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ARTICLES

Experimental Evaluation of Instructional Consultation Teams on Teacher Beliefs and Practices

Phuong Vu, Katherine Bruckman Shanahan, Sylvia Rosenfield, Todd Gravois, Jessica Koehler, Lauren Kaiser, Jill Berger, Megan Vaganek, and Gary D. Gottfredson
Department of Counseling and Personnel Services, University of Maryland, College Park, Maryland, USA

Deborah Nelson
Department of Counseling, Bowie State University, Bowie, Maryland, USA

Instructional Consultation Teams (IC Teams) are an early intervention service intended to support teachers in working with struggling students. This is a large-scale experimental trial investigating the effects of IC Teams on teacher efficacy, instructional practices, collaboration, and job satisfaction. Public elementary schools ($N = 34$) were matched based on their risk composite and then randomly assigned to treatment or control groups. A multilevel model tested the effects of IC Teams on the beliefs and practices of teachers ($N = 1{,}440$) across three years of implementation. Results indicated that IC Teams had a significant effect on teacher efficacy and collaboration compared to randomly assigned control schools. The remaining effects were nonsignificant.

Keywords: Collaboration, instruction, Instructional Consultation Teams, job satisfaction, teacher beliefs, teacher efficacy

The classroom teacher represents a critical mediating variable important to student achievement and success. Increasingly, research has focused on documenting the effect of quality teaching on student achievement (e.g., see Peverly, 2009; Sanders & Horn, 1998) and identifying the essential teacher variables associated with high levels of student achievement (e.g., see LeTendre, 2009; Ysseldyke & Christenson, 2002). Likewise, recent policy initiatives in the United States (e.g., Race to the Top Act, 2009) advanced this focus by linking evaluation of teacher effectiveness to measures of student achievement. Although there is a growing literature that describes the multitude of teaching variables (e.g., efficacy, instructional practices, and collaboration) that have been found to positively relate to overall student achievement, understanding if and what can be done to influence these variables is much more limited. As research and policy converge, theorizing and empirically investigating interventions that can positively influence these key teacher variables would build a path toward supporting and sustaining student outcomes.

This experimental study investigates the impact of Instructional Consultation Teams (IC Teams; Rosenfield & Gravois, 1996) on critical teacher variables. The IC Team model postulates that structured collaboration with teachers will improve instructional practices and, in turn, increase student success, reduce behavioral difficulties, and avoid the need for special education evaluation and placement. Such consultation will also increase teachers' sense that the school is a more collaborative, supportive place and enhance their

Submitted November 21, 2012; accepted March 26, 2013.
Correspondence should be addressed to Phuong Vu, Department of Counseling and Personnel Services, University of Maryland, 3214 Benjamin Building, College Park, MD 20742, USA. E-mail: phuongannavu@gmail.com

sense of job satisfaction. In this way, the IC Teams is focused on facilitating *teacher* change as a mechanism for improving student outcomes. Because the intervention is directly applied to teachers, and only indirectly to students, a thorough examination of teacher effects logically precedes an examination of student effects.

OVERVIEW OF IC TEAMS

IC Teams (Rosenfield, 2008; Rosenfield & Gravois, 1996; Rosenfield, Gravois, & Silva, in press), the intervention implemented in this study, represents a comprehensive innovation bundle where consultation services are provided to classroom teachers who have requested assistance about students academic or behavioral concerns. The IC Team consists of one trained facilitator and approximately 9 to 12 multidisciplinary team members. Unlike traditional team models that employ group-based problem solving, IC Team members offer one-on-one consultation and support to teachers. After receiving extensive training and technical support in the two core areas of Instructional Consultation (IC; Rosenfield, 1987, 2008) and instructional assessment (Gickling & Gravois, in press; Gravois & Gickling, 2008; Gravois & Nelson, in press), each team member serves as a "case manager" working collaboratively with the teacher.

IC

IC (Rosenfield, 1987, 2008) represents a form of consultee-centered consultation (CCC; Lambert, Hylander, & Sandoval, 2004). CCC, which has been the topic of an international series of seminars, focuses on the consultation process and conceptual change in the consultee (Lambert et al., 2004). As applied to IC (Newman & Rosenfield, 2008; Rosenfield, 1999; Rosenfield & Gravois, 2001), the premise of consultee-centered models of consultation is twofold. First, the classroom teacher, the consultee, is assisted in addressing an immediate presenting problem related to a class or student concern. The second, and equally important, expected outcome is that through the structured, collaborative process of problem solving, the teacher acquires skills, knowledge, and capacity to confront and address future concerns. The focus of the consultation remains on the variables that are directly controlled by the teacher within the classroom, and on actions they can take to address and improve the defined situation. Data are collected and short-term goals established to provide objective confirmation of the process and outcomes.

Critical IC is the view that identification and resolution of student concerns are mediated not only by the skills and knowledge teachers possess, but also how teachers come to define and conceptualize the presenting student problem. As suggested by Hylander (2012), based on her research in Sweden, the presentation of a problem, the choice of data collected to support that presentation, and the teachers' perceived roles within the situation influence the actions they take, the assistance they seek, and their sense of efficacy in being able to effect change. Instructional consultants engage in collaborative communication, structured problem solving, and assessment that promote ongoing reflection for the teachers as they frame the presenting problem.

Instructional Assessment

A second integral component of IC Teams training is instructional assessment (Gickling & Gravois, in press; Gravois & Gickling, 2008). As a compliment to the IC process, instructional assessment assumes that student success is a function of the ecology established within the classroom setting. Specifically, student learning is maximized when there is an appropriate match between the entry skills of the student and the demands presented by instruction and curricular tasks (Rosenfield, 1987; Rosenfield, Gravois, & Silva, in press). Within IC Teams, the instructional assessment process is a critical component; the teacher and IC Team member co-conduct the assessment using the current course content. The opportunity for the teacher to observe and participate in gathering data related to the student's entry skills, the appropriateness of the instructional material and the adequacy of the instructional planning inform and influence both the teacher's identification of the problem and the resulting actions taken to resolve the concern.

Although one-on-one IC and assessment seeks to influence individual teachers, there remain school- and system-level practices that continue to shape teachers' perceptions and actions. For example, schools have institutionalized practices that identify students as having disabling conditions, suggesting that classroom teachers cannot successfully support students without additional specialized resources. Such practices can work in opposition to enhancing teacher efficacy. Developing multiple individuals who serve in the capacity of instructional consultants (i.e., as members of an IC Team), establishes what Fullan (2001) describes as a "critical mass," or a sufficient number of skilled individuals that support bringing an innovation to sufficient scale to impact the larger school functioning. Although teachers are the direct recipients of the consultation process and the focus of intended changes, existing school- and system-level practices will influence both beliefs and practices. Thus, IC Team components strategically address these more systemic issues in the school.

Research on IC Teams

A review of prior IC Team studies provides support for the effect of IC Teams on a variety of student and teacher

outcomes (Rosenfield et al., in press). Previous descriptive and quasi-experimental studies suggest that implementation of IC Teams result in improved academic achievement and behavior for students (e.g., Gravois, 1996; Levinsohn, 2000; Ray, 2005; Riley, 2012; Vail, 1999), increased application of assessment and instructional practices for teachers (Gravois & Rosenfield, 2001; Kaiser, Rosenfield, & Gravois, 2009), and reductions in disproportionate placement of minority students into special education (Gravois, 1997; Gravois & Rosenfield, 2006).

Qualitative research and program evaluations have investigated the influence of IC Teams on teacher beliefs and practices (Gravois, 1996, 1997; Gravois & Rosenfield, 2001, 2006; Kaiser et al., 2009; Levinsohn, 2000; Vail, 1999). Anecdotal, qualitative, and descriptive evidence suggests that teacher satisfaction, feelings of confidence or efficacy, collaboration, and instructional practices may change after working with IC Teams (e.g., see Kaiser et al., 2009).

Although these studies suggest that IC Teams may positively affect the teachers who work with the team, the studies were not designed to make causal inferences. Although there is a substantial history of intervention development and evaluation, no rigorous efficacy study has been conducted to assess the effect of IC Teams on teacher attitudes, beliefs, and practices. Therefore, a careful efficacy trial was designed for this purpose. The purpose of this study then is to experimentally investigate the effect of IC Teams on the key teacher variables of efficacy, collaboration, instructional practices, and job satisfaction.

METHOD

Participants

Schools are the unit of assignment and intervention. Schochet's (2005) method was used to determine the necessary number of schools to include in the study to have sufficient power = .80 to detect treatment effect sizes of .22 for many outcomes, given reasonable assumptions about the correlations of within-school and between-school covariates with the dependent variables (Rosenfield & Gottfredson, 2004). Based on this analysis, 34 suburban public elementary schools in a mid-Atlantic state participated in this study.

School district personnel collaborated with university investigators in this experiment. School principals agreed to participate, regardless of group assignment prior to randomization. Pairs of schools were matched on a risk composite based on percentage of students receiving free or reduced-price meals, minority composition, and average prior years' achievement test scores. Schools from each matched pair were then randomly assigned to either IC Teams treatment or to a control group, with 17 schools in each group.

At the time of random assignment, there were 1,440 educators and 22,543 students in the participating schools. Educators included general education classroom teachers, and non-classroom professionals. Non-classroom professionals included special education teachers, school administrators, school psychologists, health providers, social workers, counselors, and others who met the criterion of teaching at least one student during that academic year. Specifically, the sample consisted of about 63% general education teachers, 10% special education teachers, 9% Teachers of English to Speakers of Other Languages (TESOL), and 18% specialists or others. Participant grade levels range from kindergarten to fifth grade. Descriptions of the teachers, their students, and the schools are provided in Table 1.

Data about baseline school characteristics were collected during the pre-intervention year (2005–2006). School demographics, teacher demographics, and teacher self-report (TSR) survey data were analyzed, and results showed no statistically significant differences between control and experimental schools at baseline, *d*s ranged from .00 to .12, *p*s $>$ .05.

Data Collection Periods

The study had four data collection waves and the data collection process was similar for both control and treatment groups: Pre-implementation baseline year (2005–2006), implementation Year 1 (2006–2007), implementation Year 2 (2007–2008), and implementation Year 3 (2008–2009). Data were collected annually. Teacher survey data were obtained in late winter (February) of each year of the study to accommodate the district scheduling needs. This report involves all four waves of data from these teacher surveys.

Implementation Measures

Program implementation fidelity and use were collected during this study. The Level of Implementation Scale–Revised (LOI; Fudell, 1992; Gravois, Fudell, & Rosenfield, 1998) assessed the quality and fidelity of consultation process between teachers and team members. Measuring fidelity of the consultation process represents an important variable when evaluating the impact of consultation services (Noell, 2008). The LOI is a semi-structured interview and record review to determine the presence of critical indicators of program fidelity. The LOI is administered so that active team members are interviewed for at least one case. The interviews are conducted separately with the team member and corresponding teacher.

Fudell (1992) examined the reliability of the LOI among 62 team member/teacher pairs from 13 schools. The total interrater reliability was .92 and total test–retest reliability

TABLE 1
Participant Characteristics

School Characteristics (N = *34*)		*Teachers* (N = *1,440*)		*Students* (N = *22,543*)	
Number of students		Gender		Gender	
M	663	Female	91%	Female	48%
SD	191	Male	9%	Male	52%
Number of teachers		Ethnicity		Ethnicity	
M	42	Caucasian	85%	Caucasian	50%
SD	8	African American	8%	African American	18%
Male (%)		Hispanic	3%	Hispanic	20%
M	52%	Asian	1%	Asian	8%
SD	2%	Other	<1%	Other	<1%
FARM (%)		Education		Not specified	5%
M	25%	Bachelor's degree	12%	Grade level	
SD	18%	Bachelor's degree plus	37%	Kindergarten	15%
TESOL(%)		Master's degree	21%	1st grade	18%
M	17%	Master's degree plus	31%	2nd grade	17%
SD	13%	Doctoral degree	<1%	3rd grade	17%
Special Education (%)		Years of teaching experience		4th grade	
M	12%	1 year or less	7%	5th grade	
SD	2%	2–5 years	25%	Age	
Retention in grade (%)		6–10 years	22%	6 years or younger	
M	2%	11–20 years	23%	7 years	
SD	2%	More than 20 years	23%	8 years	
Asian or Caucasian (%)		Age		9 years	
M	55%	30 years or younger	26%	10 years	
SD	20%	31–40 years	25%	11 years or older	
		41–50 years	22%	GPA (mean)	
		51 years or older	27%		

Notes. Male = proportion of students who are male. FARM = proportion of students receiving free or reduced meals. TESOL = proportion Teachers of English to speakers of Other Languages. Special education = proportion of students receiving special education services. Retention in grade = proportion of students retained. GPA = Grade point average.

was .78. Content validity was originally established by Fudell and subsequently reaffirmed by McKenna, Rosenfield, and Gravois (2009). Among a sample of 20 team member/teacher pairs, the McKenna et al. study compared actual recorded case consultation behavior to responses obtained through the semi-structured LOI interview process. Agreement of observed behavior to reported behavior ranged from 80% to 100% for all dimensions of the scale. An agreement of 90% was found for a majority of LOI dimensions.

Teacher use of the IC Team process was also collected (i.e., diffusion of use; Rogers, 2003). A measure of program use was obtained from two sources. As part of the IC Team process, a record (i.e., Systems Tracking) of each case was maintained from the point of a teacher's request for assistance until the case was closed. The Systems Tracking was a required program component provided by the developers and integrity of use was assessed as part of the LOI. The IC Team facilitator maintained the System Tracking for each project school and submitted the record annually. A second measure of use was collected as part of the annual self-report survey described in the next section. All individuals in each of the schools who taught at least one child were asked, in the late winter of each year, to complete questions asking if they had worked or consulted with an IC Team (i.e., "Have you ever worked or consulted with an IC Team case manager about a student who was experiencing difficulty?"), been a member of the IC Team ("Have you been a member of your school's IC Team?"), and worked with or been a member of the school's child study team (the district's name of their Individualized Education Program team).

Dependent Measures

A TSR questionnaire was developed and administered online using the SurveyMonkey® Web site. The conceptual model of IC Teams hypothesizes that structured consultation will influence how teachers define, approach, and resolve student concerns, as well as how they seek out and interact with other professionals in pursuit of promoting student achievement. This process, over time, will build a teacher's confidence in their capacity to manage and deliver effective instruction, and increase engagement in interprofessional collaboration. Each of these teacher outcomes has a strong empirical base as they relate to promoting individual and school-level achievement for students.

The TSR questionnaire measured four constructs: instructional practices, collaboration, teacher efficacy, and

job satisfaction, all of which are related to the purpose of the IC Team model. The Instructional Practices and Collaboration scales were developed for this study, and the Teacher Efficacy and Job Satisfaction scales were obtained from prior studies (Bryk & Schneider, 2002; Tschannen-Moran & Hoy, 2001; Tschannen-Moran, Hoy, & Hoy, 1998).

Instructional practices. The Instructional Practices scale measures the perceptions of teaching practices and performance of the teachers within the classroom (Kaiser, 2007); the scale was based on instructional principles supported by research (Berger, 2010). Considerable research has been conducted on the positive effect of teacher instructional practices on student outcomes (Brophy & Good, 1984; D'Agostino, 2000; Guarino, Hamilton, Lockwood, Rathbun, & Hausken, 2006; Nye, Konstantopoulos, & Hedges, 2004). To be effective, teachers must not only have knowledge of content and effective instruction, but they must also be skilled in the application of these principles (Shulman, 1986).

The Instructional Practices scale was initially composed of 20 items, and Kaiser (2007) reported an alpha reliability of .97. Following the teacher survey for 2006 through 2007, Berger and Kaiser (2008) conducted a cognitive pretest interview with a small group of teachers external to the study participants to gather information on how teachers thought about the questions on the survey and how they responded. Berger and Kaiser found that the teachers did not necessarily focus on specific students who were having difficulties, as was requested in the survey, that there was some confusion in the definition of the terms, and that there was a ceiling effect. Hence, the scale was revised to address these concerns. The revised 18-item version was used for the surveys conducted in 2007 through 2008 and after. Sample items for this scale are as follows: "I develop my lesson so that I do not have the student work on too much unknown material at once," "I take the time to assess the student's prior knowledge and skills before teaching a lesson," and "I collect data on this student to monitor progress towards short-term goals." The items were rated on a 5-point Likert-type scale ranging from 1 (*almost never*), 2 (*a few lessons a week*), 3 (*a couple lessons per day*), 4 (*almost every lesson per day*), to 5 (*every lesson per day*). To ensure similarities between the original and revised scales, correlation analysis was conducted, and results indicated that the revised scale was similar to the original scale: $r = .57$, $p < .01$.

Collaboration. The Collaboration scale measures the degree to which teachers perceive that faculty members in the school worked together. Although different types of collaboration have been identified, Fullan and Hargreaves (1996) clarified the importance of working together to improve instruction and educational outcomes. Goddard, Goddard, and Tschannen-Moran (2007), using hierarchical linear modeling (HLM) analyses, found higher achievement in mathematics and reading for fourth-grade students attending schools characterized by higher levels of teacher collaboration.

The Collaboration scale was composed of items written for this study. The initial six-item scale used during the baseline data collection was lengthened to 10 items in an effort to make it more sensitive to the intervention for the remaining waves of data collection. Sample items for this scale are as follows: "In our school, teachers are expected to work with specialists and other teachers to resolve problems," "Specialists (e.g., TESOL, special educators, and reading teachers) and classroom teachers plan together for students they teach in common," and "Teachers in this school consult with each other to improve their own classroom management." The items were rated on a 5-point Likert-type scale ranging from 1 (*strongly disagree*), 2 (*disagree*), 3 (*neutral*), 4 (*agree*), to 5 (*strongly agree*). To evaluate the relation between the original and revised scales, correlation analysis was conducted, and results indicated that the revised scale was similar to the original scale: $r = .50$, $p < .01$.

Teacher efficacy. *Teacher efficacy* is defined as "the extent to which the teacher believes he or she has the capacity to affect student performance" (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977, p. 137). The Teacher Efficacy scale measured the extent to which teachers believed in the efficacy of their teaching to overcome student learning or behavioral problems. In addition, the teacher efficacy questions evaluated the degree to which teachers felt they could promote student learning and engagement in the classroom. Over the past four decades, teacher efficacy has been related to student achievement (e.g., Armor et al., 1976), student motivation (e.g., Tounaki & Podell, 2005), quality of student–teacher relationships (e.g., Ashton & Webb, 1986), and time spent on academic learning (e.g., Allinder, 1995).

The Teacher Efficacy scale consisted of 16 items adapted from the Teachers' Sense of Efficacy Scale, Efficacy for Instructional Strategies (TSES EIS; Tschannen-Moran & Hoy, 2001; Tschannen-Moran et al., 1998). Previous studies using the TSES EIS reported a reliability estimate of .87, and found that it correlated with Gibson and Dembo's (1984) Personal Teaching Efficacy Scale ($r = .64$, $p < .01$; Tschannen-Moran & Hoy, 2001). Four additional items were developed by Koehler (2009) specifically for this research project. Following internal consistency item analysis from the baseline year data, the scale was modified and shortened from 20 to 16 items. The shorter scale was used for the remaining three years. Sample items from this scale are as follows: "How much can you do to adjust your lessons to the proper level for individual students," "How much can you do to increase the achievement of a student from a disadvantaged family background," and "How much can you do in your classroom to improve the learning of a

student with emotional and/or behavioral problems." The items were rated on a 5-point Likert-type scale ranging from 1 (*nothing/not at all*), 2 (*very little*), 3 (*some*), 4 (*quite a bit*), to 5 (*a great deal*). For a more detailed description of the Teacher Efficacy scale and its relation to the IC Teams intervention, see Koehler. To evaluate the similarities between the original and revised scales, correlation analysis was conducted; results indicated that the revised scale was similar to the original scale: $r = .62$, $p < .01$.

Job satisfaction. The Job Satisfaction scale measures the extent to which faculty members like working in the school and would recommend the school to others (Bryk & Schneider, 2002). Job satisfaction has been found to positively relate to teacher efficacy (Klassen & Chiu, 2010), lower teacher turnover (Ingersoll, 2001; Mobley, Horner, & Hollingsworth, 1978), and student educational outcomes at the school level (Gottfredson & Gottfredson, 1989; Ostroff, 1992). The Job Satisfaction scale was composed of four items. Sample items for this scale are as follows: "I like working in this school," and "I usually look forward to each working day at this school." The items were rated on a 5-point Likert-type scale ranging from 1 (*strongly disagree*), 2 (*disagree*), 3 (*neutral*), 4 (*agree*), to 5 (*strongly agree*). Bryk and Schneider (2002) reported an alpha reliability of .89 for this scale. Because of a concern about possible ceiling effects for this measure following the first three years of data collection, four items were added to increase variance at the top end of the scale (and, hence, our ability to detect effects) in the final year. To evaluate the similarities between the original and revised scales, correlation analysis was conducted; results indicated that the revised scale was similar to the original scale: $r = .34$, $p < .01$.

Reliability and Response Rates for Dependent Measures

Reliability estimates for the scales in each year's sample were examined, and the reliability estimates are consistently high for all four years. The alpha reliability coefficients for Instructional Practices ranged from .90 to .91, Collaboration ranged from .81 to .88, Teacher Efficacy ranged from .92 to .94, and Job Satisfaction ranged from .89 to .92.

Response rates were uniformly high throughout the study for all four years, ranging from 84% to 89% across all responders. The response rates for the treatment group across the four years ranged from 85% to 89%, and the response rates for the control group across the four years ranged from 85% to 90%. A structured procedure to foster high levels of response was implemented including reminder emails, an incentive gift (i.e., a small notepad) and hand delivered memos to each teacher. Survey directions included a Web link to access the survey on SurveyMonkey, informed consent guidelines, and information on the voluntary nature of the survey. Further, survey response rates were calculated and shared with district contacts and schools to promote the highest possible response rates. Annual certificates were issued recognizing school's overall response rates.

Implementation of IC Teams

The process of training and implementation of teams is based on the work of Rosenfield and Gravois (1996). Training procedures are drawn from principles of adult learning and professional development and are more fully described in Gravois, Knotek, and Babinski (2002). Training was conducted using the procedures developed by project developers for IC Team implementation as follows.

Facilitator training. Facilitators, selected by the schools, and principals received an intensive, three-day session, followed by structured monthly training held on site within schools provided by staff from the Laboratory for IC Teams at the University of Maryland. The training session exposed facilitators to the assumptions and base skills of the IC Team model, including (a) effective collaborative communication skills, (b) systematic problem-solving stages, (c) instructional assessment, (d) functional behavioral assessment, (e) collecting, analyzing, and graphing data, and (f) goal setting. Additional facilitator skills related to their leadership role, including (a) managing organizational change, (b) planning and delivering professional development, including coaching, (c) conducting administrative consultation, and (d) organizing and leading effective team meetings.

Team member training. Team members received their training during the first year of implementation (2006–2007). All team members participated in an initial three-day introductory session delivered by university trainers, and they were exposed to the base skills of the IC Team model. Facilitators, who had one year of experience in consultation, began to build and lead teams in their schools. Team members received continuing training and coaching from their facilitators during weekly team meetings.

Continuing staff development. Training during the second year (2007–2008) was similar to that in Year 1, but focused on preparing the teams for full implementation and ultimate institutionalization within the schools. The university personnel provided coaching and technical support to the school-based IC Team facilitators and team members to promote effective implementation. An additional focus of training during this year was on continued development of facilitators' leadership skills and knowledge of the IC Team process to support the sustainability and future expansion of the IC Teams intervention beyond the research period.

In summary, training of facilitators began in the baseline year, and teams began taking cases during implementation

Year 1. Therefore, Year 1, Year 2, and Year 3 implementation data are used as posttest data for the experimental analysis.

Data Analysis

Two approaches, intent-to-treat-schools (ITS) and intent-to-treat-teachers (ITT), were used to test the effects of IC Teams on teacher outcomes. These approaches were designed to assess the potential effects of the IC program on (a) the *schools* that might be affected and (b) the *individual teachers* potentially exposed to the program (including teachers who never interacted directly with the team).

The ITS approach refers to assessing the effect of the intervention on the entire population of teachers who worked in intervention and control schools during the years following the initiation of the experimental program. This comparison is sensitive to and reflects the fact that mobility would likely reduce the opportunity of individual members of the school population to be exposed to the intervention over the four years. For example, teachers who were new to the school in the second year or third year following the initiation of the experiment would not have been exposed to the intervention in prior years. The ITS method includes data for all teachers in the experimental schools at each outcome measurement point, regardless of when they entered the school or whether they had directly received collaborative support from the IC Team. For this approach, teacher outcome data were assigned to the outcome year school, not necessarily the school where teachers worked at baseline.

The ITT approach refers to assessing the effect of the intervention on the individual teachers who were initially randomly assigned to the conditions by virtue of their presence in the schools at the time of random assignment. Other teachers, who may enter the school in subsequent years, are clearly not randomly assigned and may introduce selection or other bias. Further, teachers who leave the school over the course of the experiment pose an attrition threat to internal validity to the extent to which there is differential attrition from intervention and control schools. When teachers who enter the schools and teachers who leave the schools in the years following random assignment are not included in the samples, then the study focuses only on teachers who have been exposed to the opportunity to access the intervention for all years of intervention. It is biased to the extent that the greater opportunity of exposure to treatment for these teachers may produce larger effects than might be observed for those who leave the school during the study. It is also possible that attrition could attenuate estimated effects if educators who directly accessed the intervention were more likely to leave the study schools than those who did not access the intervention. The ITT method includes data for the individual teachers who were initially randomly assigned to the intervention by virtue of being in randomly assigned schools and who remain in the schools, but not necessarily those who accessed the intervention.

A two-level HLM (Raudenbush & Bryk, 2002), in which teachers are nested within schools, tested the effects of IC Teams on teacher outcomes. The same model is used for both the ITS and ITT methods. For each outcome variable, the Level-1 covariate is that teacher's score for the same variable in a survey conducted the prior year. The statistical model at Level 1 in the ITS method does not include the covariate (teacher's baseline score), in part, because no baseline score was available for teachers new to the school following the initial year.

In the ITT approach, the slopes (the partial regression of the teacher outcome on the covariate in their school) for each teacher outcome were tested, for each year of implementation, to determine whether they randomly varied. For slopes that did not vary randomly across schools, the cross-level interactions between the intervention and the slopes were not examined. For slopes that randomly varied across schools, those slopes were examined to determine whether the cross-level interaction between the intervention and the slopes predicted the teacher outcomes for each year.

Special analyses focused on the possibility that attrition influenced our results. Attrition was examined in a multilevel logistic regression where the Level-2 variable was treatment group and the dichotomous dependent variable was attrition. In addition, Level-1 individual characteristics were examined to determine whether they predicted attrition and whether treatment had a cross-level interaction with any of these individual characteristics. The extent of mobility between treatment and control schools was also examined by cross-tabulating initial and final school treatment status.

Finally, our sample in the TSR survey includes all educators who taught at least one pupil each year. Teachers assigned homeroom classes by the district were considered general educators, and non-general education teachers were identified according to their self-reported roles on the TSR. Non-general educators include special education teachers, school administrators, school psychologists, health providers, social workers, counselors, and others who met the criterion of teaching at least one student during that academic year. Because the intervention had the potential to differentially influence general and non-general educators, parallel analyses for the two groups were conducted.

RESULTS

Descriptive Statistics for the Teacher Outcomes

Table 2 presents the descriptive statistics for the teacher outcomes measured by the TSR survey for 2007, 2008, and

TABLE 2
Descriptive Statistics for Teacher Outcomes for Experimental and Control Schools from 2006–2007 to 2008–2009

	Treatment				*Control*			
Outcome Variable	*M*	*SD*	*Min*	*Max*	*M*	*SD*	*Min*	*Max*
Intent-to-treat-schools method								
2006–2007 ($N = 1{,}207–1{,}222$)								
Instructional practice	3.91	0.55	2.20	5.00	3.88	0.56	1.94	5.00
Collaboration	3.96	0.67	1.00	5.00	3.95	0.61	1.67	5.00
Teacher efficacy	3.98	0.52	1.63	5.00	3.94	0.50	2.50	5.00
Job satisfaction	4.31	0.80	1.00	5.00	4.36	0.70	1.00	5.00
2007–2008 ($N = 1{,}228–1{,}273$)								
Instructional practice	3.92	0.55	2.22	5.00	3.95	0.53	2.22	5.00
Collaboration	4.02	0.60	1.78	5.00	3.95	0.64	1.22	5.00
Teacher efficacy	4.02	0.51	1.88	5.00	3.96	0.53	2.56	5.00
Job satisfaction	4.27	0.83	1.00	5.00	4.27	0.76	1.00	5.00
2008–2009 ($N = 1{,}157–1{,}188$)								
Instructional practice	3.97	0.51	2.17	5.00	3.96	0.55	1.72	5.00
Collaboration	3.99	0.59	1.60	5.00	3.89	0.55	1.70	5.00
Teacher efficacy	4.07	0.49	2.63	5.00	4.01	0.51	2.44	5.00
Job satisfaction	4.45	0.55	2.13	5.00	4.33	0.64	1.00	5.00
Intent-to-treat-teachers method								
2006–2007 ($N = 864–871$)								
Instructional practice	3.90	0.54	2.20	5.00	3.86	0.58	1.94	5.00
Collaboration	3.95	0.65	1.00	5.00	3.94	0.61	1.67	5.00
Teacher efficacy	4.01	0.51	1.63	5.00	3.95	0.49	2.50	5.00
Job satisfaction	4.34	0.76	1.00	5.00	4.32	0.72	1.00	5.00
2007–2008 ($N = 706–728$)								
Instructional practice	3.93	0.56	2.22	5.00	3.93	0.54	2.22	5.00
Collaboration	4.01	0.57	2.11	5.00	3.96	0.60	1.78	5.00
Teacher efficacy	4.04	0.52	1.88	5.00	3.96	0.51	2.75	5.00
Job satisfaction	4.29	0.86	1.00	5.00	4.32	0.73	1.00	5.00
2008–2009 ($N = 629–641$)								
Instructional practice	3.97	0.50	2.61	5.00	3.96	0.56	1.72	5.00
Collaboration	3.98	0.57	1.80	5.00	3.89	0.55	1.70	5.00
Teacher efficacy	4.10	0.49	2.63	5.00	4.04	0.50	2.69	5.00
Job satisfaction	4.45	0.55	2.63	5.00	4.35	0.61	1.75	5.00

Note. Descriptive statistics are for raw data from the teacher survey. Min = minimum; Max = maximum.

2009 using the ITS and ITT methods. Statistical tests for treatment–control group differences involve the multilevel models described earlier.

Proportion of Variance Explained for Teacher Outcomes

The proportions of variance explained by the multilevel models are presented in Table 3 for all teacher outcomes for 2007, 2008, and 2009 using the ITS and ITT methods. The total variance in any outcome can be partitioned into a within-school and a between-school component. Variance within schools describes individual differences among teachers in schools, and the between-school variance describes how variable schools are in their average teacher characteristics. The intraclass correlation (ICC) coefficient measures the proportion of variance in the outcomes that is between schools.

According to the fully unconditional model of the ITS method, the ICCs indicate that 8% to 15% of the variance in job satisfaction and 7% to 10% of the variance in collaboration lies between schools. As a practical matter, there is considerable between-school variance to explain. Less of the variance in teacher efficacy (2%) lies between schools, and only 0% to 2% of the variance in instructional practices lies between schools. According to the unconditional model for the ITT approach, the ICC indicates that 10% to 14% of the variance in job satisfaction and 7% to 13% of the variance in collaboration lies between schools. A small amount of variance in teacher efficacy (3%) and instructional practices (0%–2%) lies between schools.

Results from the fully unconditional and the final models were used to estimate the proportion of variance explained between and within schools. Based on the ITS method, the final model explained a moderate to large amount of between-school variance for all of the teacher outcomes across all years. The final model explained the most between-school variance for teacher efficacy, 35% to 81% of the between-school variance. For instructional practices, 17% to 76% of the between-school variance was explained

TABLE 3
Variance Components and Proportion of Variance Explained for Teacher Outcomes for Experimental and Control Schools from 2006–2007 to 2008–2009

	Unconditional Model			*Final Model*		*Variance Explained*	
Outcome Variable	σ^2	τ	*ICC*	σ^2	τ	*Proportion of σ^2 Explained*	*Proportion of τ Explained*
Intent-to-treat-schools method							
2006–2007 ($N = 1{,}207–1{,}222$)							
Instructional practice	0.30	0.01	0.02	0.30	0.00	–	0.76
Collaboration	0.37	0.04	0.10	0.37	0.03	–	0.40
Teacher efficacy	0.25	0.01	0.02	0.25	0.00	–	0.48
Job satisfaction	0.49	0.08	0.14	0.49	0.05	–	0.40
2007–2008 ($N = 1{,}228–1{,}273$)							
Instructional practice	0.29	0.00	0.00	0.29	0.00	–	0.75
Collaboration	0.36	0.03	0.07	0.36	0.02	–	0.24
Teacher efficacy	0.27	0.01	0.02	0.27	0.00	–	0.35
Job satisfaction	0.54	0.10	0.15	0.54	0.08	–	0.21
2008–2009 ($N = 1{,}157–1{,}188$)							
Instructional practice	0.28	0.00	0.00	0.28	0.00	–	0.17
Collaboration	0.31	0.02	0.07	0.31	0.02	–	0.31
Teacher efficacy	0.25	0.01	0.02	0.25	0.00	–	0.81
Job satisfaction	0.33	0.03	0.08	0.33	0.02	–	0.29
Intent-to-treat-teachers method							
2006–2007 ($N = 864–871$)							
Instructional practice	0.31	0.01	0.02	0.18	0.00	0.42	0.95
Collaboration	0.35	0.05	0.13	0.27	0.03	0.23	0.46
Teacher efficacy	0.24	0.01	0.03	0.14	0.00	0.42	0.30
Job satisfaction	0.49	0.06	0.11	0.37	0.03	0.24	0.44
2007–2008 ($N = 706–728$)							
Instructional practice	0.30	0.00	0.00	0.20	0.00	0.32	0.67
Collaboration	0.32	0.02	0.07	0.27	0.01	0.16	0.41
Teacher efficacy	0.26	0.01	0.03	0.18	0.00	0.31	0.48
Job satisfaction	0.56	0.09	0.14	0.51	0.05	0.08	0.49
2008–2009 ($N = 629–641$)							
Instructional practice	0.28	0.00	0.00	0.19	0.00	0.30	–[α]
Collaboration	0.30	0.02	0.06	0.22	0.02	0.28	0.12
Teacher efficacy	0.24	0.01	0.03	0.15	0.00	0.35	0.75
Job satisfaction	0.31	0.03	0.10	0.26	0.02	0.15	0.41

Note. N schools $= 34$. $\sigma^2 =$ within-school variance; $\tau =$ between-school variance. ICC = intraclass correlation. ICC is computed as follows: τ unconditional/(τ unconditional $+\sigma^2$ unconditional). Proportion of σ^2 explained is computed as follows: (σ^2 unconditional $-$ σ^2 final)/σ^2 unconditional. Proportion of τ explained is computed as follows: (τ unconditional $-$ τ final)/τ unconditional. The proportion of σ^2 explained was not calculated for the intent-to-treat-schools method because there were no changes in the σ^2 between the unconditional and final models.

[α]The denominator estimator of τ is zero, so this proportion cannot be meaningfully estimated.

by the final model. For collaboration, 24% to 40% of the between-school variance was explained by the final model. For job satisfaction, 21% to 40% of the between-school variance was explained by the final model. The proportion of within-school variance explained by the final model was not calculated for the ITS method because there were no changes in the within-school variance between the unconditional and final models.

According to the ITT method, the final model explained a moderate amount of the within-school variance for instructional practices (30%–42%) and teacher efficacy (31%–42%). The final model explained a smaller amount of the within-school variance for collaboration (16%–28%) and job satisfaction (8%–24%). The final model explained the most between-school variance for instructional practices (67%–95% of the between-school variance). The final model explained a moderate amount of the between-school variance for collaboration (12%–46%), teacher efficacy (30%–75%), and job satisfaction (41%–49%).

Treatment Effects

A summary of the treatment effects is presented in Table 4. The hypothesis was that the intervention would increase teachers' perceptions of their efficacy, instructional practices, collaboration, and job satisfaction. For completeness, the results for all three years of implementation are presented. A gradual increasing pattern of effects on teacher beliefs and practices as the teachers within the treatment schools had the opportunity to receive more of the IC Teams intervention was expected.

TABLE 4
Summary of Effect Estimates on Teacher Outcomes for Experimental and Control Schools from 2006 to 2009

Outcome Variable	*Coefficient*	*SE*	*p*	*d*
Intent-to-treat-schools method				
2006–2007 ($N = 1{,}207–1{,}222$)				
Instructional practice	0.02	0.03	0.59	0.03
Collaboration	−0.02	0.06	0.73	−0.03
Teacher efficacy	0.06	0.03	0.08	0.11
Job satisfaction	−0.09	0.08	0.31	−0.12
2007–2008 ($N = 1{,}228–1{,}273$)				
Instructional practice	−0.04	0.03	0.20	−0.07
Collaboration	0.05	0.06	0.36	0.09
Teacher efficacy	0.07	0.03	0.05	0.13
Job satisfaction	−0.06	0.10	0.53	−0.08
2008–2009 ($N = 1{,}157–1{,}188$)				
Instructional practice	0.00	0.03	0.94	0.00
Collaboration	0.09	0.05	0.10	0.16
Teacher efficacy	0.08	0.03	0.01	0.15
Job satisfaction	0.09	0.06	0.13	0.14
Intent-to-treat-teachers method				
2006–2007 ($N = 864–871$)				
Instructional practice	0.01	0.03	0.75	0.02
Collaboration	0.01	0.07	0.88	0.02
Teacher efficacy	0.05	0.03	0.14	0.10
Job satisfaction	−0.03	0.08	0.72	−0.04
2007–2008 ($N = 706–728$)				
Instructional practice	−0.02	0.03	0.43	−0.04
Collaboration	0.04	0.06	0.48	0.07
Teacher efficacy	0.08	0.04	0.02	0.16
Job satisfaction	−0.09	0.09	0.35	−0.12
2008–2009 ($N = 629–641$)				
Instructional practice	0.02	0.04	0.66	0.03
Collaboration	0.12	0.06	0.04	0.22
Teacher efficacy	0.08	0.03	0.03	0.15
Job satisfaction	0.10	0.06	0.13	0.16

Note. *N* schools = 34. Coefficient is the effect estimate from the two-level model. The covariates are the corresponding outcome scale for the baseline year (2005–2006). For the intent-to-treat-schools method, teachers in each school in 2009 are included. For the intent-to-treat-teachers method, teachers' school at the time of random assignment is used, and only teachers initially randomly assigned are included.

Implementation year 1. There were no significant treatment effects on teacher reported beliefs and practices at this early stage in the study according to both the ITS and ITT methods. The estimated effect sizes for outcomes were mostly small, ranging from $d = .02$ for collaboration to .11 for teacher efficacy.

Implementation year 2. Teacher efficacy, one of the four teacher outcomes, was significantly affected by the intervention according to both ITS and ITT methods. Estimated effect sizes for all outcomes were mostly small, ranging from .07 to .13 using the ITS method and ranging from .04 to .16 using the ITT method. The estimated effect of IC Teams was largest for teacher efficacy compared to the other outcome variables. After about 1.5 years of IC Teams implementation, teacher self-reported efficacy was higher in IC Teams schools than in control schools, 13% of a standard deviation based on the ITS method and 16% of a standard deviation based on the ITT method. The remaining estimated treatment effects were not statistically significantly different from zero.

Implementation year 3. For the third and final year of implementation, teacher efficacy and collaboration, two of the four teacher outcomes, were significantly affected by the intervention. Minor differences were found between the ITS and ITT methods. First, according to the ITS method, teacher self-reported efficacy was significantly higher in IC Teams schools than in control schools ($d = .15$). The effect sizes for all outcomes were no more than about 1/7 *SD*, ranging from .00 to .15, with teacher efficacy the largest. Second, according to the ITT method, the IC Teams intervention significantly and positively affected teacher efficacy and collaboration. The effect sizes for all outcomes ranged from .03 to .22, with collaboration as the largest. After about 2.5 years of IC Teams implementation, teacher self-reported efficacy was 15% of a standard deviation higher in IC Teams schools than control schools, and teacher self-reported collaboration was 22% of a standard deviation higher in the intervention schools than in control schools. No other statistically significant differences were found between intervention and control schools.

IC Team Implementation and Use

Implementation and use of the intervention varied across treatment schools. According to the ITS method, the proportion of general education teachers in intervention schools who had used the IC Teams ranged from 32% to 93%. According to the ITT method, the proportion of classroom teachers who had initially been in the treatment and control schools, had not left, and who had used the IC Teams ranged from 36% to 88%. This range of utilization is large.

Potential effects of the IC Teams intervention on teacher outcomes are contingent on the level of use of the teams that was achieved in intervention schools. It was hypothesized that the effects of the IC Teams program may depend on the level of use of the teams achieved in the schools. Therefore, the possibility of an interaction between the level of utilization of IC Teams in the school and treatment group status for each of the four teacher outcome variables was examined. There was no evidence of such a contingent effect for any of the four teacher outcome variables examined, d ranged from .00 to .02, $ps > .05$. Results indicated that the IC Team intervention effect on teacher outcomes is not conditioned on the level of use within this wide range. Within this range of utilization in this project, there is no evidence of a "dose response" such that the effects are enhanced when utilization is greater.

Attrition and Mobility Between Treatment and Control Groups

Little mobility was found between treatment and control groups. By the final year of the study, 15 out of 696 educators (2%) who were initially randomly assigned to treatment schools in 2005 through 2006 moved to control schools by 2008 through 0209. By the final year of the study, 28 out of 734 educators (4%) who were initially randomly assigned to control schools in 2005 through 2006 moved to treatment schools.

The teacher attrition rate for 2007 was 29% in the treatment group and 34% in the control group. Attrition is cumulative, so that by 2008 the attrition rate was 40% in the treatment group and 40% in the control group. By 2009, the cumulative attrition rate was 47% in the treatment group and 48% in the control group.

Individual teacher characteristics were examined to determine whether they predicted attrition. The teacher characteristics included teacher age, years of experience, years at school, and education level. For the first year of implementation (2006–2007), teacher age significantly predicted attrition (one year greater in age was associated with about a 1% reduction in the odds of remaining in the school and providing data; $p < .01$). None of the other individual characteristics significantly predicted attrition for the first and second years of implementation. By the third year of implementation, one year of greater teacher age was associated with about a 2% reduction in the odds of being present and providing data ($p < .01$). Similarly, years of experience (which is, of course, correlated with age) also significantly predicted attrition rate by the final follow up; one year of experience was associated with about an 11% reduction in the odds of providing data. The examination of whether treatment had a cross-level interaction with any of the individual teacher characteristics was conducted. Results indicated that attrition was not statistically associated with treatment status for any of the three years of the study. Furthermore, treatment did not interact with the individual characteristics listed earlier, so there is no evidence of differential attrition in treatment and control schools.

DISCUSSION

As policymakers continue to focus on teachers' contribution to overall student achievement, there is both a need to understand which teacher variables are related to student outcomes, and also to understand what, if anything, can be done to positively influence those variables. This study addresses the latter, and measured the impact of an empirically derived model of teacher support, IC Teams, on four key variables thought to relate to student achievement. The study used schools as the unit of analysis, and equated a teacher's presence within the school as exposure to the intervention condition, whether they directly worked with the IC Team or not.

Within this design, the results indicate that the IC Teams intervention had a small, but gradually increasing, significant effect on teacher efficacy at two years of implementation ($d = .13$) and then at three years of implementation ($d = .16$). A small significant effect ($d = .22$) on teacher collaboration was found at the third year of implementation. This gradual increase in effect supports our hypothesis that continued program implementation would allow additional exposure to the intervention.

In addition, two approaches to data analyses investigated the effects of IC Teams intervention on two unique groups of teachers; teachers who remained exposed to the intervention condition throughout the entire study period (ITT) and those who were exposed to the intervention at the point of data collection and analyses (ITS). Presenting both analyses provides greater confidence in the findings. As might be expected, results according to the ITT approach produced somewhat larger effect estimates (teacher efficacy: ds $= .15–.16$; collaboration: $d = .22$) than did the ITS method (teacher efficacy: ds $= .13–.15$)—that is, the effect of the intervention was greater for those teachers who were in schools with IC Teams and exposed to the treatment conditions for longer periods of time. This difference, albeit small, suggests that the IC Teams intervention may have had more influence on teachers who had greater exposure to the intervention condition.

Although the effect sizes found here are small according to Cohen's (1988) general categorization, it is important to recognize that Cohen considered his categorization a guideline. These effects for self-efficacy are modest in size, especially considering the rigor of design and point of implementation at which analyses were conducted. However, according to Fullan (2001), "[E]ffective change takes time ... Significant change in the form of implementing specific innovations can be expected to take a minimum of 2 or 3 years; bringing about institutional reforms can take 5 or 10 years" (p. 109). Moreover, the significant results in the third year replicated and increased the size of the second-year results on teacher efficacy.

The self-reported Teacher Efficacy scale measures the extent to which teachers believe they can influence student learning and bring about changes in student engagement. The self-reported teacher Collaboration scale measures the degree to which teachers perceive that faculty members in the school work together. Our findings suggest that the implementation of the IC Teams intervention in a school changes teachers' beliefs about how much they can do to influence student learning and increases teachers' perception of how school members work together. These effects are not specific to educators who actually accessed the intervention, but to all educators exposed to IC Teams by virtue of working in an intervention school.

Effects across other teacher outcomes were all small and not statistically significant. Results do not provide evidence of treatment effects for teacher perceptions of job satisfaction or for their instructional practices. It is possible that changes in job satisfaction and instructional practices require greater, more extensive intervention than was applied in this experimental trial, that the measures examined were not sufficiently sensitive to the intervention, or that IC Teams do not influence these outcomes. A study of the Instructional Practices scale demonstrated a number of problems with how teachers interpreted the questions, which the problems were addressed with some modifications in the scale in Year 2. However, it is possible that the ceiling effect noted on the scale (i.e., most teachers in both treatment and control groups reporting extensive use of the desirable practices) and issues related to participant understanding of the scale items were not successfully addressed. An observational study of teacher practices could provide additional information on this area of teacher behavior, rather than examining their perceptions of their teaching.

Results from subgroup analyses for general education teachers and non-general education teacher indicated that the IC Teams intervention positively affected the efficacy of general education teachers (ds $= .15-.17$), but did not statistically significantly affect the efficacy of non-general education teachers. Further, the IC Teams intervention significantly and positively affected the collaboration of non-general education teachers (ds $= .25-.30$), but did not significantly affect the collaboration scores of general education teachers. The findings imply that having the IC Teams intervention in the schools causes non-general education teachers, such as specialists, counselors, administrators, and others, to perceive more collaborative efforts to provide support for others in the school. The intervention does have some influence on the general education teachers' perceptions of their efficacy, which is a relevant finding given the relation found in other research between efficacy and student outcomes.

Potential Limitations

A number of potential limitations need to be stated. First, restriction of range may occur for some outcome variables. The teacher survey consisted of four-to-five response option items. Most teachers chose high responses, and few teachers chose low responses. The clustering of teacher ratings at the high end of the scale suggests a possible ceiling effect for the outcome variables. Alternatively, the sample of schools may be particularly high in mean levels of these variables—restricting the range in this sample of schools. In either case, restriction of range may attenuate the estimated effects of IC Teams on teacher beliefs and practices and might help explain the small effect sizes found in our study (Gulliksen, 1950). At the same time, the reliability coefficients reported are high, so there appears to be adequate variance to detect effects even if the resulting effect size estimates are somewhat attenuated.

In any research, the measured outcomes may not reflect the theoretical constructs that were intended to measure. A self-report method was used to collect information on teacher beliefs and practices, and it was assumed that teacher responses to survey items reflect their actual beliefs and classroom practices. Despite efforts made as the study progressed to improve the TSR measures (e.g., Berger & Kaiser, 2008), it is possible that self-reported attitudes and practices may not actually reflect how teachers instruct and how they think about themselves and their teaching. In other words, it is possible that IC Teams did affect the theoretical constructs that were intended to measure, but that these effects could not be captured by the self-report measures employed.

Attrition is another potential problem of this longitudinal study, albeit considered similar to reported rates of attrition for public schools in general (Marvel, Lyter, Peltola, Strizek, & Morton, 2007). In our analyses, attrition was found to be independent of school treatment status and of most individual characteristics examined across all years. A couple of teacher characteristics predicted attrition: In the first year of implementation (2006–2007), attrition was associated with age, and in the third year of implementation (2008–2009), attrition was associated with age and experience (older teachers more likely to leave). Furthermore, no evidence of an interaction of treatment with individual characteristics was found, which indicates no differential attrition in treatment and control schools. Very little attrition was due to the failure of active teachers to participate in our surveys; annual survey response rates were very high. It is noted that no effort was made to obtain responses from individuals who left the study after random assignment.

Some degree of treatment diffusion evidently occurred. Berger et al. (2011) show that teachers in control schools increasingly reported over the years that they were involved with IC Teams. Although the levels of teacher reports of exposure to IC Teams in control schools never reached the level at which treatment schools reported exposure in the baseline year and, although control school teachers' reports of IC Team involvement appeared most strongly in the final year, treatment diffusion may have diluted the experimental–control group contrast to some degree, attenuating our estimate of the treatment effect. Within the district, according to a key administrator

> The language of the "Instruction Match" has found its way in the vocabulary of the administrative staff in the Office of Special Education … There were inroads made across the division about the thinking with respect to intervening on behalf of kids. (K. Aux, personal communication, June 22, 2010)

In addition, one of the facilitators from the experimental schools became an assistant principal at a control school, and one of the treatment school principals became an associate superintendent over one-third of the elementary schools. Further, there were 11 schools with IC Teams in the district prior to the experimental study, and other diffusion might have also occurred. However, the control schools had no full-time treatment facilitator, as did the treatment schools, and they did not receive the technical assistance and training.

Finally, the study took place in a suburban public school system in the mid-Atlantic region, and results may not generalize to schools that differ substantially in terms of demography, grade level, or teacher education. Furthermore, this school system volunteered to participate in this study. Results could differ had a full range of schools been studied, had the school district been less cooperative, or if the school teachers had been less satisfied and efficacious.

CONCLUSION

Prior research provided us with a theoretical and empirical basis for hypothesizing that supportive interdisciplinary teams would produce beneficial teacher outcomes. Methodological limitations in prior research militated against inferences about causal effects. Erchul and Sheridan (2008) suggested that "the practice of school consultation has developed at a much faster rate than the research base that should logically support it" (p. 10). This study contributes experimental evidence concerning the effects of a supportive interdisciplinary team within the school. Given that this study is the first to use the pretest-posttest control group design with random assignment to experimentally study IC Teams, many threats to causal inferences were minimized, providing the best evidence to date of IC Teams effects on teacher beliefs and practices.

The IC Teams intervention had a modest effect on teachers' sense of efficacy in the last two years, and also affected collaboration among educators within the last year of the study. There was no consistent evidence of effects on teacher job satisfaction or instructional practices at three years of implementation of the intervention. Although results provide no information about the effects of this intervention if implemented beyond three years, effects began to emerge after two and three years of implementation of the intervention. This suggests that interventions, such as IC Teams, applied to whole schools may take several years to have effects on the teachers and students they seek to change, a finding congruent with the literature on school change.

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ABOUT THE AUTHORS

Phuong Vu, Katherine Bruckman Shanahan, Sylvia Rosenfield, Todd Gravois, Jessica Koehler, Lauren Kaiser, Jill Berger, Megan Vaganek, Gary D. Gottfredson, and Deborah Nelson were involved in the study on the effects of Instructional Consultation Teams while they were at the University of Maryland, College Park in the Department of Counseling and Personnel Services. Their research interests are in school psychology and educational psychology.

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