
Observation of Classroom Social Communication: Do Children With Fetal Alcohol Spectrum Disorders Spend Their Time Differently Than Their Typically Developing Peers?

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Purpose: In this research, the authors examined how social communication profiles during classroom activities differed between children with fetal alcohol spectrum disorders (FASD) and typically developing pair-matched peers.

Method: Twelve pairs of children were observed in their classrooms 20 min a day for 4 days across 2 weeks. Coders documented classroom social communication by recording performance on handheld computers using the Social Communication Coding System (L. B. Olswang, L. Svensson, T. E. Coggins, J. Beilinson, & A. L. Donaldson, 2006). The Social Communication Coding System consists of 6 behavioral dimensions (prosocial/engaged, passive/disengaged, irrelevant, hostile/coercive, assertive, and adult seeking) that account for all verbal and nonverbal productions during a specified timeframe. The frequency of occurrence and duration of each dimension (as measured by proportion of time and average length of time spent performing each dimension) were recorded.

Results: Children with FASD had significantly more occurrences of passive/disengaged and irrelevant behavior, and the proportion and average length of time in these behaviors were larger and longer than those of their peers. Further, children with FASD had significantly more occurrences of prosocial/engaged behavior; however, the proportion and average length of time that they spent being prosocial were smaller and shorter than those of their peers.

Implications: Results suggest children with mild FASD performed differently than their peers in regard to classroom social communication, which was consistent with parent and teacher behavioral reports.

KEY WORDS: fetal alcohol syndrome, observation, school-age children, elementary schools

School-age children who have been diagnosed with fetal alcohol spectrum disorders are frequently noted to have difficulty interacting with peers in classroom situations. Teachers as well as parents have expressed concerns about social communication for these children, along with their other behavioral and academic problems (see, e.g., Jacobson & Jacobson, 2002, for a review). Yet, for these children, the nature of the social communication problems has been difficult to portray and even more challenging to document. Standardized tests do not capture the nature of the problems, and teacher ratings yield a more global view of performance. Researchers who are interested in social

communication that occurs during dynamic, interactive events in natural contexts have long been vigorous advocates of using authentic, real-time observation (Damico, 1992; Dodge, McClaskey, & Feldman, 1985; Fujiki, Brinton, Isaacson, & Summers, 2001; Lund & Duchan, 1993; Olswang, Coggins, & Timler, 2001; Prutting & Kirchner, 1987; Rice, Sell, & Hadley, 1990). Continuous recording of ongoing verbal and nonverbal behaviors offers an opportunity to document not only individual, momentary behaviors quantified as frequency of occurrence but also behavior states or behavioral dimensions quantified using duration measures (Bakeman & Gottman, 1997; Olswang, Coggins, & Svensson, 2007; Olswang, Svensson, Coggins, Beilinson, & Donaldson, 2006). For children who are at risk for social communication problems, this perspective can provide a unique and valuable insight into classroom performance as the children interact with others. In the present study, we examined the social communication of children with fetal alcohol spectrum disorders and matched peers by documenting frequency of occurrence and duration of behavioral dimensions as they were observed in classroom settings. The purpose is to document the social communication profile of children with fetal alcohol spectrum disorders and to determine whether their profile differs from that of matched, typically developing peers.

Prenatal Alcohol Exposure and Social Communication Problems

Fetal Alcohol Spectrum Disorders

Children with prenatal alcohol exposure range in their diagnoses, from the full diagnosis of fetal alcohol syndrome (FAS) to the classification of alcohol-related neurodevelopmental disorders (ARND; Stratton, Howe, Battaglia, & the Committee to Study Fetal Alcohol Syndrome, Institute of Medicine, 1996). The label *fetal alcohol spectrum disorders (FASD)* has been used to cover this range. At one end of the continuum, FAS is characterized by growth deficiency, a unique set of minor facial anomalies, documented central nervous system (CNS) structural and/or functional abnormality, and confirmed prenatal alcohol exposure. Children with FAS may demonstrate an array of neurobehavioral problems, including cognitive, social, and language deficits that range in severity and that challenge the children's success in school and beyond. At the other end of the continuum, children with ARND are known to have been exposed to alcohol prenatally, yet they do not show the growth or facial features associated with FAS. They, too, exhibit a range of neurobehavioral problems reflecting some type of CNS damage, but typically, deficits are less severe, and a causal link to their prenatal alcohol exposure cannot be confirmed or ruled out. The documented array of

disabilities in children with FASD likely contributes to social communication problems being one of the most prevalent characteristics of this population (Coggins, Olswang, Carmichael Olson, & Timler, 2003).

Social, Behavioral, Language, and Neuropsychological Characteristics of Children With FASD

Children with FASD who are enrolled in regular and special classrooms are frequently described as having difficulty managing social interactions, including notable behavior problems. Because prenatal exposure to alcohol can interfere with the developing brain at multiple levels and can alter the coordinated developmental schedule of the CNS, it can have long-term consequences for several domains of development that impact social performance and, ultimately, learning (Carmichael Olson, Morse, & Huffine, 1998; Streissguth & Kanter, 1997).

Data from teacher and parent questionnaires as well as anecdotal and clinical reports abound in reference to social and behavioral problems that these children exhibit (Brown et al., 1991; Carmichael Olson, Feldman, Streissguth, Sampson, & Bookstein, 1998; Coles et al., 1997; Kleinfeld & Wescott, 1993; Mattson & Riley, 2000; Steinhausen, Willms, Metzke, & Spohr, 2003; Streissguth & Kanter, 1997; Thomas, Kelly, Mattson, & Riley, 1998). The authors of these studies have used a variety of methodologies and terminology to describe performance; the focus in this review is on those characteristics that likely pertain to social communicative interactions. In research based on teacher and parent ratings of adaptive behavior, children with prenatal alcohol exposure are viewed as having difficulty managing social situations (e.g., Mattson & Riley, 2000; Steinhausen et al., 2003). For example, using the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984) to examine adaptive functioning of children with FASD as reported by their parents, Thomas et al. (1998) found that children diagnosed with the full FAS exhibited significant deficits across the three domains of communication, socialization, and daily living skills compared with typically developing children. Children with FAS were most impaired in the subdomain measuring interpersonal relationships. These researchers noted that the social problems associated with prenatal alcohol exposure did not appear to be solely the result of decreased cognitive functioning, suggesting that social abilities may be of particular concern (Thomas et al., 1998). Other researchers, using The Child Behavior Checklist (CBCL; Achenbach, 1991a, 1991b) to examine social skills and behavior problems as reported by parents or teachers, have found similar outcomes. Brown et al. (1991) discovered that children who had been exposed to alcohol throughout pregnancy were rated by

their teachers as showing more problem behaviors than children whose mothers never drank or stopped drinking by the second trimester. Likewise, using CBCL parent ratings, Mattson and Riley (2000) found that children with FASD were more impaired on the Total Problem scale than children who were not exposed to alcohol and who were matched for verbal IQ. Clinical observational reports also refer to social and behavioral problems as being commonly exhibited by children with FASD. For example, it has been reported that many children with FASD display impulsive, aggressive, assertive, and unpredictable behaviors (Aronson, 1997; Streissguth, 1997; Tanner-Halverson, 1997), and difficulty with peer interactions is a recurring theme (Kleinfeld & Wescott, 1993).

Researchers have noted that children with prenatal alcohol exposure have difficulty resolving conflicts and anticipating the consequences of their actions (Caldwell, 1993; Timler & Olswang, 2001; Timler, Olswang, & Coggins, 2005). Related specifically to the challenges that children with FASD face in interacting with peers, Timler and colleagues (Coggins et al., 2003; Timler, 2000) examined nine children with prenatal alcohol exposure using social conflict vignettes. The vignettes described a conflict with a peer that a child was asked to resolve. In comparison with typically developing peers, children with FASD produced fewer prosocial/engaged strategies for resolving conflicts and more passive/disengaged, hostile/coercive, assertive, and adult-seeking strategies. Even when the children were given choices for how they might resolve the conflicts, the children with FASD still selected fewer prosocial/engaged strategies and more hostile/coercive ones. These data are notable, suggesting that children prenatally exposed to alcohol would be at risk for problems in their social interactions.

In addition to social and behavioral problems being characteristic of this population, language difficulties have been repeatedly observed. Although language deficits have been hard to consistently document using standardized tests, problems using language in conversation and narratives appear prevalent (Coggins, Friet, & Morgan, 1998; Coggins et al., 2003; Thorne, Coggins, Carmichael Olson, & Astley, 2007). In particular, the challenges include difficulty producing language that takes into account the listener's perspective and responding appropriately to assumptions about shared knowledge. Recently, Thorne and colleagues (2007) found difficulties with the production of cohesive narratives by children with FASD resulting, in part, from errors with a syntactic element marking nominal reference. This error illustrates the link between syntax and language use, which is notable because it could disrupt communication during social interactions.

Further evidence on specific neuropsychological limitations exhibited by children with FASD may contribute

to the challenges these children demonstrate during social interactions. Various studies have documented deficits in executive function, including limitations in planning, inhibition, self-regulation, attention, and memory (Coles et al., 1997; Kodituwakku, Handmaker, Cutler, Weathersby, & Handmaker, 1995; Mattson, Calarco, & Lang, 2006; Mattson, Goodman, Caine, Delis, & Riley, 1999). It appears that these deficits are manifested in performance decrements that are frequently accompanied by behavior problems and social ineptitude. Furthering the challenge for these children, Kodituwakku (2007) observed that the children's behavior suffers when task complexity increases—which, of course, is a hallmark of advancement in school and participation in academic and social situations.

Summary—Child Characteristics and the School Setting

In summary, the phenotype of children with FASD is characterized by social, behavioral, and language problems that disrupt interactions with peers and that appear to be influenced by task complexity. These characteristics—along with neuropsychological problems in planning, inhibition, self-regulation, and attention and memory—arguably contribute to the challenges facing these children in school settings. In particular, children with FASD may suffer in social and academic situations because their deficits interfere with their ability to be as engaged as they need to be. Student engagement, inferred from performance (attention, work completed, appropriate participation), is key to motivation and, ultimately, learning or mastering knowledge or skills (Newmann, Wehlage, & Lamborn, 1992). A number of researchers have shown the value of observation in addition to teacher report in identifying factors that might impact engaged performance in the classroom (Fredricks, Blumenfeld, & Paris, 2004; Powell, Burchinal, File, & Kontos, 2008). These studies, using an eco-behavioral approach, have begun to isolate factors (e.g., teacher talk, activity type) that can facilitate children's engaged performance. This approach has great appeal for examining the performance of children with FASD as they struggle with their deficits and strive to meet classroom expectations. However, prior to determining what factors might be influencing performance, first we need to (a) better understand and document the performance of children with FASD as they interact in classroom settings and (b) examine the differences between children with FASD and their typically developing peers. Determining the nature of performance in the classroom will not only reveal more about the phenotype but also provide implications as to how to better work with these children to improve social communication and, ultimately, school outcomes.

Social Communication—Observation

Social communication, which is viewed as ongoing verbal and nonverbal behaviors during interactive contexts, allows for the observation of behavioral states or dimensions as well as the observation of discrete, momentary behaviors. This approach has been advocated by several researchers interested in social interactions (Bakeman & Gottman, 1997) and classroom performance, particularly behavioral engagement (Fredricks et al., 2004). The value in viewing and coding states versus individual, momentary behaviors comes, in part, from research on peer relations, particularly in regard to peer acceptance and rejection. Specifically, Bierman (2004) argued that a child's social behaviors that are clustered into the dimensions of prosocial/cooperative, aggressive/disruptive, inattentive/immature, and anxious/avoidant provide the best empirical evidence that reflects peer social status and problematic peer relationships. These behavioral dimensions, or variations on these particular categories, have been used with different methodologies, such as peer nomination tasks or ratings (e.g., Pope, Bierman, & Mumma, 1991), teacher ratings (e.g., Flanagan, Bierman, & Kam, 2003), and observational rating scales (e.g., Ladd & Profilet, 1996). Recently, this dimensional view of performance was adopted for use in observational methodology designed to describe the frequency of occurrence of behavior states and their durations performed by children in classrooms (Olswang et al., 2006).

The Social Communication Coding System (SCCS; Olswang et al., 2006) was designed to capture how children spend their time as they interact with others in the classroom. Using a dimensional perspective based on the work by Bierman (2004) as well as by Asher and colleagues (e.g., Chung & Asher, 1996), a child's social communication status can be coded into one of six mutually exclusive categories suggesting manner of performance: prosocial/engaged, passive/disengaged, irrelevant, hostile/coercive, assertive, or adult seeking. For example, the dimension of *prosocial/engaged* is defined by verbal and nonverbal behaviors reflecting that a child is engaged in a task, such as a child's commenting, raising his or her hand, watching a demonstration, and/or asking a question. *Passive/disengaged* includes behaviors such as looking out the window or moving away from a group activity. The *irrelevant* dimension captures behaviors that are out of place, unrelated, extraneous, or odd according to what is expected at the time. The *hostile/coercive* dimension is defined by a child's verbal and nonverbal behaviors that reflect aggressive or intimidating actions, such as hitting, pushing, or teasing, versus the *assertive* dimension, which reflects a child's being firm or outspoken about an opinion but without crossing a line that is perceived

as threatening. Finally, *adult seeking* refers to verbal and/or nonverbal communication that solicits help or attention from an adult. In the classroom, social communication as measured by dimensions is conceptualized as always occurring, with categories being mutually exclusive. As such, during a classroom activity, all categories of behavioral dimensions may occur, but research has indicated that these behavioral dimensions are not expected to be equally occurring. As identified by Powell and colleagues (2008), who recently examined engagement in early childhood classrooms, children spend their time primarily being engaged (47% of the time) or attentive (40% of the time).

An advantage of conceptualizing social communication behavioral dimensions is that performance may be analyzed as a function of occurrence as well as duration. Historically, frequency of occurrence has been useful in describing the individual behaviors that a child is demonstrating to illustrate his or her consistency or variety in performance during classroom interactions. For example, Damico (1992) counted frequency of illocutionary acts. Although informative, frequency of occurrence captures only part of the picture. Critical to the profile of children is the amount of time that they spend demonstrating each of the social communication behavioral dimensions; thus, duration becomes important to measure.

Two valuable types of duration data are the proportion of time and the average length of time that children spend demonstrating different social communication behavioral dimensions. *Proportion of time* reveals how much of a given time period (e.g., specific activity or part of a school day) a child spends demonstrating each social communication behavioral dimension (i.e., prosocial/engaged, passive/disengaged, irrelevant, hostile/coercive, assertive, adult seeking). *Average length of time* reveals the mean duration of each occurrence of a particular dimension. Across activities and/or days, an observer could create a profile of performance capturing how a child primarily performs. For example, a child who spends a relatively large proportion of an activity demonstrating irrelevant performance would likely be of concern, considering irrelevant behaviors are typically off task. Thus, for a thorough look at classroom performance, both frequency and duration measures are critical.

Purpose of the Research

The increasing difficulties that children with FASD exhibit in social situations as they grow older no doubt result from greater societal demands to be responsive to a variety of individuals across a variety of situations. Managing social interactions becomes increasingly

important and challenging when children enter school (Campbell & Siperstein, 1994). To date, research has not documented real-time social communication performance for this population in natural settings, such as school, to validate teacher and parent concerns. The overall sense is that social/behavioral problems exist, but the nature and extent of these problems as they are manifested in everyday settings during social communication interactions are not well understood. Specifically, research has not quantitatively documented the classroom performance of children with FASD, particularly those on the mild end of the continuum who are enrolled in regular education classrooms.

The purpose of this research was to examine the social communication performance of children with FASD compared with their matched, typically developing peers during classroom activities. In the study, we used an observational methodology that employed a behavioral dimensional coding taxonomy yielding frequency and duration data. The following general question was addressed: When social communication performance is divided into six mutually exclusive dimensions (prosocial/engaged, passive/disengaged, irrelevant, hostile/coercive, assertive, and adult seeking), do two groups of children (i.e., a group diagnosed with FASD and a group of matched, typically developing peers) demonstrate different profiles of social communication in regard to frequency of occurrence and duration (proportion and average length of time) of each dimension in a classroom setting?

Method

Participants

In this paired, case-control study, participants consisted of 12 children with FASD (cases) and 12 typically developing (TD) children (controls), ages 7;5–11;8 (years;months). Each child with FASD was pair matched on gender and age to a TD classmate in the same regular education classroom; therefore, this study included 12 classrooms. Each matched pair was observed alternately in their classroom to document social communication performance using the SCCS (Olswang et al., 2006), a behavioral dimensional coding system. The children with FASD were previously diagnosed and recruited through the Washington State Fetal Alcohol Syndrome Diagnostic and Prevention Network (FAS DPN) at the University of Washington (described in the sections that follow). The TD children were identified by their respective teachers. For all children, consent to enroll was obtained from the caregiver, the child's teacher, and the child (i.e., informed assent) following the University of Washington Human Subjects Institutional Review Board approval policy. Demographic data were obtained from the caregiver.

Identification and Selection of FASD Participants

For this study, we recruited children with FASD who met the inclusion/exclusion criteria detailed in the subsections that follow.

Inclusion Criteria

Each child had to meet six criteria for inclusion in the study:

1. Child was age 7;0–12;0.
2. Child had an FASD diagnosis of FAS, partial FAS, static encephalopathy/alcohol exposed, or neurobehavioral disorder/alcohol exposed. The last two diagnoses are comparable to the U.S. Institute of Medicine (Stratton et al., 1996) diagnostic criteria for ARND with confirmed prenatal alcohol exposure. More specifically, they would be equivalent to severe and mild ARND, respectively.
3. Child performance was in the clinical range on the Problem Behaviors subscale (i.e., standard score > 115) of the Social Skills Rating System (SSRS)–Teacher Form (Gresham & Elliott, 1990). Sample items from the Problem Behaviors component of the SSRS include fights with others, threatens or bullies others, appears lonely, appears easily distracted, interrupts conversations, disturbs others, does not listen to what others say, has temper tantrums, and acts impulsively. We included this criterion to further ensure that the children identified by the FAS DPN met the description of the FASD phenotype as described previously.
4. Child had a composite IQ score of no more than 1.0 *SD* below the mean (i.e., a standard score \geq 85) on the Kaufman Brief Intelligence Test (Kaufman & Kaufman, 1990; administered by a certified speech-language pathologist [SLP]).
5. Child had been mainstreamed in a regular education classroom.
6. Child was residing in the greater Seattle area.

Exclusion Criteria

Children were excluded if they met any of the following five criteria:

1. Eligible comparison classroom peer could not be identified.
2. There was a confirmed presence of severe psychiatric condition (e.g., schizophrenia, pervasive developmental disorder, etc.).
3. There was a confirmed presence of severe physical or motor handicaps.

4. Child had hearing or vision impairment.
5. English was not used as primary language at home.

Identification and Selection of TD Participants

The TD control participants were identified by the regular education teacher in the classroom of the experimental participant with FASD. For this study, we recruited TD control participants who met the inclusion/exclusion criteria detailed in the subsections that follow.

Inclusion Criteria

Children had to meet the following five criteria for inclusion in the study:

1. Child was enrolled in the same classroom as the pair-matched child with FASD. The teacher was asked to select a child who was as close a cognitive match as possible.
2. Child performance was not in the clinical range on the Problem Behaviors subscale (i.e., standard score < 115) of the SSRS–Teacher Form (Gresham & Elliott, 1990).
3. Child had a composite IQ score of no more than 1.0 *SD* below the mean (i.e., a standard score \geq 85) on the Kaufman Brief Intelligence Test (Kaufman & Kaufman, 1990).
4. Child was the same gender as the child with FASD to whom he or she was matched.
5. Child's chronological age was within ± 6 months of the chronological age of the matched child with FASD.

Exclusion Criteria

Children were excluded if they met any of the following four criteria:

1. There was a confirmed presence of severe psychiatric condition (e.g., schizophrenia, pervasive developmental disorder, etc.).
2. There was a confirmed presence of severe physical or motor handicaps.
3. Child had hearing or vision impairment.
4. English was not used as primary language at home.

Table 1 presents the sociodemographic and clinical description of the study population. The FASD group consisted of one child with partial FAS, two with severe ARND, and nine with mild ARND. The FASD–control pairs were effectively matched on age and gender. IQ was also comparable between the two groups. By design,

the FASD group had a significantly higher mean score on the Problem Behaviors subtest of the SSRS.

Equipment

Data on social communication behavior dimensions and type of situation in which they occurred were collected in real time in the classroom using the SCCS (Olswang et al., 2006), which is a handheld computer-based (Palm, M100) coding system developed by the Child Language Laboratory at the Department of Speech and Hearing Sciences, University of Washington. The sessions were not videotaped. This technology allowed for coding the duration of social communication behavioral dimensions. Specifically, as the researcher observed the child in the school environment, data were entered by tapping a stylus on specific entries via drop-down menus.

Selecting a child social communication behavioral dimension started a time code for that dimension. On selecting a new dimension, the duration of the previous dimension ended, and the duration for the new code started. The dimensions were mutually exclusive, and only one could be selected at a time. As long as the observation was occurring, a code was entered into the Palm device. The data were coded by subject number and observer number and were later sent to a secure central database for analysis (American Head and Neck Society Speech and Language Otobase; Coltrera, 2002).

SCCS: Behavioral Dimensions

The SCCS included six *behavioral dimensions*—that is, clusters of discrete behaviors to describe state or manner of performance (based on Bierman, 2004; Chung & Asher, 1996)—which are described in the text that follows.

Prosocial/engaged. This dimension reflected a child being engaged in a social interaction or the school activity relative to teacher's expectations, school rules, or the surrounding context (e.g., peer behaviors). Examples include listening attentively, on-task work or conversations, helping, sharing, compromising, and making an appropriate request or comment. For instance, during a cooperative group work activity, a child may constructively interact with his or her peers using appropriate language and staying on task, thus displaying prosocial/engaged behavior.

Passive/disengaged. This dimension reflected a child's lack of involvement in the situation or activity and/or physical disengagement from the activity. Examples include staring into space, putting his or her head down, or walking away from an activity without a clear

Table 1. Clinical and sociodemographic description of the study population: Children with fetal alcohol spectrum disorders (FASD) and their typically developing (TD) matched peers.

Characteristic	FASD (n = 12)	TD (n = 12)	Stat	p
Age in years: M (SD)	9.2 (1.1)	9.1 (1.3)	paired t = 0.32	.75
Gender—Females: n (%)	6 (50)	6 (50)	χ^2 Yates = 0.17	.68
Race—Caucasian: n (%)	6 (50)	4 (33)	χ^2 Yates = 0.67	.41
SSRS Problem Behavior Standard Score: M (SD)	122.8 (7.4)	92.5 (9.0)	paired t = 10.23	.000
K-BIT IQ Standard Score: M (SD)	109.8 (12.5)	114.7 (10.8)	paired t = -1.36	.20
FASD 4-digit code diagnosis: n			N/A	
Full FAS	0	0		
Partial FAS	1	0		
Static encephalopathy/alcohol exposed ^a	2	0		
Neurobehavioral disorder/alcohol exposed ^b	9	0		
Typical development/no alcohol exposure	0	12		
Grade level: n (%)			$\chi^2 = 0.0$	1.0
Grade 2	5 (42)	5 (42)		
Grade 3	2 (17)	2 (17)		
Grade 4	4 (33)	4 (33)		
Grade 5	1 (8)	1 (8)		
Home placement: n (%)			$\chi^2 = 12.6$.000 ^c
Birth family	1 (8)	10 (82)		
Adoptive family	8 (67)	1 (8)		
Foster family	3 (25)	0 (0)		

Note. SSRS = Social Skills Rating System—Teacher Form (Gresham & Elliott, 1990); K-BIT = Kaufman Brief Intelligence Test (Kaufman & Kaufman, 1990); Stat = statistic; N/A = not applicable. Blank cells indicate xxxxxxxxxxxxxxxxxxxxxxx.

^aEquivalent to Institute of Medicine (IOM) severe alcohol-related neurodevelopmental disorder (ARND). ^bEquivalent to IOM mild ARND.

^cBirth family versus other placement.

purpose or instruction. For instance, when working together with peers on solving a problem, a child may become passive/disengaged and put his or her head down instead of actively participating in the ongoing discussion.

Irrelevant. This dimension reflected (a) a child being actively engaged in an off-task behavior in which the child says or does something that he or she is not supposed to do according to teacher instructions and classroom rules or (b) behaviors that are out of place, unrelated, extraneous, or odd. Examples include starting an activity that is different from the teacher-directed task, fiddling with objects as a main focus of attention, engaging in goofy or silly behaviors, or saying something that bears no relationship to the task at hand. For instance, during a class discussion, a child may engage in irrelevant behavior by leaning back and whispering to a peer.

Hostile/coercive. This dimension reflected a child's aggressive behavior or ridicule of another child; typically, these behaviors would be considered unacceptable in a social situation, according to the teacher and the rules of the school. Examples include grabbing, hitting, pinching, kicking, pushing, taunting, provoking, yelling, and screaming. For instance, during negotiating a conflict with peers, a child might get hostile and hit or scream.

Assertive. This dimension reflected a child stating a position, opinion, or idea in a firm, persistent, or bold way. Examples include stressing a point, demonstrating an assertion of rights or beliefs (verbally or nonverbally), and persuading or directing another person. For instance, when a peer leans over and whispers something during quiet independent work, a child may firmly state, "Stop whispering! I have to finish this," thus displaying assertive behavior.

Adult seeking. This dimension reflected a child making an effort to seek assistance or attention from an adult. Examples include requesting help from an adult, summoning the teacher from across the room, and moving to the teacher to initiate an interaction. For instance, during a small-group discussion, a child goes to find the teacher and asks the teacher if he or she will tell the child's peers that they need to listen to the child's ideas.

Classroom Setting and Specific Data Collection Procedures

Within 2 weeks of qualifying for entry into the study, data on the children's social communication performance were collected in the children's classroom. Observations

were conducted 20 min per day for each child, on 4 separate days, occurring within 2 weeks whenever possible. The time period of 4 days was selected for three major reasons: (a) representativeness—recommendations that observational data be collected for at least two or three sessions in the setting of concern (following Walker, Ramsey, & Gresham, 2004); (b) feasibility—challenges associated with arranging and scheduling observations in the schools; and (c) maturation effects—intent of capturing performance within a short enough period of time to avoid child maturation/development or changes that might occur in the classroom over time. Each observation was conducted in the respective classrooms of each child pair. Children were observed in their classrooms at times that were convenient to the teacher. However, the teachers made an effort—at the request of the study team—to include two major types of activities: (a) small-group, cooperative work among students and (b) large-group work involving the teacher as leader. The former included math, science, and art activities, in which the students worked in small groups to complete a specific task. The latter involved the teacher at the “head of the class” giving instructions, leading a discussion, or giving a test. Because the intent of this study was to observe children in their natural environment, requests to the teacher to alter his or her typical day were held to a minimum. To account for day and activity effect, data were collected for the TD-matched peer on the same days as for the child with FASD. The coder alternated between observing the child with FASD and his or her matched peer in 5-min sessions (20 min per child) as they participated in classroom activities. Order of coding was counterbalanced by alternating which child was coded first on the different observation days. The coder observed for 5 min before starting the actual coding in order to reduce subject reactivity. The child was allowed to interact with any peer(s) or with the teacher during the observations. The goal was to be an unobtrusive observer.

Observational data were collected by three trained observers. Observer training is described in the section that follows. All observers were female certified SLPs with an average of 12.3 years of clinical experience (3, 5, and 29 years, respectively). These observers were different from the SLP who conducted initial testing. Because the informed assent was obtained from the children at the time of initial testing, the children were aware of the observers' participation in a study but had not met the observers.

Before the observations started, the observer(s) spent a few minutes talking to the teacher to get further information about the classroom (e.g., activity), how the experimental and control children were doing that day, best positions for observing, restrictions about walking around the room, and reminding the teacher about how to introduce the observers. The teacher subsequently introduced the observer(s) by telling the class: “We have

one (two) visitors from the University of Washington who will be watching our class today. They will be staying a while today and other days. They will be sitting or walking around quietly taking some notes.”

Observers arranged themselves as close to the target child as possible in order to hear conversations and see the target child's gestures and nonverbal cues from a front or side angle view. Often, this entailed some quiet moving around the classroom, especially during small-group activities. In order to be as unobtrusive as possible, observers looked at a variety of children in the classroom or the teacher during the first 5 mins before actual coding started and during intermissions between coding sessions.

Observer Training

Training of the three observers occurred over 3 months for approximately 30 hr (see Olswang et al., 2006, for details). Training involved a series of phases including discussing relevant articles addressing social communication; reading the *SCCS Procedural Manual* (Olswang & Svensson, 2005), which included definitions of behavioral dimensions, examples, and short written quizzes; and then practicing and being tested on coding of children in a variety of classroom settings via videotape. Video coding was done independently by observers and then was compared using the Kappa (κ) coefficient. Live coding was not allowed until interobserver agreement testing achieved a κ value of .60 or better on at least one set of ten 2-min video segments. Guidelines for interpreting κ values were borrowed from Cicchetti and Sparrow (1981).

Observer Agreement for In-Class Observation

To examine interobserver agreement during the live observations, approximately 25% of the data were coded concurrently by two independent observers. Eighteen children were observed simultaneously by two observers (nine children with FASD and nine TD children) for 1 or 2 days. Following Olswang and colleagues (2006), interobserver agreement was assessed using time-interval analysis. This procedure—which was based on the work of Cordes, Ingham, Frank, and Ingham (1992)—divides an observation period into fixed time-interval units, which allows for comparison across observers. Time-interval analysis is an effective and appropriate strategy that can be applied to analyzing agreement of occurrence and duration judgments (Cordes et al., 1992; Olswang et al., 2006). Agreement is determined by dividing the actual time frame of observation into fixed time-interval units for comparison across observers. Breaking down the entries into preset intervals allows for an interval-by-interval comparison of type of behavior present; the continuous,

real-time duration data may now be manipulated and analyzed for agreement in the same way as data collected using interval recording. In the present research, time-interval units for examining reliability were set to 5 s because this is the shortest duration in which any coding entry can be conducted and based on the results by Olswang and colleagues (2006). For each interval, the dimension that was coded defines the interval. If two behaviors occur during the interval, the one with the longest duration defines the interval. Using the interval data, Cohen's κ was calculated to provide a summary agreement score between observers for coding the six SCCS behavioral dimensions for each child whose data were included in this analysis. In addition, to provide another index of agreement, point-by-point percent agreement between intervals was calculated using the same data set for each child. Table 2 provides a list of children with number of observation days, number of 5-min observation sessions, and number of intervals included in agreement analyses. This table also presents the κ values and point-by-point percent agreement for the independent observers' coding of the agreement data set for each child using an interval-by-interval analysis. Guidelines for "acceptable" κ values followed the recommendations of Cicchetti and Sparrow (1981): $\kappa < .40$ = poor agreement; κ between $.40$ and $.59$ = fair agreement; κ between $.60$ and $.74$ = good agreement; $\kappa > .75$ = excellent agreement. For percent agreement, an "acceptable" agreement level was defined as at least 80% agreement (following Cordes et al.,

1992). Using these guidelines, the data of five children stood out as below the acceptable level of agreement either by virtue of their overall κ value or point-by-point percent agreement. For these children, point-by-point percent agreement, including chance, was calculated for all codes that the children demonstrated. These data are presented in Table 3. The results presented in this table indicate high point-to-point agreement for each of the behavioral dimensions. In all cases, percent agreement is equal to (i.e., TD11: passive/disengaged) or better than chance when the behavioral dimension occurred. It is worth noting the high levels of chance; this reflects, for some categories, extremely high levels of occurrence or nonoccurrence of entries, which is known to increase chance (McReynolds & Kearns, 1983). This is particularly noteworthy for the categories of hostile/coercive, assertive, and adult seeking. These data indicate that the agreement analyses, which were conducted live in the school setting, were comparable to the agreement that was achieved via videotapes (Olswang et al., 2006), confirming the success of the training and SCCS coding.

Data Reduction

Children's social communication performances in classrooms were coded into the six mutually exclusive social communication behavioral dimensions via the SCCS, as described previously. These coded data were

Table 2. Live observation (Social Communication Coding System) interobserver agreement using time-interval analysis: Overall κ (all codes) and point-by-point percent agreement between coded intervals.

Participant	Days	Number of 5-min observation sessions	Number of total 5-s intervals	κ	% point-by-point agreement between coded intervals
FASD1	2	6	382	.69	82
TD1	2	8	510	.49 ^a	96
FASD2	1	5	321	.66	95
TD2	1	4	254	.85	99
FASD4	2	8	510	.67	87
TD4	2	8	504	.29 ^a	89
FASD5	2	8	509	.62	87
TD5	2	7	401	.56 ^a	85
FASD8	1	4	257	.74	83
TD8	1	4	255	.67	87
FASD9	1	5	318	.69	89
TD9	1	4	250	.65	97
FASD10	1	3	191	.84	95
TD10	1	3	193	.90	98
FASD11	1	5	254	.66	84
TD11	1	4	249	.48 ^a	92
FASD12	1	4	236	.58 ^a	78 ^a
TD12	1	4	254	.70	90

^aFor overall $\kappa < .60$ and/or percent agreement $< 80\%$, point-by-point agreement—including chance—was calculated for each of the social behavioral dimensions (see Table 3).

Table 3. Point-by-point agreement (and chance) for all behavioral dimensions.

Participant	κ all codes	% point-by-point agreement (and chance)						
		All codes	Prosocial/engaged	Passive/disengaged	Irrelevant	Hostile/coercive	Assertive	Adult seeking
TD 1	.49	96	96 (92)	99 (98)	97 (94)	99 (99)	99 (99)	No occurrence
TD 4	.29	89	91 (86)	97 (94)	94 (93)	99 (99)	98 (98)	No occurrence
TD 5	.56	85	90 (68)	91 (86)	93 (82)	99 (99)	99 (99)	97 (97)
TD 11	.48	92	93 (85)	97 (97)	94 (87)	No occurrence	No occurrence	No occurrence
FASD 12	.58	78	86 (57)	93 (87)	85 (68)	No occurrence	No occurrence	97 (93)

used for data reduction and analysis. As a reminder, actual coded data, not interval data, were used for data reduction and analysis; intervals were used only for examining interobserver agreement. Coded data were summed across the four observation days to ensure representativeness of child performance (note that day-to-day performance variation was examined in a separate study; see Svensson, 2006). Four primary outcome measures were computed to document the performance based on the six social communication behavioral dimensions, as follows: (1) number of children exhibiting each of the behavioral dimensions, (2) frequency of occurrence of each behavioral dimension that was coded, (3) proportion of time spent in each coded dimension, and (4) average length of time (in seconds) spent in each coded dimension. Number of children exhibiting each type of social communication behavioral dimension was used descriptively to compare the groups of children based on the array of behaviors that they demonstrated. Frequency of occurrence indicated the total number of times that each behavioral dimension was coded for each child. *Proportion of time* was defined as the total duration (in seconds) of a behavioral dimension totaled across the 4 observation days divided by the total duration of the observation (typically 80 min; i.e., 20 min per observation day) multiplied by 100. *Average length of dimension occurrences* was defined as the total duration of a behavioral dimension (in seconds) divided by the total number of occurrences of that dimension totaled across the 4 observation days.

Data Analysis

Differences with regards to frequency, proportion of time, and average length of time spent in each behavioral dimension were compared between the FASD and TD groups using the paired *t* test. The number of children presenting each behavioral domain was compared between the FASD and TD groups using the χ^2 or the Fisher exact test. Effect sizes were examined using Glass's *d* (Glass, McGaw, & Smith, 1981), a standardized mean difference derived by dividing the difference between the FASD group's mean and the TD group's mean by the *SD* of the TD group's scores. A *d* of ≥ 0.80 has been suggested

as reflecting a large effect size—that is, a large magnitude of an effect/difference (Cohen, 1988).

Results

Table 4 presents the results for all aspects of the data analysis. First, to examine diversity of performance using the SCCS, we examined the data to determine the number of children exhibiting each of the behavioral dimensions. Most children in both groups presented at least one occurrence of prosocial/engaged, passive/disengaged, irrelevant, and adult-seeking behavior (see Table 4). No more than half the children in each group presented with any hostile/coercive behavior. The number of children presenting one or more occurrence of each behavioral domain was comparable between the two groups.

In the second part of the analysis, we examined frequency of occurrence of each behavioral dimension that was coded. As displayed in Figure 1, children in the FASD group, on average, exhibited more occurrences of each behavioral dimension than children in the TD group: prosocial/engaged (FASD = 50.0 occurrences, TD = 39.0 occurrences); irrelevant (FASD = 27.8 occurrences, TD = 14.9 occurrences); passive/disengaged (FASD = 14.8 occurrences, TD = 6.3 occurrences); adult seeking (FASD = 3.3 occurrences, TD = 2.8 occurrences); assertive (FASD = 4.1 occurrences, TD = 3.3 occurrences); and hostile/coercive (FASD = 1.1 occurrences, TD = 0.4 occurrences). Frequency of occurrence was significantly different between the groups for the following dimensions: prosocial/engaged, $t(11) = 6.1, p < .001, d = 1.9$; irrelevant, $t(11) = 4.9, p = .001, d = 1.9$; and passive/disengaged, $t(11) = 8.1, p < .001, d = 3.2$. Although children in the FASD group were more likely to exhibit more occurrences of adult-seeking, assertive, and hostile/coercive performances relative to the children in the TD group, these differences were not statistically significant (see Table 4).

In regard to proportion of time spent in each coded dimension, the observations revealed that both groups spent the majority of their time (over 76%) in prosocial/engaged behavior (see Figure 2). Moreover, on average, children in both groups spent most of their time

Table 4. Comparison of the frequency, proportion, and average length of time for each behavioral dimension between the FASD and TD groups across all 4 observation days.

Behavioral dimension	FASD (n = 12) M (SD)	TD (n = 12) M (SD)	Statistic	p
Prosocial/engaged				
Number of children with 1 or more occurrences of the domain	12	12	0.0 ^b	1.0
Frequency of occurrence	50.0 (7.4)	39.0 (5.9)	6.1 ^a	.000
Proportion of time	76.7 (9.7)	89.3 (5.4)	-4.6 ^a	.001
Average length of time (in s)	88.6 (18.1)	127.5 (26.9)	-7.2 ^a	.000
Irrelevant				
Number of children with 1 or more occurrences of the domain	12	12	0.0 ^b	1.0
Frequency of occurrence	27.8 (11.6)	14.9 (6.7)	4.9 ^a	.001
Proportion of time	15.8 (8.1)	7.2 (4.9)	4.3 ^a	.001
Average length of time (in s)	32.3 (12)	25.0 (9.3)	2.3 ^a	.044
Passive/disengaged				
Number of children with 1 or more occurrences of the domain	12	12	0.0 ^b	1.0
Frequency of occurrence	14.8 (3.6)	6.3(2.7)	8.1 ^a	.000
Proportion of time	5.4 (2.4)	1.8 (1.1)	4.4 ^a	.001
Average length of time (in s)	20.8 (8.3)	14.7 (5.6)	2.3 ^a	.044
Adult seeking				
Number of children with 1 or more occurrences of the domain	12	10	0.0 ^c	0.47
Frequency of occurrence	3.3 (3.0)	2.8 (2.5)	0.6 ^a	.591
Proportion of time	1.1 (1.1) ^d	1.0 (1.3)	0.1 ^a	.915
Average length of time (in s)	14.4 (8.0)	14.5 (13.1)	-0.03 ^a	.973
Assertive				
Number of children with 1 or more occurrences of the domain	9	8	0.0 ^c	0.0
Frequency of occurrence	4.1 (3.7)	3.3 (4.0)	0.8 ^a	.453
Proportion of time	0.8 (0.7)	0.5 (0.7)	1.5 ^a	.163
Average length of time (in s)	10.9 (11)	5.7 (4.7)	1.7 ^a	.111
Hostile/coercive				
Number of children with 1 or more occurrences of the domain	6	4	0.2 ^b	0.68
Frequency of occurrence	1.1 (1.2)	0.4 (0.7)	1.5 ^a	.151
Proportion of time	0.3 (0.4)	0.1 (0.2)	1.4 ^a	.194
Average length of time (in s)	6.0 (7.8)	3.4 (5.7)	0.9 ^a	.399

Note. s = seconds.

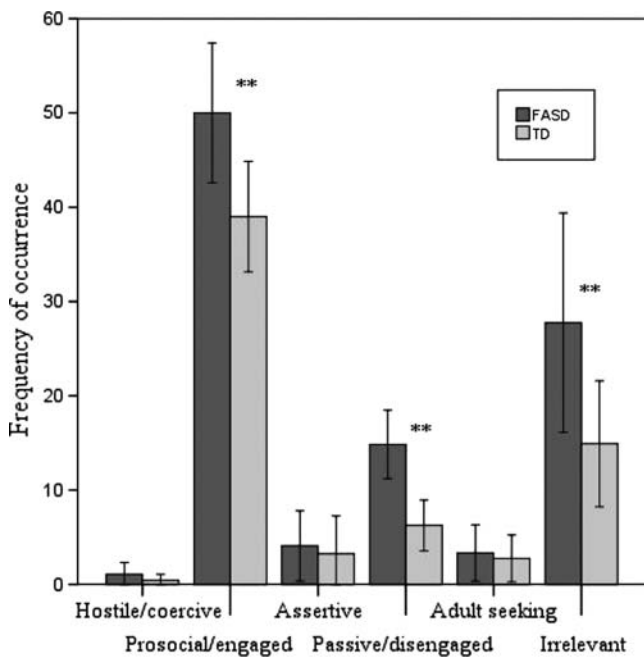
^astatistic = paired *t* test. ^bstatistic = chi-square. ^cstatistic = Fisher exact test. ^dThe .1 difference in values between Table 4 and Figure 2 reflect a rounding artifact.

exhibiting three of the dimensions: prosocial/engaged (FASD = 76.7%, TD = 89.3%); irrelevant (FASD = 15.8%, TD = 7.2%); and passive/disengaged (FASD = 5.4%, TD = 1.8%). Results of the paired *t* tests confirmed the pattern seen in the descriptive data for these three major dimension categories. Children with FASD spent significantly less time demonstrating prosocial/engaged performance than did TD children, $t(11) = -4.6, p = .001, d = -2.3$. In contrast, children with FASD spent significantly more

time than their matched peers in irrelevant, $t(11) = 4.3, p = .001, d = 1.7$, and passive/disengaged, $t(11) = 4.4, p = .001, d = 3.2$, performances. Although children with FASD spent more time demonstrating adult-seeking, assertive, and hostile/coercive behaviors relative to the children in the TD group, these differences were slight and not statistically significant (see Table 4).

Finally, when examining average length of time (in seconds) spent in each coded dimension, Figure 3 shows

Figure 1. Mean frequency of occurrence of the Social Communication Coding System behavioral dimensions for children with fetal alcohol spectrum disorders (FASD) and typically developing (TD) children. Error bars denote ± 1 SD. Group differences were examined using the paired *t* test. $**p < .01$.



that instances of the three dimension types in which the children spent most of their time, on average, also were the longest: prosocial/engaged (FASD = 88.6 s, TD = 127.5 s); irrelevant (FASD = 32.3 s, TD = 25.0 s); and passive/disengaged (FASD = 20.8 s, TD = 14.7 s). Results revealed that instances of prosocial/engaged behavior were significantly shorter for children with FASD when compared with instances of coded prosocial/engaged behavior exhibited by children in the TD group, $t(11) = -7.2$, $p < .001$, $d = -1.4$. On the contrary, instances of irrelevant behavior were significantly longer for the children with FASD than for TD peers, $t(11) = 2.3$, $p = .044$, $d = 0.8$. This pattern was observed for passive/disengaged performances as well, $t(11) = 2.3$, $p = .044$, $d = 1.1$. Although not significant, the average length of time for occurrences of assertive and hostile/coercive behavior was longer for children with FASD than for TD matched peers (see Table 4). Average length of time for adult-seeking occurrences was comparable across the two groups of children.

Discussion

Summary of Findings

Data revealed that children with FASD and TD children display a similar array of behavioral dimensions

Figure 2. Mean proportion of time spent in the Social Communication Coding System behavioral dimensions by children with FASD and TD children.

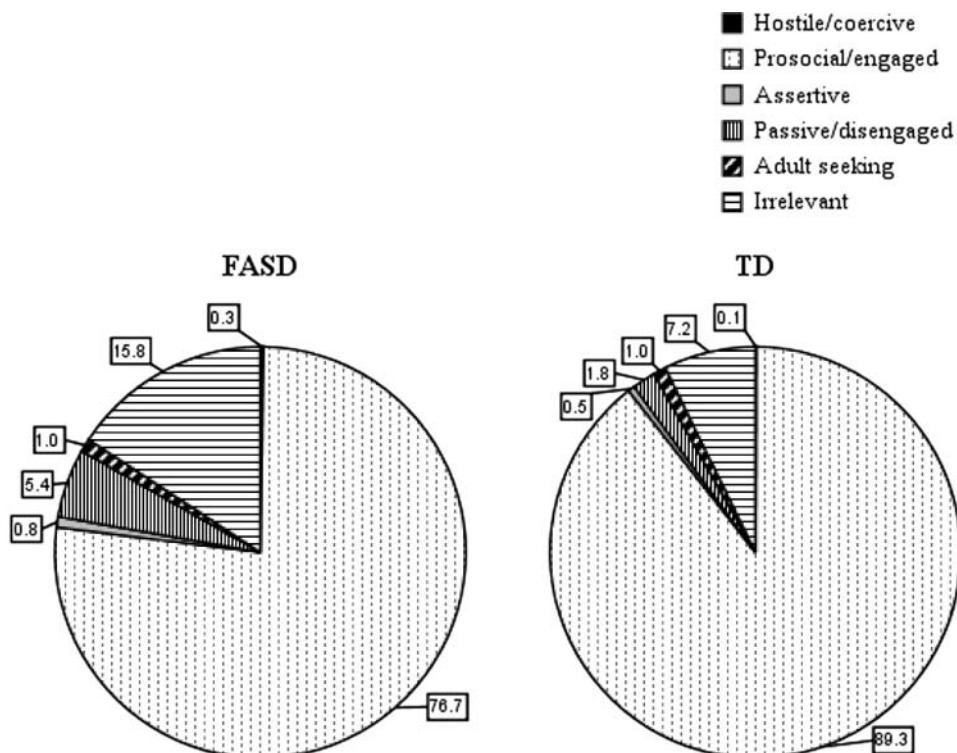
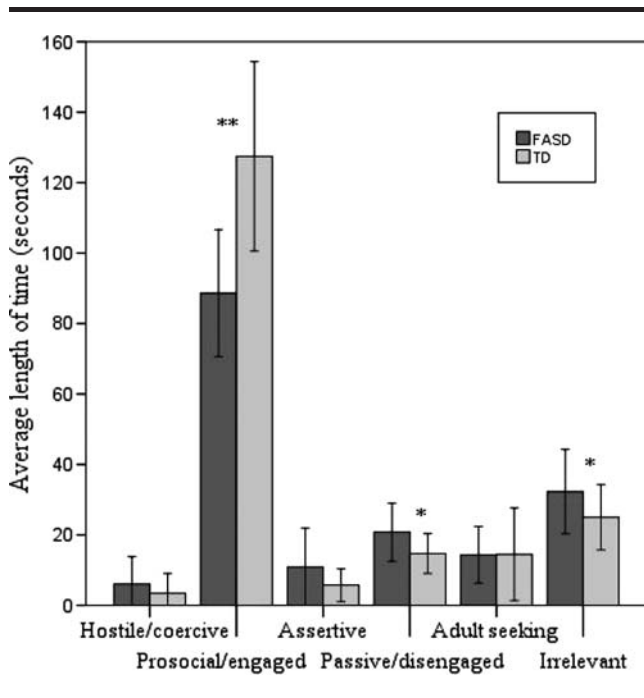


Figure 3. Mean average length of time of Social Communication Coding System behavioral dimension instances for children with FASD and TD children. Group differences were examined using the paired *t* test. **p* < .05. ***p* < .01.



during classroom activities. During the course of a 4-day observation, both groups of children demonstrated performances that could be categorized into the six social communication behavioral dimensions. The predominant performances in terms of proportion of time displayed in the classroom were prosocial/engaged, irrelevant, and passive/disengaged, with both groups of children spending most of their time demonstrating prosocial/engaged performances. The predominance of prosocial/engaged performance corresponds to the results reported by Powell and colleagues (2008). Compared with their matched TD peers, children with FASD spent a smaller proportion of their time displaying prosocial/engaged performance and a larger proportion of their time displaying passive/disengaged and irrelevant performances. With regard to the average length of occurrences of the predominant dimensions, the results revealed that for children with FASD, prosocial/engaged occurrences were shorter than those of their matched peers, and passive/disengaged and irrelevant occurrences were longer than those of their matched peers. Taken together, the frequency and duration data suggest that children with FASD have more occurrences of prosocial/engaged behavior than do their TD peers; however, overall, the proportion of time that they spend being prosocial/engaged is smaller, and the average length of each such instance is shorter than that of their TD

peers. Further, they have more passive/disengaged and irrelevant occurrences than do their TD peers, and the proportion and average length of time in these off-task behaviors are larger and longer, respectively, than those of their peers. The previously discussed differences between the groups concerning frequency, proportion of time, and average length of time with regard to the prosocial/engaged, irrelevant, and passive/disengaged dimensions are not only statistically significant but also important in magnitude, as reflected by large effect sizes. Hence, they are likely to be clinically relevant.

This study was designed to explore the social communication performance of children with FASD as they participated in their classrooms as a way to further understand the nature of their problems. We accomplished this objective by examining the differences in social communication profiles between children with FASD and their matched peers in the classrooms. The research successfully revealed new information about the nature of social communication problems that characterize children with prenatal alcohol exposure, particularly those who are on the mild end of the continuum and who are enrolled in regular education classrooms. Further, surprising similarities—as well as differences—emerged as the two groups were compared.

Classroom Performance From a Dimension Perspective: Children With FASD and TD Children

The observational data from this research indicate that children diagnosed with FASD and their TD matched peers spent most of their time demonstrating prosocial/engaged behaviors, followed by irrelevant and passive/disengaged performances. This is a significant finding, particularly for the sample of children with FASD. These data reveal that in general, children with mild FASD perform similarly to their peers in the classroom during both small-group and large-group activities with regard to behavior states/dimensions. Perhaps the message is “children are children” and that school performance of children between the ages of 7 and 12 involve both on-task and off-task performance throughout the day—and even children who are identified as having problem behaviors do not exhibit large extremes in their performance. Both groups spent most of their time being prosocial/engaged—well over 70% of the time across all days and classroom activities—as was expected. Yet, all of the children spent some proportion of their time exhibiting irrelevant and passive/disengaged performances. Until now, this degree of similarity has not been documented. This finding seems particularly revealing in light of the extensive literature describing the social/behavioral problems of children with FASD.

The observational data enlighten our understanding of the nature of the problems that have been noted in the FASD population. Findings from this study validate other literature indicating that children with FASD are characterized by problems interacting with others, yet this study reveals important nuances. Notably, the children with FASD did not demonstrate a significant number of hostile/coercive or assertive behaviors during the observation period, as might have been expected given the literature cited earlier, particularly Aronson (1997), Streissguth (1997), Tanner-Halverson (1997), and Timler (2000). Perhaps this finding reflects the influence of a relatively structured classroom environment on the children's performances. As shown in a case study of a school-age boy with FAS, Timler and Olswang (2001) explained that the boy's behavioral and social performance varied between the school and home environment, seemingly as a result of the difference in structure between the two settings. Another possibility for the limited occurrence of hostile/coercive and assertive behaviors is that the children with FASD in this study were on the mild end of the continuum and were enrolled in regular education classrooms. The research cited earlier in regard to hostile, assertive, and aggressive behavior included children across the FASD continuum. The results from our research suggest that "standout" hostile/coercive or assertive performance as defined by the SCCS protocol may not be accounting for the problem-behavior status of the children with FASD as noted by teachers. In fact, as noted earlier, items from the Problem Behaviors component of the SSRS involves a range of behaviors, including "is easily distracted," "interrupts conversations of others," "acts impulsively," and "disturbs ongoing activities," along with more aggressive and assertive behaviors such as "fights with others" and "threatens or bullies others" (Gresham & Elliot, 1990). High ratings by teachers (i.e., the behavior occurs very often) on the former (less aggressive and assertive) type of items could result in categorizing a child as having problem behaviors according to the SSRS rather than high ratings for the latter (more aggressive and assertive) items.

The results from this observational study serve to enlighten our understanding of why children on the mild end of the FASD continuum may be described as exhibiting problem behaviors. Recall that during the observation period, the children with FASD demonstrated predominantly prosocial/engaged behavior during classroom activities; in fact, frequency of occurrence for this coded dimension was larger for the children with FASD than for their typical peers. However, the proportion of time and average length of each occurrence were shorter than those demonstrated by TD children. These data suggest that children with FASD—particularly on the mild end of the continuum—may have problems sustaining

attention, and this, in turn, may lead to their increased challenges in learning and behaving appropriately in class rather than to extremes in behavior (such as those viewed as hostile/coercive or assertive).

Contributing to the profile of children with FASD in this study are the behaviors exhibited that were coded as irrelevant and passive/disengaged. All children act irrelevant or disengage during the school day, but what seems to be true for the children with FASD is that they did so more often (frequency of occurrence data) and for a greater proportion of the day than their peers. Further, when the children with FASD were irrelevant or passive during the observations, these "bouts" lasted longer than the "bouts" of their peers. These factors—in combination with the shorter periods of prosocial/engaged performance—seemingly could account for why these children are notable to their teachers as exhibiting "behavior problems" and why these children are less successful in school. This study revealed that although in large part, children at the mild end of the continuum for FASD act like their peers in the classroom from a social communication behavioral dimensional perspective, they are, in fact, different in regard to being engaged versus disengaged. Their documented performance differences are ones that could call attention to themselves and, perhaps, even be disruptive—or at least counterproductive—in the classroom. These results suggest that the differences noted between groups in the performance of prosocial/engaged, irrelevant, and passive/disengaged dimensions could be accounting for at least part of the problem-behavior status of the children with FASD rather than more conspicuous behaviors, such as those categorized as hostile/coercive or assertive.

The children included in the experimental group in this research were selected because of their prenatal alcohol exposure and behavior problems to confirm the characteristics of the phenotype for FASD. These inclusionary criteria did not allow us to argue convincingly that prenatal alcohol exposure was solely responsible for differences between groups. Nevertheless, the data granted us the opportunity to suggest that children with FASD—even those on the mild end of the spectrum—show differences in their performance in the classroom when compared with peers. The results from this research validate the findings by several researchers (Carmichael Olson, Feldman, et al., 1998; Kodituwakku, 2007; Mattson & Riley, 2000; Thomas et al., 1998) indicating that the social/behavior problems associated with prenatal alcohol exposure do not appear to be solely the result of decreased cognitive functioning. This is the case because the children with FASD in the present research were matched with TD peers in their classrooms, and paired analysis revealed no significant differences between the groups with regard to IQ. Perhaps the children with FASD had other deficits that contributed to

their social communication problems tapped by the observational data. These deficits might have been in any number of areas, as discussed by Coggins and colleagues (2003) and Svensson (2006), such as deficiencies in language, attention, self-regulation, problem solving, and/or memory. We do know that for almost half the children with FASD in our sample, caregivers had noted some language and academic concerns. In a study by Greenbaum, Nulman, Rovet, and Koren (2002), 52 children who had been referred to a hospital-based outpatient program because of learning and behavior problems were split into two groups: 28 children with prenatal alcohol exposure (ARND group) and 24 children without prenatal alcohol exposure. Group comparisons revealed that the ARND group had lower scores on standardized measures of intelligence, language, and memory abilities than the nonalcohol group. Yet, the groups did not differ in the frequency of behavior or social problems as measured by The CBCL (Achenbach, 1991a). Greenbaum and colleagues' (2002) data suggest that children with ARND are likely to have neuropsychological deficits that characterize them but that social problems may not be significantly different from those of other children with learning and behavior problems. Our study isolated and documented the social differences between children with FASD and TD matched peers. Considering the findings of these two studies, perhaps the CNS involvement related to alcohol exposure can be manifested in a variety of ways, one of which is neuropsychological deficits with concomitant social problems. For children with language-learning problems or attention-deficit/hyperactivity disorder, studies suggest that their neurological impairments may contribute to problems in social interactions (Brinton & Fujiki, 1993; Bruce, Thernlund, & Nettelbladt, 2006; Fujiki, Brinton, Morgan, & Hart, 1999; Redmond & Rice, 1998). Children with FASD may share this characteristic. Clearly, future research is needed to address the underlying cause of social performance problems. Be that as it may, some children with FASD seem to stand out in regard to their interaction abilities with children, and this becomes an important aspect of their profile.

Clinical Implications

The data from this study provide a picture of performance of children with FASD as they interact with teachers and peers in the classroom. The data demonstrate the value of using a dimensional approach for documenting performance that might otherwise be challenging to depict. In turn, the results begin to explain why children with FASD—even those on the milder end of the continuum—are conspicuous to their teachers and why they may struggle in school. Direct observation served to enlighten the teacher report and, as such, contributed important information to the assessment process.

An important outcome of the observational methodology was recognizing the strengths as well as weaknesses of children with FASD as they interacted with others in the classroom. Prosocial/engaged behaviors were most common for children with known behavior problems. This directly speaks to the need for an ecobehavioral analysis of classroom performance for children with FASD—that is, determining those activities and factors that appear to facilitate prosocial/engaged performance. Such research would yield important information in regard to how teachers might engineer their classrooms to better support desired, on-task performance for children who face significant challenges in being successful. In regard to the children's off-task behaviors, such as irrelevant and passive/disengaged behaviors, investigating specific classroom factors that may influence performance would be a valuable exercise. As a component of intervention, classroom management, as suggested by Watson and Westby (2003), seems important. Without a doubt, the nature of the neuropsychological deficits that characterize children prenatally exposed to alcohol will create ongoing challenges to engagement in the classroom and deserve careful analysis.

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Observation of Classroom Social Communication: Do Children With Fetal Alcohol Spectrum Disorders Spend Their Time Differently Than Their Typically Developing Peers?

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