	(14.58)	(24.75)		(15.49)	(24.43)		

Notes. SIFTER, Screening Instrument for Targeting Educational Risks (Anderson, 1989). SIFTER scoring was on a 5-point scale ranging from below average (1) to above average (5).
** $p < .05$. *** $p < .01$. **** $p < .001$.

Figure 1
Total SIFTER Scores, by Hearing Status and Grade Level



Notes. SIFTER, Screening Instrument for Targeting Educational Risks (Anderson, 1989). SIFTER scoring was on a 5-point scale ranging from below average (1) to above average (5).

to compare those with and without additional learning difficulties did not reveal significant differences, except for the academic domain. The children with additional learning difficulties scored significantly lower (M = 2.90) than those without additional difficulties (M = 3.58), t (31) = 2.02, $p < .05$.

Discussion

In recent years, educators and policymakers have endeavored to include children with hearing loss in the regular classroom with their hearing peers. Nevertheless, hearing impairment may have a negative effect on a child's classroom performance. Therefore, a screening tool to identify difficulties in various domains of classroom functioning may facilitate efforts to meet the particular needs of children at educational risk within the regular class setting. The present study used the Arabic version of the SIFTER screening tool to investigate the school functioning of children who were included in regular Israeli Arab classrooms in comparison to their classmates with normal hearing. The effects of degree of hearing loss and of grade level on the children's school functioning were examined as well. Academic functioning was also evaluated by means of the children's achievement levels in Arabic and math.

Based on previous research that explored the effect of hearing loss on children's functioning in academics, communication, and social domains (Anderson, 1991; Davis et al., 1986; American Speech-Language-Hearing Association, 2005), lower levels of performance among children with hearing loss relative to the children with normal hearing were expected. The results supported this hypothesis. Teachers rated the children with hearing loss significantly lower than their classmates with normal hearing, both in their Arabic and math performance and in their performance on all the SIFTER domains: academics, attention, class participation, communication, and school behavior.

The difference between the group with normal hearing and the group with hearing loss also manifested itself in the distribution of children among the three SIFTER scoring categories: passing, failing, and marginal. Individual children's plotted chart scores for the SIFTER screening in the group with hearing loss revealed a substantial number of children who failed (and thus required further assessment) and a considerable number who received marginal scores (and thus required future monitoring) in every domain. As already noted in the present study, significantly more children with hearing loss than children with normal hearing received failing or marginal scores. This finding is important in view of the SIFTER's ultimate goals of identifying children at educational risk and their specific domains of functioning in need of further assessment or monitoring, and of screening out those who do not require additional evaluation in order to increase the cost-effectiveness of resource management.

Previous research reported the validation of the SIFTER (Anderson, 1991; Bess et al., 1998; Wray et al., 1997) and showed the close relationship between SIFTER scores and children's performance in school. The high correlations that emerged in the present study between children's SIFTER scores and their Arabic and math achievement levels provide further support for use of the SIFTER tool. This finding is important inasmuch as the SIFTER questionnaire is practical, brief, and simple to use.

The findings of the present study are especially relevant to educators and other school staff providing services to children with hearing loss, as there is a growing trend toward inclusion of children with hearing loss in the regular education environment. In Israel, this trend stems from the Special Education Law, which encourages children's enrollment in the least restrictive environment, and from the

availability of advanced sensory aids that provide increased information to children with impaired auditory systems. Nevertheless, mere eligibility and the desire for placement in a regular classroom do not ensure that a child is receiving the optimal services to enable maximum benefit from the educational system. A brief screening mechanism such as the SIFTER can help identify the three subgroups of children with hearing loss who need differential handling within the regular system: (a) those who are having difficulties in one or more of the class domains, who require more detailed assessment; (b) those whose performance should be monitored more closely throughout the school year; and (d) those who appear to be adjusting adequately with no need for special intervention.

Notably, the high correlation in the present study between the SIFTER scores and academic achievement levels among the children with normal hearing, as well as the fact that some hearing children fell into the failing or marginal categories, suggests that the SIFTER may serve as a general screening tool for children who are at risk for academic difficultes. Future research would do well to employ this tool with larger normative populations to provide further validity for this suggestion.

Beyond making a comparison between the two hearing-status groups, the present study also investigated the effects of hearing loss severity and grade level on the performance of children with impaired hearing. It was predicted that children with more severe hearing loss would show lower levels of classroom performance than children with less severe hearing loss. The results, however, indicated the opposite pattern for two of the SIFTER domains and for the tool's total score. Children with poorer hearing scored significantly better on communication, participated more actively in class, and scored significantly higher on the total SIFTER questionnaire. Significant differences did not emerge for the other three domains or for academic achievement. These outcomes support the direction of previous findings obtained for Israeli Jewish second graders with hearing loss (Most, 2004). However, different SIFTER domains emerged as positively correlated with severity of hearing loss in the earlier study versus the present study. In other words, the previous study showed that children with poorer hearing scored better academically and demonstrated more adaptive behavior, whereas no significant relationships emerged between the communication or attention domains and the child's degree of hearing loss. Likewise, other studies have shown the negative effect of minimal or unilateral hearing loss on children's functioning (Bess, 1999; Bess et al., 1986; Blair et al., 1985; R. F. Oyler, A. L. Oyler, & Matkin, 1988).

The demographic characteristics of the sample for the present study may supply a possible explanation for the findings on the relationship between severity of hearing loss and academic performance. In general, children who showed a higher severity of hearing loss were diagnosed at an earlier age and thus received additional support services sooner. The children with more severe hearing loss wore hearing aids and received individual tutoring and communication therapy. Teachers of such children recognized them as having special needs and received guidance from speech-and-language clinicians on coping with having to help the child use and maintain the hearing aid, as well as the implications for classroom decorum and effective instruction of the presence of a child with a hearing aid. Such services aimed to help these children improve their functioning and better achieve their potential. On the other hand, the children with only minimal or unilateral hearing loss received considerably fewer support services. In most cases, they obtained no intervention or therapy, and teachers generally remained unaware of the negative effects such a hearing loss might have on their academic performance. Perhaps this paucity of support was linked with these children's performance at a level below their capacity.

The present findings substantiate those of previous studies, suggesting that professionals and educators should increase sensitivity to the adverse effects of a minimal or unilateral hearing loss on children's functioning within the educational system, and should provide the necessary services. It is important to follow up on such children, using a tool such as the SIFTER and intervening with those who fail in some domains.

It should be noted that the present study included only three children with severe hearing loss, and that two of these children used cochlear implants. Thus, the present findings should not be generalized to children with severe to profound hearing loss who wear hearing aids. Possibly, the impact of a severe or profound hearing loss on these children's school performance may be more negative than a milder loss, despite the receipt of more support services. Future research would do well to include more participants with severe and profound hearing loss who use hearing aids, as well as such children who have cochlear implants.

Another effect the present study examined was grade level. It was predicted that the discrepancy in functioning between the two hearing-status groups would be wider in the higher grades than in the lower grades. This prediction derived from the increas-

ing demands in the higher grades, which confront children with hearing loss with harder and more complex academic and social tasks (Anderson, 1991; Bess et al., 1998; Blair et al., 1985; Cambra, 2002). The results bore out this prediction: The SIFTER scores in all domains except school behavior were better among the younger children with hearing loss (first and second graders) than among their counterparts in the higher grades. However, a similar pattern did not emerge for the SIFTER scores of the children with normal hearing in the different grades.

The effect of the use of sensory aids was examined as well. It was predicted that children with sensory aids would perform better than children without sensory aids. It is possible that the results did not support this hypothesis because the degree of hearing loss constituted a confounding variable in the analysis.

Another limitation of the present study was its reliance on teachers as the sole source of information on the children, both via scores of in-class performance derived from teacher ratings using the SIFTER and via teacher's evaluations of children's academic achievements. Possibly, teachers' awareness of individual children's hearing loss may have biased their evaluations. Perhaps in an attempt to be lenient or compensatory, teachers gave higher scores or evaluations to those children who were known to have a hearing loss.

In summary, the findings of the present study suggest that the use of the SIFTER as a screening tool is beneficial in detecting children with audiologic difficulties, including those who may ordinarily be overlooked because of the minimal nature of their hearing loss. Regular use of this cost-effective tool and appropriate follow-up on its results may better enable each child to perform at his or her best within the educational system.

Note

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