

Children with fetal alcohol spectrum disorders: A descriptive profile of adaptive function

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Key words

- Fetal alcohol syndrome ■ Prenatal alcohol exposure ■ Occupational therapy ■ Adaptive behavior
- Child development

Mots clés

- Syndrome d'alcoolisme foetal ■ Exposition prénatale à l'alcool ■ Ergothérapie ■ Comportement adaptatif
- Développement de l'enfant

Abstract

Background. Children with fetal alcohol spectrum disorders (FASD) demonstrate neurobehavioral impairments that affect function and participation. Adaptive behavior deficits have been documented; however, specific functional profiles are less well described. **Purpose.** This study compared caregiver-reported adaptive and maladaptive behaviors between a clinic-referred sample of 25 five- through eight-year-old children with FASD and a sample of 23 children with typical development. **Findings.** Children with FASD were rated significantly lower on the Scales of Independent Behavior-Revised in social interaction and communication, personal-living skills, and community-living skills and significantly higher on maladaptive behavior scales. Exploratory contrasts revealed strengths and needs within specific functional domains, along with the need for more support and supervision than peers with typical development to perform day-to-day adaptive skills and manage behavior. **Implications.** Children with FASD and their caregivers need support for daily activities involving personal and social performance. Awareness of specific strengths and needs can guide interventions that promote function and participation.

Résumé

Description. Les enfants atteints d'un syndrome d'alcoolisme foetal (SAF) montrent des déficits neurologiques du comportement qui touchent la fonction et la participation. Les déficits dans les comportements adaptatifs ont été documentés; toutefois, les profils fonctionnels spécifiques sont moins bien décrits. **But.** Cette étude avait pour but de comparer les comportements adaptatifs et inadéquats rapportés par les soignants d'un échantillon clinique de 25 enfants de cinq à huit ans atteints d'un SAF et d'un échantillon de 23 enfants ayant un développement type. **Résultats.** Les enfants atteints de SAF ont obtenu des cotes plus basses sur les Scales of Independent Behavior-Revised pour l'interaction sociale et la communication, les aptitudes à la vie quotidienne et les habiletés à la vie communautaire et ils ont obtenu des cotes plus élevées aux échelles des comportements inadéquats. Les contrastes exploratoires ont permis de mettre en relief les forces et les besoins des enfants atteints d'un SAF dans des domaines fonctionnels spécifiques, de même que leur besoin d'un plus grand soutien et d'une plus grande supervision que leurs pairs ayant un développement type pour réaliser leurs activités quotidiennes adaptatives et gérer leur comportement. **Conséquences.** Les enfants atteints d'un SAF et leurs soignants ont besoin de soutien pour accomplir les activités quotidiennes faisant appel au rendement personnel et social. Une meilleure conscience de leurs forces et de leurs besoins spécifiques peut orienter les interventions qui favorisent la fonction et la participation.

Children with fetal alcohol syndrome (FAS) and other alcohol-related diagnoses that fall under the umbrella term of fetal alcohol spectrum disorders (FASD) have multiple neurobehavioral impairments that affect occupational performance and participation. These primary neurobehavioral impairments include deficits in cognition, communication, learning, sensory-motor abilities, and executive functions that are associated with the teratogenic

impact of prenatal alcohol exposure (Connor & Streissguth, 1996; Mattson & Riley, 1998; Osborn, Harris, & Weinberg, 1993; Rasmussen, 2005). Significant adaptive, social, and behavioral problems also are described that indicate the challenges children with FASD face in their daily functioning in the home, school, and community (Olson, Morse, & Huffine, 1998; Roebuck, Mattson, & Riley, 1999; Thomas, Kelly, Mattson, & Riley, 1998; Whaley, O'Connor, &

Gunderson, 2001). High rates of secondary disabilities later in life, such as failure in school, decreased independent living, substance abuse, and employment problems further reveal the persistent and lifelong functional challenges that individuals affected by prenatal alcohol exposure experience (Streissguth et al., 2004).

Promoting function and participation across all domains over the lifespan are important priorities among occupational therapists and others who support individuals with disabilities (American Occupational Therapy Association, 2002; Law, Baum, & Baptiste, 2002; World Health Organization, 2004). The early identification of functional deficits (and strengths) among children with FASD could presumably guide clinical assessment and subsequent interventions that aim to improve safe and successful participation in daily activities as early as possible. However, despite evidence that individuals with FASD demonstrate functional deficits across multiple domains, more specific information about the quality and type of performance challenges faced by those with FASD, particularly young children, is still needed.

Adaptive skill deficits are clearly a primary clinical concern for this population. Among individuals with FASD, adaptive skills are reported to be significantly lower than expected for age and intellectual level (Streissguth et al., 2004). Also, childhood deficits in adaptive skills are reported to increase with age, even compared to other clinic-referred groups (Whaley et al., 2001). Social performance deficits have been among the more prominent findings in the FASD literature, with interpersonal relationships and the use of play and leisure time identified as specific aspects of problematic social performance (Thomas et al., 1998). Other potentially problematic areas of adaptive function such as activities of daily living (ADL), however, are not well described. Documentation regarding the support and resources needed to help children with FASD improve or maintain daily function is also lacking. Such resources are particularly important considering the remarkably high levels of stress, parenting challenges, and unmet needs reported among caregivers raising children with FASD (Olson, Brooks, Davis, & Astley, 2004; Ryan & Ferguson, 2006).

Adaptive behavior is broadly defined as the performance of daily activities required for personal and social sufficiency (Sparrow, Cicchetti, & Balla, 2006). Standardized assessments of adaptive behavior provide one means for understanding function and participation in childhood occupations that include ADL, social participation, and work/school performance. Adaptive behavior scales, such as the Scales of Independent Behavior-Revised (SIB-R) (Bruininks, Woodcock, Weatherman, & Hill, 1996), make it possible to examine age-related adaptive skills in specific contexts based on the standards or expectations of others (e.g., parent).

The purpose of this study was to compare the adaptive

function of a clinical sample of young school-aged children with clearly diagnosed FASD to a group of children with typical development (TD) using a standardized caregiver report of both adaptive and maladaptive behaviors. The first objective was to determine whether children with FASD would indeed demonstrate lower mean standard scores across the SIB-R adaptive clusters of motor, social interaction and communication, personal living, and community-living skills and higher maladaptive behavior ratings than the comparison group of children with TD. The second objective was to identify specific areas of strength and need among children with FASD by describing function within each of the SIB-R adaptive cluster subscales and problem behavior indexes. The final objective was to estimate the intensity of support and resources needed for those with FASD to participate in personal and social activities by describing the SIB-R support scores, a unique composite score derived from both adaptive skill performance and problem behaviors.

Methods

Participants

All procedures met research standards set and approved by the university's institutional review board. The current analysis included data from 25 children with FASD and 23 children with TD (ages 5-0 to 8-6 years) whose caregivers completed the SIB-R. The SIB-R, a caregiver report of adaptive and maladaptive behavior, was one measure administered within a larger study that examined sensory motor abilities, school function, and behavior in which all of the children in the current analysis were enrolled (Jirikowic, 2003).

The children with FASD were selected through a clinical registry database that at the time included over 1,500 children and adults systematically diagnosed with FASD from a diagnostic specialty clinic at a major urban university. FASD diagnoses were derived by an interdisciplinary team (Clarren, Carmichael Olson, Clarren, & Astley, 2000) using the 4-Digit Diagnostic Code (Astley & Clarren, 2000).

Children with FASD were eligible for the study if they (a) were 5 through 8 years of age; (b) lived within a 125-mile radius of the diagnostic specialty clinic; and (c) had a 4-Digit Diagnostic Code of fetal alcohol syndrome (FAS) or other diagnosis that met the Institute of Medicine (Stratton, Howe, & Battaglia, 1996) criteria for falling on the broader fetal alcohol spectrum. The 4-Digit Diagnostic Codes (Astley, 2004) included neurobehavioral disorder (alcohol exposed), static encephalopathy (alcohol exposed), partial FAS (alcohol exposed), or the full FAS (with or without confirmed alcohol exposure). To decrease the possible confounding effects of a new or unstable caregiving environment on behavior, children with FASD were excluded if they had resided in their current home or foster placement for less than one year. Children with a severe physical or neurological disability

(e.g., cerebral palsy) or intellectual disability (e.g., IQ standard score <60 or descriptive evidence of severe mental retardation) were excluded to reduce the confounding effects of severe motor and/or intellectual impairments on performance.

From the diagnostic specialty clinic's database population of 1,500 individuals, 73 children with FASD were eligible and invited to participate. Of the 73 invited, 25 children (34%) were enrolled. These 25 children were representative of the larger target population on key sociodemographic variables (e.g., gender, race/ethnicity, diagnosis). Five (20%) children had FAS and 20 had other alcohol-related diagnoses on the fetal alcohol spectrum, specifically 3 (12%) had static encephalopathy (alcohol exposed), and 17 (68%) had neurobehavioral disorder (alcohol exposed) (Astley, 2004). Caregivers of all 25 children with FASD completed the SIB-R; thus data for 25 participants were included in this analysis.

Children in the comparison group were recruited by sending invitation letters to 300 caregivers of children with presumed typical development. These were children in grades kindergarten through two, attending local urban and suburban public schools and community after-school programs that agreed to participate in study recruitment. Inclusion/exclusion criteria were used to help achieve a TD group comparable in age, gender, and racial/ethnic background to the FASD group. All children in the TD group were enrolled in regular education programs and received no special education services. Comparison group participants were not formally screened for prenatal alcohol exposure because of confidentiality restrictions imposed by the educational institutions that agreed to participate. It was assumed there would be a low risk of adverse outcomes from prenatal alcohol exposure in this comparison sample because only children without special education or related services were eligible to enroll.

Among the 300 children with TD invited to participate, 26 (9%) enrolled in the peer comparison group. Caregivers of 23 children with TD completed the SIB-R; three parents did not return the SIB-R form. Data from 23 children with TD were included in the current analysis.

Data collection

Each child's primary caregiver completed the Scales of Independent Behavior-Revised (SIB-R) (full scale checklist version) (Bruininks et al., 1996). The SIB-R is a comprehensive measure of adaptive behavior and problem behavior for birth through adulthood across home, school, work, and community settings. It is comprised of 14 subscales organized into four adaptive behavior clusters: (a) Motor Skills; (b) Social Interaction and Communication Skills; (c) Personal Living Skills; and (d) Community Living Skills. Each item is scored on a 4-point rating scale from 0 to 3. A

"0" indicates the child cannot do the task even if asked. A "3" indicates that the child almost always does the task independently and does it very well.

The Motor Skills subscales examine gross motor (e.g., rides bicycle, pours liquid from glass/pitcher) and fine motor abilities (e.g., prints first name, fastens clothing). The Social Interaction and Communication Skills subscales examine social interaction (e.g., waits for turn in group activity, takes part in games or activities), language comprehension (e.g., follows two-part directions, responds to common signs and symbols), and language expression (e.g., says last name when asked, uses complex sentences). The Personal Living Skills subscales examine eating and meal preparation (e.g., takes appropriate portions, prepares simple snacks), toileting (e.g., controls bowel and bladder, demonstrates appropriate hygiene), dressing (e.g., ties shoes, selects appropriate clothing), personal self-care (e.g., brushes teeth, dries after bathing), and basic domestic skills (e.g., clears table, puts belongings in proper place). The Home/Community Orientation subscales examine higher level skills involving time and punctuality (e.g., looks at a clock when it is "time" to do something, locates day and month on a calendar), understanding of money and value (e.g., counts, discriminates coins), basic work skills (e.g., indicates when a chore/task is finished, requests materials when needed), and home and community orientation skills (e.g., finds toys/objects in the home, stays in yard without wandering, crosses nearby streets alone).

The SIB-R also includes a problem behavior scale, which contains a summary of eight problem behavior areas organized into four Maladaptive Behavior Indexes (Internalized, Asocial, Externalized, and General). A support score can also be rendered that estimates the amount of support and supervision needed by an individual in personal and social activities, taking into account both adaptive and problem behaviors.

The SIB-R is a technically sound measure of adaptive and problem behaviors (Bruininks et al., 1996). Cluster and scale intercorrelations range from .91 to .99 and provide evidence of construct validity. The SIB-R correlates strongly with other measures of adaptive behavior and problem behavior, and evidence of discriminant validity among individuals with different types and severity of disabilities is reported. Test-retest reliability coefficients for the Broad Independence score and four cluster scores are reported above .95. Parent inter-rater reliabilities range from .88 to .95, and internal consistency reliabilities are greater than .84. For the Maladaptive Behavior Indexes, test-retest reliability coefficients range from .80 to .83, and parent inter-rater reliabilities range from .78 to .86.

The Test of Non-verbal Intelligence 2nd edition (TONI-2) (Brown, Sherbenou, & Johnson, 1990) was administered to each child as part of the comprehensive assessment battery in

the larger study. Intellectual differences between the two study groups were anticipated; however time and resource constraints did not permit administration of a full IQ test. The TONI-2 was therefore used as an IQ estimate. The TONI-2 is a relatively brief language-free, motor-reduced, and culture-reduced measure of cognitive ability involving abstract and figural problem solving. Internal consistency (Cronbach's alpha = .95), test-retest reliability ($r = .86$), and test-retest stability over one week ($r = .85$) are reported. The TONI-2 correlates significantly ($r = .64$ to $.85$) with other full-scale measures of intelligence such as the Weschler Intelligence Scale for Children-Revised (Weschler, 1974), indicating high concurrent validity.

Data analysis

ANCOVA was used to compare the performance between groups on the SIB-R adaptive cluster standard scores. The

TONI-2 standard score was entered as a covariate because, as expected, statistically significant group differences on nonverbal IQ were found (See Table 1) ($t [45] = -4.18, p = <.001$ [two-tailed]). Chi-square tests for independence or the Fisher Exact Test were used to compare group contrasts in proportions on demographic and categorical test variables (See Table 2). To explore performance on each of the 14 SIB-R subscales, a difference score was calculated by subtracting the child's age-equivalent scores from the child's actual age in days. To aide clinical interpretation, the mean group difference score was then divided by 365.25 to transform days into years. Group contrasts for the mean difference scores on each of the 14 SIB-R subscales were examined with t -tests. Significance levels for all contrasts were set at a two-tailed alpha $p = 0.05$. All p values for exploratory contrasts should be interpreted with caution due to multiple comparisons and the increased risk for Type I error.

TABLE 1
Participant demographic information (continuous variables).

Variable	FASD (n = 25)			TD (n = 23)			t value independent samples t test	p value
	Mean	(SD)	Range	Mean	(SD)	Range		
Child age (years)	6.5	0.89	5.0-8.0	7.0	0.95	5.3-8.5	-1.75	.087
IQ (Test of Non-Verbal Intelligence-2)	91.2	15.0	60-128	109.0	14.1	82-136	-4.18	.001

TABLE 2
Participant demographic information as reported by primary caregiver (categorical variables).

Variable	FASD (n = 25)		TD (n = 23)		χ^2 value	p value
	n	%	n	%		
Child gender						
Male	14	56	11	48	.32	.571
Female	11	44	12	52		
Child race/ethnicity						
Caucasian	12	48	13	57	3.89	.253
African American	3	12	2	9		
Hispanic/Latino	1	4	4	17		
Other/not reported	9	36	4	17		
Household caregivers						
Single caregiver	8	32	2	9	4.78	.092
Two caregivers	12	48	16	70		
Other/not reported	5	20	5	21		
Family structure						
Biological parent/s	2	8	18	79	34.45	.001
Foster/guardianship	7	28	2	9		
Adoptive	16	64	0	0		
Not reported	0	0	3	12		
Grade						
Preschool	7	28	0	0	8.59	.035
Kindergarten	8	32	9	39		
Grade 1	7	28	7	30		
Grade 2	3	12	7	30		

TABLE 3
Descriptive data and mean contrasts for the Scales of Independent Behavior-Revised Broad Independence score and adaptive behavior clusters.

Adaptive Clusters ^a	FASD (n = 25)			TD (n = 23)			p value ^b
	M	SD	Low/Hi	M	SD	Low/Hi	
Broad Independence							
Motor	81.68	23.65	37-138	107.39	13.89	84-131	.017
Social/Communication	91.52	23.57	40-133	110.30	17.17	78-146	.229
Personal Living	84.36	20.09	33-126	107.56	15.74	74-141	.007
Community Living	85.72	22.03	37-131	108.48	16.40	78-135	.003
	76.80	20.98	34-130	97.09	14.09	64-123	.017

Note. ^aBased on standard scores (M = 100; SD = 15). ^bTwo-tailed *p*-value for ANCOVA after adjustment for IQ.

Findings

Sociodemographic data for the study participants, 25 children with FASD and 23 children with TD, are presented in Tables 1 and 2. The groups were balanced by age, gender, and race/ethnicity. The groups differed significantly by grade level as several children with FASD were enrolled in preschool. The groups also differed significantly by family structure, but not by number of caregivers in the home. Only two children with FASD were living in a stable home situation with a biological parent at the time of the study, while the remaining 23 were in other stable home placements (e.g., foster, adoptive).

Table 3 presents descriptive statistics and mean contrasts for the SIB-R Broad Independence score and four adaptive cluster scores adjusted for IQ. Even with statistical adjustment for nonverbal IQ, the mean standard score for the SIB-R Broad Independence score was significantly lower for the group with FASD compared to the group with TD. Of the children with FASD, almost half (48%) scored 1.0 SD below the mean on the SIB-R Broad Independence score, with one-third (32%) of the sample scoring more than 2.0 SD below the mean. The mean scores on three of the four adaptive clusters (Social Interaction and Communication, Personal Living, and Community Living) were also significantly lower for the group with FASD. The mean score on the Motor Skills cluster was also lower, but the group contrast was not significant following adjustment for nonverbal IQ.

Performance across the 14 SIB-R adaptive subscales is profiled by group in Figure 1. All contrasts with the exception of Gross Motor Skills, Domestic Skills, and Home/Community Orientation were significant between the two groups. Results indicate that the children with FASD were performing most skills at an age level well below that of peers with TD; however, relative strengths in the Gross Motor, Personal Self-care, and Domestic subscales emerged. The

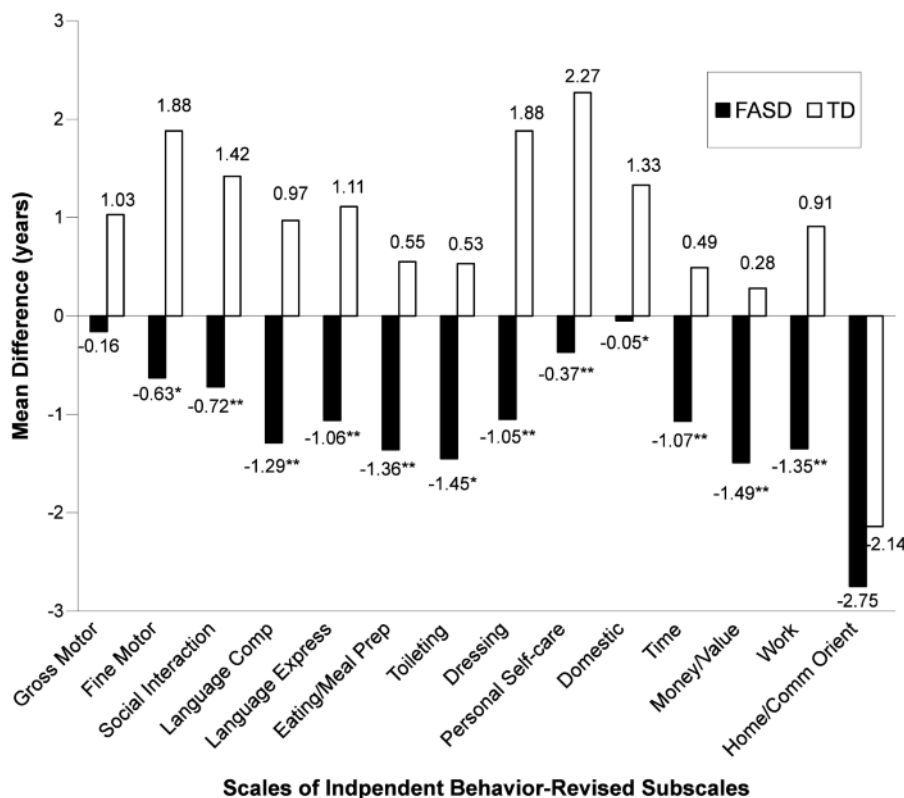
mean subscale age-equivalent scores were higher than expected for this group of children with TD; therefore, a post-hoc analysis contrasted the mean difference score for each subscale to the expected normative age-equivalent score of zero for the FASD group. Exploratory *t*-tests revealed significant differences in the following subscales: Language Expression, Eating/Meal Preparation, Toileting, and Dressing ($p < .05$); and Language Comprehension, Money/Value, Time/Punctuality, Work Skills, and Home/Community Orientation ($p < .001$). Performance on these subscales, with the exception of Home/Community Orientation, was significantly lower than both the comparison group and the SIB-R normative sample.

Table 4 describes performance on the Maladaptive Behavior Indexes, which indicates the seriousness of problem behaviors based on the reported frequency and severity. Children with FASD were classified in significantly more serious behavior categories than peers with TD across all of the indexes. The percentage of caregivers reporting each of the eight problem behaviors examined by the Maladaptive Behavioral Indexes is presented by group in Figure 2. For children with FASD, “disruptive behaviors” were the most frequently reported problem behaviors, followed by “uncooperative behaviors.” This was also true of children with TD, though their problem rates were far lower. Interestingly, “socially offensive behavior” was reported far more frequently among children with FASD (65%) relative to same-age peers with TD (9%).

The SIB-R support scores for both groups are presented in Table 5. The support score is a composite score derived from both adaptive behavior (SIB-R Broad Independence score) and problem behavior (General Maladaptive Behavior Index score). Six support levels describe the overall intensity of the estimated resources, supports, and supervision required to improve or maintain an individual's functional

FIGURE 1

Mean difference between age equivalent score and chronological age for Scales of Independent Behavior-Revised subscales by group.



Note. * $p < .05$. ** $p < .001$.

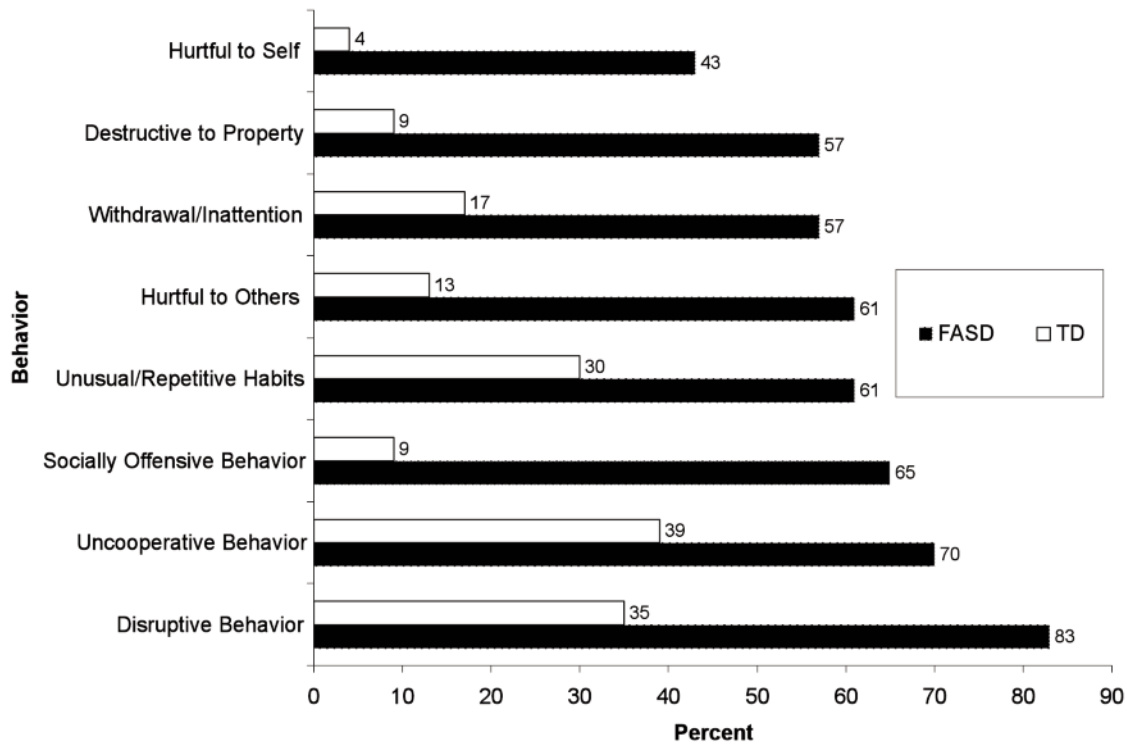
TABLE 4
Scales of Independent Behavior-Revised Maladaptive Behavioral Indexes: Contrasts by group.

Index Category	FASD (n = 23) ^a		TD (n = 23)		p-value ^b
	n	%	n	%	
General Maladaptive					.002
Normal	5	22%	22	96%	
Marginally Serious	10	44%	1	4%	
Moderate to Serious	8	34%	0	0%	
Internalizing					.001
Normal	11	48%	23	100%	
Marginally Serious	6	26%	0	0%	
Moderate to Serious	6	26%	0	0%	
Externalizing					.002
Normal	13	57%	22	96%	
Marginally Serious	3	13%	1	4%	
Moderate to Serious	7	30%	0	0%	
Asocial					.007
Normal	10	44%	21	92%	
Marginally Serious	4	17%	2	9%	
Moderate to Serious	9	39%	0	0%	

Note: ^a The behavioral indexes data on 2 participants with FASD were incomplete and not included in this analysis.

^b The Fisher exact statistic was computed after the groups were collapsed into Normal/Not Normal to adjust for small samples in some cells.

FIGURE 2
 Percentage of problem behaviors reported on the Scales of Independent Behavior-Revised Maladaptive Behavior Indexes



Note. The behavioral indexes data on 2 participants with FASD were incomplete and not included in this analysis.

independence in school, home, and other community settings. Most of these young school-aged children with TD (74%) were classified as needing “intermittent” support or less. In contrast, the majority of the children with FASD (74%) were perceived as needing “limited” or “frequent” support and supervision to manage daily adaptive skills and behavior, with a small percentage (13%) requiring “extensive” support and supervision.

Discussion

This clinic-referred sample of young children with FASD functioned significantly more poorly across caregiver-rated clusters of adaptive behavior involving social, personal living, and community-living skills and showed significantly more maladaptive behaviors than a comparison group of peers with TD. Indeed, results replicate earlier findings that describe compromised adaptive function among children with FASD; however, findings from the current study expand the literature in two important ways. First, children with FASD clearly required greater levels of support and supervision than same age peers with TD to help them perform daily activities and to manage challenging behaviors. This suggests that even though this group of children had, on average, nonverbal IQ performance within normal limits,

their capacity to successfully function at age level within several facets of home and community life was substantially limited by a combination of delayed adaptive skills and more frequent and severe problem behaviors. Second, although this group of children with FASD performed well below age expectations in most areas of function, on average about 1 to 2 years lower than the comparison group of peers, results provide a broader descriptive profile of the occupational performance of young children with FASD and reveal more specific areas of relative strength and need.

Findings underscore the clinical importance of addressing functional skills among this population. Occupational therapists are well suited to evaluate and support adaptive function at multiple levels by considering the impact of alcohol-related neurobehavioral impairments on component skills and how task demands, caregiver expectations, and other contextual factors interact to influence performance. Further, individuals with FASD often face challenges getting needed supports and services, and adaptive abilities may decline even further as children with FASD get older (Whaley et al., 2000). Therefore, advocating for or providing early, targeted interventions aimed at enhancing function and participation across daily living, social, and other adaptive domains appear critical and timely

TABLE 5
Proportion of children with FASD and TD across the Scales of Independent Behavior-Revised support score categories.

Level of Support	Category Description	FASD (n = 23) ^a		TD (n = 23)	
Pervasive	Pervasive, continuous support and supervision to manage behavior or support adaptive skills.	0	0%	0	0%
Extensive	Extensive or continuous support and supervision (needing someone in the same room or nearby) to manage behavior or support adaptive skills.	3	13%	0	0%
Frequent	Frequent or close support and supervision (one adult present or within close proximity) to manage behavior or support adaptive skills.	8	35%	0	0%
Limited	Limited but direct, consistent support and supervision to manage behavior and daily activities for much of day across settings.	9	39%	6	26%
Intermittent	Periodic support, advice, assistance, or supervision to manage behavior and support adaptive skills.	3	13%	16	70%
Infrequent	Infrequent support, advice, assistance or supervision to manage behavior and support adaptive skills.	0	0%	1	4%

Note: ^aThe behavioral indexes data on 2 participants with FASD were incomplete and not included in this analysis.

for both young children and their caregivers.

The increased level of support required by children with FASD is an important finding for both clinical practitioners and service systems. The SIB-R support score is expected to better predict service intensity than either the level of adaptive function or maladaptive behavior alone (Bruininks et al., 1996). This means, for instance, that a higher functioning individual with severe behavior problems may be more difficult to support than a lower functioning individual without problem behaviors. Children with FASD often present with “borderline” neurocognitive abilities that do not easily meet the eligibility criteria for supports and services available to children with other developmental disabilities (Streissguth, 1997), or they present with behavior problems that do not respond well to available intervention. Subsequently, they may not be served, or they may be provided with services that are not well-tailored to their actual deficits. These support score findings clearly show that considerable support for daily function is required for many children with FASD and, as such, begin to explain the burden of caregiving experienced by parents who report very high levels of child-related parenting stress (Olson et al., 2004; Paley, O'Connor, Frankel, & Marquardt, 2006).

The adaptive profiles revealed by examining performance on the SIB-R subscales generate more clinical insight into the daily function and needs of younger children with this set of neurodevelopmental disabilities. Motor skills were revealed as a relative strength among this sample of young children with FASD. However, closer analysis revealed that while gross motor abilities may be quite functional, fine motor skills may actually lag behind the more advanced abilities of children with TD, as noted in other studies (e.g., Adnams et al., 2001; Kahlberg et al., 2006).

Social communication has been described as an under-recognized but crucial area of need among children along the

fetal alcohol spectrum (Coggins, Olswang, Carmichael Olson, & Timler, 2003). Indeed, this sample of children with FASD was struggling to meet age expectations during social interactions requiring the use of social conventions and rules to engage with other people (e.g., taking turns, asking for food to be passed, playing games by the rules), and even more so in understanding and using language effectively on a daily basis in ways that become increasingly important with age (e.g., following directions, using verbal and written communication skills). It is essential to recognize social communication deficits and address them in order to fully promote the social development and participation of children with FASD (e.g., when teaching friendship skills).

Children with FASD acquired fewer age-appropriate ADL skills than children with TD in dressing, mealtime, and toileting domains. The impact on parents of raising children with problems in these areas is self-evident. Relative strengths among these young children were seen in the areas of personal self-care and the “domestic skills” of helping to maintain a home environment through such activities as household chores. Personal living skills have been reported as an area of relative strength among adolescents and adults affected by prenatal alcohol exposure (Olson, Feldman, Streissguth, Sampson, & Bookstein, 1998; Streissguth, 1997), but findings from this study suggest it is clearly not a uniform strength in the younger years. Results point out an important need to target self-help skill development in young children with FASD and help parents cope with caregiving needs that may persist over time. Implementing accommodations (e.g., visual schedules, clothing adaptations) or reframing developmental expectations may be useful interventions to support skill performance (Olson et al., 2004).

Higher-level skills tapped within the Community Living Skills cluster also fell below expected age norms. Certainly, many of these skills are expected to emerge later in life as

“executive functions” (higher level cognitive abilities) develop. But, it is notable that the early precursors to more complex skills and concepts involving time, money, and value (e.g., basic number recognition, calendar skills, understanding/telling time) were already lagging significantly behind peers with TD. These findings are congruent with reported deficits in arithmetic, cognitive estimation, and related conceptual impairments in older children, adolescents, and adults with FASD (Coles et al., 1991; Kopera-Frye, Dehaene, & Streissguth, 1996). Interestingly, both groups demonstrated lower than expected performance on home and community orientation activities. This may be a reflection of more contemporary personal safety trends that demand greater parental vigilance and supervision for all children within their neighborhoods and communities.

Because this was a clinical sample of children with FASD, it was expected that this group would exhibit more maladaptive behaviors than peers with TD. Indeed, slightly over three-quarters of the children with FASD were classified as having marginally serious to serious behavior problems on the General Maladaptive Behavior Index. Findings from this study, along with previous descriptions of behavioral and psychosocial problems (Brown et al., 1991; Mattson & Riley, 2000; Olson et al., 1998; Roebuck et al., 1999) highlight the importance of addressing problem behaviors in young children with FASD since they are an overarching concern and one of the primary reasons that families seek diagnosis or treatment (Spohr & Steinhausen, 1996). Disruptive behaviors (e.g., pestering, arguing, interrupting) and uncooperative behaviors (e.g., refusing to take turns or follow rules, acting defiantly, pouting) were reported among the majority of the children with FASD. In addition, however, slightly over half of the children with FASD also showed marginally serious to serious internalizing problems. Although externalizing behaviors may be easier to identify, these results, along with findings reported by O'Connor and Paley (2006), suggest that clinicians should also be aware of behavioral signs and risk factors for internalizing problems such as depression.

Limitations and directions for future research

Limitations of this study include the use of the SIB-R checklist version instead of the caregiver interview. This may have resulted in caregiver bias and higher ratings than actual performance levels for both groups. The small sample size and use of a clinical sample limit generalizability of findings to the entire population of children with prenatal alcohol exposure. The more advanced skills seen in this group of children with TD also may have spuriously increased the number of significant exploratory contrasts among the adaptive cluster subscales; therefore, descriptive findings should be interpreted with particular caution. Given the significantly higher IQ estimates among the children with

TD in this sample, the use of clinical comparison groups matched on IQ would strengthen future studies.

Finally, this study raises important questions about the nature of adaptive behavior deficits among those with FASD. Adaptive function rests on a broad, complex interplay of personal, environmental, and contextual factors. To learn how to best support occupational performance, future research into the adaptive skills of children with FASD should move forward from questionnaire studies of clinical samples to more intensive consideration of how child and context interact. Possible research directions include detailed qualitative interviews that focus on caregiver observations of adaptive function, direct observations of participation and performance in specific childhood contexts (home, school, recreational settings), or careful study of “resilient” children with FASD and the natural ecological factors that support them.

Conclusion

The group of young children with FASD in this study demonstrated caregiver-reported impairments in function and participation across multiple domains of occupational performance. Findings suggest that personal, social, and community-based adaptive skills as well as problem behaviors should be concurrently addressed when evaluating the development of young school-aged children with FASD and the needs of their caregivers. By considering how child, family, and other contextual factors interact, occupational therapists have the capacity to implement a wide range of supports, accommodations, and direct interventions to maximize independence and safety in daily activities and manage problem behaviors among this clinical population.

Key messages

- Young children with fetal alcohol spectrum disorders (FASD) demonstrate significant occupational performance deficits as indicated by adaptive skill delays and increased behavior problems relative to peers with typical development.
- Children with FASD need support and supervision beyond age-level expectations to perform daily activities safely and successfully.
- The deficits identified in this study fall within the scope of practice of occupational therapists.

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