Teacher Interaction Styles and Task Engagement of Elementary Students with Cognitive Disabilities

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Abstract: Interaction styles of special education teachers were investigated using semi-structured observation of 13 student-teacher pairs during one-on-one language arts instruction of elementary students with cognitive disabilities. Teacher use of directions and responses of differing communication modes and types were analyzed. Student task-engagement behaviors (i.e., engage, intrusive/disruptive, on-task, and off-task) provided a context for understanding differences in teacher styles. The results indicate that, similar to previous studies of mother-child interaction in developmental disabilities, special educator style is more directive than responsive; they used directions over twice that of responses. Gestural prompts and questions were the most frequently used directions. Teacher directions – individual as well as aggregate measures – were related to the rate dimension, but not the duration dimension, of student active task engagement, suggesting short-lived effects of teacher directions. Thus, while teachers may observe a desired change in student performance, the change may not be durable and, hence, may not be as desirable as they had believed. Implications and cautions of the current findings are discussed.

Interpersonal environments provided by significant others — parents, teachers, and peers — are critical in development of children who are identified to have, or have a potential to develop, significant developmental problems (Clark & Seifer, 1985; El-Ghoroury & Romanczyk, 1999). As predicted from research of typically developing children, studies with children with disabilities and other developmental problems (e.g., prematurity) confirmed that maternal responsiveness was related to various favorable developmental outcomes, including attachment (De Wolff & van IJzendoorn, 1997), cognitive functioning (Clark & Seifer; Mahoney, Finger, & Powell, 1985), language development (Kaiser et al., 1996; Mahoney, 1988), social-communicative skills (Clark & Seifer; Fischer, 1987), and compliance (Maurer & Sherrod, 1987).

Early studies of mother-child social interactions of young children with cognitive impairments (e.g., mental retardation, Down Syndrome, developmental delay) indicated that, compared to parents of typically developing children, mothers of these children exhibited interactional patterns that were directive, controlling, dominant, as well as less responsive (Jones, 1980; Buium, Rynders, & Turnure, 1974). Even though there are some reasons to believe that these maternal interaction styles are a reaction to developmental problems in these children (Maurer & Sherrod, 1987; Watson, 1998), intervention studies also demonstrated that children’s developmental competence can be enhanced further in areas of language (Girolametto & Tannock, 1994; Warren & Yoder, 1994) and social-communicative skills (Kaiser et al., 1996; Girolametto, 1988) by changing parental interaction styles to be more responsive and less directive.

Teacher style becomes especially important when children have developmental and learning problems. First, children with disabilities have more intense, individualized contacts with special education teachers through special education services (Heward, 2000). Second, children with disabilities, because of characteristics associated with their disabilities, may be more susceptible to adult influences. For instance, infants with mental retardation were found to have difficulties in
shifting attention in response to parental attempts for redirection compared to mental-age matched, high-risk infants (Landry & Chapieski, 1989). Therefore, adults need to be especially diligent to be contingent and responsive to these children’s attentional focus in order for effective learning to happen. Interestingly, children with cognitive disabilities are more likely to show dependency to adult input (i.e., out directedness) than are typically developing children (Harter & Zigler, 1974; Zigler, 1971). Similarly, Beyda, Zentall, and Ferko (2002) reported that middle school students with behavior disorders were more dependent on teacher practices than were their peers without disabilities in general education settings. In this study, significant association between student-centered teacher practices and positive, task-appropriate student behaviors as well as association between negative teacher practices (e.g., teacher-directed classroom management) and negative student behaviors were observed only in students with behavior disorders.

Considering the established importance of parental interaction styles in children’s development, teacher interaction styles and their developmental significance in children with disabilities has been a relatively neglected area of study. Rimm-Kaufman, Voorhees, Snell, and La Paro (2003) point out that special education research literature is abundant with studies of instructional strategies, teaching practices, and curriculum materials (e.g., Kame‘enui, Carnine, Dixon, Simmons, & Coyle, 2002), without much attention to teachers themselves. Mize and Pettit (1997) showed that parenting styles and parenting practices made unique and additive contributions to typically developing children’s social competence. The parental teaching practice (e.g., social coaching) was only moderately related to the parenting style (e.g., responsive style), indicating independence of these two aspects. Therefore, teacher interaction style is a promising point of investigation that could contribute to children’s learning above and beyond what is achieved by existing instructional strategies.

Unfortunately, the portrayal of teacher-pupil interactions in cognitive disabilities in the modest base of extant research is not very positive when the responsiveness is considered. A common finding in studies of parent-child interactions is that parental responsiveness is a consistent predictor of better child outcomes. Yet, one persistent finding from classroom observational studies is that classroom communication is, perhaps understandably, dominated and controlled by teachers in both regular classrooms (Bunce, 1993; Ornstein, 1986) and special education classrooms (Craig & Collins, 1970; Fink, 1972).

Instructional intent on an adult’s part is known to contribute to a heightened level of directiveness (Davis, Stroud, & Green, 1988; Landry, Garner, Pirie, & Swank, 1994), and the current research base indicates that a consistent directive style of interaction has a potential to unfavorably influence development of children with developmental disabilities. If these are true, what would be the consequences of interaction styles of special education teachers whose primary responsibilities are ‘instruction’? Two areas of research provide some clues to answering this question: literature on teacher styles on communicative or linguistic performance of students with disabilities, and literature on teacher verbal practices, particularly what is commonly called ‘opportunities to response’ (OTR), and their effects on student task engagement behaviors.

Teacher Styles and Communication of Students with Disabilities

As far as communication and language is concerned, special education teachers do not seem to provide an optimal linguistic environment during their interactions with students with various disabilities, including deafness (Beattie & Kysela, 1995; Wood & Wood, 1984), behavior disorders (DeVoe & McMillen, 1994), learning disabilities (Klein & Harris, 1986), developmental disabilities (Girolametto, Hoaken, Weitzman, & van Lieshout, 2000; Mahoney & Wheeden, 1999; Pecyna Rhyner, Lehr, & Pudlas, 1990), and severe-profound disabilities (Beveridge & Hurrell, 1980; Stillman, Williams, & Linam, 1997). A consistent finding of these studies is that teacher talk in classrooms is filled with directions, most often in the form of questions (Craig & Collins, 1970; DeVoe & McMillen; Klein & Harris; Girolametto, Hoaken, et al.), and teachers give few chances to their stu-
dents to continue and elaborate student-initiated topics (i.e., low responsiveness) (Pecyna Rhyner et al.; Stipek & Sanborn, 1985). Generally, teacher directiveness is negatively associated with language productivity of students, such as MLU, different words used, or multi-word phrases (Beattie & Kysela). Students’ social functioning, particularly social initiation, is also negatively affected by high level of teacher directiveness and control (Mahoney & Wheeden; Mirenda & Donnellan, 1986).

Teacher Directions and Task-Engagement of Students with Disabilities

Interestingly, teacher direction is considered as very appropriate within the context of effective instruction, with respect to student task engagement or on-task behaviors. Sutherland, Wehby, and Yoder (2002) stated that effective instruction, characterized by high academic achievement and low problem behaviors, has two critical components that are similar to directiveness and responsiveness dimensions: the rate of opportunities given to students to actively respond to academic requests (OTR) and the amount of praise students receive for appropriate behaviors. OTR is more or less universally accepted as a key indicator of effective instruction (CEC, 1987, as cited in Sutherland, Alder, & Gunter, 2003). Higher OTR has been associated with or resulted in increased academic achievement in reading (Carnine, 1976), mathematics (Skinner, Belfiore, Mace, Williams-Wilson, & Jones, 1997), and ratings of teacher effectiveness (Espin & Yell, 1994). In a series of studies, Sutherland and his colleagues (Sutherland et al., 2003; Sutherland & Wehby, 2001; Sutherland et al., 2002) demonstrated positive relationships between OTR and task engagement and negative relationships between OTR and problem behaviors in children with behavior disorders. Despite these reported benefits, the observed OTR in teachers during actual classroom instruction was generally low ranging from 0.019 per minute from general education teachers (Van Acker & Grant, 1996) to 3.52 per minute from special education teachers (after intervention) (Sutherland et al., 2003).

Although teacher directions, especially academic requests like OTR, have favorable effects on student engagement, some researchers have expressed concerns regarding the role of directiveness in student learning. For example, Sapona, Bauer, and Phillips (1989) emphatically argued that the teacher directive stance, as compared to the facilitative stance, is not conducive to cultivating self-directed learning in students. There is some evidence showing that children who were exposed to directive teachers or were interrupted often with teacher help during tasks tend to persist less in subsequent, independent problem solving situations (Stipek & Sanborn 1985). The finding that student social functioning, particularly social initiation, is also negatively affected by high level of teacher directiveness and control (Mahoney & Wheeden, 1999; Mirenda & Donnellan, 1986; Wood & Wood, 1984) provides another support to this concern.

To summarize, the current pattern of findings (i.e., special education teachers who are both insufficiently responsive as interaction partners and insufficiently directive as instruction providers) may reflect two potentially competing goals of instruction for students with cognitive disabilities, with respect to their social and communicative development as well as academic learning. The extant research base does not provide a clear direction regarding specific (behavioral) manifestations of effective interaction styles of special education teachers that are conducive to both children’s development as well as learning. The present study was proposed and implemented to address this gap in our understanding of teacher use of directions and responses during their instruction of school-age children with cognitive disabilities, using task-engagement behaviors as student outcome measures. These behaviors were selected not only because of apparent importance to teachers (i.e., face validity), but also because they have been shown to be directly or indirectly related to students’ performance on academic tests, particularly academic responding or engagement (Greenwood, Carta, Kamps, Terry, & Delquadri, 1994). Also, these behaviors are amenable to instructional interventions and, thus, have served as one of the central targets to improve teacher effectiveness or teaching strategies (Espin & Yell, 1994; Logan & Keefe, 1997).

Finally, relationships involving different
forms of teacher directions of varying degrees of explicitness were also examined. Increased attention has been given to identify specific forms of directions that may be conducive to children’s learning, and conditions under which directions may be more effective, rather than asking whether directiveness is adaptive or maladaptive. For example, directives that are difficult and complex, directives that request developmentally challenging actions, or directives that are issued out of child’s focus of attention were associated with less desirable child behaviors (Curcio & Paccia, 1987; Mahoney & Neville-Smith, 1996; McCathren, Yoder, & Warren, 1995; Watson, 1998), compared to directives that are less complicated and those given within the focus of child’s attention. To extend this line of research, teacher directions of varying explicitness were included as target variables. The specific research questions that guided the study are as follows:

How do special education teachers use directions and responses during one-on-one instruction of elementary students with cognitive disabilities?

How are teachers’ interaction styles related to task-related behaviors in students with cognitive disabilities?

Method

Participants

Thirteen student-teacher dyads, each composed of an elementary student with cognitive disability and his/her special education teacher, participated in the study. Students with cognitive disabilities were included in the study if they were (a) receiving special education services for mild-moderate mental impairments or developmental cognitive disabilities, (b) in the grades 3rd through 5th, and (c) using speech as a primary means of communication. To control for potential confounding effects, children were excluded if they had sensory impairments or physical disabilities. Children whose primary home language was other than English were also excluded. Qualifications for teachers as participants were (a) being fully licensed to teach in the area of special education, and (b) providing instruction for participating students regularly. All participants were recruited from public schools in a large metropolitan city and neighboring suburban areas in the Midwest.

After obtaining informed consents from teachers and parents, participating teachers provided brief demographic information about themselves and their students as well as students’ testing scores available from the most recent special education eligibility reports. All participating teachers were women, reflecting the current pool of special education teachers. In general, teachers who participated in the study were mature (mean age of 42.54 years old, range 26-53), were experienced (mean teaching experience of 17.72 years, range 4-32), and held multiple special education teaching licensures (mean number of 2.08 licensures, range 1-3). These teachers had been teaching the participating students for an average of 3.08 years (range 0.3-6 years).

Student participants were comprised of nine girls and four boys, with a mean age of 10.91 years (range 9.3-11.9 years). The primary diagnoses were developmental cognitive disability for seven students and mild-moderate mental impairments for six students. These differing labels are due to the state changing labels for mental retardation. Additionally, seven of 13 participating students either had a secondary diagnosis of speech-language impairment or were receiving speech-language services as part of their instructional programs. Testing scores could be obtained for only part of the participating students because one of the school districts, where five participant dyads were recruited, had a district-wide policy of not reporting standard scores in special education evaluation reports. Diagnoses of participating students from this district were confirmed by the participating teachers based on students’ performance range in intelligence tests and general performance level of adaptive behaviors. From available test scores, student participants had a mean IQ score of 60.56 (range 50-73, n = 9) and a mean receptive language standard score of 72.00 (range 59-84, n = 7).

Procedure

Instructional interactions of each child-teacher dyad were videotaped using SONY
Digital Video Camera Recorders (Model No. DCR-TRV 27) across two sessions, each 10-25 minutes long, during one-on-one language arts (i.e., reading, writing, or spelling) instruction. Language arts instruction was selected as the observational context because it is one of the most typical instructional activities occurring in elementary classrooms for students with or without disabilities. Teachers were asked to schedule observation sessions within naturally scheduled classroom instructional routines, and to engage in activities that were part of regular instructional programming of the target student during observations. Videotaping occurred in the participating children’s special education classrooms (i.e., resource rooms or self-contained classrooms) for all but one student. For one student, instruction for observation occurred in a school conference room due to the teacher’s concerns regarding possible disruption to and from other students in the classroom. After these observation sessions, this teacher reported interactions during the observation as typical. All observations were conducted toward the end of school year (i.e., March through June) when teachers and students were well accustomed to each other. No observation sessions were more than two weeks apart for all dyads.

To videotape instructional interactions of each dyad, the camcorder was set up in a way that behaviors of both the teacher and the child could be recorded. To reduce reactivity from participants, the following actions were taken: (a) before actual data collection began, at least one practice videotaping session was conducted during regular instruction of target students; (b) the camcorder was set up in an unobtrusive location; (c) a tripod was used and the observer stayed away from the instructional area except to check proper operation of videotaping; and (d) participating teachers and children were kept blind to specific hypotheses of the study, although information regarding a general purpose and experimental procedures was provided during the informed consent process.

From each videotaped instructional session, a 15-minute segment with minimal disruption (e.g., teacher out of camera, etc.) was transformed as digitally compressed video clips onto CD. The first 10-minute segment of each observation session was coded for study variables. The duration of observation sessions and coding periods were relatively short but similar to other microanalytic observation studies of teacher-child (e.g., Girolametto, Hoaken, et al., 2000; Girolametto, Weitzman, van Lieshout, & Duffy, 2000; Mahoney & Wheeden, 1999) or parent-child interactions (Tannock, 1988).

Coding and observational software. From the videotaped observations, MovieStarTM software was used to create digitally compressed video clips for coding. For coding and data analysis, PROCODER (Tapp & Walden, 2000) and Multiple Option Observational System for Experimental Studies (MOOSES) (Tapp, Wehby, & Ellis, 1995) software packages were used. From the compressed video-clips of observation sessions, three general classes of target behaviors were identified, coded, and analyzed: teacher nonverbal behaviors (i.e., nonverbal directions and responses), teacher verbal behaviors (i.e., verbal directions and responses), and student task behaviors. Three slightly different coding procedures were used for each class of behaviors. Teacher nonverbal behaviors (i.e., nonverbal directions and responses) were directly coded from video-clips of observation sessions, using the PROCODER program.

To code teacher verbal behaviors, each observation session was first transcribed including a description of nonverbal interactions between a teacher and a student. Then, based on the transcripts, the observer coded teacher verbal behaviors by (a) first, segmenting teacher verbalizations into analysis units, (b) second, determining whether each unit was teacher verbal directions or responses, (c) third, assigning and recording a specific code for teacher verbal behaviors for those units that were either teacher verbal directions or responses, and (d) fourth, transferring codes on the transcripts into PROCODER files. Whenever necessary, observers viewed video-clips to aid initial coding on the transcripts. The unit used to code teacher verbal behaviors was the Analysis of Speech Unit, or AS-Unit, as proposed by Foster, Tonkin, and Wigglesworth (2000). An AS-unit is “a single speaker’s utterance consisting of an independent clause, or sub-clausal unit, together with
any subordinate clause(s) associated with either” (p. 365).

Student task behaviors were coded using the similar coding procedures as those of teacher nonverbal behaviors. While watching video-clips of instructional interactions, the observer pressed assigned keys for student task behaviors at the onset of each task behavior. Codes for student task behaviors were set up as mutually exhaustive and exclusive so that at any moment only one particular kind of student task engagement behaviors was recorded, while codes for teacher behaviors were set up as mutually exclusive. The resulting PROCODER data files contained information regarding code occurrences, timing of each code occurrence, and, for student task-related behaviors, duration of each occurrence.

Observer Training and Reliability

Observers were trained and interobserver agreement (IOA) was established prior to data coding. The first author served as a primary observer and three PhD level graduate students served as independent observers for reliability checks. Disagreement in coding during the practice periods was resolved through discussion. Training was continued until two observers reached the agreement ratio of 80% or higher in three consecutive training tapes. Interobserver agreement was assessed by calculating point-by-point agreement ratio for occurrences of target behavior (House, House, & Campbell, 1981). Agreement checks of teacher verbal behaviors were conducted using coded transcripts; observers (coders) went over the coded transcripts and recorded each occurrence of target behavior as agreement or disagreement. Agreement checks of teacher nonverbal behaviors were conducted using the MOOSES program. MOOSES computed event frequency agreement (i.e., occurrence agreement) using a 5-second time window around each event file in the primary observer’s file. Agreement was considered as a match between an event code of a primary observer and the same code found in the second observer’s file within the time window. All unmatched codes were considered to be disagreements. Interobserver agreement was then calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying it by 100.

Interobserver agreement data was collected for 27% of observation sessions that were randomly selected across different participant dyads and observation sessions. The mean occurrence agreement was 89.8% (range, 83-100%) for teacher nonverbal directions, 87.1% (range, 81-100%) for teacher nonverbal responses, 91.9% (range, 87-94%) for teacher verbal directions, 90.3% (range, 81-96%) for teacher verbal responses, and 85.7% (range, 81-90%) for student task behaviors.

Codes and Study Variables

For teachers, directions and responses were coded as events. Teacher direction codes were divided further depending on the form and degree of explicitness, as portrayed in Table 1. Included in teacher verbal directions were Command, Question, and Suggestion and, in teacher nonverbal directions, Full Physical Prompt, Partial Physical Prompt, and Gestural Prompt. Teacher responses were divided further depending on level of elaboration. Included in teacher verbal responses were Elaboration, Repeat, and Acknowledgement and, in teacher nonverbal responses, Compliance, Imitation, and Nonverbal Acknowledgment. For the teachers, analyses were conducted on the rate (i.e., frequency divided by duration of observation session) of verbal directions, nonverbal directions, total directions, verbal responses, nonverbal responses, and total responses. Because the rates of physical prompts were very low, Full and Partial Physical Prompts were not included in computing rates of Total Direction and subsequent statistical analyses. These analytic units are presented as secondary indices in Table 1.

For students, task-related behaviors were coded as duration, as presented in Table 2. Codes and definitions for students’ task-related behaviors – Engagement (active task-conducive), On-Task (passive task-conducive), Intrusive (active, task-interfering), and Off-Task (passive, task interfering) – were adapted from Espin and Yell’s (1994) Pupil Observation Procedures. For the students, analyses were conducted on the rate and duration of task behaviors (i.e., Engagement + On-Task)
Table 1
Mean, SD, and Range of Teacher Directions and Responses

<table>
<thead>
<tr>
<th>Target Behavior</th>
<th>Frequency</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Range</td>
</tr>
<tr>
<td>Verbal Direction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Command</td>
<td>31.31 (18.92)</td>
<td>13–72</td>
</tr>
<tr>
<td>Question</td>
<td>67.23 (26.78)</td>
<td>31–118</td>
</tr>
<tr>
<td>Suggestion</td>
<td>46.15 (25.90)</td>
<td>11–90</td>
</tr>
<tr>
<td>Nonverbal Direction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Physical Prompt</td>
<td>0.62 (0.96)</td>
<td>0–3</td>
</tr>
<tr>
<td>Partial Physical Prompt</td>
<td>1.46 (2.15)</td>
<td>0–8</td>
</tr>
<tr>
<td>Gestural Prompt</td>
<td>156.08 (113.11)</td>
<td>10–383</td>
</tr>
<tr>
<td>Verbal Response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elaboration</td>
<td>32.69 (11.86)</td>
<td>16–59</td>
</tr>
<tr>
<td>Repeat</td>
<td>13.23 (8.32)</td>
<td>4–30</td>
</tr>
<tr>
<td>Acknowledge</td>
<td>43.23 (19.72)</td>
<td>19–79</td>
</tr>
<tr>
<td>Nonverbal Response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance</td>
<td>1.62 (3.66)</td>
<td>0–13</td>
</tr>
<tr>
<td>NV Acknowledge</td>
<td>34.00 (21.59)</td>
<td>12–85</td>
</tr>
</tbody>
</table>

Secondary Indices
- Verbal Direction: 7.23 (2.54) 3.10–12.20
- Nonverbal Direction: 7.90 (5.70) 0.50–19.20
- Total Direction: 15.04 (7.62) 3.60–28.05
- Verbal Response: 4.45 (1.34) 2.30–6.75
- Nonverbal Response: 1.78 (1.20) 0.60–4.90
- Total Response: 6.15 (2.02) 3.60–10.25

Note. a Number of occurrences summed across two 10-minute observation sessions. b Imitation was observed only once for the entire observation sessions, thus deleted from summary. c Due to extremely low occurrences, full and partial physical prompts were not included in computing Total Direction to streamline subsequent analyses.

Table 2
Mean, SD, and Range of Student Task-related Behaviors

<table>
<thead>
<tr>
<th>Target Behavior</th>
<th>Rate</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Range</td>
</tr>
<tr>
<td>Engagement</td>
<td>5.03 (1.30)</td>
<td>2.30–7.25</td>
</tr>
<tr>
<td>On-Task</td>
<td>5.20 (1.25)</td>
<td>3.25–7.50</td>
</tr>
<tr>
<td>Intrusive</td>
<td>0.81 (0.84)</td>
<td>0.00–2.85</td>
</tr>
<tr>
<td>Off-Task</td>
<td>0.54 (0.45)</td>
<td>0.00–1.75</td>
</tr>
</tbody>
</table>

Secondary Indices
- Task Behavior: 10.24 (2.52) 5.55–14.75 92.75% (9.61) 62.42–99.25
- Non-Task Behavior: 1.36 (1.00) 0.00–3.55 6.73% (9.42) 0.00–36.67
and non-task behaviors (Intrusive + Off-Task); see the secondary indices in Table 2. A detailed description of operational definitions of target behaviors as well as the segmentation rules used for the study is available from the first author.

Analysis

Relationships between teacher directiveness and responsiveness and student task behaviors were examined by correlational analysis (Schneider & Hecht, 1995). Due to the small number of participant pairs, a nonparametric correlation analysis of Spearman’s rho correlation was used (a) to guard against the normality assumption required for the parametric Pearson correlation analysis and (b) to increase power of detecting significant relationships even with small number of subject dyads. An examination of relationships between teacher behaviors and student behaviors required a large number of analyses. To reduce potential number of analyses to be conducted, only those target behaviors with sufficient occurrences were included. Considering the exploratory nature of the current study, a liberal alpha level of .05 was chosen to control for the Type II error.

Results

Special Education Teachers’ Use Directions and Responses

Means, standard deviations, and ranges of teacher target behaviors are presented in the Table 1. The most frequent type of teacher direction was the Gestural Prompt, a nonverbal direction (an average rate of 7.80/min). The next most frequent teacher direction was Question, a verbal direction (an average rate of 3.36/min). Nonverbal Direction (i.e., composite of Gestural, Full Physical, and Partial Physical Prompt) was used more frequently (an average 7.91/min) than Verbal Direction (i.e., composite of Command, Question, and Suggestion) (an average rate 7.23/min) due to high rates of Gestural Prompt (98.7%). Summed together, special education teachers used directions on average 15.04 times per minute, or approximately for every 4 seconds, during one-on-one instruction of their elementary students with cognitive disabilities.

The most frequently used teacher responses was (Verbal) Acknowledgment, which occurred an average rate of 2.16/min. The second most frequent teacher responses were Nonverbal Acknowledgment with an average rate of 1.70/min. This was followed by Elaboration, used an average rate of 1.63/min. Verbal Response was more frequent than Nonverbal Responses with average rates of 4.45/min and 1.78/min. Overall, special education teachers responded to students 6.16 times per minute or approximately for every 10 seconds, which is less than half (41%) the rate of teacher direction use.

A wide variability was observed in individual special education teachers’ use of directions and responses. For example, one teacher used Gestural Prompt 10 times during the 20-minute observation period, while another teacher used them 383 times during the same period. Likewise one teacher used directions sparingly (3.60/min), while another teacher used directions frequently (28.05/min) during instruction. Similar variability but of less magnitude was also observed in teacher responses. One teacher responded to her student infrequently (3.60/min), but another teacher responded to her student far more frequently (10.25/min).

Task Engagement of Students with Cognitive Disabilities

Table 2 includes information about means, standard deviations, and ranges of student target behaviors. Within the context of one-on-one instruction, elementary students with cognitive disabilities were most likely to spend their instructional time actively Engaged in task (an average of 58.15% of time or an average rate of 5.03/min), followed by passive orientation to task (i.e., On-Task) (an average of 34.60% time or an average rate of 5.20/min). Overall, student participants exhibited Task-Behavior (i.e., a composite of Engagement and On-Task) for an average of 92.75% of time. Non-Task Behavior, which is a composite of Intrusiveness and Off-Task, occurred infrequently for an average of 6.73% of the observation period.
Relationships Between Teacher Interaction Styles and Student Task-Engagement

To reduce the number of correlational analyses, thus to reduce probability of Type I error, data were examined and data reduction was attempted. First, teacher target behaviors that occurred infrequently (i.e., Full Physical Prompt, Partial Physical Prompt, and Compliance) were excluded from further analysis. Second, when there were no statistically significant differences between Session 1 scores and session 2 scores, based on Wilcoxon Signed Ranks Tests, scores from two observation sessions were combined to produce one overall score (except for the Off-Task). Third, when there was significant and strong correlation ($r \geq .80$) between duration and frequency scores, only duration scores were used. The criterion correlation existed only for the Intrusiveness and Off-Task.

Teacher directions. Table 3 summarizes results of correlation analysis involving directions. Statistically significant, high positive correlations were observed between teacher Command, Suggestion, Gestural Prompt, Verbal Direction, and Total Direction and rates of student Engagement ($r = .68 - .81$), On-Task ($r = .67 - .80$), and Task-behaviors ($r = .66 - .80$). There were no or very small correlations between teacher Question and rates of student Engagement, On-Task, and Task-related behaviors ($r = -.02 - .16$). With respect to relative duration indices of student behaviors, statistically significant and high correlations were observed only between the relative duration of On-Task and teacher Suggestion ($r = .76$), Gestural Prompt ($r = .67$), and Total Direction ($r = .67$). Teacher directions, both individual directions and composite variables, were not correlated with student Off-Task or Intrusiveness, except for the significant relationship between teacher Question and Session 2 Off-Task ($r = .60$).

Potential changes in the relationships as a function of explicitness of directions were examined only for teacher verbal directions – Command, Question, and Suggestion – because Physical Prompts occurred very infrequently. Correlation coefficients involving teacher Command and those involving

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Correlation$^a$ between Teacher Directions and Student Behaviors</th>
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<tbody>
<tr>
<td></td>
<td>Command$^b$</td>
</tr>
<tr>
<td>Engagement</td>
<td></td>
</tr>
<tr>
<td>Rate</td>
<td>.680*</td>
</tr>
<tr>
<td>% Time</td>
<td>.033</td>
</tr>
<tr>
<td>On-Task</td>
<td></td>
</tr>
<tr>
<td>Rate</td>
<td>.740**</td>
</tr>
<tr>
<td>% Time</td>
<td>.176</td>
</tr>
<tr>
<td>Task</td>
<td></td>
</tr>
<tr>
<td>Rate</td>
<td>.737**</td>
</tr>
<tr>
<td>% Time</td>
<td>-.476</td>
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</tbody>
</table>

| Intrusive |       |       |       |       |       |       |
| % Time    | .395   | -.041 | -.459  | -.377  | -.179  | -.308  |
| Off-Task  |        |       |       |       |       |       |
| % Time 1c | -.037  | .088  | -.446  | -.284  | -.095  | -.278  |
| % Time 2c | .208   | .508* | .119   | .091   | -.359  | .158   |
| Non-Task |        |       |       |       |       |       |
| % Time   | .476   | .049  | -.500  | -.363  | -.069  | -.275  |

Note. $^a$ Spearman’s rho correlation. $^b$ Rate per minute. $^c$ Session 1 and Session 2 indices.

* $p < .05$.

** $p < .01$. 

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Teacher Suggestion were of similar magnitude across pairs of comparison (refer to Table 3). Correlations involving Command were consistently higher than those involving Question with respect to rates of student Engagement ($r = .68$ vs. $r = .16$, respectively), On-Task ($r = .74$ vs. $r = .09$), and Task Behavior ($r = .74$ vs. $r = .09$). On the other hand, although Suggestion was a less explicit teacher direction than Question, correlations involving Suggestion were greater than those involving Question in terms of rates of student Engagement ($r = .69$ vs. $r = .16$, respectively), On-Task ($r = .67$ vs. $r = .09$), and Task Behavior ($r = .67$ vs. $r = .09$). Similarly, no notable differences in magnitude of correlation were observed in correlations involving relative durations of student behaviors except the relative duration of On-Task ($r = .18$, $r = .12$, and $r = .76$ for Command, Question, and Suggestion, respectively) and Task Behavior ($r = .48$, $r = -.03$, and $r = .47$). Therefore, no consistent trend was observed with respect to explicitness of teacher directions and its relationship to student task behaviors.

**Table 4**

<table>
<thead>
<tr>
<th></th>
<th>Elaborate$^b$</th>
<th>Repeat$^b$</th>
<th>Acknowledge$^b$</th>
<th>Nonverbal Acknowledge$^b$</th>
<th>Verbal Response$^b$</th>
<th>Total Response$^b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate</td>
<td>.566*</td>
<td>.488</td>
<td>.531</td>
<td>.113</td>
<td>.665*</td>
<td>.587*</td>
</tr>
<tr>
<td>% Time</td>
<td>-.003</td>
<td>.279</td>
<td>.228</td>
<td>-.171</td>
<td>.324</td>
<td>.240</td>
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<tr>
<td>On-Task</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate</td>
<td>.471</td>
<td>.398</td>
<td>.478</td>
<td>.059</td>
<td>.569*</td>
<td>.476</td>
</tr>
<tr>
<td>% Time</td>
<td>.159</td>
<td>.000</td>
<td>-.030</td>
<td>-.069</td>
<td>.033</td>
<td>-.011</td>
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<td>Task</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate</td>
<td>.499</td>
<td>.422</td>
<td>.517</td>
<td>.063</td>
<td>.604*</td>
<td>.521</td>
</tr>
<tr>
<td>% Time</td>
<td>-.204</td>
<td>-.152</td>
<td>-.261</td>
<td>-.217</td>
<td>-.253</td>
<td>-.193</td>
</tr>
<tr>
<td>Intrusive</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Time</td>
<td>.142</td>
<td>.087</td>
<td>.285</td>
<td>.303</td>
<td>.176</td>
<td>.203</td>
</tr>
<tr>
<td>Off-Task</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Time 1$^c$</td>
<td>-.069</td>
<td>.105</td>
<td>-.205</td>
<td>-.404</td>
<td>-.132</td>
<td>-.258</td>
</tr>
<tr>
<td>% Time 2$^c$</td>
<td>.466</td>
<td>.492</td>
<td>-.222</td>
<td>-.294</td>
<td>.288</td>
<td>.081</td>
</tr>
<tr>
<td>Non-Task</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Time</td>
<td>.204</td>
<td>.182</td>
<td>-.176</td>
<td>.124</td>
<td>.192</td>
<td>.118</td>
</tr>
</tbody>
</table>

*Note.*  
$^a$ Spearman’s rho correlation.  
$^b$ Rate per minute.  
$^c$ Session 1 and Session 2 indices.  
* $p < .05$.  
** $p < .01$.  

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Discussion

Summary of Teacher Direction and Response Use

Mirroring findings from existing adult-child interaction studies of young children with developmental disabilities, special education teachers in the current study were more directive than responsive during their instructional interactions with their students. Specifically, special education teachers used more than twice as many directions (an average rate of 15.04/min) as responses (an average rate of 6.16/min) during one-on-one language arts instruction of their upper elementary students with cognitive disabilities. So, looking just at the observed frequency, special education teachers were more directive than responsive.

The observed rate of directions (approximately 15/min) is much higher than the observed Opportunities to Respond (OTR) (0.019 – 3.52 per min) (Van Acker & Grant, 1996; Sutherland et al., 2003) or recommended OTR (8-12 /min during independent practice) (CEC, 1987, as cited in Sutherland et al., 2003).

Several factors unique to this study may have contributed to this exceptionally high level of teacher directions, including one-on-one instruction (vs. group instruction), experienced teacher participants, and teacher reactivity during observation. As early as 1968, Fine, Allen, and Medvene described potential elevation of teacher directiveness during observation due to teacher observation anxiety. The finding that questions were the most frequent form of teacher verbal direction is consistent with the extant literature describing dominance of teacher questions in classroom exchanges (Craig & Collins, 1970; DeVoe & McMillen, 1994; Girolametto, Hoaken et al., 2000; Klein & Harris, 1986). Very few nonverbal prompts involving physical contacts were used by teachers during observation sessions. Individual differences were observed across participating special education teachers in terms of overall use of directions and responses, with more variability in direction use (800% difference) than response use (300% difference). Individual differences in teacher styles were also reported by Mahoney and Wheeden (1999) and Jordan and Lindsay, (1997), and they are believed to be more or less stable within individual teachers.

Upper elementary students with cognitive disabilities in this study, on the other hand, were observed engaged in behaviors that are directly related to task for the majority of observation sessions, either actively engaged or passively oriented. Behaviors that interfered with task, either actively or passively, were rarely observed (on average 7% time). Several factors appear to have contributed to this high level of task engagement in the study participants. First is the format of instruction. Students with cognitive disabilities in this study were observed during one-on-one instruction. Given high levels of teacher attention during one-on-one instruction, one could expect students to engage in more task-conducive behaviors compared to the amount that could be expected during independent seat work or large-group instruction. Also any task-interference behaviors from these students were likely to be immediately noticed by teachers and prevented from continuing, thus resulting in a very low level of task-interference behaviors observed.

Second, most teachers who participated in the current study were experienced teachers, with close to 18 years of teaching experience on average. These experienced special education teachers were more likely to have provided effective instruction, encouraging high levels of task-conducive behaviors and low level of task-interference behaviors in participating students with cognitive disabilities. The third factor is an interaction of the above two factors and the outerdirected (i.e., heavy reliance on outside cues especially from teachers or other adults) characteristics of children with cognitive disabilities (Harter & Zigler, 1974; Zigler, 1971). In other words, during one-on-one instruction, these experienced teachers provided frequent and effective directions and verbal feedback to students with cognitive disabilities and, in return, these students, being more susceptible to teacher influences, were able to be engaged in task for the majority of time.

Relationship between Teacher Instructional Behaviors and Student Task Behaviors

Many indices of teacher directions examined in this study were observed to have strong and statistically significant correlations with rates of
student engagement and on-task, including teacher Command, Suggestion, Gestural Prompt, Verbal Direction, and Total Direction. There were fewer significant and high correlations between teacher directions and duration of student engagement and on-task; only teacher Suggestion and Gestural Prompt were significantly correlated with On-Task relative duration. Interestingly, teacher Question was not significantly correlated to students’ engagement or on-task (either rate or duration) despite the fact that Question was the most frequently occurring teacher directions. Only Elaboration was significantly related to rates of student engagement among individual teacher responses. Composite variables of teacher responses - Verbal Response and Total Response - were significantly related to rates, but not duration, of student engagement.

The pattern of relationships between teacher directions and responses and student task-conducive behaviors (i.e., Engage + On-Task) was generally in line with the relationship between OTR and task engagement behaviors in the OTR literature. In the current study, teacher directions appeared to have strong ties with task-conducive behaviors of students with cognitive disabilities, both in terms of magnitude of relationships and number/types of directions. Individual directions (e.g., command, suggestion) were significantly related to student task-conducive behaviors. Similarly, in OTR research, OTR (or academic requests) were positively related to task-engagement and negatively related to disruptive behaviors (Sutherland et al., 2003; Sutherland & Wehby, 2001; Sutherland et al., 2002).

Why there were weaker and fewer significant relationships between teacher responses and student task-related behaviors, compared to teacher directions, cannot be readily explained. It may be partly due to the observed frequencies of teacher response use. Participating teachers used responses about half as often as their direction use with less variability. This reduced use and variability might have contributed to failure to detect significant relationships involving individual responses (e.g., acknowledgement). The emergence of significant relationships between composite response variables (i.e., Verbal and Total Responses) and student engagement adds support to this possibility.

Related to this is the general lack of significant correlation between task-interference behaviors (i.e., Intrusiveness and Off-Task) from students and teacher direction or response variables as Intrusiveness and Off-Task occurred so few times in the current study. While Sutherland and Wehby (2001) reported negative correlation between OTR and disruptive behaviors, in the present study, the direction of relationships were not consistent – some positive and some negative correlations with respect to both teacher directions and responses. Different patterns of relationships may emerge in students who exhibit higher levels of task-interference behaviors such as students with behavioral disorders as reported by Sutherland and Wehby.

The fact that teacher behaviors were related mainly with the ‘rate’ (or frequency) dimension of student task behaviors but not ‘duration’ dimension requires further discussion. In other words, teacher behaviors were related to how often student task behaviors occurred but not necessarily how long students were engaged in these behaviors. One way to examine this finding is to look at observed frequencies of teacher behaviors. On average, teachers issued directions approximately 15 times per minute and responses 6 times per minute; combined, teachers exhibited 21 directions or responses per minute, or issued directions or responses in every 3 seconds. This ‘saturated’ nature of teacher behaviors may be partially responsible for the observed high On-Task/Engagement (93% of time) of students with cognitive disabilities. However, this saturation with teacher behavior is also likely to be responsible for relatively short-lived occurrences of On-Task and Engagement behaviors. The mean bouts of On-Task and Engagement were 4 seconds and 7 seconds in this study, respectively. Due to almost constant stream of teacher behaviors, student task-conducive behaviors, whether they be passive or active, were interrupted frequently, which may have resulted in only short bouts of these behaviors and, thus, precluded influences on duration dimension of student task-conducive behaviors. Several scholars have warned about potentially deleterious effect of interruptions and excessive teacher directions on student
future persistence on task and self-directed learning (Mahoney & Wheeden, 1999; Stipek & Sanborn, 1985; Wood & Wood, 1984). Combined with the outer-directed characteristics of students with cognitive disability, there is reason to be cautious about all positive interpretation of statistically significant, positive relationships between teacher directions and student task-conducive behaviors.

No consistent trend was observed in the magnitude of correlation with respect to the explicitness of teacher verbal directions. Both Command, the most explicit verbal direction, and Suggestion, the least explicit one, showed higher correlations than did Question, middle in explicitness, with rates of student task-conducive behaviors, despite the fact that Question was the most frequently exhibited teacher verbal direction. This pattern of findings could be explained from grammatical complexity, rather than explicitness, of teacher directions. That is, teacher Questions (e.g., wh-questions) may be more grammatically complex and longer than teacher commands or teacher suggestions (e.g., verbal models), which may have affected understanding and compliance from students with cognitive disabilities. Previous research of parent-child interactions in developmental disabilities identified difficulty level (Mahoney & Neville-Smith, 1996) and syntactic complexity (Curcio & Paccia, 1987) as factors that determine effectiveness of parental directions.

Limitations and Future Directions

A large number of statistical analyses were conducted with data obtained from a small number of participants, necessitating consideration of both Type I and Type II errors. The small number of participants may have not allowed detection of potentially statistically significant findings particularly when the strength of relationship is small. Therefore, findings of the current study need to be approached as exploratory; replication with a large number of participant pairs is necessary. Before concluding teacher directions ‘lead to’ or ‘increase’ engagement of students with cognitive disabilities, findings of the current study need to be replicated with experimental studies that directly test causal or functional relationships. The present study provides many potential candidates for subsequent experimental studies of teacher and student behaviors.

The findings of the current study need to be interpreted in consideration of the observational context of the study. Generalization to other types of instruction (small group, large group), other subject areas (mathematics, independent living), other disability types (e.g., emotional behavioral disorders, sensory disabilities), or the entire population of special education teachers should be considered with caution. Specifically, in the present study, the choice of academic task was up to the teachers within the regular school work of participating students, with the intention of enhancing ecological validity. However, due to this fact, the difficulty level of the task was not controlled. Considering the suggested variations of teacher behaviors during different task demand (Davis et al., 1988; Girolametto, Weitzman, et al., 2000), and differential effects of adult directions of varying difficulty (Curcio & Paccia, 1987; Mahoney & Neville-Smith, 1996), the effect of difficulty level of task on teacher behaviors and their subsequent effect on student behaviors needs to be examined explicitly.

Although the observation periods of the current study are comparable to some studies of adult-child interactions (e.g., Girolametto, Hoaken, et al., 2000; Tannock, 1988), observations in the current study were relatively short and provided only a snap-shot of teacher-child instructional interactions at one point of time. The long-term effect of, or effects of prolonged exposure to, the highly directive style of special education teacher interaction styles on children’s functioning needs to be examined further. It appeared that overall teacher directions facilitated engagement of students with cognitive disabilities. It was also found that teacher directions were related to ‘rate’ dimension of task-conducive behaviors of students but not the duration dimension, showing short-lived influence of teacher directions. If this pattern of interactions persists across the school career of students with cognitive disabilities, would it be possible that students become ‘dependent’ on teacher directions in order for them to be actively engaged in the task? It is important that this long-term changes or potential shifts in stu-
dent task engagement behaviors as a function of prolonged exposure to different teacher interaction styles (e.g., different levels of directions and responses) is investigated and understood.

The present study investigated relationships of teacher behaviors (i.e., directions and responses) with a specific emphasis on task-engagement behaviors. And the tentative finding is that teacher directions appeared to serve an effective instructional function to special education teachers. This finding needs to be extended to other aspects of student academic performance such as accuracy of responding, elaborateness/complexity of student response (Jordan & Lindsay, 1997), or measures of overall academic achievement. Moreover, there are other developmental areas that studies of effects of teacher interaction styles may potentially promising, such as social-communicative development of students with cognitive disabilities. Teachers’ roles as facilitators of language and social skills of children with disabilities have been increasingly emphasized (McCathren, 2000; Pecyna Rhyner et al., 1990; Sargent, 1991). Additionally, existing approaches like social skill training have been criticized for their lack of generalizability (Hughes & Sullivan, 1988; Mathur & Rutherford, 1989) and lack of effects on spontaneous social reciprocity (Strain, 2001). Adult interaction styles represented as responsiveness have been potentially shown to affect social reciprocity (Clark & Seifer, 1985; Girolametto, 1988; Tannock, 1988) or social initiation (Girolametto) of children with developmental disabilities. Studies of adult, particularly teacher, interaction styles may yield an innovative approach that improves social competency of these students in school settings.

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