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ORIGINAL PAPER

Using Coaching to Support Teacher Implementation of Classroom-based Interventions

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Abstract Despite the growing evidence base for the efficacy of preventive interventions, the level of implementation of these interventions in schools is often less than optimal. One promising approach to supporting teachers in implementation of interventions is the use of coaching. In this study, teachers were trained in a universal classroom management intervention and provided ongoing coaching. The association between the type and amount of coaching activities and teacher implementation of proactive classroom management over time were investigated. Results indicated that teachers who received more performance feedback had higher levels of implementation over time in comparison with teachers who received less feedback. In addition, a significant interaction between the amount of coaching a teacher received and his or her implementation of proactive classroom management was found. Increased implementation over time was observed for teachers with lower initial levels of implementation who received more coaching, whereas implementation decreased over time for teachers who received less coaching. The importance of coaching as a support system for enhancing implementation quality of classroom-based preventive interventions is discussed.

Keywords Implementation · Coaching · Classroom-based intervention · Prevention

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Despite the growing evidence base for the efficacy of preventive interventions (Durlak et al. 2011; National Research Council and Institute of Medicine 2009), the implementation of these interventions is often less than optimal (Gottfredson et al. 2002). Importantly, interventions or practices that are implemented with higher fidelity produce more favorable outcomes for students (Durlak and DuPre 2008). Many of these interventions require teachers to implement them in their classrooms. To support high-quality implementation, teachers often require ongoing, interactive professional development that allows teachers to reflect on their practices (Darling-Hammond 2009). Traditional professional development provided as an inservice is not as effective as professional training paired with follow-up support for implementation in the classroom setting (e.g., Joyce and Showers 2002; Noell et al. 2005). Further, teachers face a variety of challenges in their classrooms that likely impact their implementation of new practices with fidelity (Fixsen et al. 2005). For instance, practices learned in trainings may be difficult to translate into daily classroom routines due to limited resources, challenges associated with students with diverse learning needs, or resistance to change from administrators, parents, or students. Coaching, a supportive professional development practice in which a person with specialized knowledge in a particular area works directly with a classroom teacher toward changing current practices and improving skills (Denton and Hasbrouck 2009), is a promising approach that can help to address some of the gaps in teacher preparation and the implementation of preventive interventions.

Coaching is being used more and more to support teachers' implementation of social, behavioral, and academic interventions (Pas et al., in press). However, there is relatively limited information about the amount and types of activities that coaches use when supporting teacher implementation, particularly for social behavioral interventions (Stormont et al. 2013). Research that evaluates how coaching practices support teacher implementation can guide advances in implementation science (Cappella et al. 2011). To this end, the purpose of this study was to investigate teacher implementation of proactive classroom management skills following training in a universal classroom management intervention and ongoing coaching. This study capitalizes upon an ongoing efficacy trial of the Incredible Years Teacher Classroom Management program (IY TCM). Teachers in the intervention also received ongoing coaching to support the applications of skills learned through the IY TCM into their classrooms. Data were gathered about the types of strategies or activities that the coach utilized with each teacher. The study investigates the association between coaching activities and teacher implementation. The following review of the literature underscores the importance of this research.

Teacher Need for Training and Support in Effective Classroom Management

Student disruptive and challenging behaviors are major concerns to teachers (Reinke et al. 2011). Considerable research has demonstrated that effective teacher classroom management strategies can reduce disruptive behavior (Hawkins et al. 1999; Kellam et al. 1998; Walker et al. 1995), and enhance academic achievement (Brophy 1996; Coladarci and Gage 1984), school readiness, and student's social

competence (Webster-Stratton et al. 2008, 2004). Conversely, ineffective classroom management practices are associated with increased disruptive behavior, and negative academic, behavioral, and social outcomes for students (Ialongo et al. 2001; Kellam et al. 1998; National Research Council 2002). However, many teachers are not adequately prepared to manage behavior problems in the classroom (Barrett and Davis 1995; Evertson and Weinstein 2006; Houston and Williamson 1992) causing a large number to leave the profession early in their careers (Ingersoll 2002). Providing teachers with the supports and tools they need for effective classroom management can improve student and teacher outcomes.

In particular, supporting teachers in their use of proactive classroom management strategies or strategies that prevent disruptive behaviors before they occur in the classroom can be very useful. Two highly effective proactive strategies include using praise to acknowledge student appropriate behavior and providing precorrective statements. For instance, teachers who deliver a high amount of praise for appropriate behavior typically experience lower off-task and disruptive behaviors from their students (Espin and Yell 1994; Reinke et al. 2007). Precorrection is another effective strategy for preventing predictable errors or problem behaviors by providing students with a reminder of the appropriate behavior or response prior to the situation in which the problem behaviors typically occur (Colvin et al. 1997; DePry and Sugai 2002; Lewis et al. 2000; Smith et al. 2011). Although research supports the use of these proactive classroom management practices, direct observations of teachers indicate they do not regularly use these practices (Kim and Stormont 2012; Reinke et al. 2013; Smith et al. 2011). Furthermore, teachers report they feel unprepared in overall classroom management and request additional support in this area (Reinke et al. 2011).

Incredible Years Teacher Classroom Management Program

The Incredible Years Teacher Classroom Management (IY TCM) program is an evidence-based preventive intervention for supporting teacher use of effective classroom management practices. Teachers in the program learn evidence-based classroom management practices (Simonsen et al. 2008), including proactive strategies such as building positive teacher–student relationships and encouraging student successful behaviors through praise and rewards, and discouraging student misbehavior through planned ignoring, use of explicit reprimands, and time-out. Research on IY TCM has found that teachers who received the training used more praise, were more nurturing and consistent, and reported more confidence in teaching. Additionally, the children in classrooms of trained teachers were observed to be significantly less aggressive and more cooperative (Webster-Stratton et al. 2001, 2004).

Coaching Supports

One integral part of the IY TCM intervention is the rigor in which teachers are supported in learning key concepts across multiple trainings and then subsequently supported in using them with ongoing one-on-one sessions with IY TCM coaches in

their classrooms. Driscoll et al. (2011) reported teachers were 13 times more likely to implement an intervention when granted access to additional supports, such as a coach. Furthermore, research has also documented that when provided additional intervention support, such as coaching, teachers are more effective intervention implementers and report greater self-efficacy and ability to maintain newly learned practices (Forman et al. 2009; Ransford et al. 2009; Wenz-Gross and Upshur 2012). The additional support coaching sessions offer teachers as part of the IY TCM intervention is often cited as necessary to intervention implementation fidelity and success (Driscoll et al. 2011; Forman et al. 2009; Noell et al. 2002; Ransford et al. 2009; Wenz-Gross and Upshur 2012). Further, a recent review of the literature on coaching teachers found that 83 % of interventions that utilized coaching as a component of an intervention yielded positive results (Stormont et al. 2013).

One component of coaching that is clearly linked to teacher implementation and positive student outcomes is the delivery of performance feedback (Reinke et al. 2008; Solomon et al. 2012). The IY TCM coaching model includes delivery of performance feedback to teachers. The use of performance feedback within the context of coaching needs more research. Of interest is whether teachers who receive different amounts of performance feedback implement practices with greater frequency when compared to those who receive less. It is clear that teachers, like students, need different levels of support. Previous research has primarily compared teachers who received no feedback with teachers who received feedback (Stormont et al. 2013). Also, research to date has not compared different types of coaching practices including action planning and modeling and how they are related to teacher implementation of key practices (Stormont et al. 2013). For instance, other elements of the IY TCM coaching model include modeling, action planning, goal setting, reviewing, and role-play (Reinke et al. 2012). Thus, overall, although the use of coaching has been associated with positive outcomes in research, the specific elements of coaching need more research to substantiate their effectiveness.

Current Study

The purpose of this study was to evaluate the association between teacher implementation of classroom management practices and coaching supports provided to teachers over the course of the school year. The current study was conducted in the context of another larger efficacy trial that did not have a primary focus of evaluating the coaching model, but rather allowed the opportunity to utilize and evaluate data gathered as part of the coaching process of supporting teachers in the IY TCM intervention. This study provides new information about how coaching can support teacher implementation of skills learned through the IY TCM preventive intervention. Further, this study provides some initial information about coaching strategies and how certain strategies may be helpful in supporting teacher implementation. Because the IY TCM has a strong emphasis on the use of proactive classroom management, we hypothesized that teachers would show an initial increase in implementation of proactive skills following participation in the IY TCM workshop sessions, and teachers would maintain this increase over time.

Second, we predicted that teachers receiving higher amounts of coaching (i.e., a stronger dose) would have higher levels of implementation of proactive strategies and that particular types of coaching activities would be aligned with better teacher implementation. In particular, greater amounts of performance feedback were expected to be associated with higher levels of implementation over time. Although exploratory in nature, we hypothesized that other coaching activities, including action planning and reviewing, would be positively associated with teacher implementation of proactive strategies.

Method

Fifty-two elementary school teachers trained in the IY TCM intervention from nine urban schools serving primarily African American (76 %) students participated in this study. These teachers were part of a large-scale-group-randomized trial evaluating the efficacy of the IY TCM. Teachers consenting to participate were randomly assigned to intervention versus control conditions. For the purposes of this study, only teachers who received the IY TCM intervention were included. Most teachers were female (94 %) and white (75 %). Twenty-one percent of teachers were African American, 2 % were Asian, and 2 % were Hispanic. A total of 14 teachers taught Kindergarten, 15 taught First grade, 10 taught Second grade, and 13 taught Third grade. Participants' years of teaching experience ranged from 1 to 42 years, with an average of 11.31 years. Teachers were provided six workshop sessions of IY TCM training followed by ongoing on-site coaching. All study procedures were reviewed and approved by the University and participating school district's institutional review board (IRB) prior to implementation.

Two certified IY TCM leaders provided the workshop trainings. One leader was a white male with a doctoral degree in Counseling Psychology. The second leader was a white female with a doctoral degree in Special Education. The second leader also provided weekly on-site coaching to each teacher in the intervention. During the individual coaching sessions, the coach reviewed workshop content, supported goal setting for use of strategies, provided feedback on teacher use of skills, modeled effective practice, and supported action planning.

IY TCM Training Workshops and Weekly Onsite Coaching

Teachers participated in six, 6-h workshops spread out across the school year. The purpose for spreading workshop sessions over time is to allow for teachers to work on applying specific workshop content strategies into their classrooms with the support of the IY TCM coach. The coaching model is learner-centered, supportive and collaborative, and focuses on building on teachers' strengths (Reinke et al. 2012). In between each workshop session, the IY TCM coach observed the teachers in the classroom and met with them individually for up to 1 h on a weekly basis. The coach recorded any contact with teachers, including brief check-ins to review strategies and schedule the next meeting. Therefore, the mean time spent with a

teacher by the coach, outside of observing in the classroom, was 28 min (range = 4–120 min). During the individual coaching sessions, the coach reviewed workshop content and supported goal setting for use of strategies, provided feedback on teacher skills and interpersonal teaching processes with children, modeled effective practice, role-played potential barriers and challenges, and supported action planning.

Initial goal setting focused on scaffolding the environment to provide a positive climate with clear predictable rules, routines and schedules, and providing effective praise. A typical coaching session included the teacher and coach reviewing the teacher's goals from the previous week and reviewing anecdotal or graphically displayed performance feedback data collected by the coach during observations in the classroom. Data shared with the teacher included the frequency of general and specific praise, the ratio of praise statements to reprimands, and the frequency of the number of opportunities to respond, precorrects, and harsh reprimands. The teacher would assess her performance based on the feedback provided and create a plan to increase or refine her use of the proactive classroom management strategies, or to use new strategies to meet new goals for the coming week. As teachers mastered the classroom management strategies, their goals and action plans would focus more on promoting positive growth in their relationships with students and parents, at times setting a goal to repair a relationship with a student or family.

The IY TCM is a universal intervention for teachers, meaning that the intervention is intended for all teachers regardless of skill level. However, the IY TCM coach was able to differentiate the amount of coaching provided to teachers based on their need for supports. All teachers received some coaching. The coach initially met with all teachers on a weekly basis, but this tapered off over time based on the coach's perception of teacher's need for additional supports. No specific criteria were provided to the coach for determining when to continue or discontinue coaching. Some reasons that the coach may have discontinued coaching were the coach and teacher feeling like all goals had been met, that the teacher did not need additional supports, and on occasion due to difficulties in scheduling due to logistical issues. Although the coach did not document for this study the reasons for continuing or discontinuing coaching, a recent paper demonstrated that the coach in this trial spent more time with teachers who had higher rates of disruptive behavior (Reinke et al., in press-b).

Measures

Teacher Implementation of Proactive Strategies

Independent observers conducted direct observations of teacher implementation using the *Multi-Option Observation System for Experimental Studies* (MOOSES; Tapp 2004) interface for handheld computers to gather real-time data using the *Brief Classroom Interaction Observation Revised* observation code (BCIO-R; Reinke and Newcomer 2010). The frequency of teacher use of proactive classroom management strategies, including praise statements and precorrections, and reactive strategies

(i.e., use of reprimands), were gathered simultaneously during each observation. Observations were conducted across the academic year at 4 time points. The first observation occurred in October prior to receiving IY TCM training or coaching. The second observation occurred between 2 weeks after teachers received workshop sessions 1 through 4 (24 h of workshop training) and approximately 5 weeks of coaching. The third observation occurred 2 weeks after the final workshop sessions (12 additional hours of training) and ongoing weekly coaching sessions. The final observation occurred at the end of the school year (approximately 8 weeks from the prior observation) following completion of all IY TCM workshop sessions and coaching. All observations occurred in classrooms during instructional times (i.e., reading and math). The pre- and post-observations also included individual student-level data, which was not utilized in this study. The pre- and post-observations were an aggregation of a series of 5-min observations, whereas the second and third observations were both 20 min in length. The range in length of the aggregated pre- and post-observations were comparable, ranging from 15 to 80 min (Mean = 41.26) across teachers for the preassessment and 15 to 65 min (Mean = 36.37) for the post-assessment. All data were converted to rate per minute, which allows observations with varying lengths to be directly compared. For the purposes of this study, the rate of overall praise, precorrections, and reprimands were compiled for each observation period. Next, the rate of proactive classroom management strategies (praise and precorrection) were added together and divided by the total rate of observed practices (praise, precorrections, and reprimands) and multiplied by 100. Thus, the percentage of proactive classroom management strategies observed for each teacher across the four time points were utilized as an indicator of the quality of teacher implementation of skills learned through the IY TCM trainings and supported by ongoing coaching. While there is no specific level of proactive classroom management considered to meet high standards of implementation, in general, teachers have been observed to use reactive strategies more often than proactive (Reinke et al. 2013). Higher proactive implementation is better with implementation above 50 % indicating that teachers are using more proactive strategies than reactive. We also provide the mean rate of praise, precorrection, and reprimands at each time point.

Reliability checks were conducted for 30 % of the observations. The mean percentage agreement across time points on the BCIO-R was 91 %, ranging from 81 to 95 %. MOOSES utilizes second-by-second comparison of raters to determine reliability, and an overall reliability of 80 % is considered acceptable; thus, 91 % is considered highly reliable (Tapp 2004).

Coaching Activities

The amount of time and type of activities utilized by the coach with teachers was tracked by the coach during each coaching session using a handheld computer in which the duration of the session and each session activity was recorded in real-time. The coach began documenting the type of activity at the start of each session, changing the activity throughout the session. These data provide information about the amount of time the coach used a specific strategy during each session, including

providing performance feedback, action planning, modeling, reviewing, role-playing, and goal setting. Following inspection of the data, modeling, role-playing, and goal setting represented very little time across sessions. Therefore, for the purpose of this study, data on the amount of time the coach spent on providing performance feedback, action planning, reviewing, and the overall amount of coaching a teacher received were utilized. Performance feedback was recorded any time the coach provided feedback related to implementation of strategies the teacher identified they would like to work on following a classroom observation. Action planning was operationalized as conversations between the coach and teacher specifically related to action steps toward implementing new strategies or revisions to current plans toward meeting identified goals. Reviewing was recorded for conversations that occurred during the first meeting after a workshop training. Within these meetings, reviewing consisted of discussing any thoughts and hesitations, confirming understanding of the content, reminding of essential features of a strategy, referencing back to video or conversations during trainings, and/or generally discussing successes or struggles since the last coaching session. Each variable was separately dichotomized at the 50th percentile so that teachers are grouped into those receiving less (lowest 50 % = 0) versus teachers receiving more (highest 50 % = 1).

Analytic Plan

First, to evaluate whether teacher implementation of proactive classroom management skills increased following receipt of the IY TCM intervention, we conducted a one-way repeated measures analysis of covariance (ANCOVA). We also calculated the mean rate of praise, precorrections, and reprimands observed at each time point to demonstrate any changes in the base rate of the teacher behaviors utilized to derive the dependent variable (percentage of observed proactive strategies). Next, to test our primary hypotheses regarding the impact of coaching on teacher implementation, we conducted a series of two-way repeated measures ANCOVA to determine whether teachers' level of implementation of proactive management varied based on whether they received more or less overall coaching or whether they received more or less of each coaching activity over time (time points 2 through 4), while controlling for baseline levels of implementation.

Results

Intercorrelations between study variables are reported in Table 1. To evaluate whether teacher implementation of proactive strategies increased overall after teachers received the intervention, a repeated measures ANCOVA was conducted. The results revealed a statistically significant difference among teacher implementation time points (i.e., October: time point 1, December: time point 2, February: time point 3, May: time point 4), Wilks's $\lambda = .41$, $F(3, 48) = 22.73$, $p < .001$, $\eta^2 = .59$. Because we were interested in whether there was an initial increase in

Table 1 Intercorrelations for study variables

Variable	1	2	3	4	5	6	7
T1 Implementation	–						
T2 Implementation	.46**	–					
T3 Implementation	.56**	.52**	–				
T4 Implementation	.49**	.52**	.39**	–			
Performance feedback	−.39**	−.14	.07	−.01	–		
Action planning	−.17	−.30*	−.35*	−.12	−.07	–	
Reviewing	−.26	−.08	.05	.06	.23	−.31*	–
Overall coaching	−.30*	−.35*	−.16	−.001	−.39*	.31*	.23

Performance feedback, action planning, reviewing, and overall coaching are dichotomous (less = 0; more = 1)

** $p < .01$ * $p < 0.05$

proactive management implementation following teacher receipt of training and coaching, we conducted within-subject contrasts and found that time point 1 was significantly lower than time point 2 [$F(1, 50) = 44.99$, $p < .001$, $\eta^2 = .47$], time point 3 [$F(1, 50) = 52.57$, $p < .001$, $\eta^2 = .51$], and time point 4 [$F(1, 50) = 37.59$, $p < .001$, $\eta^2 = .43$], meaning that teacher implementation improved significantly after receiving the intervention and then maintained over time (see Fig. 1). We also provide the mean rate of praise, precorrective statements, and reprimands in Table 2 for each time point. These data illustrate that praise increases following time point 1; reprimands decrease following time point 1; and precorrections are relatively stable over time. This indicates that in general, increases in the percentage of observed proactive strategies was due to increased praise and decreased reprimands.

Descriptive statistics are provided in relation to coaching activities and overall amount of coaching in Table 3. Next, a series of repeated measures ANCOVA analyses were conducted to determine whether teachers varied on implementation over time by the amount and type of coaching they received. Time point 1 was included as a covariate in the model to control for teacher baseline levels of implementation because coaching activities did not occur until after time point 2. Results indicated a significant interaction between the amount of performance feedback a teacher received and their level of implementation of proactive strategies over time; Wilks's $\lambda = .86$, $F(2, 47) = 3.81$, $p < .05$, $\eta^2 = .14$. Teachers receiving more performance feedback had significantly higher levels of implementation over time than did teachers receiving less performance feedback (see Fig. 2). There was also a significant interaction between the overall amount of coaching teachers received and their implementation of proactive strategies over time; Wilks's $\lambda = .86$, $F(2, 47) = 3.90$, $p < .05$, $\eta^2 = .14$. Results indicated that teachers receiving more coaching had initially lower levels of implementation of proactive strategies and increased implementation over time, whereas teachers with less coaching started out with higher levels of implementation of proactive strategies and this decreased over time (see Fig. 3). Neither action planning nor reviewing were significantly associated with teachers' implementation of skills over time.

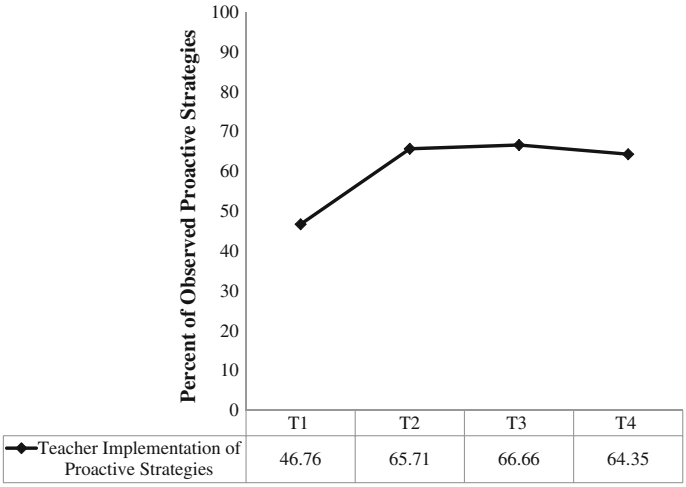


Fig. 1 Overall mean percent of observed proactive strategies for teachers across time

Table 2 Mean rate and standard deviation of teacher use of praise, precorrective statements, and reprimand across time points

Teacher behavior	Time 1 Mean (SD)	Time 2 Mean (SD)	Time 3 Mean (SD)	Time 4 Mean (SD)
Praise	0.68 (0.40)	1.23 (0.64)	1.20 (0.63)	1.03 (0.71)
Precorrection	0.02 (0.03)	0.03 (0.04)	0.02 (0.05)	0.02 (0.03)
Reprimand	0.84 (0.53)	0.65 (0.45)	0.61 (0.44)	0.51 (0.34)

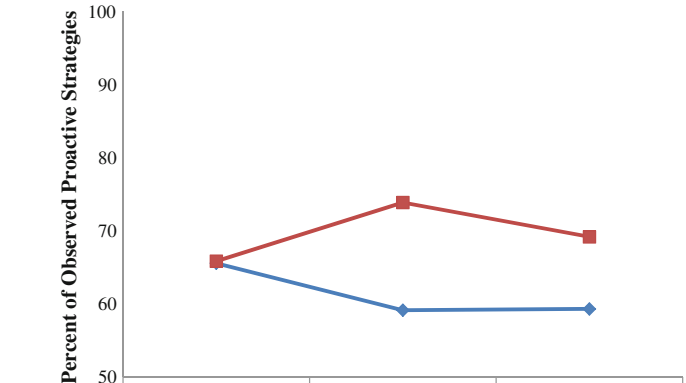
Discussion

This study adds to the literature on coaching by exploring whether teacher implementation of target practices in classrooms increased after receiving an intervention, the IY TCM, and whether specific coaching practices were related to increased implementation. The first hypothesis was supported; teachers receiving the intervention and coaching did demonstrate an increase in their use of proactive classroom management strategies over time. Although there is not a comparison of teachers who did not receive the intervention in this study, the finding is encouraging in that it suggests the IY TCM training and coaching had an impact on teacher classroom practices that maintained over time. Furthermore, the mean rates of praise increased in the sample, whereas reprimands decreased, indicating that the teachers were not simply praising more to increase their proactive management, but also delivered fewer reprimands.

In support of our second hypothesis, the use of performance feedback was found to be associated with higher implementation of proactive strategies. Teachers receiving more versus less performance feedback implemented significantly higher levels of proactive strategies, suggesting that performance feedback may be a critical

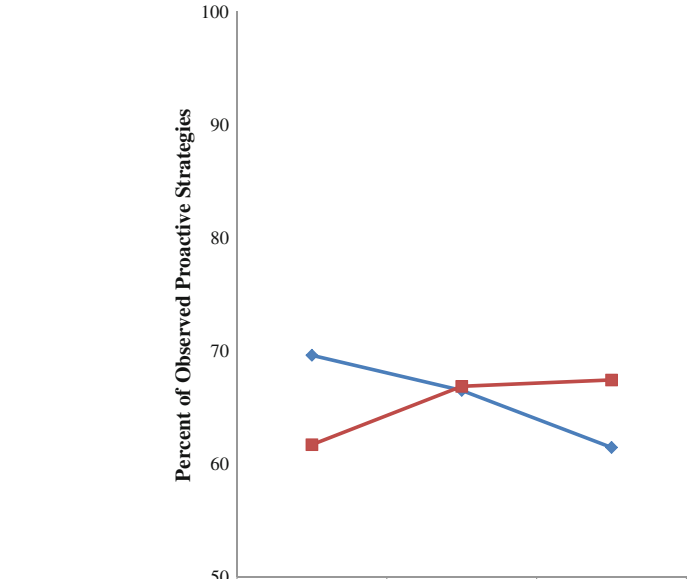
Table 3 Mean minutes, standard deviation, and range of coaching activities for teachers receiving less and more time of each

Coaching activity	Overall ($n = 52$)		Less time ($n = 26$)		More time ($n = 26$)	
	Mean (SD)	Range	Mean (SD)	Range	Mean (SD)	Range
Performance feedback	33.41 (36.15)	0.00–174.55	7.06 (7.95)	0.00–21.40	59.76 (34.03)	24.95–174.76
Action planning	53.28 (50.18)	0.00–226.95	19.17 (10.64)	0.00–36.70	87.38 (51.03)	39.85–226.38
Reviewing	27.84 (19.69)	1.03–116.90	14.70 (6.31)	1.03–22.33	40.98 (19.80)	23.43–116.90
Total amount of coaching	358.13 (104.90)	185.92–774.62	286.29 (43.33)	185.92–337.87	429.96 (99.19)	346.58–774.96



	T2	T3	T4
Less PF	65.57	59.14	59.32
More PF	65.85	73.88	69.19

Fig. 2 Mean percent of observed proactive strategies for teachers grouped by amount of performance feedback provided by the coach. *Controlling for baseline levels of proactive strategy implementation



	T2	T3	T4
Less Overall Coaching	69.59	66.48	61.43
More Overall Coaching	61.68	66.84	67.40

Fig. 3 Mean percent of observed proactive strategies for teachers grouped by amount of overall coaching provided by the coach. *Controlling for baseline levels of proactive strategy implementation

component to supporting teacher implementation over time. This is consistent with prior research on performance feedback showing that teachers are able to increase targeted behaviors when provided performance feedback (Solomon et al. 2012).

Other coaching strategies were not found to distinguish teachers by their level of implementation. However, these findings are preliminary in nature because little research has been directed toward the effects of action planning or reviewing as stand-alone interventions with teachers to increase implementation of new skills. Rather, these components of coaching are often used within a broader coaching or consultation model. Perhaps separating these types of coaching activities is unnecessary, and instead, a comprehensive set of coaching components should be evaluated in the context of the overall time spent coaching. The fact that we found a significant interaction between the total amount of coaching time a teacher received and his or her implementation of proactive strategies over time may be an indication that the combination of coaching activities is important and difficult to evaluate separately.

Interestingly, those teachers who received the most coaching started out with lower levels of implementation, but this increased over time, whereas teachers receiving less coaching started out at a higher level of implementation of proactive strategies, but demonstrated a decrease over time. It is possible that the coach continued coaching sessions later into the year with teachers who were demonstrating lower levels of implementation as compared to those teachers who were implementing at a higher level at time point 2. The finding suggests that as implementation varies over time, it is important for coaches to continue to check back on teachers who may have been implementing practices well on a regular basis to help support ongoing maintenance of skills. Past research has demonstrated similar findings where teachers begin implementing but taper off over time (Noell et al. 2005). The use of coaching to support application of new skills into the classroom has been associated with greater fidelity of implementation by teachers and positive outcomes for students (Stormont et al. 2013). Even when teachers receive extensive training outside of the classroom, are part of the intervention planning, and demonstrate they can use the intervention, they will likely discontinue use of the intervention without ongoing support (e.g., Fixsen et al. 2005; Noell et al. 2005). Provision of on-site coaching following intervention content is a promising and important activity to support the application of content learned into classroom settings.

There is a need for more research on specific coaching activities that are associated with increased intervention implementation and more positive outcomes for teachers and students. Modeling, action planning, and delivery of feedback over time have been part of coaching models that have yielded positive outcomes (Kretlow and Bartholomew 2010; Stormont et al. 2013). The current study fills a need in the research on coaching by trying to determine which specific activities that coaches employ are associated with teacher implementation. However, many questions remain for future research including determining teacher characteristics that may influence coaching practices. For instance, some teachers may find coaching to be aversive, avoiding meetings or becoming disengaged during coaching sessions. Future research on coaching and teacher implementation may consider video recording coaching sessions and systematically evaluating the moment-by-moment interactions between coaches and teachers to understand what increases teacher engagement in the process (Reinke et al., in press-a).

Further, there are also questions remaining about how performance feedback can be supported by schools utilizing existing resources. In relation to schools being able to implement performance feedback, in two recent reviews on coaching and performance feedback, in the vast majority of cases, coaches were highly skilled professionals from outside the school (Solomon et al. 2012; Stormont et al. 2013). Building capacity to train more natural implementers or school professionals who are already available within school settings is key to more widespread use of evidence-based interventions.

There has also been some evidence that the impact of performance feedback is moderated by the type of intervention, with academic interventions having larger effects than social behavioral interventions (Solomon et al. 2012). Interestingly, in past research, no significant effect was found for latency of performance feedback comparing immediate, 24 h, and weekly coaching. The effect of performance feedback was also not moderated by the grade level (pre-K, Elementary, Middle). These findings are promising in terms of supporting the use of performance feedback across grade levels and that there appears to be flexibility in terms of when feedback is delivered. Another method for more flexible delivery of feedback that schools could consider includes providing email feedback (Hemmeter et al. 2011).

It is important to note that, while the findings are promising, the study was conducted within the context of an ongoing efficacy trial of IY TCM. The coaching process was not directly manipulated (e.g., providing some teachers with more or less performance feedback systematically). Rather the coach used her own judgment about whether to provide or not provide performance feedback and when to continue versus discontinue coaching. Furthermore, data were not gathered about why the coach and teacher engaged in more or less coaching over time. Future studies should systematically gather data related to the reasons a coach discontinues coaching or why some teachers receive less coaching than others. Despite this limitation, the study still provides interesting findings about the coaching process. Many social behavioral interventions now utilize coaching, but little information is provided for how much coaching they provide, how coaching activities are determined for each teacher, and how long coaching occurs (Stormont et al. 2013). Future research focused on systematically evaluating coaching within the context of evidence-based intervention is needed.

We were unable to evaluate other potentially impactful coaching practices, such as use of modeling, goal setting, and role-playing, because of the limited amount of time the coach spent on these activities in comparison with others. The IY TCM workshops provide extensive opportunities for modeling, practice, and feedback which may support teacher application of skills better than less intensive programs or ones that provide fewer opportunities for practice. Thus, it is likely that the coach and teacher felt that more time could be spent in coaching sessions on other activities such as feedback and action planning. In addition, reliability data were not gathered for the coaching activity variables. This limits our ability to know how accurately or consistently the coach coded the data. Future research might use video recording of coaching sessions to code for the types and amount of time coaches spend on activities to compare to what the coach reports.

It is also important to note that this is a descriptive study, so causal inferences are inappropriate. Subsequent studies are needed that manipulate the targeted coaching behaviors using an experimental design (e.g., randomly assign teachers to receive more or less performance feedback) to confirm findings of this study. Further, teacher and student behaviors can be variable over time. This study used four time points over the course of the year as indicators of teacher implementation. Some teachers' implementation may have been higher or lower than typical during a particular observation. This study reports teachers' average implementation on a particular day. Future research might consider gathering multiple observations to represent teacher implementation of skills at different time points. Lastly, the sample for this study is relatively small and limited to elementary classrooms. Thus, replication of findings with a larger sample and across other grade levels is warranted.

On a positive note, this study employed a longitudinal design to demonstrate the temporal sequence of the studied variables. Additionally, the study relied on real-time direct observations of teacher behavior and also used technology to carefully document coaching behaviors. Future studies should also employ these methods to adequately capture and describe the coaching process as well as effects on teacher performance.

Teachers need to be prepared to work with children who display problem behavior and be effective in classroom management. However, teachers report they need more support in learning social behavior interventions, citing this as a significant training need (Reinke et al. 2011). Use of ongoing coaching following exposure to an intervention has support as an effective practice to increase teachers' use of skills in classrooms (Kretlow and Bartholomew 2010; Stormont et al. 2013). However, much remains unknown regarding coaching elements and their relationship to other variables. Continued work in this area is vital to determine contextual factors that are associated with successful coaching models. In addition, more research is needed to explore whether specific teacher, student, and school-level factors are associated with the effectiveness of specific coaching practices. Finally, it is important to determine how coaches make decisions about how much and what type of activities they use when meeting with individual teachers. Such research will help support coaches in making the best decisions to guide their coaching activities. As we work toward improving the types of support for implementing evidence-based intervention that we offer to teachers, understanding the coaching process will help guide implementation science.

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