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Brief Teacher Training Improves Student Behavior and Student–Teacher Relationships in Middle School

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Despite research demonstrating the importance of student–teacher relationships for student functioning, little is known about strategies to enhance such relationships, particularly in secondary school. The current study examined effects of a professional development for middle school teachers on the Establish-Maintain-Restore (EMR) approach. EMR aims to enhance teachers' skills in cultivating relationships with students and involves brief training (3 hr) and ongoing implementation supports. In a randomized controlled trial, 20 teachers and 190 students were assigned to EMR or control. Observers rated academically engaged time and disruptive behavior, and teachers reported on relationship quality. Multilevel models showed that EMR resulted in significant improvements in student–teacher relationships (Hedge's $g = .61$, 95% CI [0.21, 1.02]), academically engaged time ($g = .81$, 95% CI [0.01, 1.63]), and disruptive behavior ($g = 1.07$, 95% CI [0.01, 2.16]). Results indicate potential promise for EMR.

Impact and Implications
This study tested a novel, brief training for middle school teachers aimed at enhancing their skills in building relationships with students, called Establish-Maintain-Restore (EMR). Students of EMR-trained teachers had improved behavior in the classroom. While these findings suggest that EMR is a promising cost-effective strategy for improving student behavior, more research is needed to test its impact on student achievement.

Keywords: student–teacher relationships, professional development, student engagement, disruptive behavior, middle school

Positive student–teacher relationships impact student engagement and behavior, and predict both short- and long-term academic success (Pianta, Hamre, & Allen, 2012). Researchers have argued that student engagement is inherently a relational process (Pianta et al., 2012). That is, engagement reflects students' cognitive, emotional, behavioral, and motivational states, but it is the interpersonal relationships that activate and organize these states in the service of some larger task. Although most teachers endorse the importance of positive relationships (Hargreaves, 2000), many fail to employ proactive practices to cultivate such relationships, and instead rely on reactive strategies when particular students do not meet their expectations (Jennings & Greenberg, 2009). In many cases, these reactive strategies are punitive and harmful to the student's sense of belonging and motivation (Jennings & Greenberg, 2009).

Student–teacher relationships are particularly important after the middle school transition, which is marked by a normative decline in relationship quality, and student engagement and achievement (Hughes & Cao, 2018). This decline is not surprising given the multitude of challenges facing students entering middle school, including increased social comparison and competition, and heightened demands for academic success (Akos, Rose, & Orthner, 2015; Roeser, Strobel, & Quihuis, 2002). Positive student–teacher relationships can be a critical protective factor during this period (Wang, Brinkworth, & Eccles, 2013). Indeed, meta-analytic findings suggest the association between student–teacher relation-

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ships and behavioral engagement is stronger for secondary than elementary school students (Roorda, Koomen, Spilt, & Oort, 2011).

Prior research indicates that the quality of student–teacher relationships varies across student race, gender, and socioeconomic status (SES), with weaker student–teacher relationships among students of color, boys, and those from low-SES backgrounds (Hughes, Gleason, & Zhang, 2005; Roorda et al., 2011). At the same time, there is evidence that strong student–teacher relationships can be especially protective for these groups (Murray & Zvoch, 2011; Winding & Andersen, 2015).

Student–Teacher Relationships in Existing Interventions

Despite the increased need for student–teacher relationship interventions among middle schoolers, the vast majority of such interventions have focused on elementary-age or younger students. At the secondary school level, student–teacher relationships have been incorporated into two multicomponent interventions, both of which are relatively time- and resource-intensive. For instance, My Teaching Partner–Secondary (MTP-S; Allen, Pianta, Gregory, Mikami, & Lun, 2011), is based on the Teaching Through Interactions framework, and aims to improve the instructional quality of teachers' daily interactions with students. Organized around dimensions of the Classroom Assessment Scoring System–Secondary (Pianta, Hamre, Hayes, Mintz, & LaParo, 2008), MTP-S provides training and coaching in three domains: Emotional Support (positive climate, negative climate, teacher sensitivity, and regard for adolescent perspectives); Classroom Organization (behavior management, productivity, and instructional learning formats), and Instructional Support (content understanding, analysis and problem solving, and quality of feedback).

As another example, restorative practice or restorative justice is a school-wide approach to reduce punitive discipline that has a relational focus. Although there is lack of expert and practitioner consensus about terminology, restorative justice is often used to refer to school-wide practices that are focused on relationship repair (Gregory, Clawson, Davis, & Gerewitz, 2016). Restorative practice, on the other hand, typically includes both proactive or preventative and restorative strategies, and may include proactive circles (teachers lead structured group discussions), responsive circles (whole classrooms address issues that negatively impact the community), and restorative conferences to repair harm between two or more parties (Costello, Wachtel, & Wachtel, 2010). Despite the popularity of restorative practice, scientific evidence lags behind its adoption in schools. Evidence for restorative practice consists of case studies showing reductions in discipline from pre- to post-implementation (e.g., González, 2011; Lewis, 2009). As an exception, Simson (2012) compared schools implementing restorative practice to schools that did not. That study found trends favoring restorative practice in reducing suspension rates. However, the study is not peer-reviewed and schools were not randomized to condition. In another study, Gregory and colleagues (2016) demonstrated that, in two schools implementing restorative practice, teachers who implemented the practice with high fidelity also had better student–teacher relationships. Although these findings are promising, the lack of rigorous designs makes it difficult to draw conclusions about the efficacy of restorative practice.

Purpose of This Study

Our team previously developed and piloted an approach, called Establish-Maintain-Restore (EMR), designed to improve teachers' skills in cultivating, maintaining, and restoring relationships with their students. EMR can be distinguished from MTP-S and restorative practice in conceptualization and feasibility of implementation. EMR focuses on a single target of intervention: the dyadic relationship between a student and a teacher. In contrast, MTP-S focuses on the student–teacher interaction and teaching quality more generally. Conceptually, EMR is most aligned with the Emotional Support domain of MTP-S. Similarly, EMR's focus of intervention is narrower than that of restorative practice, which focuses on student–teacher relationships, as well student–student relationships and community building in the school as a whole. Parsimonious interventions that target focused mechanisms can help the field move toward greater streamlining of multicomponent strategies and identify "minimal interventions necessary for change" (Glasgow et al., 2014).

EMR is also designed to be feasible for schools to implement. Even if effective, multicomponent interventions such as MTP-S and restorative practice have some disadvantages. For one, increasing program complexity often means concomitant increases in the time and effort required for successful implementation. For instance, the training model of SaferSanerSchools™, a proprietary version of restorative practice purveyed by the International Institute for Restorative Practices (IIRP), includes 2 full days of training, 2 days of observation and consultation by an IIRP consultant, and is estimated to take 2 to 3 years to fully implement. Similarly MTP-S consists of an initial training, followed by 1 to 2 years of web-based, individualized coaching that involves submission of videotapes and personalized feedback. Complex programs also tend to be expensive. MTP-S, for example, costs $5,000 per teacher per year. It is unclear how feasible such programs are for everyday school settings, given limited resources and competing demands on professional development. Briefer, more cost-effective interventions are likely to be more feasible for schools, and thus may be better positioned to positively impact student outcomes.

In a previous block-randomized controlled trial with elementary school teachers and students (Cook et al., 2018), we found that EMR improved student–teacher relationships, and observer-rated disruptive behavior and academically engaged time, with moderate to large effect sizes (Cohen's d = .61 to .89). The current study extends on our previous work by testing EMR among middle school students and teachers. We hypothesized that EMR training and follow-up consultation would be associated with improvements in student–teacher relationships and academically engaged time, and decreased disruptive behavior. We also explored potential moderators of EMR effectiveness, including student ethnic minority status, gender, free/reduced lunch eligibility, and baseline scores.

Method

Participants and Setting

Participants were 20 teachers and 190 students, recruited from a public middle school in the Pacific Northwest region of the United

States. All teachers were general education certified. Racial/ethnic composition of teachers was 75% Caucasian, 10% Asian, 5% African American, 5% Hispanic/Latino, and 5% Other. Eighteen were female, with a mean age of 32.7 (SD = 6.9) and an average of 8.7 years (SD = 7.4) of teaching experience. The student sample was 53.7% Caucasian, 21.1% Asian, 20.0% Hispanic/Latino, 3.7% Other, and 1.6% African American. Fifty percent were receiving free/reduced lunch. These demographics resembled the school overall.

Procedure

All study procedures were approved by an Institutional Review Board. A block randomized design was used. As shown in Figure 1, research staff explained the study aims and procedures to all 49 teachers in the school. Teachers were considered eligible if they were employed at least 50% time and taught at least one general education (i.e., not self-contained special education) class. The first 20 teachers who expressed interest and return signed consent were included in the study. For each teacher, one class period was selected at random for recruitment. All students on that class roster were considered eligible and assigned a random number. Research staff sent consent forms to the home address on file for the first 10 students on this random list, and followed up with phone and e-mail reminders until a parent consented/declined, or the recruitment period ended. If a parent either declined or failed to respond after repeated calls, the next student on the list would be recruited. In some cases, nonresponsive parents returned forms after an additional student had already been consented, resulting in more than 10 students enrolled in that classroom. On the day of data collection, research staff explained the study and obtained written assent. Of 204 students recruited, consent and assent was obtained for 93.1% (n = 190). There were no significant differences between the study sample and the school as a whole on any of the above demographic characteristics (all ps > .33).

After students were enrolled (but prior to randomization), baseline data collection was completed. Classes were pair-matched using student academically engaged time and percent of students eligible for free/reduced lunch. Within each pair, a research coordinator applied random number sequences to de-identified lists to assign teachers/classes to intervention or control. Teachers then participated in training and consultation according to condition. Initial training occurred in October, approximately 1 month into the school year. Three months after the initial training, post-intervention data collection was conducted. Although it was not possible to conceal allocation from teacher participants, students and parents were not informed of each teacher's condition assignment.

Study Conditions

EMR condition. EMR provides a heuristic for relationships that is based on prior research and represents an intentional approach to cultivating, maintaining, and repairing relationships. During the *Establish* phase, the objective is to facilitate student belonging, trust, and connection with the teacher. The key practice during this phase is banking time, or individual interactions with students that is nondirective, validating, and responsive (Williford et al., 2017). Once a relationship is established, active effort is required to maintain it. Without proactive maintenance, relationship quality can deteriorate over time as the ratio of positive to negative interactions naturally diminish (Steinberg, 2001). The primary practice during the *Maintain* phase is the 5-to-1 ratio of positive to negative interactions (Flora, 2000). Finally, the *Restore*

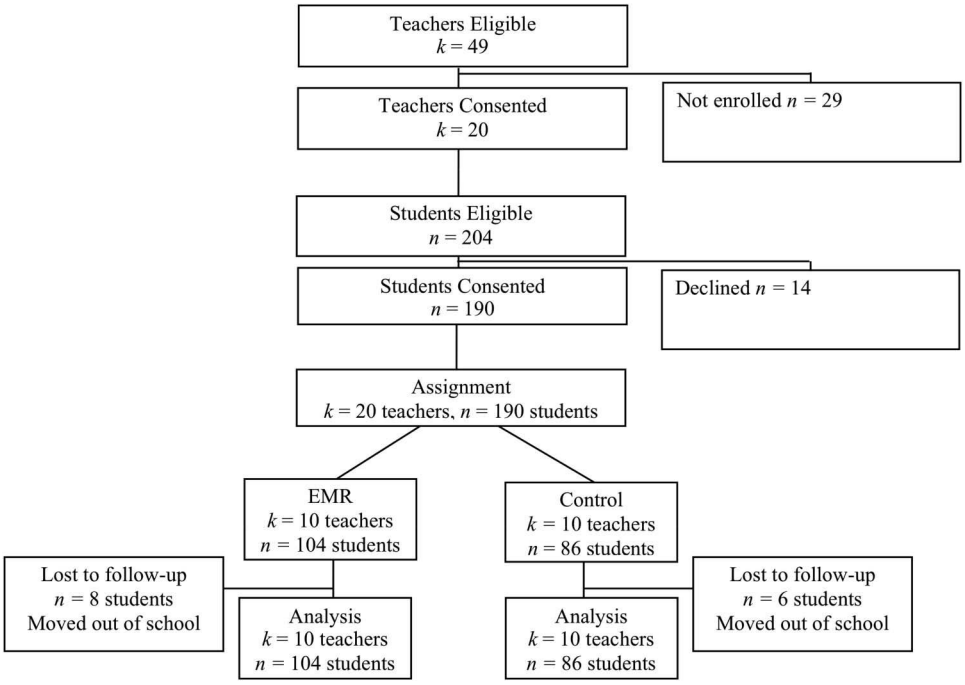

Figure 1. Participant flow.

phase is triggered when harm to the relationship has occurred because of a misunderstanding, conflict, neglect, or some other negative interaction. EMR aims to enhance teachers' recognition of situations and cues that indicate a need to restore the relationship. The teacher then selects and delivers at least one restorative communication: (a) letting go of previous event, (b) taking ownership for the problem, (c) validating the student's feelings, (d) collaborative problem solving to identify a mutually agreed-upon solution, or (e) expressing caring by separating the deed from the doer. Restorative conversations are brief and delivered privately at a convenient time for the teacher.

A 3-hr training was delivered to all teachers assigned to the EMR condition. A site administrator also attended the training to provide administrative support. After training, weekly reminder e-mails prompted teachers to use the strategies and biweekly professional learning communities (PLCs) were held. In the PLCs, teachers used class rosters to reflect on their relational status with each of their students (i.e., whether their relationship with the student is in the Establish, Maintain, or Restore phase). They then used this information to plan the delivery of specific practices with particular students, and received feedback from colleagues regarding their plan.

Control condition. Teachers in the control condition were provided the same amount of professional development time during the EMR initial training and PLC meetings. As with EMR, a site administrator attended the initial meeting. All 10 teachers assigned to this condition attended the initial training. During the initial meeting and subsequent PLCs, teachers were asked to discuss strategies they use to establish positive relationships with students and effective classroom management practices. No other instruction was provided. This condition is intended to control for nonspecific components (Mohr et al., 2014), including support from other teachers and administrators, and opportunities to reflect on one's relationships with students.

Measures

Student–teacher relationships. A modified version of the Student–Teacher Relationship Scale (STRS; Pianta, 1992) was used to measure the quality of relationships between teachers and students. The STRS includes 28 items measured on a 5-point Likert scale, and has demonstrated good reliability and validity in prior research (Pianta, 1992). For the purposes of this study, only five items from the STRS deemed most relevant to the EMR approach were used: (a) this child values his or her relationship with me, (b) when I praise this child, he or she beams with pride, (c) this child's feelings toward me can be unpredictable or can change suddenly, (d) this child openly shares his or her feelings and experiences with me, and (e) this child and I always seem to be struggling with each other. This modified scale showed good reliability in this sample ($\alpha = .78$).

Academically engaged time. A behavioral observation system was developed based on the Behavioral Observation of Students in Schools (Shapiro, 2004), a widely used assessment. At pre- and post-intervention, three 10-min observations were conducted for each participating classroom. Observers began with one student, selected at random, and moved to the next participating student after 10 seconds. This was repeated until the observation time was completed. By the end of each observation session, there were approximately 22 intervals per student. Pre- and post-scores for academically engaged time and disruptive behavior were calculated by averaging across the three observations. All three observations were completed within a 10-day window.

Three trained observers (a school psychologist, a school psychology intern, and a school counselor) who were blinded to condition conducted the observations. Before beginning baseline data collection, observers were trained to ≥90% agreement on a 30-min classroom observation. Interobserver agreement, calculated on 20% of the observation sessions, averaged 91% (range 72–100%), representing an acceptable level of reliability (Bailey & Burch, 2002).

Coding categories consisted of academically engaged time and disruptive behavior. Academically engaged time was defined as instances when the student was paying attention to instruction by looking at the teacher or working on the academic task at hand. It was measured on a momentary time-sampling basis.

Disruptive behavior. Disruptive behavior was defined as behaviors that were not related to the task at hand and were disruptive to learning or the classroom environment (e.g., call outs, talking to peer when not permitted, out of seat, behavior that draws peers off task, playing with objects not related to instruction). Disruptive behavior was measured using a partial-interval recording format.

Intervention fidelity. Fidelity was gathered via a self-report checklist that we used in a previous study (Cook et al., 2018). Six yes/no items assessed adherence to EMR (e.g., "I devoted individual time with student(s) for the purpose of establishing a positive relationship"). Teachers completed the checklist weekly. Percent of "yes" responses were averaged for the 13 weeks (3 months) from training to postassessment.

Data Analyses

Given the nested nature of the data, multilevel modeling (MLM) was used to estimate the effects of EMR on student–teacher relationships, academically engaged time, and disruptive behavior. All analyses were conducted using package nlme (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2013) in R Version 3.1 (R Core Team, 2014). Consistent with recommendations from Enders and Tofighi (2007), predictor variables were grand mean centered. Each dependent variable (student–teacher relationships, disruptive behavior, and academically engaged time) was transformed into a *z*-score to facilitate comparison of coefficients, and modeled separately. Because of limited power, we used a two-level model with students at Level 1 and classrooms/teachers at Level 2. The intraclass correlation coefficient (ICCs) indicated that the percentage of variance clustering at the classroom level was 8% for student–teacher relationships, 36% for academically engaged time, and 38% for disruptive behavior. With these ICCs and the sample and cluster size, we had power to detect effects of .55 for student–teacher relationships, .87 for academically time, and .88 for disruptive behavior. We selected the final model by comparing the Akaike Information Criteria (AIC), the Bayesian Information Criteria (BIC), and the change in chi square of nested models. Smaller values of AIC, BIC, and chi square indicate better model fit.

We also used MLM to explore whether the effects of EMR varied by student characteristics (ethnic majority vs. ethnic minority youth, gender, free/reduced lunch eligibility, and baseline

scores). Each of the four moderators were tested one at a time, by adding a multiplicative term between the intervention condition and each moderator, constituting two-way cross-level interactions with intervention condition (Snijders & Bosker, 2012). Predictor variables were centered within clusters (i.e., classrooms) when examining moderation (Enders & Tofighi, 2007). Significant moderation was decomposed by calculating simple slopes (Preacher, Curran, & Bauer, 2006).

Consistent with the intent-to-treat framework, data from all students who completed baseline measures were included in the analyses even if post-intervention data were unavailable. Observational data were missing at post for students who moved out of the school ($n = 14$). In addition, 37 participants (19%) had missing data on the teacher-reported relationship measure. To examine patterns of missingness, we examined the association between participant characteristics and missing data. There were no significant differences between those with complete and incomplete data with regard to gender (χ^2 (1) = .18, $p = .66$), ethnicity (χ^2 (1) = 3.56, $p = .35$), and intervention condition (χ^2 (1) = .10, $p = .75$). Maximum likelihood estimation was used, which analyzes partially missing data without imputing missing values. Initial analyses indicated that student–teacher relationships, academically engaged time, and disruptive behavior had sufficiently normal distributions based on skewness and kurtosis statistics. Measures were multivariate normal and scatterplots indicated that relationships among variables were linear. Effect sizes were calculated using student-level means and standard deviations, to optimize comparability with other studies (What Works Clearinghouse, 2017). We calculated Hedge's g using post-intervention means, adjusted for pre-intervention scores, and unadjusted standard deviations.

Results

Intervention Fidelity

Across all strategies, EMR was implemented with 82% fidelity. The average fidelity rating for Establish strategies was 82% (range 68–100%), 96% for Maintain (range 74–100%); and 78% for Restore (range 62–100%).

Effects of EMR on Student Outcomes

Student–teacher relationships. Table 1 summarizes the results of the MLM analyses. As shown, we first fitted an unconditional model with only a random intercept. We then added the pre-intervention score. Then, we added an effect of condition (0 = control, 1 = intervention). As shown, adding a fixed effect of condition improved model fit for student–teacher relationships, with an associated standardized parameter estimate of .55, indicating that students in the intervention condition exhibited an improvement in student–teacher relationships by .55 *SD* more than those in the control condition. Pre- to pos-tintervention scores (adjusted means) are displayed in Figure 2. While the control condition remained stable from pre- to post-intervention, students in the EMR condition showed improved student–teacher relationships, with a moderate effect size (Hedge's $g = .61$, 95% CI [0.21, 1.02]).

Table 1
2-Level Models Estimating Impact of Intervention on Academically Engaged Time, Disruptive Behavior, and Student–Teacher Relationships

	Student–teacher relationships						Academically engaged time						Disruptive behavior					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
Variables	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*
Intercept	.00	.09	.00	.08	.25***	.08	.01	.15	.01	.15	.31*	.15	−.01	.15	−.01	.15	−.47***	.11
Preintervention score			.57	.06***	.56***	.06			.03	.06					.02**	.01	.02**	.01
Condition					.55***	.11					.68**	.21					1.03***	.16
Variance components																		
Intercept	.08		.07		.00		.36		.36		.18		.38		.36		.07	
Residual	.92		.59		.59		.64		.64		.67		.62		.59		.61	
Model fit																		
Model *df*	170		169		168		170		169		168		170		169		168	
−2LL	538.04		461.82		447.86		495.08		498.08		486.76		489.56		488.4		469.44	
AIC	544.05		469.82		457.86		501.09		506.60		503.83		495.55		496.39		479.43	
BIC	553.77		482.76		474.02		510.81		519.55		519.99		505.28		509.34		495.59	
Model 2 to 3 comparison																		
Δ−2LL (*df*)	13.96 (1)***						8.32 (1)**						18.96 (1)***					

Note. Condition is coded is 0 = control, 1 = intervention. All outcome variables were standardized prior to analyses. AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria.
* $p < .05$. ** $p < .01$. *** $p < .001$.

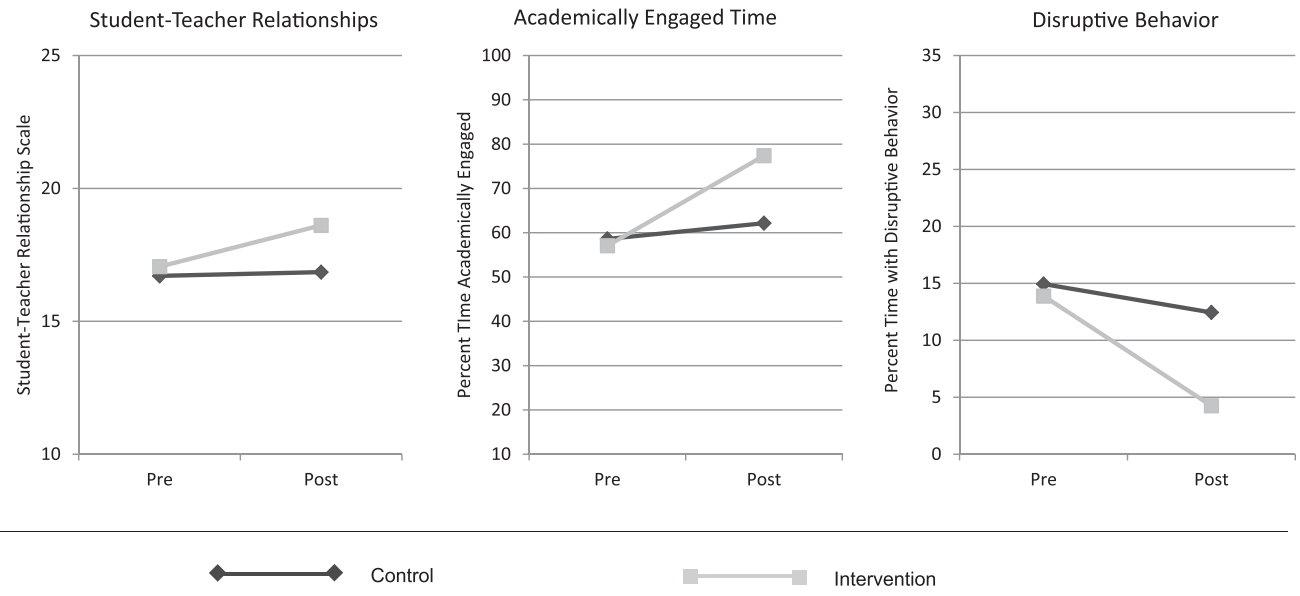

Figure 2. Changes in student–teacher relationships, academically engaged time, and disruptive behavior from preintervention to postintervention for students in the control and intervention conditions.

Academically engaged time. Similar analyses were conducted for academically engaged time. Adding the pre-intervention scores in Model 2, however, resulted in a significant decrement to model fit. Thus, Model 3 did not include pre-intervention scores and only included a random intercept and a fixed effect of condition. Model 3 fit significantly better than Model 1, and the parameter estimate for condition was significant, indicating a positive effect of EMR on students' academically engaged time. Again, adjusted means at pre- and postintervention are displayed in Figure 2. Academically engaged time remained approximately stable for students in the control group but increased for those in the intervention group ($g = .81$, 95% CI [0.01, 1.63]).

Disruptive behavior. As shown in Table 1, fit improved when pre-intervention scores were added to the model. Fit further improved when intervention condition was added to the model, indicating that students in the intervention condition exhibited significantly greater decreases in disruptive behavior than those in the control group. As shown in Figure 2, although students in the control condition showed some decrease in disruptive behavior from pre- to post-intervention, this decrease was much larger among students in the EMR condition ($g = 1.07$, 95% CI [0.01, 2.16]).

Exploratory Moderator Analyses

To understand who most benefited from the intervention, we conducted exploratory analyses examining student characteristics (ethnic minority status, gender, free/reduced lunch eligibility, and baseline scores) as moderators of intervention effects. Results are summarized in Table 2. For most moderators, including a cross-level interaction between the moderator and intervention condition resulted in a worse fitting model. The only significant moderator was baseline student–teacher relationship scores. We decomposed this interaction to examine the effects of the intervention for students with weak (i.e., baseline scores one *SD* below the sample mean), average (scores between −1 *SD* and 1 *SD*), and strong relationships (1 *SD* above the mean). The intervention had significant effects among students who had weak ($\beta = .89$, $p < .001$) and average ($\beta = .50$, $p < .001$) student–teacher relationships at baseline, but not among students with strong student–teacher relationships at baseline ($\beta = 0.10$, $p = .51$).

Discussion

Few evidence-based interventions exist to promote positive student–teacher relationships among secondary school students. The present study extended the research on EMR, previously found to be effective for elementary school teachers (Cook et al., 2018) for use in middle school. Teachers who were trained on EMR demonstrated significant and practically meaningful change in their relationships with their students, compared to those in the control group. Students with EMR-trained teachers showed significantly less disruptive behavior and greater academically engaged time, based on classroom observation. These effects were, in most cases, consistent across student characteristics, including ethnic minority status, free/reduced lunch eligibility, gender, and baseline scores. However, the intervention had the strongest positive impact on students with the lowest quality relationships with their teachers at baseline.

Our findings are consistent with theory and empirical findings that underscore the importance of relationships in student engagement (Pianta et al., 2012). We found moderate to large effects even with a relatively focused intervention. Focused interventions can lead to significant change over time if they trigger a series of reciprocally reinforcing interactions between the youth and his or her environment (Yeager & Walton, 2011). Our experience indicates that the effects of EMR may be attributable to the strong

Table 2
Summary of Exploratory Moderator Analyses

	Student–teacher relationships				Academically engaged time				Disruptive behavior			
	Model 4		Model 5		Model 4		Model 5		Model 4		Model 5	
	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*
Model: Ethnic minority												
Intercept	−.01	.08	−.01	.08	−.03	.10	−.03	.10	.00	.10	.00	.10
Preintervention score	.58***	.06	.57***	.06	.03	.07	.03	.07	.22**	.07	.20**	.07
Condition	.01	.12	.01	.12	.06	.15	.06	.15	−.01	.14	−.01	.14
Ethnic minority	.30*	.13	.28	.18	.02	.16	−.02	.22	.10	.16	.36	.21
Ethnic minority × Condition			.04	.25			.07	.32			−.56	.31
−2LL (*df*)	461.26 (167)		462.14 (166)		548.5 (167)		548.9 (166)		539.68 (167)		536.96 (166)	
Model 4 to 5 comparison (*df*)	−.88 (1)				−.40 (1)				2.72 (1)			
Model: Gender												
Intercept	−.01	.08	−.01	.08	−.03	.10	−.03	.10	.00	.10	.00	.10
Preintervention score	.60***	.06	.60***	.06	.02	.07	.04	.07	.21**	.07	.21**	.07
Condition	.02	.12	.02	.12	.06	.15	.59	.15	−.01	.14	−.01	.14
Gender	.12	.31	.02	.36	.44	.38	.02	.45	.27	.37	.16	.44
Gender × Condition			.35	.68			.45	.84			.41	.83
−2LL (*df*)	464.62 (167)		463.30 (166)		545.48 (167)		544.0 (166)		537.76 (167)		536.06 (166)	
Model 4 to 5 comparison (*df*)	1.32 (1)				1.48 (1)				1.70 (1)			
Model: FRL												
Intercept	−.01	.08	−.01	.08	−.03	.10	−.03	.10	.00	.10	.00	.10
Preintervention score	.60***	.06	.60***	.06	.03	.07	.03	.07	.21**	.07	.20**	.08
Condition	.02	.12	.02	.12	.06	.15	.06	.15	−.01	.14	−.00	.14
FRL	.07	.13	.04	.18	.13	.16	.13	.22	.35*	.15	.22	.21
FRL × Condition			.07	.26			.01	.32			.28	.31
−2LL (*df*)	466.2 (167)		467.0 (166)		547.8 (167)		548.4 (166)		534.94 (167)		534.64 (166)	
Model 4 to 5 comparison (*df*)	−.80 (1)				−.60 (1)				.30 (1)			
Model: Baseline												
Intercept	−.01	.08	−.01	.08	−.03	.10	−.03	.10	.00	.10	.00	.10
Preintervention score	.60***	.06	.42***	.07	.03	.07	−.09	.10	.21**	.07	.08	.10
Condition	.02	.12	.02	.11	.06	.15	.06	.15	−.01	.14	−.01	.14
Baseline × Condition			.43***	.11			.25	.15			.26	.14
−2LL (*df*)	464.26 (168)		453.2 (167)		546.72 (168)		545.88 (167)		538.18 (168)		537 (167)	
Model 4 to 5 comparison (*df*)	5.34* (1)				.84 (1)				1.18 (1)			

Note. Condition is coded as 0 = control, 1 = intervention. All outcome variables were standardized prior to analyses.
* $p < .05$. ** $p < .01$. *** $p < .001$.

post-training implementation supports, which is a critical element for adult behavior change (Wandersman, Chien, & Katz, 2012).

During the development of EMR, we invested significant effort into linking each of the EMR phases to concrete and easy-to-learn practices. The in-person training provided ample opportunity for teachers to see the skills modeled, practice the skills, and receive performance-based feedback. Our work with teachers during this and other projects suggests that maintaining a dual emphasis on effectiveness and feasibility is critical to the success of school-based prevention and intervention programs, where time is often a scarce resource and there are significant competing demands on teacher implementation.

With few exceptions, we found that the effects of EMR were consistent across gender, ethnic minority status, free/reduced lunch eligibility, and baseline scores. However, the intervention had significant effects for students with poor and average relationships with teachers, but had nonsignificant effects for those with strong relationship scores at baseline. This may reflect a "ceiling effect" where students with higher scores had little room for improvement. The way that the PLCs were structured may have also encouraged teachers to focus their attention on relationships that needed the most attention.

The results of this study have implications for practices implemented within multitiered systems of support (MTSS). The foundation of MTSS is the universal level of support, which entails evidence-based programs and practices delivered to all students to prevent mental health problems and promote social, emotional, and academic success. The promising results of this study suggest that EMR could be integrated as a universal prevention practice that complements other evidence-based programs or practices, such as social-emotional learning curricula or school-wide positive behavior supports. Further, research indicates that positive student relationships are a critical component of trauma-informed practices (Kataoka et al., 2003), suggesting that improving such relationships may be a worthwhile aim of universal programming.

Limitations and Future Directions

Some limitations of the current study should be noted. First, this study included only teachers and students from one middle school. Although the findings are promising, future replication with larger samples is needed before conclusions can be drawn about effectiveness. In a similar vein, evaluation of long-term outcomes, including student academic achievement, is needed. Further, unlike measures of disruptive behavior and student–teacher relationships, adding the pre-intervention scores for academically engaged time did not improve model fit. It may be that some of observations were conducted on days characterized by deviations from typical school or classroom routine, resulting in greater measurement error. A different control condition that is manualized, and employs rigorous fidelity monitoring may have resulted in improved outcomes for the control condition, and thus a smaller effect size for EMR (Mohr et al., 2014). We only measured teacher perceptions of student–teacher relationships in the current study. The primary threat of relying solely on teacher reports of relationships is a concern about internal validity. In addition to any EMR effects, demand characteristics or placebo effects may cause teachers to report more favorable relationships with students. The findings on student behavior in the classroom as rated by blinded observers, however, should reduce worry that this is the sole explanation for the findings reported in this study. A final limitation of this study is the reliance on teacher reports of relationships and implementation fidelity. Previous research suggests that teachers can be accurate reporters of fidelity (Sanetti & Kratochwill, 2009), and the changes in observer-rated student behavior provide converging evidence of the impact of EMR. Nevertheless, future research may consider a more comprehensive assessment approach using multiple informants and methods. Finally, exploration of additional moderators, such as student achievement levels, may yield important insights.

It may be worthwhile for future research to examine whether EMR can be strategically applied at critical transition points or with targeted populations of students or teachers. For example, implementing EMR at the transition from elementary to middle, or from middle to high school, may be an effective strategy for mitigating the normative disengagement and achievement declines that occur during these periods. As Hertzog and Morgan (1999) aptly noted, "Students will decide during the first few weeks of their freshman year if they intend to be engaged in high school" (p. 27), and EMR may show stronger effects if the implementation is strategically timed to catch students when they need it most. Moreover, a more intensive version of EMR could be implemented as a selective or targeted intervention for students who are identified as at-risk. EMR could be intensified by increasing the time and number of adults who are intentionally using relational practices with identified students. Alternatively, EMR could be targeted toward teachers who self-identify or are identified by administrators as needing support in relationship building.

Finally, EMR can be adapted or targeted to improve teachers' relationships with ethnic minority students. The majority of teachers are Caucasian and female (Howard, 2010), and they are serving students who are increasingly from ethnic minority backgrounds (Howard, 2010). Student–teacher relationships are particularly protective among historically underserved groups (Murray & Zvoch, 2011), yet teachers are least likely to have positive relationships with these students (Hughes et al., 2005). In our data, we found a nonsignificant trend for ethnic minority students to report lower-quality relationships with their teachers at baseline. Evidence of cultural responsiveness is often operationalized as nonsignificant moderation by race/ethnicity (i.e., the intervention leads to similar changes across groups). We argue that a truly culturally responsive intervention should correct for systemic inequities at baseline. Thus, in cases where significant baseline differences exist, a culturally responsive intervention should theoretically be more helpful for disadvantaged groups and offset the potential lack of belonging and mistrust that can result from cultural mismatch and misunderstanding (Stephens & Townsend, 2015).

Conclusion

Few cost-effective, feasible, and focused approaches for professional development exist for improving student–teacher relationships. The current study offers support for the EMR method as an effective strategy for improving student–teacher

relationships and classroom behaviors. Belonging, trust, and understanding are foundational to student well-being, and it is only through concerted effort, supported by well-designed programs and practices, that educators can help the whole child to succeed.

References

Akos, P., Rose, R. A., & Orthner, D. (2015). Sociodemographic moderators of middle school transition effects on academic achievement. *The Journal of Early Adolescence, 35,* 170–198. http://dx.doi.org/10.1177/0272431614529367

Allen, J. P., Pianta, R. C., Gregory, A., Mikami, A. Y., & Lun, J. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement. *Science, 333,* 1034–1037. http://dx.doi.org/10.1126/science.1207998

Bailey, J. S., & Burch, M. R. (2002). *Research methods in applied behavior analysis*. Thousand Oaks, CA: Sage Publications. http://dx.doi.org/10.4135/9781412985710

Cook, C. R., Coco, S., Zhang, Y., Fiat, A. E., Duong, M. T., Renshaw, T. L., . . . Frank, S. (2018). Cultivating positive teacher-student relationships: Preliminary evaluation of the Establish-Maintain-Restore (EMR) method. *School Psychology Review, 47,* 226–243.

Costello, B., Wachtel, J., & Wachtel, T. (2010). *Restorative circles in schools: Building community and enhancing learning*. Bethlehem, PA: International Institute for Restorative Practices.

Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods, 12,* 121–138. http://dx.doi.org/10.1037/1082-989X.12.2.121

Flora, S. R. (2000). Praise's magic reinforcement ratio: Five to one gets the job done. *The Behavior Analyst Today, 1,* 64–69. http://dx.doi.org/10.1037/h0099898

Glasgow, R. E., Fisher, L., Strycker, L. A., Hessler, D., Toobert, D. J., King, D. K., & Jacobs, T. (2014). Minimal intervention needed for change: Definition, use, and value for improving health and health research. *Translational Behavioral Medicine, 4,* 26–33. http://dx.doi.org/10.1007/s13142-013-0232-1

González, T. (2011). Restoring justice: Community organizing to transform school discipline policies. *UC Davis Journal of Juvenile Law & Policy, 15,* 1–36.

Gregory, A., Clawson, K., Davis, A., & Gerewitz, J. (2016). The promise of restorative practices to transform teacher–student relationships and achieve equity in school discipline. *Journal of Educational & Psychological Consultation, 26,* 325–353. http://dx.doi.org/10.1080/10474412.2014.929950

Hargreaves, A. (2000). Mixed emotions: Teachers' perceptions of their interactions with students. *Teaching and Teacher Education, 16,* 811–826. http://dx.doi.org/10.1016/S0742-051X(00)00028-7

Hertzog, C. J., & Morgan, P. L. (1999). Making the transition from middle level to high school. *High School Magazine, 6,* 26–30.

Howard, T. C. (2010). *Why race and culture matter in schools: Closing the achievement gap in America's classrooms*. New York, NY: Teachers College Press.

Hughes, J. N., & Cao, Q. (2018). Trajectories of teacher–student warmth and conflict at the transition to middle school: Effects on academic engagement and achievement. *Journal of School Psychology, 67,* 148–162. http://dx.doi.org/10.1016/j.jsp.2017.10.003

Hughes, J. N., Gleason, K. A., & Zhang, D. (2005). Relationship influences on teachers' perceptions of academic competence in academically at-risk minority and majority first grade students. *Journal of School Psychology, 43,* 303–320. http://dx.doi.org/10.1016/j.jsp.2005.07.001

Jennings, P. A., & Greenberg, M. T. (2009). The prosocial classroom: Teacher social and emotional competence in relation to student and classroom outcomes. *Review of Educational Research, 79,* 491–525. http://dx.doi.org/10.3102/0034654308325693

Kataoka, S. H., Stein, B. D., Jaycox, L. H., Wong, M., Escudero, P., Tu, W., . . . Fink, A. (2003). A school-based mental health program for traumatized Latino immigrant children. *Journal of the American Academy of Child & Adolescent Psychiatry, 42,* 311–318. http://dx.doi.org/10.1097/00004583-200303000-00011

Lewis, S. (2009). *Improving school climate: Findings from schools implementing restorative practices*. Bethlehem, PA: International Institute of Restorative Practices.

Mohr, D. C., Ho, J., Hart, T. L., Baron, K. G., Berendsen, M., Beckner, V., . . . Duffecy, J. (2014). Control condition design and implementation features in controlled trials: A meta-analysis of trials evaluating psychotherapy for depression. *Translational Behavioral Medicine, 4,* 407–423. http://dx.doi.org/10.1007/s13142-014-0262-3

Murray, C., & Zvoch, K. (2011). Teacher–student relationships among behaviorally at-risk African American youth from low-income backgrounds: Student perceptions, teacher perceptions, and socioemotional adjustment correlates. *Journal of Emotional and Behavioral Disorders, 19,* 41–54. http://dx.doi.org/10.1177/1063426609353607

Pianta, R. C. (1992). *Student–teacher relationship scale - Short form*. Lutz, FL: Psychological Assessment Resources.

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher–student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 365–386). Boston, MA: Springer. http://dx.doi.org/10.1007/978-1-4614-2018-7_17

Pianta, R. C., Hamre, B. K., Hayes, N., Mintz, S., & LaParo, K. M. (2008). *Classroom Assessment Scoring System- Secondary* (CLASS-S). Charlottesville: University of Virginia.

Pinheiro, J., Bates, D., DebRoy, S., Sarkar, D., & R Core Team. (2013). nlme: Linear and nonlinear mixed effects models (R package version 3.1–113) [Computer software]. Retrieved from https://CRAN.R-project.org/package=nlme

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics, 31,* 437–448. http://dx.doi.org/10.3102/10769986031004437

R Core Team. (2014). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing.

Roeser, R. W., Strobel, K. R., & Quihuis, G. (2002). Studying early adolescents' academic motivation, social-emotional functioning, and engagement in learning: Variable- and person-centered approaches. *Anxiety, Stress, & Coping, 15,* 345–368. http://dx.doi.org/10.1080/1061580021000056519

Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher–student relationships on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research, 81,* 493–529. http://dx.doi.org/10.3102/0034654311421793

Sanetti, L. M. H., & Kratochwill, T. R. (2009). Treatment integrity assessment in the schools: An evaluation of the Treatment Integrity Planning Protocol. *School Psychology Quarterly, 24,* 24–35. http://dx.doi.org/10.1037/a0015431

Shapiro, E. S. (2004). *Direct observation: Manual for the Behavioral Observation of Students in Schools (BOSS)*. Bloomington, MN: Pearson.

Simson, D. (2012, May). *Restorative justice and its effects on (racially disparate) punitive school discipline*. Paper presented at the 7th Annual Conference on Empirical Legal Studies, Stanford, CA. http://dx.doi.org/10.2139/ssrn.2107240

Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. Thousand Oaks, CA: Sage.

Steinberg, L. (2001). We know some things: Parent–adolescent relationships in retrospect and prospect. *Journal of Research on Adolescence, 11,* 1–19. http://dx.doi.org/10.1111/1532-7795.00001

Stephens, N. M., & Townsend, S. S. M. (2015). The norms that drive behavior: Implications for cultural mismatch theory. *Journal of Cross-Cultural Psychology, 46,* 1304–1306. http://dx.doi.org/10.1177/0022022115600264

Wandersman, A., Chien, V. H., & Katz, J. (2012). Toward an evidence-based system for innovation support for implementing innovations with quality: Tools, training, technical assistance, and quality assurance/quality improvement. *American Journal of Community Psychology, 50,* 445–459. http://dx.doi.org/10.1007/s10464-012-9509-7

Wang, M.-T., Brinkworth, M., & Eccles, J. (2013). Moderating effects of teacher-student relationship in adolescent trajectories of emotional and behavioral adjustment. *Developmental Psychology, 49,* 690–705. http://dx.doi.org/10.1037/a0027916

What Works Clearinghouse. (2017). *Procedures and standards handbook* (Version 3.0). Washington, DC: U.S. Department of Education.

Williford, A. P., LoCasale-Crouch, J., Whittaker, J. V., DeCoster, J., Hartz, K. A., Carter, L. M., . . . Hatfield, B. E. (2017). Changing teacher–child dyadic interactions to improve preschool children's externalizing behaviors. *Child Development, 88,* 1544–1553. http://dx.doi.org/10.1111/cdev.12703

Winding, T. N., & Andersen, J. H. (2015). Socioeconomic differences in school dropout among young adults: The role of social relations. *BMC Public Health, 15,* 1054. http://dx.doi.org/10.1186/s12889-015-2391-0

Yeager, D. S., & Walton, G. M. (2011). Social-psychological interventions in education: They're not magic. *Review of Educational Research, 81,* 267–301. http://dx.doi.org/10.3102/0034654311405999

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