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Teachers' Use of Naturalistic Communication Intervention Practices

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The purpose of this study was to determine the extent to which naturalistic practices were being implemented across a representative sample of 17 early intervention programs and classroom activities. Measures of teacher-child communicative interactions, program quality, specialized training, and ongoing support were administered. Results indicated that teachers use descriptive talk more frequently than direct teaching strategies, particularly during freeplay activities. Implementation of direct teaching strategies was positively related to program quality, and specialized training might influence teacher's perspectives about use of freeplay as an opportunity to facilitate communication development. Data obtained in separate geographic regions of the country were remarkably similar, providing modest support for the external validity of these findings. Implications for practice and research are discussed.

Naturalistic communication interventions are implemented within the context of children's daily activities and routines. Accordingly, teachers should be expected to use these naturalistic intervention practices (e.g., descriptive talk, follow-in models, linguistic mapping, follow-in directives, imitation, and expansions) across play activities and other daily routines in early intervention settings. A modest amount of research supports the effectiveness of such practices in promoting communication and language development (see Warren & Walker, in press; Warren, Yoder & Leew, 2002). Little descriptive data exist, however, on the extent to which these communication and language intervention practices are being implemented in early intervention settings.

Teacher's use of recommended practices to facilitate communication development in preschool children with disabilities was the focus of an investigation by Roberts, Bailey, and Nychka (1991) and two studies by Schwartz, Carta, and Grant (1996). Roberts et al. (1991) observed the communicative interactions between preschool children with disabilities and their teachers during routine activities (e.g., freeplay, circle) and mealtimes in self-contained, center-based programs. Direct observations and the Teacher-Child Communication Scale (TCCS; Bailey & Roberts, 1987) were used to measure communicative interactions. Roberts et al. (1991) reported that teachers in their study used some facilitative strategies. These teachers, however, generally did not implement some of the specific language inter-

vention strategies demonstrated previously as effective for promoting communication development in young children. For example, teachers frequently responded to communication attempts but did not comment or expand upon the interaction to support a higher level of communication.

Schwartz et al. (1996) reported two related studies in a single article. First, a three-group (i.e., mild, moderate, severe) descriptive design was used to assess implementation of recommended language intervention practices. The Ecobehavioral System for Complex Assessments of Preschool Environments (ESCAPE; Carta, Greenwood, & Atwater, 1985) and the Language Intervention Features Checklist (Schwartz & Carta, 1990) were used to observe the implementation of language intervention practices with preschool children across daily activities. Schwartz et al. (1996) found that the frequency with which teachers implemented recommended practices varied from 25% to 89% of the opportunities. The most frequently occurring practices included use of natural setting for training (89%), teacher's shared control of topics (81%), and teacher's response to general language use (74%). Data obtained from the ESCAPE direct observational system revealed that children demonstrated higher rates of engagement and verbalizations when they experienced higher rates of intervention strategy implementation. The findings also indicated that the focus of language training activities varied for children of differing abilities; group settings were used to implement language training for children with mild disabilities, whereas individual approaches were used for children with severe disabilities.

In the second study, Schwartz et al. (1996) used a process-product design to investigate the relationship between observed level of exposure to recommended practices and child language outcome. The Language Intervention Features Checklist (Schwartz & Carta, 1990) measured implementation of practices while child language gain was evaluated through standardized assessments and ratings completed by communicative partners (i.e., parents, teachers). Results showed a relationship between exposure to recommended language intervention practices and child outcome (e.g., language gain). Children who demonstrated greater gains in language outcome experienced strategies designed to promote functional use of language directly such as receiving natural consequences for communication, interacting with peers, and having opportunities to share control of conversation topics.

Collectively, these studies suggest that the frequency with which recommended language intervention practices are implemented vary according to specific practices. Critical practices demonstrated previously to be effective in directly enhancing language development and use (e.g., expansions, promoting peer interactions, commenting, or describing the event) are not implemented as frequently as other, possibly less effective practices (e.g., engaging the child, responding to communication attempts, waiting for a response). These less effective strategies likely play important support roles for the more effective strategies, but by themselves do not have a substantial impact on language development (Tannock & Girolametto, 1992; Tannock, Girolametto, & Siegel, 1992; Yoder, Warren, McCathren, & Leew, 1998).

The extent to which specific communication intervention practices were implemented with children under 3 years of age was the focus of an unpublished pilot study by Smith and Warren (1998). They developed a direct observational measure, the Communication and Language Strategies Observation System (CLSOS; Smith, Warren, & Wentz, 1998), to collect data on the communicative interactions in various early intervention settings across classroom activities. Data obtained from the CLSOS indicated that the percentage of time teachers were observed implementing recommended communication intervention practices varied according to the specific strategies being observed. For example, teacher talk was used 46% of the time but recasting and linguistic mapping were not implemented.

The initial seven categories of recommended intervention practices were collapsed to represent passive and active intervention strat-

egies due to the low frequency with which various strategies occurred. Passive language intervention strategies (e.g., passive models, teacher talk) tend to support the use of a child's existing communication abilities, whereas active strategies (e.g., active models, linguistic mapping, imitation, recasts) are recommended to teach new and higher-level skills (Roberts et al., 1991). Data from the pilot study (Smith & Warren, 1998) indicated that passive communication intervention strategies occurred more frequently than active strategies and that the implementation of intervention practices might vary by individual site and type of activity observed.

The studies by Roberts et al. (1991) and Schwartz et al. (1996) focused on the implementation of recommended communication and language intervention practices with preschool children with disabilities. Designation of a practice as *recommended* does not ensure that it is effective (Goldstein, Kaczmarek, & Hepting, 1996; Wolery, 1995). Naturalistic communication interventions have been identified as both recommended and empirically valid practices (Warren et al., 2002). Therefore, the primary purpose of the present descriptive study was to determine the extent to which naturalistic communication intervention practices were being implemented with young children with disabilities across early intervention programs and classroom activities. A review of the extant literature generated two fundamental assumptions. First, direct teaching strategies are requisite to affect child outcomes positively. Second, full implementation of recommended language intervention practices are associated with improved child outcomes for preschool children with disabilities; thus, it is logical to hypothesize that similar effects would be identified for infants and toddlers with disabilities.

We tested three hypotheses based on data obtained in the pilot study (Smith & Warren, 1998). First, we hypothesized that direct teaching strategies (i.e., follow-in models, linguistic mapping, follow-in directives, expansions, and imitation) would be implemented more frequently at snack time and descriptive talk would occur more frequently during free-play. Second, the implementation of direct teaching strategies were predicted to be related positively to (a) program quality, (b) level of specialized training of staff, (c) level of ongoing support provided to staff, and (d) class composition (e.g., adult-child ratio, group size). Third, we expected findings (e.g., use of language intervention strategies, use of strategies related to program quality) obtained in early intervention programs located in a southeastern state to be replicated in a comparable area in a northeastern state. Data were collected in these two states as a means of enhancing the external validity and generalizability of findings. For the purposes of this descriptive study, data obtained in the southeastern state were considered exploratory. Data obtained in the northeastern state were confirmatory and used to cross-validate the exploratory findings.

METHOD

Setting

Implementation of naturalistic communication and language intervention practices was assessed in 17 programs providing early intervention services to young children with disabilities under the age of 3 years. Eleven of the programs were located within counties surrounding a moderate-sized metropolitan area in the southeast. To provide support for the external validity of the findings, data also were collected in six programs in a comparable sized metropolitan city in the northeast. All programs described themselves as inclusive; however, each program defined inclusion differently. For example, one site defined inclusion as equal numbers of children with and without disabilities participating in the program. Another site defined their program as inclusive because one child with a disability was enrolled with peers who were developing typically. Consequently, the proportion of children with and without disabilities within each classroom varied from program to program. Program demographics (e.g., number and types of positions of staff) and child characteristics also varied across individual pro-

Table 1.
Program Demographics

State	Classroom staff	Age of children (months)	Total enrolled (# with disabilities)	Types of disabilities
TN	ECSE teacher, ECE teacher	24–36	12 (6)	DD, SPL, SYN
TN	ECSE teacher, TA	21–36	11 (5)	DD, SPL, SYN, VI
TN	ECE teacher, 2 TAs	18–24	15 (1)	SYN
TN	ECE teacher, TA	31–36	10 (7)	DD, SPL, SYN, AUT, PHI
TN	ECE teacher, 2 TAs	24–30	7 (7)	DD, SPL, CP. AUT
TN	ECSE teacher, TA	16–36	8 (7)	DD, SPL, CP, AUT, VI, HI
TN	ECE teacher, TA	29–48	19 (2)	SPL
TN	ECE teacher, 2 TAs	24–36	13 (10)	SPL, SYN, AUT, VI, HI
TN	ECE teacher, TA	24–48	12 (2)	DD, CP
TN	ECE teacher, TA	12–18	7 (1)	SYN
TN	ECSE teacher, ECE teacher	18–36	12 (6)	DD, SPL, CP, SYN,
PA	ECE teacher, 2 TAs	24–42	8 (8)	DD, SPL, SYN, AUT, VI
PA	ECE teacher, TA	23–33	12 (2)	DD, SPL
PA	ECE teacher, TA	24–36	5 (5)	DD, SPL, SYN, AUT
PA	ECE teacher, TA	12–18	9 (1)	DD, SPL
PA	ECE teacher, TA	24–36	13 (1)	SYN
PA	ECSE teacher, 2 TAs	29–36	16 (4)	DD, SPL

Note. ECSE = early childhood special education; ECE = early childhood education; TA = teaching assistant; DD = developmental delays; SPL = speech and language delays; SYN = diagnosed syndromes (e.g. Down syndrome, Rhett syndrome; CP = cerebral palsy; AUT = autism; VI = visual impairments; HI = hearing impairments; PHI = physical impairments.

grams. A description of program demographics is shown in Table 1.

Participants

Participants were young children with and without disabilities, 12 to 48 months of age. Children with identified disabilities ranged in age from 12 to 36 months and exhibited a variety of developmental disabilities. Diagnosed disabilities included developmental delays, autism, speech and language delays, hearing impairments, and various syndromes (e.g., Down syndrome, Rhett syndrome). Their peers were developing typically and ranged in age from 12 to 48 months.

Communicative interactions were observed between the staff member primarily responsible for conducting the activity and all children (i.e., children with and without disabilities) in the classroom at each site. Data collection excluded communicative interactions with other professionals (e.g., speech and language pathologists, occupational therapists, early childhood special education itinerant teachers) who were not generally present full time in the classroom.

Consent was obtained from each staff member prior to beginning data collection. The lead teacher for each classroom was asked to complete the Communication Practices Background Information Form (Smith & Warren, 1999a). The form was developed for this study and provided the opportunity for the lead teacher to (a) identify staffing positions in the early intervention setting and (b) provide information regarding educational training and background for each staff member. A total of 39 staff members were observed and characteristics of these staff members are shown in Table 2.

Measures

Communication and Language Strategies Observation System. The CLSOS (Smith et al., 1998) was revised to assess teachers' use of intervention practices. Observations were conducted using a 10-sec observe and 5-sec code time-sampling procedure. Data were col-

Table 2.
Demographic Information for Early Intervention Staff Members

Variable	Program location: Southeast *n* (%)	Program location: Northeast *n* (%)
Gender		
Female	25 (96)	13 (100)
Male	1 (4)	0 (0)
Position		
ESCE	7 (27)	3 (23)
ECE	6 (23)	3 (23)
TA	13 (50)	7 (54)
Education		
High School diploma	10 (38)	6 (46)
Associate's degree	3 (12)	2 (15)
Bachelor's degree	7 (30)	3 (23)
Graduate degree	5 (19)	2 (15)

Note. ECSE = early childhood special education; ECE = early childhood education; TA = teaching assistant.

lected for three categories of teacher behavior including descriptive talk, direct teaching strategies (i.e., follow-in models, linguistic mapping, follow-in directives, expansions, imitation), and no occurrence of teacher behavior. Teacher behavior was coded for occurrence during the interval. Coding definitions and protocols were developed by adapting and synthesizing information from the literature (McCathren, Yoder, & Warren, 1995; Warren & Reichle, 1992), from studies evaluating recommended practices for preschool children with disabilities (Roberts et al., 1991; Schwartz et al., 1996), from studies evaluating naturalistic language interventions (Tannock & Girolametto, 1992; Warren, Yoder, Gazdag, Kim, & Jones, 1993; Yoder, Warren, Kim, & Gazdag, 1994), and from previously developed codes (e.g., Warren et al., 1993; Yoder et al., 1994). Coding definitions are provided in the Appendix.

Infant/Toddler Environment Rating Scale (ITERS). Because classroom quality might affect teachers' implementation of naturalistic communication intervention practices, the ITERS (Harms, Cryer, & Clifford, 1990), a measure of global quality, was completed during the course of the classroom observations. The following five subscales were rated and summed to obtain an overall ITERS score: Furnishings and Display for Children, Personal Care Routines, Listening and Talking, Learning Activities, and Interaction. Two subscales (i.e., Program Structure, Adult Needs) are not recommended for use in research (Clifford et al., 1989) and were not included in the summary score.

Index of Specialized Training. The Index of Specialized Training (Smith & Warren, 1999b) was developed for this study to measure a teacher's level of specialized education/training and experience. The measure is comprised of nine statements that describe a range of educational/training opportunities. Participants were asked to respond to each statement. A point system was developed where participant responses were assigned higher scores for formal education and training (e.g., informal training = 1 point, graduate degree = 5 points). Twenty was the maximum score that could be obtained on the measure. Low scores (e.g., 2, 3) indicated minimal or informal levels of specialized training and education; high scores (e.g., 14, 15) suggested considerable formal specialized training and education.

Index of Ongoing Support. The Index of Ongoing Support (Smith & Warren, 1999c) also was developed for this study to measure the level of support that teachers receive from early childhood special education itinerant teachers and related support personnel (e.g., speech and language therapists, occupational therapists, physical therapists) to address the developmental needs and facilitate successful inclusion of children with disabilities in the classroom. The measure consists of nine statements describing a variety of activities that teachers might participate in with related support services ranging from participation in the assessment process to collaborative planning and feedback sessions. Items for the measure were identified through DEC Recommended Practices (Odom & McLean, 1996; Sandall, McLean, & Smith, 2000) and personal experiences.

Teachers were asked to indicate the level at

which they participated in each activity for children with disabilities in their classroom. Participants also were asked to rate whether they *almost always, sometimes,* or *almost never* participated in the activity. Again, a point system was developed to code participant responses. Consistent and direct forms of participation were scored higher than informal or indirect participation (e.g., almost always = 2 points, direct participation = 2 points). Scores for each statement were summed to derive a total score for ongoing support. The maximum score on the Index of Ongoing Support was 26 points. Low scores (e.g., 4, 5) indicated that minimal levels or indirect forms of support were being provided by related services personnel while high scores (e.g., 25, 26) suggested the provision of extensive and direct forms of support.

Procedures

Using the CLSOS (Smith et al., 1998), 10-min observations were conducted to determine the extent to which intervention practices were being implemented during two regularly occurring classroom activities (i.e., freeplay, snack/mealtimes). Teachers were not asked to modify activities or schedules in any manner. A total of 80 min of observational data (i.e., four sessions of each activity type) were collected on two separate occasions at each site. Within a month after beginning data collection in the southeast, procedures were replicated in six classrooms in a northeast metropolitan area.

Classroom observation data were collected using Videx© TimeWand optical bar code readers (http://www.videx.com). Bar code sheets were created to code header information including observation site number, primary and reliability observer, activity, lead teacher classification, ratio of children to adults, and number of children with and without disabilities present. We also used bar code sheets to record teacher-child communicative interaction categories (i.e., descriptive talk, direct teaching strategies, or no occurrence). A portable audio cassette player was used to cue observers to observe and record.

A Generalizability Theory approach (Cronbach, Gleser, Nanda, & Rajaratnam, 1972) was used to calculate intraclass correlation coefficients between observers across observation categories (e.g., descriptive talk, direct teaching). This approach to calculating reliability was selected because it addressed the sources of variance that could potentially influence the reliability of the observations using the CLSOS measure. Systematic variance across subjects, systematic variance across observers, and random error variance represented the three sources of variance accounted for when calculating generalizability coefficients.

Reliability was calculated at the level of individual observations. G coefficients were maintained at acceptable levels (.65 or greater) to complete the training phase and throughout the data collection phase. Reliability data were collected on 29 of the 136 (21%) classroom observations across sessions, activities, and sites to ensure a representative sample in both geographic locations. G coefficients obtained during the data collection phase ranged from .95 to .99 (see Table 3).

Table 3.
Summary of Observer Reliability Calculated as G Coefficients

Variable	Freeplay	Snack
Descriptive talk		
Targets	.99	.98
Peers	.99	.99
Direct teaching		
Targets	.99	.98
Peers	.95	.95
Adult-child ratio	.98	.99
Total group size	.99	.99
Proportion of children with disabilities	.99	.99

Analysis Strategy

The proportion of intervals during which a teacher used a naturalistic practice such as descriptive talk or direct teaching strategies towards young children with disabilities and children who were developing typically might have been influenced by the proportion of children with disabilities in the activity. For

example, teachers who had a higher proportion of children with disabilities in their classrooms might have more opportunities to implement specific practices with children with disabilities because there were more children with disabilities in the group to receive such teaching. Increased opportunities to implement practices could have resulted in higher proportions of intervals during which strategies were observed. Another consideration was that child composition (i.e., proportion of children with and without disabilities) at each activity varied considerably from one classroom to another.

Consequently, the proportion of children with disabilities was treated as a potential covariate in the analyses testing each research question. The rationale for providing statistical control of the covariate, when required, was to improve the interpretability and precision of the dependent variable. To control for the possible confounding effect of classroom composition on the dependent variable, the first step in data analysis was to determine whether the dependent variable (e.g., teachers' use of a naturalistic practices) varied as a function of the average proportion of children with disabilities.

RESULTS

Covariate Analysis

The dependent variable for the hypothesis related to naturalistic practices was a linear combination of the proportion of intervals in which descriptive talk and/or direct teaching strategies were observed at freeplay and snack time. Observation categories were not mutually exclusive, both descriptive talk and direct teaching strategies could be observed during the same interval. A correlation coefficient was calculated to determine whether this dependent variable varied as a function of the covariate for the children with disabilities and their peers. The covariate was not correlated strongly with the dependent variable for the children with disabilities ($r = .162$), therefore, analyses for the children with disabilities specific to this dependent variable did not require the use of the covariate. The covariate correlation for the peers ($r = -.884$, $p < .01$), however, was noteworthy warranting the use of a covariate in subsequent analyses for peer data specific to this dependent variable.

Observation of Naturalistic Practices in Two Activities

We predicted that direct teaching strategies would be implemented more often at snack time and that descriptive talk would occur more frequently at freeplay. Implicit in the hypothesis is that a difference in type of talk exists and that it varies as a function of the activity. To test this research question, data on the teachers' communicative interactions with all young children (i.e., with and without disabilities) were collected using the CLSOS. Data were analyzed initially using mixed model, repeated-measures analyses of variance (RMANOVA) to test for the effect of geographic location. Type of talk (i.e., descriptive talk vs. direct teaching) and activity (i.e., freeplay vs. snack/mealtime) were designated as within-subject factors and location (i.e., southeast vs. northeast) was treated as a between-subject factor. The mean proportion of intervals during which the linear combination of descriptive talk and/or direct teaching strategies were observed at freeplay and snack served as the dependent variable and site served as the unit of analysis. Table 4 reports the mean proportion of intervals naturalistic intervention practices were observed across locations. Results of the initial RMANOVA for the children with disabilities did not detect a statistically significant between-subjects effect of location, $F(1, 15) = .01$, $p = .923$ or an interaction effect of talk $\times$ activity $\times$ location, $F(1, 15) = .166$, $p = .690$.

A mixed model, repeated-measures analysis of covariance (RMANCOVA) was used to test for the effect of location for the peer data because the covariate related to the dependent variable for the peers who were developing typically was statistically significant. Results did not detect a statistically significant between-subjects effect of location, $F(1, 14) = .337$, $p = .571$, or an interaction effect of talk $\times$ activity $\times$ location, $F(1, 14) = .086$, $p = .774$. The absence of any type of location ef-

Table 4.
Mean Proportion of Intervals Naturalistic Intervention Practices Were Observed

Strategy	Location		
	Southeast *M* (*SD*)	Northeast *M* (*SD*)	Across locations *M* (*SD*)
Descriptive talk			
Freeplay			
Target children	.30 (.19)	.32 (.25)	.31 (.22)
Peers	.28 (.13)	.26 (.24)	.27 (.19)
Snack			
Target children	.27 (.14)	.23 (.18)	.25 (.16)
Peers	.23 (.15)	.20 (.15)	.22 (.15)
Direct teaching			
Freeplay			
Target children	.14 (.13)	.18 (.15)	.16 (.14)
Peers	.11 (.06)	.11 (.09)	.11 (.08)
Snack			
Target children	.20 (.18)	.21 (.19)	.21 (.19)
Peers	.10 (.06)	.11 (.10)	.11 (.08)

fect justified collapsing the data obtained from sites in the southeast and northeast in subsequent analyses.

Next, we tested for a talk × activity interaction using RMANOVA to analyze the naturalistic language intervention practices directed to children with disabilities during snack and freeplay. For this analysis, type of talk and activity were considered within-subject factors. The mean proportion of intervals during which the linear combination of descriptive talk and/or direct teaching at freeplay and snack were observed served as the dependent variable and site was the unit of analysis. Results of the RMANOVA, without location as a factor, revealed a statistically significant talk × activity interaction $F(1, 16) = 9.702$, $p < .007$, suggesting that the type of talk to a child with disabilities varied as a function of the activity. The standardized effect size (0.38) associated with this outcome was moderate (cf. Cohen, 1988). Follow-up analyses indicated a statistically significant effect, $F(1, 16) = 36.913$, $p < .001$, for type of talk at freeplay. The standardized effect size (0.70) was large (cf. Cohen, 1988). Descriptive talk to targets occurred significantly more often than direct teaching at freeplay. The follow-up analyses for snack were not statistically significant, $F(1, 16) = 3.785$, $p = .069$, with descriptive talk again occurring more frequently than direct teaching strategies.

RMANCOVA was used to test for a talk × activity interaction for naturalistic language intervention practices directed to peers. For this analysis, type of talk and activity were considered within-subject factors. The mean proportion of intervals, during which the linear combination of descriptive talk and/or direct teaching at freeplay and snack were observed, served as the dependent variable, site was the unit of analysis, and the average proportion of children with disabilities served as the covariate. Results of the RMANCOVA, without location as a factor, did not identify a statistically significant type of talk × activity interaction, $F(1, 15) = .869$, $p = .336$. The type of talk to peers did not vary as a function of the activity.

These findings provided partial support for the first hypothesis because descriptive talk did occur more frequently at freeplay, but descriptive talk also occurred more frequently than direct teaching at snack. The mean pro-

portion of intervals observed indicated that direct teaching to children with disabilities occurred more frequently at snack than freeplay and that direct teaching to peers was lower at both snack and freeplay. The most frequent intervention that teachers used was descriptive talk during freeplay to children with and without disabilities and direct teaching during freeplay was the intervention implemented least frequently.

Implementation of Direct Teaching Strategies

We predicted that the implementation of direct teaching strategies would be positively related to (a) program quality, (b) level of specialized training, (c) level of ongoing support, and (d) class composition. To address this hypothesis, we administered the following measures: Infant Toddler Environmental Rating Scale (ITERS), Index of Specialized Training, and Index of Ongoing Support. Information pertaining to the proportion of children with disabilities, adult-child ratio, and group size was collected during CLSOS observations.

Infant Toddler Environment Rating Scale. Partial correlation coefficients were calculated by regressing the proportion of intervals during which direct teaching was implemented to target children at freeplay and snack with the total ITERS score, while controlling for the proportion of children with disabilities participating in the activities. Results of these analyses indicated that program quality, as measured by the ITERS, was positively related to the implementation of direct teaching to children with disabilities at freeplay ($r = .664$, $p < .003$) and snack ($r = .653$, $p < .003$). Similar analyses conducted with peer data indicated that program quality was positively related to the implementation of direct teaching to peers at snack ($r = .544$, $p < .015$) but not freeplay ($r = .112$, $p = .06$).

Index of Specialized Training. The Index of Specialized Training was administered to all teachers and teaching assistants who participated in the classroom observations. A total of 39 classroom staff members participated in the CLSOS observations. Thirty-five questionnaires were returned for an overall response rate of 90%. Of the four questionnaires that were not returned, two represented teaching assistants who were no longer employed with their respective programs, one represented a master's level student teacher who had completed her academic placement, and one represented a teaching assistant who was on an extended leave of absence.

The teacher served as the unit of analysis and the total score obtained on the Index of Specialized Training served as the measure of specialized training. The proportion of intervals that direct teaching was implemented to children with disabilities during freeplay and snack was regressed with the total score for the Index of Specialized Training, while controlling for the proportion of children with disabilities participating in the activities. Randomization tests were used because the units of analysis were not independent. That is, more than one teacher represented the same classroom. Nonindependent units of analysis violate the assumption of asymptotic tests of significance such as F or t tests. P values from randomization tests are presumed valid despite nonindependent units of analysis (Edgington, 1987).

A modest relationship ($r = .409$, $p < .025$) was found between the implementation of direct teaching to children with disabilities at freeplay and teacher training. The relationship between the implementation of direct teaching to children with disabilities at snack and teacher training was weaker and not statistically significant ($r = .307$, $p = .09$). Results also did not support a relationship between teacher training and implementation of direct teaching strategies to peers at freeplay ($r = -.015$, $p = .26$) or snack ($r = -.039$, $p = .36$).

Index of Ongoing Support. Data obtained for the Index of Ongoing Support were analyzed using multiple regression. Site served as the unit of analysis and the total score obtained on the Index of Ongoing Support served as the measure of support. The proportion of intervals during which direct teaching was observed being implemented to children with disabilities during freeplay and snack was regressed with the total score for

the Index of Ongoing Support, while controlling for the proportion of children with disabilities participating in freeplay and snack, respectively. Analyses did not reveal a statistically significant relationship between support and the implementation of direct teaching to children with disabilities at freeplay (R = .028, p = .459) or snack (R = .086, p = .377). In contrast, analysis of the peer data identified a statistically significant and noteworthy relationship between support and the implementation of direct teaching to peers at freeplay (R = .539, p < .016) and snack (R = .503, p < .024).

Class composition. The relationship between class composition variables (i.e., adult-child ratio, group size) and the implementation of direct teaching strategies to young children with disabilities was tested using a randomization test implementation of a multiple regression model. The analyses examined the relationship between adult-child ratio and group size with direct teaching, controlling for the proportion of children with disabilities. The two predictors were entered simultaneously with the covariate to predict direct teaching.

Adult-child ratio and group size were not significantly related to direct teaching to children with disabilities at freeplay (R = .001, p = .44; R = .006, p = .87, respectively) or snack (R = .049, p = .63; R = .008, p = .83, respectively). Similar findings were obtained in analyses of the peer data. Neither statistically significant or noteworthy interactions were detected between the implementation of direct teaching strategies to adult-child ratio and group size at freeplay (R = .000, p = .50; R = .000, p = .88, respectively) or snack (R = .002, p = .42; R = −.004, p = .23, respectively).

Naturalistic Language Practices Across Locations

We predicted that statistically significant findings obtained in a medium-sized metropolitan area in the southeast would be replicated in a comparable metropolitan area in the northeast. The limited sample size did not provide the statistical power required to replicate findings across locations; therefore, the decision was made to determine the extent to which the locations were comparable with respect to teachers' use of naturalistic intervention practices to facilitate communication development.

Findings for the data regarding children with and without disabilities using RMANOVA and RMANCOVA did not detect an interaction effect of type of talk × activity × location. The absence of this interaction provided statistical support to indicate that the difference between types of talk within activities was not affected by location. The mean proportion of intervals during which descriptive talk and direct teaching strategies to young children with disabilities was observed in the southeast and northeast were similar (see Table 4). Descriptive talk to children with disabilities at freeplay occurred during 30% of the intervals observed in the southeast and 32% of the intervals observed in the northeast. Descriptive talk to children with disabilities at snack was observed 27% and 23% of the time in the southeast and northeast, respectively. Direct teaching strategies to children with disabilities at freeplay were observed during 14% of intervals in the southeast and 18% of intervals in the northeast. Direct teaching strategies to children with disabilities at snack were observed during 20% and 21% of intervals in the southeast and northeast, respectively. A similar pattern was identified in the data collected for their peers who were developing typically.

DISCUSSION

The primary purpose of this study was to assess the extent to which naturalistic communication intervention practices were being implemented with young children with disabilities across early intervention programs and classroom activities. Results provided partial support for three hypotheses. First, results indicated teachers used descriptive talk more frequently than direct teaching strategies with young children with disabilities and their peers regardless of activity. Further, these

practices were implemented during 10% to 32% of the intervals observed.

Second, results indicated the most consistent factor related to the implementation of direct teaching strategies was program quality. A positive relationship between program quality and the implementation of direct teaching strategies to young children with disabilities was identified at freeplay and snack. Similar findings were identified with peers at snack time. Results indicated that higher quality programs implemented direct teaching strategies more frequently than lesser quality programs.

A relationship between the implementation of direct teaching strategies to young children with disabilities and specialized training was identified at freeplay but not at snack. Teachers with higher levels of specialized training were more likely to implement direct teaching strategies to young children with disabilities at freeplay than teachers with lower levels of specialized training. This finding suggests that a teacher's level of specialized training might positively influence their perspectives about and use of freeplay as an opportunity to facilitate communication development in young children with disabilities.

Informal observation indicated that the structure of freeplay varied widely from one site to another, possibly representing the range of views and approaches to conducting freeplay. For example, programs adhering to a traditional early childhood approach to freeplay might perceive and conduct freeplay as a time for children to explore materials and play on their own. Teachers' interactions with children during this time might be intentionally limited. In contrast, programs following an early childhood special education or an inclusive orientation might perceive freeplay as a naturally occurring opportunity to embed intervention goals and objectives into daily activities and routines.

The lack of a relationship between specialized training and the implementation of direct teaching strategies at snack might be explained by characteristics (e.g., structure of the activity, desired materials, natural consequences for communication) inherent in the activity that naturally facilitated the implementation of direct teaching strategies. Informally, less variation was observed in the structure of snack. All teachers typically facilitated the activity by passing out materials and then participating in snack with the children. This process lent itself to the implementation of direct teaching strategies (i.e., asking the children what they wanted, modeling appropriate responses) by all teachers, not just those with specialized training.

Finally, we analyzed data to determine the extent to which the locations were comparable with respect to teachers' use of naturalistic practices to provide modest support for the external validity and generalizability of the findings. Failure to detect a statistically significant type of talk $\times$ activity $\times$ location interaction supported the notion that differences between type of talk within activities were not affected by location. In addition, the mean proportion of intervals during which descriptive talk and direct teaching were observed further illustrated the similarity of the data across geographic locations. Thus, the patterns of implementation for naturalistic communication practices detected in this study might be representative of a general pattern of implementation rather than those associated with a specific geographic location or program type.

A limitation of this study is that teachers from only 17 programs were evaluated. Replication of the findings with a larger sample size is needed to confirm the external validity of our findings. Further, this study did not examine the relationship between teachers' use of naturalistic practices and child outcomes. Thus, implications of these findings and their possible relationship to outcomes for infants and toddlers with disabilities are subject to empirical validation. Other studies, however, have previously identified such a relationship for preschool children (e.g., Roberts et al., 1991; Schwartz et al., 1996).

An additional limitation of this study is that identification of specific communication goals for language intervention strategies was not possible with the observational system used in this study. We coded intervention strategies occurring during interactions with children with disabilities and their peers who were de-

veloping typically. The impact of the rates at which these practices were implemented is impossible to evaluate without specific knowledge pertaining to (a) the individual focus of the language practices and (b) the language needs of the particular child. Furthermore, no published analyses were found indicating how intensely these techniques need to be implemented to impact development. In this respect, our analyses represent an initial baseline study that sets the groundwork for further research in the implementation of naturalistic communication intervention techniques in typical early intervention contexts.

This study represents an initial attempt to assess the extent to which naturalistic language intervention practices are being implemented with children under the age of 3 years in classroom contexts. Consistent with the findings from the two published studies evaluating the implementation of practices with preschool-aged children, this study found that teachers are implementing naturalistic language intervention practices at differing rates. Specifically, the findings suggest that teachers implement descriptive talk strategies more frequently than direct teaching interventions. The implementation of direct teaching interventions appears to be associated with program quality and specialized training.

Evidence from recent studies by Yoder and Warren (1998, 2001) and a growing body of research in responsive interaction techniques (Yoder et al., 1998) suggests that descriptive talk alone is not likely to have substantial effects on communication and language development unless combined with more direct intervention techniques. Future research might focus on the necessary density of descriptive talk and more direct intervention techniques in classroom contexts to optimize communication and language learning by young children with disabilities. Generating this knowledge would then provide guidelines for more effective classroom practices.

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APPENDIX

Communication and Language Strategies Observation System (CLSOS) Definitions

Descriptive Talk

The teacher uses developmentally appropriate talk to describe the child's actions, interests, or focus of attention. Example: The child is looking at pictures in a book and the adult responds saying "you are looking at a book," or "here's the cat," or "the dog says woof." Descriptive talk does not obligate a child response. Descriptive talk always follows the child's focus of attention. Descriptive talk is initiated by the teacher and is not contingent on a child communicative act.

Direct Teaching Strategies

Direct model. The teacher provides a dem-

onstration of a desired verbal or nonverbal response (e.g., sign, picture symbol, gesture) with an implied expectation that the child will imitate the model; models are provided by placing an emphasis on a word, phrase or sign, or by a verbal cue such as "say, [specific word]." Direct models are delivered so that the child has an opportunity to respond (adult waits at least 3 seconds for a response) prior to repeating the model.

Linguistic mapping. Immediately following a child's nonverbal communicative act, the adult provides a descriptive label or states the core meaning for the child's communicative act. For example, if a child looks at a book and reaches for it, the adult responds by saying "want book." Linguistic mapping is a consequence strategy contingent on a child's communicative act but does not obligate a child response. The intent of linguistic mapping is to provide labels for objects in the child's environment or another person's actions that the child is attempting to communicate.

Follow-in directive for communication. Following the child's lead, the adult asks a question, delivers a command, or makes a request for verbal or nonverbal behavior. The directive follows the child's attentional lead and refers to the event, object, or person to which the child is already attending. For example, the child is playing with cars and trucks and the adult says "Tell me what you are playing with."

Expansion. The teacher responds to the child's utterance with a more sophisticated utterance, which expands or elaborates on the intent of the child's original verbal response. For example, if the child says "daddy work," the adult could respond by saying "your daddy is at work." Expansions do not obligate a child response.

Imitation. The teacher immediately imitates the child's verbal or nonverbal response. For example the child says "ball" and the adult immediately responds by saying "ball." Imitations are a consequence strategy contingent on the child initiating a verbal or nonverbal communicative interaction and do not obligate a child response.

No Occurrence

The behaviors described above did not occur during the observation interval.