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Academic Engagement: Current Perspectives on Research and Practice

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Abstract. Classroom behaviors that enable academic learning are the focus of this article. A brief perspective is offered on the development and validation of one enabler—engagement in academic responding—and recent findings are provided of an effort to bridge the gap between research and practice by employing this knowledge in Title 1 elementary schools to improve instruction. In prior research, the authors identified a class of "academic responses" (e.g., reading aloud), positively correlated to student achievement as measured by standardized tests, that were differentially accelerated by instructional situations and interventions, and mediated the relationship between instruction and achievement. Translating these findings to practice within three magnet schools, teachers were provided engagement information on individual students in their classrooms as well as (a) schoolwide engagement and classroom behavior norms, including trends over grade levels and type of learner, and (b) instructional situations that accelerated versus decelerated engagement for use in the instructional decision making of teachers. Implications for practice and future research are discussed.

What students do while being taught in the classroom has long been of interest to educators and educational researchers. If a student is unruly and disruptive, he or she will be unable to respond to academic opportunities or manage subject matter tasks rapidly and accurately. These actions may "spillover," preventing the learning of others, and may alter or interfere with a teacher's plans for teaching. If many students are engaged in this behavior, subject matter teaching and learning may be stopped altogether. Alternately, if students are well-behaved, watching and listening to the teacher, waiting to receive materials and instructions on what to do, their rate of progress in learning a subject matter will advance. When

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students are well-behaved, know what they need to study, and are able to access the needed materials independently to read, compute, and perform other academic tasks, progress in learning a subject matter will be accelerated.

What is learned in school—the academic skills attained by each individual—is largely defined by the interplay of these experiences from one day to the next and from one grade level to another, over one's entire school experience (Greenwood, Hart, Walker, & Risley, 1994). Thus, each student's classroom rate of learning is influenced by each teacher's ability to establish and motivate academic responding through instruction (e.g., Brophy & Good, 1986). This article provides a perspective on the development of this concept of academic engagement and a report of findings from a recent study in which engagement played a part of a comprehensive school reform program.

Engagement

Behaviors and nonacademic skills that contribute to academic success are often described as enabling or promoting skills (see DiPerna, Volpe, & Elliott, 2002). These behaviors are understood to be alterable variables (i.e., they are a product of teaching and instruction and of how the classroom teacher arranges instructional opportunities for students to respond in the curriculum). And because they are alterable, other classroom behaviors may occur in their stead, actively competing for occurrence depending on one's individual history and the present instructional situation. *Academic engagement* or *engagement in academic responding* is one such enabler (Greenwood, Delquadri, & Hall, 1984).

Academic engagement refers to a composite of specific classroom behaviors: writing, participating in tasks, reading aloud, reading silently, talking about academics, and asking and answering questions (Greenwood et al., 1984). Like the other enablers discussed in this issue of *School Psychology Review* (i.e., *study skills*, Gettinger & Seibert, 2002; *motivation*, Linnenbrink & Pintrich, 2002; and *interpersonal skills*, Wentzel & Watkins, 2002), evidence exists linking each of these enablers to academic achievement status, and links exist between and among those enablers (DiPerna & Elliott, 1999, 2000). Clearly, motivation and study skills directly affect engagement in academic responding, whereas interpersonal skills shape opportunities to respond and how the teacher distributes interactions with any one student for purposes of teaching or feedback.

Previous Research on Engagement

The development of the *engagement in academic responding construct* has been an effort to understand how behaviors are linked to academic achievement and influenced by teaching. Early work on the effects of students' classroom behavior employed teacher reports and ratings (Lahaderne, 1968). Subsequent work used direct observational measures and real-time recording of the occurrence of specific behavior (Greenwood, Peterson, & Sideridis, 1995). For example, measurement taxonomies increasingly enabled recording of classroom behaviors such as "reading orally" or "hand raised" as compared to global behavioral units such as "on task," or "attending," or "engagement" (e.g., Cobb, 1972; Hoge, 1985). Cobb and Hops were among the first to separate global from specific behaviors in relationship to academic achievement. For example, in reading, Cobb (1972) reported that attending, volunteering, and looking around were the best correlates of academic achievement, whereas in math, attending, looking around, and compliance were the best correlates of achievement. These individual correlations were often stronger than those obtained from global composites (e.g., total appropriate behavior). Subsequently, they demonstrated that it was possible to increase the occurrence of these enabling behaviors using instructional interventions and that these changes were associated with gains in academic achievement (Greenwood et al., 1979; Hops & Cobb, 1973).

Three classes of behaviors were identified based on evidence that specific classroom behaviors were *positive* (e.g., reading aloud, reading silently, writing), *neutral* (e.g., looking at teacher), or *negative correlates* (e.g., looking around) of student achievement on standardized tests (Greenwood et al., 1984). These classes were termed: academic respond-

ing, task management responding, and inappropriate behaviors. Results of a randomized, longitudinal clinical trial of the effects of classwide peer tutoring combined with response feedback and group reinforcement contingencies indicated, like Hops and Cobb (1973), that classroom enabling behaviors and academic achievement were accelerated due to instructional intervention (Greenwood, 1991; Greenwood et al., 1989). However, even though intervention produced increases in students' academic responding in this research, whether or not these behavioral effects actually played a causal role in students' improved year-end achievement (distal effects), or whether or not improved achievement was just another direct effect of the peer tutoring intervention were not yet known.

To investigate this hypothesis, Greenwood and colleagues tested the fit of several causal models as alternative explanations of student achievement (Greenwood, 1996; Greenwood, Terry, Marquis, & Walker, 1994). A model wherein the effects of instruction (a second-order factor composed of exposure and task quality) on school outcome were mediated by engagement produced the best fit to the data (see Figure 1) and provided evidence of a causal path between instruction, engagement, and academic achievement (Greenwood, Terry et al., 1994).

Thus, subsequent work has focused on using this knowledge to improve instruction and results for students. For example, observational measures of engagement supported by computer software and portable computers were developed and validated so that researchers and school psychologists could systematically collect and report observational data on student engagement in academic responding (see Greenwood, Carta, & Dawson, 2000; Greenwood, Carta, Kamps, & Delquadri, 1994). These instruments have since been used in research comparing alternative instructional approaches to reading (e.g., Marston, Deno, Kim, Diment, & Rogers, 1995), identifying classroom situations most promoting of engagement for students with moderate and severe disabilities (e.g., Logan, Bakeman, & Keefe, 1997), and examining engagement in high school classrooms that included students with disabilities (Wallace, Anderson, Bartholomay, & Hupp, 2002). However, exactly how this knowledge can be translated and scaled for use by teachers in local schools to support progress monitoring and educational decision making has yet to be demonstrated.

School-Wide Use of Student Engagement Information

As one component of a midwestern school district's desegregation plan supported by the Magnet School Application Programs (MSAP) and a U.S. Office of Education model demonstration project for students with disabilities, the opportunity arose to generate school-wide information on students' engagement in academic responding and use this information in a systematic effort to promote engagement. This study took place in three new Title 1 magnet-theme elementary schools, involving their faculty and students.

Based on the evidence previously described, student engagement in academic responding was identified and selected as one of nine innovative, evidence-based components to be included in a comprehensive school-wide improvement model in each school. Some of the other components of the comprehensive program were the Comer process for involving parents in school governance (Comer, 1996) and full inclusion of students with disabilities. Some of the goals for the engagement component were to (a) make engagement information for individual students readily available to teachers, (b) support use of the information to change instruction to increase engagement, (c) develop school "engagement" benchmarks, and (d) help teachers identify and use effective strategies to promote student engagement (i.e., promoters). These goals were addressed through an ongoing professional development program that included summer workshops; materials describing engagement theory, concepts, and practices; in-class observers; classroom consultation and feedback; and web-based and print newsletters for teachers (Dorsey & Schulte, 1997; Greenwood, Conroy, & Reddy, 1996). Thus, this work was designed to advance existing knowledge about using

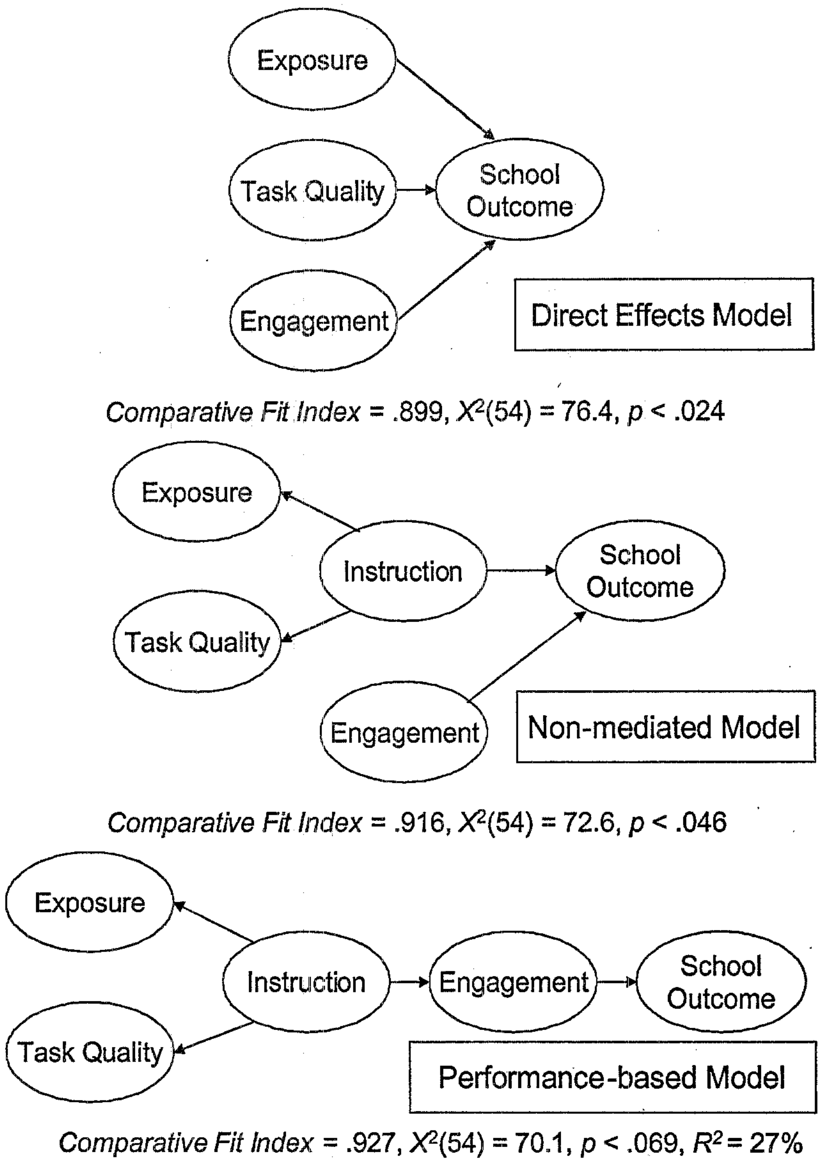

Figure 1. Alternative instructional models. The Direct Effects Model examined the fit between each construct and School Outcome (i.e., academic achievement). The Nonmediated Model hypothesized that Task Quality and Exposure were indicators of a second-order factor, Instruction. In this model, only Instruction and Engagement were hypothesized directly to affect School Outcome. The Performance-based Model hypothesized that the effects of Instruction on School Outcome are not direct, rather they are mediated by Engagement.
***Note.* From "The case for performance-based models of instruction" by C. R. Greenwood, 1996, *School Psychology Quarterly, 11,* p. 289. Copyright 1996 by Guilford Press. Reprinted with permission.**

academic engagement information schoolwide.

Reported next are the answers to two general questions from this project: (a) What were the local normative "benchmarks" for engagement and other related classroom behaviors and were there differences by individuals, type of learner, grades, and schools? and (b) What were the instructional promoters of engagement in academic responding; that is, what instructional situations increased the conditional probability of student engagement? Answers to the first question would provide school normative data for use in decision making. Answers to the second question would identify classroom instructional situations that accelerated students' engagement for use by teachers to make instruction more responsive and engaging.

Participants

Schools. Traditional (T), computer (C), and science (S) magnet themes were implemented by faculty at schools T, C, and S, respectively. The distinctive architecture of these new schools placed all classrooms on the ground floor, and separate grade level classrooms opened to a shared common area. The traditional school was organized around a traditional emphasis on the "basic academic skills." The computer school was organized around the use of computers, electronic media, and information technology. Classrooms in this school had pods of six to eight workstations in each general education classroom for use by students. The science school was organized around the philosophy of science and science themes. In this school, there were numerous labs and centers for use in "hands on" scientific studies (e.g., climate change).

Teachers. Sixty-four teachers (22, 20, and 22 in schools T, C, and S, respectively), representing kindergarten through fifth grade, participated. Two years prior to the opening of these new schools, teachers had been recruited from within and outside of the district to work at these new schools. Recruitment focused on teachers' skills and experience in the magnet theme's disciplines. Hired teachers received intensive training in a range of subjects in the year and summer before the opening of these new buildings.

Students. One target student in each of four categories of functioning was identified by each classroom teacher for observation ($n = 4$ per class). These categories were high-, mid-, low-achieving students, and students with Individual Education Programs (IEPs) who were included for instruction, a planned total sample of 256 students. A within classroom stratified sampling plan was used to produce classroom and school findings representative of the actual range of student academic ability and grade level. Teachers made these initial designations at the start of the school year in September, based on available test information and school records. In the case of IEP target students, teachers were encouraged to select students for whom there was a genuine interest in using the data, rather than a balanced sample of disability groups (e.g., LD, BD). Consequently, a diverse range of students and disabilities were observed. Further supporting the relevance of the information, the actual time and day of week target students were observed was decided by the teacher. However, guidelines required that teachers restrict observations to within key subject matter sessions.

In actuality, observations were made for a total of 224 (88%) students due to variations in students' availability, observations missed due to absences, and in some cases, lack of teacher follow through. A total of 82 students were observed in School T, 68 in School C, and 74 in School S. Overall, observations were collected between October and February for 56, 58, 64, and 46 students in high-, mid-, low-achieving, and IEP groups, respectively. All students were observed once, 40% were observed twice, and 5% were observed four times. A grand total of 8,126 minutes (135.4 hrs) of observation data were collected and shared with teachers. The 46 students with IEPs included students with learning disabilities ($n = 16$), speech/language ($n = 11$), behavior disorders ($n = 7$), cerebral palsy ($n = 4$), gifted ($n = 4$), and mild mental retardation ($n = 4$). This distribution did not differ significantly from one school to the next. Gifted students were

Table 1
MS-CISSAR Taxonomy

Category	Subcategory	Example Events
Student	Academic Responding	Writing, Reading Aloud, Silent Reading
	Task Management	Attention, Raise Hand
	Inappropriate Behavior	Disrupt, Look Around
Ecology	Setting	Regular Classroom, Resource Room
	Activity	Reading, Spelling, Math
	Task	Reader, Worksheet
	Physical Arrangement	Entire Group, Divided Group
	Instructional Structure	Independent, One-on-One
Teacher	Teacher Definition	Regular, Special, Peer Tutor
	Teacher Behavior	Read Aloud, Academic Talk
	Approval	Approval, Disapproval
	Teacher Focus	Target Student, Other

included in the "high-achieving" status group to reflect their high academic status.

Observational Procedures

Classroom observations were conducted using the Mainstream Version of the Code for Instructional Structure and Student Academic Response (MS-CISSAR; Kamps, Greenwood, & Leonard, 1991). The MS-CISSAR is a multiple-event classroom observation system based on an earlier version, the CISSAR (Greenwood & Delquadri, 1988; Stanley & Greenwood, 1981). Each individual event has a precise definition that observers learned by studying a training manual (Greenwood, Carta, Kamps, & Delquadri, 1993), using a computer-assisted tutorial (Greenwood, Carta et al., 1994), and practicing in classrooms. Training and data collection were supervised by a skilled trainer using these materials.

Individual events in the MS-CISSAR taxonomy were organized under three categories: student, ecology, and teacher events; and each category was separated further into subcategories (see Table 1). For example, *Student* events were organized under three categories of behavior: Academic Responding, Task Management, and Inappropriate Behavior. Academic responses were responses to academic situations, commands, and instructions. Task management responses were behaviors that prepared a student to make an academic response given an opportunity to do so. Inappropriate responses were undesirable behaviors—those behaviors that interfere or compete with the occurrence of academic responding and task management (see Greenwood et al., 1993). Using this taxonomy as the basis for classroom observation, it was possible to describe empirically not only the occurrence of a student's active academic responding, but also enabling and problem behaviors previously discussed.

Similarly, subcategories were used to group classroom Ecological and Teacher Behavior event classes. The subcategories of Ecology were the Setting, Activity, Task, Physical Arrangement, and Instructional Structure. These events described the physical location (Setting), the subject matter (Activity), the type of materials or media (Tasks), the seating arrangement (Physical Arrangement), and the instructional arrangement (Instructional Struc-

Table 2
MS-CISSAR Activities Percentage Occurrence by School and Total

	Schools							
	T (n = 126)		C (n = 82)		S (n = 118)		Total (N = 326)	
Activities	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Reading	20.42	34.21	18.96	33.52	30.05	39.96	23.54	36.46
Math	33.48	43.65	9.92	25.36	16.20	33.80	21.30	37.47
Language	10.35	23.43	19.55	32.54	7.51	20.96	11.64	25.61
Spelling	3.72	15.85	7.20	21.55	20.40	37.53	10.63	27.85
Social Studies	10.21	28.30	7.57	22.58	5.31	21.45	7.77	24.60
Transition	4.74	6.52	7.83	9.95	4.69	8.02	5.50	8.12
Arts/Crafts	2.75	12.28	5.19	17.62	5.92	20.82	4.51	17.13
Science	3.17	15.92	9.13	26.04	1.94	12.48	4.22	18.19
Free Time	1.74	7.88	5.26	13.22	2.25	9.47	2.81	10.09
Writing	2.17	12.69	4.23	18.15	0.00	0.00	1.90	12.11
Daily Living	3.41	16.19	1.11	6.33	0.77	8.31	1.88	11.71
Business/Management	0.44	2.18	1.11	3.78	3.72	14.09	1.80	8.89
Music	0.22	1.57	0.87	6.56	0.72	4.24	0.56	4.27
Can't Tell	0.34	1.74	0.93	5.31	0.09	0.55	0.40	2.90
Self Care	0.59	5.15	0.44	2.77	0.00	0.00	0.34	3.49
No Activity	0.00	0.00	0.39	2.11	0.00	0.00	0.10	1.07
Gross Motor	0.00	0.00	0.05	0.47	0.18	1.94	0.08	1.19
Time Out	0.06	0.69	0.00	0.00	0.00	0.00	0.02	0.43
Prevocational	0.03	0.34	0.00	0.00	0.00	0.00	0.01	0.21

Table 3
Composite Behaviors by School

		School						
		T	C	S	Combined	ANOVA		
Behavior Composite	Indicator	$n = 126$	$n = 82$	$n = 118$	$N = 326$	F	df	p
Academic Responding	M	46.9	42.9	46.8	45.9	1.024	2,323	0.360
	SD	19.9	20.0	24.7	21.8			
Task Management	M	43.8	38.2	41.7	41.6	1.873	2,323	0.155
	SD	18.3	17.4	23.9	20.3			
Inappropriate Behavior	M	10.5	19.7	18.8	15.8	13.630	2,323	0.0001
	SD	11.5	14.7	17.1	15.1			

ture). The Teacher subcategories were Teacher Definition, Teacher Behavior, Approval, and Focus. These events described who the teacher was (Teacher Definition), what the teacher was doing (Teacher Behavior), the teacher's use of approval and/or disapproval (Approval), and to whom the teacher's behavior was directed (Teacher Focus; e.g., at the target student, to others in the class, or to all).

Six graduate students served as observers collecting data from the project. MS-CISSAR observations were completed using portable notebook computers and a custom software system, the Ecobehavioral Assessment Software System (EBASS; Greenwood et al., 2000; Greenwood et al., 1993). Observations lasted on average 25 minutes (SD = 5.0 min). Ten percent of all observations conducted were paired agreement checks. The mean percentage of interobserver agreement was 96.7%, ranging from 90 to 100%. As can be seen in Table 2, observations occurred during reading, math, language, spelling, and social studies in descending order of frequency of occurrence (see Table 2). And some notable differences occurred between schools. Observations were more likely to reflect language arts and less likely math in School C. Similarly, more time was observed in spelling and less in language arts in School S.

Results

What was the Occurrence of Engagement by Students, Schools, Grades, and Type of Learner?

Individual differences. Overall, individual students varied widely in their engagement in the three composite behaviors: academic responding (M = 45.9%, SD = 21.8), task management (M = 41.6%, SD = 20.3), and inappropriate behavior (M = 15.8%, SD = 15.1). On average, students spent only slightly more time engaged in academic responding than they did in task management behaviors, and approximately one-third less time engaged in inappropriate behaviors. In terms of extreme cases, one student engaged in academic responding for 100% of an observation with no time engaged in task management and no time engaged in inappropriate behaviors. This student was maximally engaged. Another student engaged in 33% academic responding with 62% task management and the highest level of inappropriate behavior at 67%. Task management and inappropriate behavior dominated this student's time. A third student engaged in academic responding for only 5% of the observation, task management 95% of time, and no inappropriate behavior. Task management dominated this student's time.

School effects. Behavioral differences between schools were located only for the occurrence of inappropriate behavior (see Table 3). School T (the "traditional values" school) was significantly lower (M = 10.5%) than either School C (M = 19.7%, p = .0001) or School S (M = 18.8%, p = .0001). Schools C and S did not differ in terms of inappropriate behavior, p = .897.

Grade trends. Trends across grade levels indicated deceleration in task management and acceleration in academic responding following kindergarten (see Figure 2). Both composites leveled off during second and third grades with academic responding more frequent than task management. Additional separation between the two occurred in Grades 4 and 5; increases in academic responding were associated with decreases in task management (i.e., an inverse relationship). Inappropriate behavior levels declined slightly between kindergarten and third grade, increased in Grades 3 and 4, and declined again in Grade 5.

Trends in specific behaviors within these composites were also instructive (see Figure 3). The major growth in academic responding over time occurred with respect to writing, silent reading (upper panel), and in some respects, looking around (lower panel). Decelerating over time were students' engagement in task participation (upper panel) and attention to the teacher (middle panel). Oral reading and academic talk (upper panel) showed some acceleration between kindergarten and Grade 2, then declined over later grades. With the exception of attention (middle panel), the other task management behaviors were relatively stable if not gradually declining below the 5-6% level of occurrence. With the exception of looking around (lower panel), all other inappropriate behaviors fell below the 5% level of occurrence, reaching their highest levels in Grades 4 and 5.

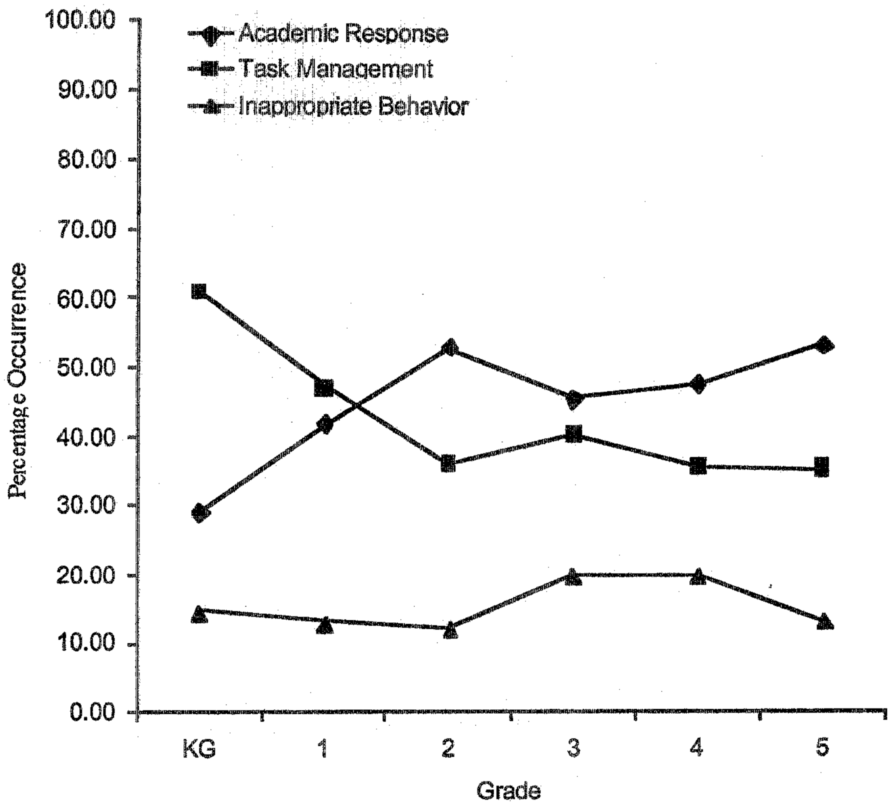

Figure 2. MS-CISSAR composite behaviors by grade level.

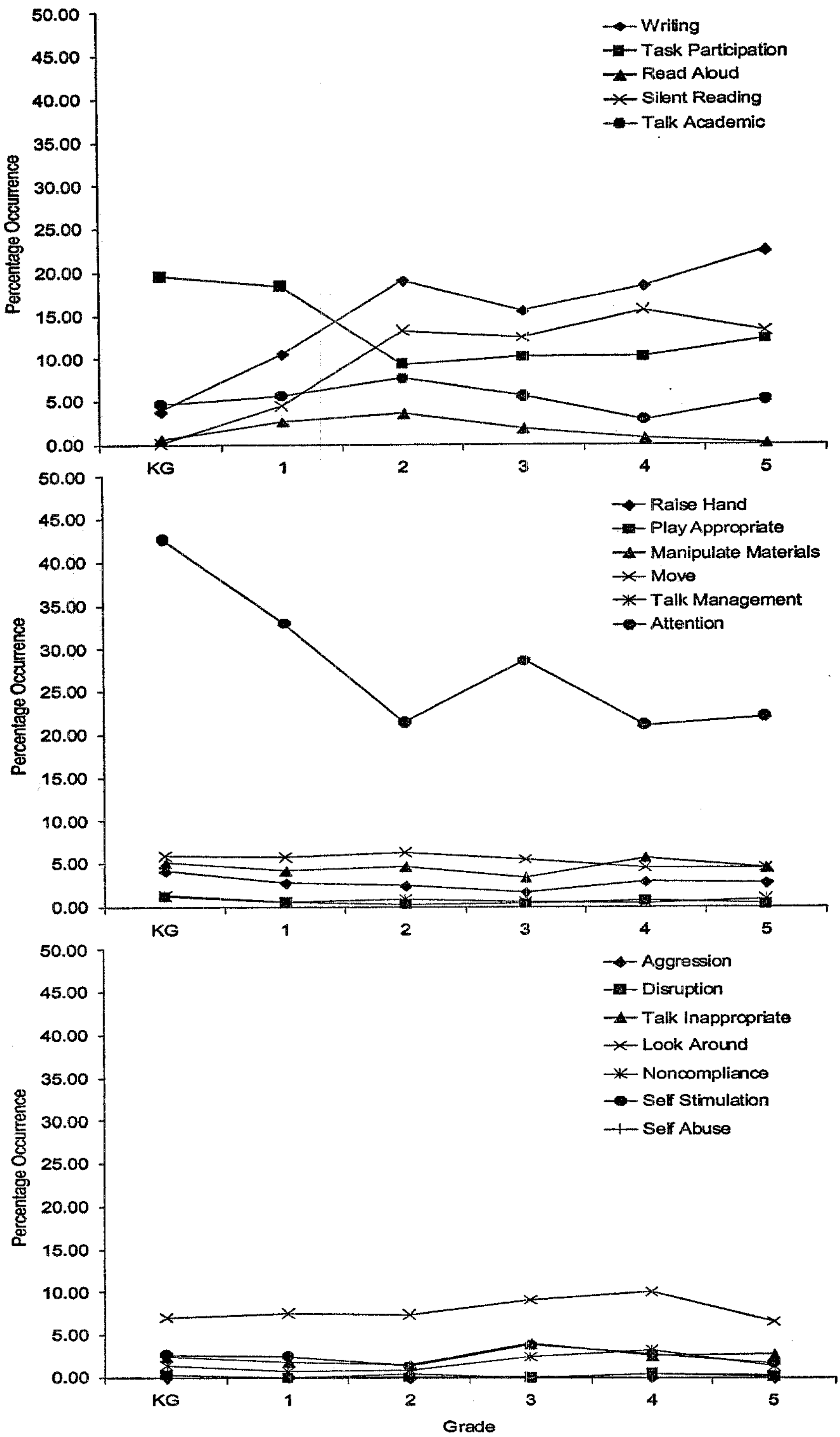

Figure 3. MS-CISSAR behaviors (Academic Responses [upper panel], Task Management Behaviors [middle panel], and Inappropriate Behaviors [lower panel]) by grade level.

Accounting for the significant differences in inappropriate composite behavior between schools, it was clear students in School T spent less time engaged in looking around and noncompliance compared to Schools S and C (see Figure 4). School S, however, was unique in its relatively higher level of time spent in self-stimulation.

Differences by learner status. The academic responding percentage means for high-, mid-, low-achieving, and IEP students were 49.1, 43.5, 44.2, and 46.8, respectively, and not significantly different. Similar means for task management percentages were 40.4, 45.4, 40.9, and 39.3, and also not significantly different. Results for inappropriate behavior were statistically significant for schools ($F[2,314] = 15.290, p = .001$), status ($F[3,314] = 3.655, p = .01$), and the interaction between schools and status ($F[6,314] = 2.204, p = .04$). The main effect percentage means for status were 13.7, 13.2, 18.3, and 19.2 for high-, mid-, low-achieving, and IEP groups, respectively. Post hoc tests indicated significant differences between the IEP group ($M = 19.2$) versus both the high- ($M = 13.7$) and mid- ($M = 13.2$) achieving groups. The interaction effect (see Figure 5) displayed the lower inappropriate behavior of high-achieving students compared to the other three groups across schools. Of particular interest was the lower inappropriate behavior of the mid-achieving group in School S, but also the high levels for low-achieving and IEP groups.

What Were the Instructional Promoters of Academic Responding?

The probability of student behavior occurrence (i.e., engagement, task management, and appropriate behavior) given that an Activity, Task, Instructional Grouping, or Teacher Definition was also occurring, is displayed in Table 4. Within each of these MS-CISSAR instructional event subcategories, each was sorted in descending order based on their associated probability of academic responding

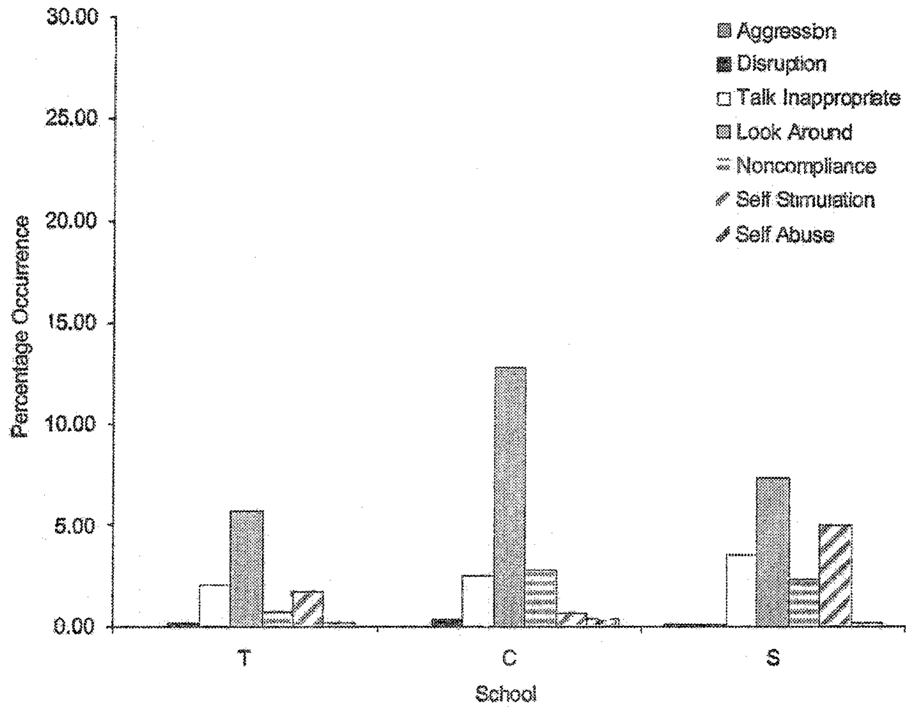

Figure 4. Inappropriate behaviors by school.

to aid visual inspection of effects. As can be seen within activities, handwriting (.70), free time (.58), arts/crafts (.58), and spelling (.56) produced probabilities of occurrence significantly larger than the base-level unconditional probability of .46, but business/management and transition activities produced probabilities significantly below this level at .14 and .13, respectively. Business/management and transition were the best promoters of students' task management behavior at .73 each. Task management occurred least in handwriting, arts/crafts, spelling, and free time. Business/management was also the best promoter of inappropriate behavior at .25. Other interesting patterns also were noted.

Inappropriate behavior was least likely to occur during free time and daily living activities. Reading instruction proved to be only an average promoter of academic responding and inappropriate behavior, but an accelerator of task management (.44). Similarly interesting relationships were seen for tasks, instructional grouping, and teacher definition in relation to the occurrence of the student behavior composites. For example, worksheets, paper/pencil, and other media were significant promoters of academic responding and decelerators of task management. Discussion, lecture, and fetch/put away were significant decelerators of academic responding but promoters of task management. Independent and one-on-one instructional groupings were promoters of academic responding, whereas whole class instruction was a decelerator. The probability of academic responding was .47 when taught by the regular education teacher. This probability was lower and the likelihood of task management higher when a related service worker or an aide or paraprofessional was acting as teacher (see Table 4). Data from these analyses helped teachers understand how time spent in particular activities affected levels of student behavior.

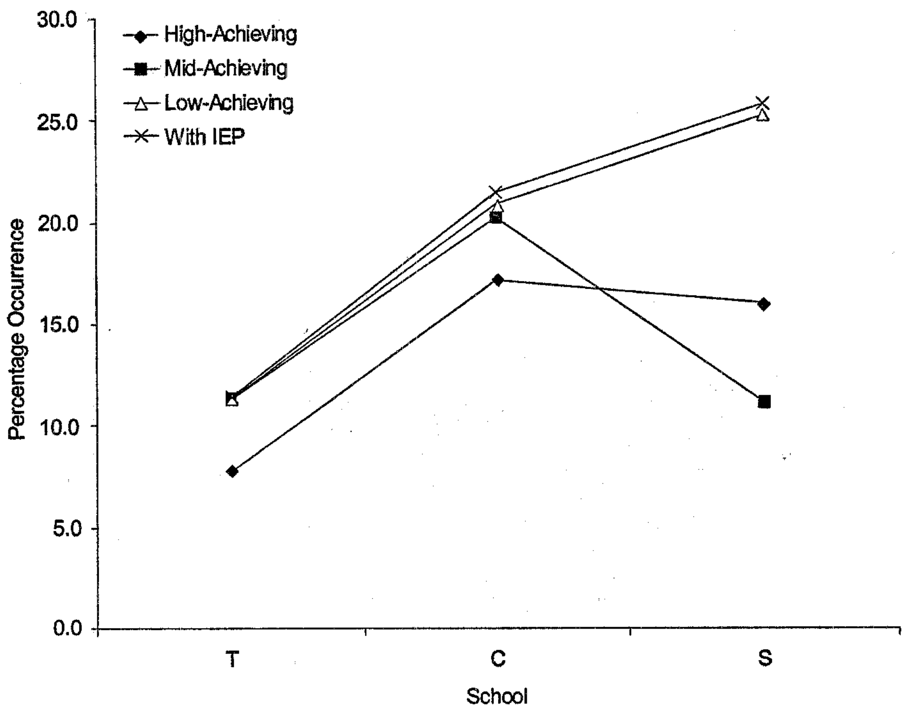

Figure 5. Inappropriate behavior composite by school and student status.

Table 4
Conditional Probabilities of Composite Responding Given MS-CISSAR Instructional Situations

				Probability of Response								
			Percentage	Academic Response			Task Management			Inappropriate Behavior		
Category	Situation	Frequency	of Total	Probability	*Z*	*p*	Probability	*Z*	*p*	Probability	*Z*	*p*
Activity	Hand Writing	133	1.7%	0.70	3.988	0.001	0.19	-3.981	0.001	0.11	-1.505	
	Free Time	243	3.1%	0.58	2.666	0.01	0.34	-1.666		0.09	-2.590	0.01
	Arts/Crafts	371	4.7%	0.58	3.397	0.001	0.30	-3.129	0.001	0.14	-0.822	
	Spelling	850	10.7%	0.56	4.033	0.001	0.30	-4.955	0.001	0.16	0.094	
	Social Studies	608	7.7%	0.51	1.608		0.35	-2.376	0.05	0.18	1.403	
	Science	369	4.7%	0.50	0.931		0.38	-0.930		0.16	0.114	
	Math	1686	21.3%	0.49	1.422		0.40	-0.903		0.14	-1.645	
	Reading	1950	24.6%	0.44	-1.352		0.44	1.970	0.05	0.16	0.711	
	Daily Living	151	1.9%	0.43	-0.568		0.48	1.372		0.09	-1.987	0.05
	Language	968	12.2%	0.43	-1.357		0.41	0.048		0.18	1.648	
	Business Management	135	1.7%	0.14	-5.448	0.001	0.73	5.656	0.001	0.25	2.740	0.01
	Transition	448	5.7%	0.13	-10.146	0.001	0.73	10.308	0.001	0.17	0.515	
Unconditional Probability	*All*	*7912* *8126*	*97.4%*	*0.46*			*0.41*			*0.16*		
Task	Worksheet	1325	16.5%	0.63	8.183	0.001	0.25	-8.644	0.001	0.14	-1.102	
	Paper & Pencil	1259	15.7%	0.57	5.014	0.001	0.27	-7.135	0.001	0.18	1.940	
	Other Media	1467	18.3%	0.54	3.988	0.001	0.36	-3.097	0.001	0.13	-2.444	0.05
	Workbooks	234	2.9%	0.50	0.933		0.34	-1.770		0.19	1.243	
	Readers	1227	15.3%	0.49	1.364		0.38	-1.646		0.18	1.900	
	Discussion	1549	19.3%	0.31	-7.903	0.001	0.57	8.985	0.001	0.15	-0.289	
	Listen to Lecture	398	5.0%	0.18	-7.985	0.001	0.71	8.878	0.001	0.17	0.757	
	Fetch/Put Away	572	7.1%	0.17	-9.768	0.001	0.71	10.608	0.001	0.14	-0.918	
Unconditional Probability	*All*	*8031* *8126*	*98.8%*	*0.46*			*0.41*			*0.16*		

Table 4 continued

				Probability of Response								
			Percentage	Academic Response			Task Management			Inappropriate Behavior		
Category	Situation	Frequency	of Total	Probability	*Z*	*p*	Probability	*Z*	*p*	Probability	*Z*	*p*
Instructional Grouping	Independent	2458	30.7%	0.65	12.020	0.001	0.22	-13.055	0.001	0.15	-0.840	
	One-On-One	87	1.1%	0.61	2.023	0.05	0.28	-1.989	0.05	0.10	-1.237	
	Small Group	963	12.0%	0.47	0.447		0.39	-1.156		0.16	0.125	
Instructional	Whole Class	4497	56.2%	0.35	-8.532	0.001	0.53	9.506	0.001	0.16	0.658	
Unconditional Probability	All	8005 8126	98.5%	0.46			0.41			0.16		
Teacher Definition	Regular	7506	94.8%	0.47	0.560		0.41	-0.331		0.15	-0.352	
	Aide/Para	163	2.1%	0.40	-1.064		0.40	-0.177		0.25	3.114	0.001
	Related Service	246	3.1%	0.31	-3.389	0.001	0.52	2.653	0.01	0.16	0.153	
Unconditional Probability	*All*	*7915* *8126*	*97.4%*	*0.46*			*0.41*			*0.15*		

The probability of specific engaged student behavior occurrence given a four-level MS-CISSAR instructional situation is provided in Table 5. The base-level (unconditional) probabilities of occurrence for writing, silent reading, task participation, academic talk, and oral reading overall situations observed were surprisingly small at .15, .11, .10, .05, and .02, respectively (see Table 5). As shown in the table, however, these behaviors were much more likely to occur in association with specific instructional conditions. For example, writing was most likely to occur in the context of math, with paper and pencil, in independent structure, while being taught by the regular teacher at .46. Silent reading was most likely to occur in the context of reading, with readers, under independent structure, while being taught by the regular teacher at .57. Task participation was most likely to occur in the context of spelling, with other media, under independent structure, while being taught by the regular teacher at .68. Academic talk was most likely to occur in the context of math, during discussion, under whole class structure, while being taught by the regular teacher at .13. And oral reading was most likely to occur in the context of reading, with readers, under small group structure, while taught by the regular teacher at .17. Data from these analyses helped teachers understand how time spent in particular activities affected levels of engaged behaviors.

Discussion

The concept of academic engagement as an enabler of academic achievement was discussed and selected findings from a recent effort to make such information available in three urban magnet schools engaged in implementing a range of exemplary practices were examined. Engagement in academic responding has been shown to be a correlate of achievement measured by academic tests (Greenwood et al., 1984); to be increased by instructional interventions; and to covary with significant gains in reading, language, and arithmetic achievement in a randomized trial (Greenwood, Delquadri, & Hall, 1989); and to mediate the effects of instruction on achievement (Greenwood, Terry et al., 1994). Conceptually and empirically, it is a variable readily alterable by changes in instruction, whether naturalistically (as in simple changes from reading to math, or from readers to worksheet materials), or systematically (as in use of class-wide peer tutoring programs; Greenwood et al., 1989; or in planned comparisons of different instructional methodologies; Marston et al., 1995). Based on this knowledge, an effort to enhance academic engagement was selected by school officials as an exemplary practice for implementation.

In terms of engagement information, mean levels were 46%, 42%, and 20% for academic responding, task management, and inappropriate behavior, respectively[1]. As expected from prior longitudinal research (Greenwood, 1991), grade level trends were evident. Engagement in academic responding increased from kindergarten through second grade, leveling off thereafter, through fifth grade. Inversely, task management behavior was highest in kindergarten, declined through second grade, and leveled off below engagement thereafter. In contrast, inappropriate behavior was relatively stable from kindergarten through second grade, increasing in third and fourth grades, and then declining in fifth grade. These changes were related to students learning to read and write after kindergarten (see Figure 3).

Based collectively on these indicators, it was evident that plenty of room existed for increasing engagement and decreasing task management and inappropriate behavior levels. Even given the sophisticated instructional reform effort underway in these schools, students still spent on the order of 42% of their time looking at the teacher, raising their hand, waiting, etc., instead of reading, writing, talking about academics, or manipulating academic tasks. These data provided a provocative basis for reflection and of planning future changes in practices to increase engagement in academic responding. Trends in task management and in competing behavior were equally helpful with respect to implementing changes in practices and as empirical targets for evaluating progress.

The best news was that the students most at risk for academic failure (i.e., the low-

achieving and IEP status students) were not significantly lower in engagement than the high- and average-achieving students, suggesting that general education instruction and inclusion support strategies being implemented were working nearly as well for them as for the nonrisk students. However, significantly higher levels of inappropriate behavior were found. Interestingly, the traditional theme school (T) was significantly lower in inappropriate behavior than either the computer (C) or science (S) theme schools. And the low-achieving and IEP status students engaged in highest levels of inappropriate behavior, particularly in School S. Compared to School T, students in the other two schools were more frequently engaged in looking around, disruption, and in the case of School S, self-stimulation. These effects can be partly explained by the ecological differences between schools contributed by the magnet themes. Students in the computer and science schools spent more time in laboratory situations, requiring them to make more frequent transitions and to function independently. And behavior management procedures as implemented in School S appeared less effective compared to the other two schools, suggesting the need for work to improve effectiveness with at-risk students.

Although these findings provided important information on the occurrence of enabling behavior, they did not reflect the instructional situations actually promoting the engagement of individuals and groups of students in the classroom. Conditional probability analyses were used to provide this information (see Tables 4 and 5). These findings were reported to teachers for individual student observations and they were summarized across a wide array of students and subjects taught, tasks/materials, instructional grouping, and types of teachers delivering instruction. These results provided an additional basis for reflection, particularly because it was not always prime time academic activities that generated the most engagement. Furthermore, within activities like reading, not all situations were equally promoting of reading behaviors.

Limitations

Limiting the utility of these findings were several issues. First, the sample was purposely one of convenience, linked to one urban district's desegregation effort, therefore limiting generality of findings beyond this project. The purpose of this study was to generate useful local information and not to generalize outcomes beyond this effort. Second, the analysis by grade level was cross-sectional rather than longitudinal; and therefore, these trends in academic engagement and other behaviors may not accurately reflect truly longitudinal trends had these students been followed over time.

Implications for Practice

Strategies exist that accelerate engagement in academic responding but they vary in their ease of use and time to learn. Perhaps the simplest step teachers can take is to increase the time students spend in situations confirmed to be promoters of academic engagement (Dorsey & Schulte, 1997; Greenwood, Carta, Arreaga-Mayer, & Rager, 1991). In the current project, teachers were provided this information and advised how to use it to modify future instruction. As shown in the conditional probability findings (Tables 4 and 5), these situations and the time they were used during daily instruction dramatically impacted the total amount of academic responding that students spent engaged. The best instructional tasks for promoting academic engagement were worksheets, paper/pencil, other media (computer), workbooks, and readers. The best instructional grouping arrangements were independent and one-on-one situations. Small groups were moderately effective, and entire class instruction was the least promoting of academic engagement. The top teacher promoters of academic engagement were a focus on individual students rather than the group, teacher location in front of or to the side of individual students or at desk, and attending to individual students and talking about academic subjects. Teachers can readily increase daily levels of academic engagement if they increase the amount of time students are exposed to these situations.

Table 5

Probabilities of Writing, Silent Reading, Task Participation, Academic Talk, and Oral Reading Given Situations Defined by Activities, Tasks, Instructional Grouping, and Teacher Definition

Situation					Percentage	Writing		
Activity	Task	Instructional Grouping	Teacher Definition	Frequency	of Total	Probability	Z	p
Math	Paper & Pencil	Independent	Regular	160	4.2%	0.46	9.625	0.001
Spelling	Paper & Pencil	Whole Class	Regular	177	4.7%	0.42	8.831	0.001
Math	Worksheet	Independent	Regular	205	5.4%	0.38	8.129	0.001
Spelling	Paper & Pencil	Independent	Regular	172	4.6%	0.38	7.392	0.001
Language	Worksheet	Independent	Regular	140	3.7%	0.34	5.655	0.001
Science	Worksheet	Whole Class	Regular	94	2.5%	0.34	4.601	0.001
Math	Worksheet	Whole Class	Regular	106	2.8%	0.32	4.367	0.001
Reading	Paper & Pencil	Whole Class	Regular	82	2.2%	0.28	2.930	0.01
Unconditional Probability				*3766* *8126*	*46.3%*	*0.15*		

Situation					Percentage	Silent Reading		
Activity	Task	Instructional Grouping	Teacher Definition	Frequency	of Total	Probability	Z	p
Reading	Readers	Independent	Regular	127	3.4%	0.57	15.035	0.001
Reading	Readers	Whole Class	Regular	317	8.4%	0.22	5.536	0.001
Reading	Readers	Small Group	Regular	178	4.7%	0.21	3.717	0.001
Unconditional Probability				*3766* *8126*	*46.3%*	*0.11*		

(Table 5 continued)

Situation					Percentage	Task Participation		
Activity	Task	Instructional Grouping	Teacher Definition	Frequency	of Total	Probability	Z	p
Spelling	Other Media	Independent	Regular	111	2.9%	0.68	18.590	0.001
Free Time	Other Media	Independent	Regular	110	2.9%	0.64	16.966	0.001
Math	Other Media	Whole Class	Regular	184	4.9%	0.20	3.934	0.001
Language	Worksheet	Independent	Regular	140	3.7%	0.20	3.412	0.001
Language	Other Media	Whole Class	Regular	88	2.3%	0.18	2.203	0.05
Math	Worksheet	Independent	Regular	205	5.4%	0.18	3.255	0.001
Reading	Other Media	Whole Class	Regular	143	3.8%	0.17	2.535	0.05
Unconditional Probability				*3766* *8126*	*46.3%*	*0.10*		

Situation					Percentage	Academic Talk		
Activity	Task	Instructional Grouping	Teacher Definition	Frequency	of Total	Probability	Z	p
Math	Discussion	Whole Class	Regular	399	10.6%	0.13	7.610	0.001
Reading	Discussion	Whole Class	Regular	271	7.2%	0.08	2.288	0.05
Unconditional Probability				*3766* *8126*	*46.3%*	*0.05*		

Situation					Percentage	Oral Reading		
Activity	Task	Instructional Grouping	Teacher Definition	Frequency	of Total	Probability	Z	p
Reading	Readers	Small Group	Regular	178	4.7%	0.17	12.957	0.001
Reading	Readers	Independent	Regular	127	3.4%	0.07	3.483	0.001
Reading	Other Media	Whole Class	Regular	143	3.8%	0.05	1.996	0.05
Reading	Readers	Whole Class	Regular	317	8.4%	0.04	2.370	0.05
Unconditional Probability				*3766* *8126*	*46.3%*	*0.02*		

The situations that were least promoting of academic engagement were transitions between activities, cleaning up and putting away, discussion, and lecture. Teachers can increase students' daily levels of academic engagement if they reduce the time students are exposed to these situations or if they add strategies that make these situations more generative of responding. Information on levels of task management and procedures for reducing the time students spend waiting, looking for materials, etc., can be critically important with respect to designing and improving the effects of instruction. Similarly, analyses of inappropriate behavior given typical instructional situations provided ideas for adjusting and reducing instructional demands and increasing positive consequences in strategic ways known to reduce behavior problems (Sugai, Lewis-Palmer, & Hagan, 1998). Using engagement data to identify and select the most engaging programs or instructional situations can be seen in the work of Ager and Shapiro (1995), Logan et al. (1997), and Wallace et al. (2002).

Secondly, a range of strategies are available to make whole-class teacher-led lecture/discussion, the most widely used and least responsive instructional context (Greenwood, Delquadri, Stanley, Terry, & Hall, 1985), more responsive than just watching and listening to the teacher (Heward, 1994). For example, strategies that evoke group rather than individual question answering represent one important technique. One validated technique requires students to write brief answers on response cards and to hold up their answers when requested by the teacher (Heward, 1994). Another teaches all students to be expected to be called on to answer the teacher's questions. The student actually called on to answer is selected at random by drawing a name on a stick from a can (Sacca & Raimondi, 1997). These tactics take only one day or less of preparation.

Another group of strategies are linked to the daily schedule and provide students with additional opportunities to respond. For example, in opening day exercises that begin with the calendar or weather, teachers can use the response cards so that all, rather than just individual children, can respond. Another example is to start the day with a student exercise on the overhead projector, designed to challenge the students immediately when they enter the class, which sets the tone for the day. Beginning the day with a 1-minute fluency builder time trial with each student working at their own level has a similar function. Starting math with four problems on the overhead projector, allowing students to work as soon as they are seated, serves the same function later in the day and helps bridge time lost to transitions. Another schedule-linked strategy is to make sure that lowest performing student groups meet first with the teacher, rather than last. This avoids losing time due to "schedule creep" that often favors advanced readers, because teachers may spend more time teaching their advanced rather than struggling students.

Third, a range of strategies are designed to replace whole-class, teacher-led lecture and discussion. Because they are instructional systems rather than individual tactics, training and support are required. For example, Marston et al. (1995) reported that computer-assisted instruction, direct instruction using Holt materials, and direct instruction using Science Research Associates materials produced relatively higher levels of academic engagement in their comparison of seven reading instruction alternatives. Classwide Peer Tutoring (CWPT; Greenwood et al., 1989) and Peer-Assisted Learning Strategies (Mathes, Fuchs, Fuchs, Henley, & Sanders, 1994) are two strategies known to increase academic responding and reduce task management and inappropriate behavior levels (Greenwood, Maheady, & Delquadri, 2002).

In this project, progress was made making MS-CISSAR observational results available and relevant to the daily practice of teachers, bridging a gap between research on engagement in academic responding as an enabler of academic achievement and translation and use of this information for practice in local schools. Local normative data were generated and made available as benchmarks for decision making, as was information on the classroom situations that promoted student engagement and other behaviors. Challenges to this work that were overcome to enable this

progress were creating a staff of trained observers, designing and implementing teacher-friendly methods of reporting and communicating findings, and providing of didactic professional development and ongoing consultation linked to the conceptual understanding of the research findings and of the practical uses of this information to promote engagement.

Yet, even with the computerized tools for collecting this information provided by EBASS, the collection of these data was decidedly expensive, required grant funds to support the observer team, and exceeded the resources typically available to school psychologists and other individuals in field-based educational settings. And even in this effort, it was not possible to observe each and every student. How empirically valid data can be collected more economically remains to be addressed.

One option may be a multigating approach (e.g., Feil, Walker, Severson, & Ball, 2000), that combines economical teacher ranking and rating assessments to identify particular students for whom an MS-CISSAR observation can provide useful macro- and micro-level analyses of student engagement. A related option would be to have teachers self-assess their instruction using the MS-CISSAR taxonomy as a basis for their evaluation (e.g., MS-CISSAR activities, tasks, instructional groupings) with responses scored in terms of existing data on the likelihood of each situation to promote engagement (see Table 5). Teachers might then generate from this knowledge an agenda with specific plans for changing their own instruction. Third, simplified versions of the MS-CISSAR system might be validated for use by classroom teachers. These and other ideas await further development and research support. However, taken with the concepts and procedures reported in this project, these ideas provide important knowledge for use by school psychologists to strengthen their work with academic enablers.

Another approach to making MS-CISSAR engagement information better suited to classroom applications and more representative of schools around the country would be development of a web site where MS-CISSAR data collected in schools could be reported and pooled for use as norms and benchmarks. The DIBELS web site, developed by Roland Good and his colleagues at the University of Oregon (Good & Kaminski, 2000), is one example of how this information could be extended and made more relevant and suitable for local use.

Future Research Directions

Future work on the academic engagement construct is needed in two key areas: (a) promotion of engagement via changes in classroom instruction, and (b) related effects on student achievement for students with and without disabilities. Experimental and quasi-experimental studies of the effects of instructional interventions are needed to demonstrate that these enabling behaviors can be changed by classroom teachers using reasonably practical techniques like those previously discussed in real classroom settings. We need to ask "What alterable instructional techniques and procedures lead to the sustainable promotion of engagement in academic responding?" In these same studies, we need to examine the relationship between these changes and changes in academic achievement in terms of both formative and summative achievement measures. We need to understand the linkage between the enabling behaviors and the short- and long-term gains in academic achievement that will lead to increased effectiveness (e.g., Marston et al., 1995). We need relatively less descriptive-correlational work on this issue in the future. Instead we need studies that demonstrate that it is possible to identify instructional situations that are promoters of engagement, then change instruction to manipulate them in experimental studies that demonstrate their functional effects. Most research to date has identified promoting situations (e.g., Logan et al., 1997), but has not yet demonstrated functional effects (Greenwood et al., 1991). This work is necessary to develop a convincing knowledge base describing the principles and procedures for accelerating these enablers and scaling up the beneficial effects.

Footnote

[1]Because MS-CISSAR allows recording of all three subcategories of behavior at the same time

sample, these data are not ipsative (i.e., they do not sum to 100%). Thus, it was possible for students to perform high in one or more behaviors.

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