Hammill Institute on Disabilities

Journal of Positive Behavior Interventions
2017, Vol. 19(2) 67–77

DOI: 10.1177/1098300716679137
jpbi.sagepub.com
SAGE

# Evaluating the Impact of Increasing General Education Teachers' Ratio of Positive-to-Negative Interactions on Students' Classroom Behavior

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**Abstract**

The aim of this study was to isolate and evaluate the impact of increasing teachers' ratios of positive-to-negative interactions with their students. Training teachers on the 5:1 ratio was evaluated using a randomized-block pre–post control design with general education classroom teachers ($N = 6$) that were characterized by a higher ratio of negative-to-positive interactions between students, as well as low academic engagement and high disruptive behaviors. Teachers in the intervention group were trained on the 5:1 ratio, instructed to wear a device that prompted them on a VI 5-min schedule to deliver specific praise, approval statements, and positive non-verbal gestures to specific students exhibiting expected behaviors or the entire class as a whole, and completing a self-monitoring chart to increase their awareness of their ratios. Results revealed that students in the intervention group displayed significantly fewer disruptive behavior problems and higher academic engaged time when compared with students in control classrooms. Social validity results also revealed that teachers found the strategy feasible, acceptable, and effective. Limitations of this research, including the small-scale nature of this study, and future directions for teacher training, retention, and schoolwide universal prevention are discussed.

**Keywords**

classroom management, schoolwide positive behavior support, academic engagement, disruptive behavior

Maximizing academic engagement and student learning demands that teachers effectively and positively manage student behavior within the classroom. Proactive classroom management (PCM) has been advocated as a prevention-oriented and intentional approach to promoting high levels of academic engagement as incompatible to classroom problem behaviors (Rathvon, 2008). PCM involves a variety of classroom management techniques and is distinguishable from other classroom management models by three primary characteristics. First, PCM seeks to optimize academic engagement as a means of preventing inappropriate behaviors that interfere with learning (Gettinger, 1988). Second, PCM integrates instruction and management into a comprehensive classroom system, rather than treating them as separate domains (Rathvon, 2008). In other words, teachers deliver and maintain the flow of academic instruction within the context of ongoing PCM strategies. Third, PCM focuses on group rather than individual aspects of student behavior (Gettinger, 1988). Prior research highlights several effective PCM strategies (Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008). However, few experimental studies have examined teacher–student interactions as a classwide PCM strategy, and more precisely, whether increasing ratios of positive-to-negative interactions can reduce problem behaviors and promote better academic engagement.

One of the most readily available and dispensable resources teachers can deliver to proactively manage desirable classroom behavior is their own attention through positive interactions with students. There are abundant opportunities provided on a daily basis to strategically and positively interact with students to recognize them for their behavior and performance, as well as engage in positive conversations that enable students to feel like a respected and valued member of the classroom. Although teacher behavior and attention can be

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**Action Editor:** Daniel Maggin

given throughout the school day, research has shown it to be particularly effective when used appropriately and intentionally during instructional time (Myers, Simonsen, & Sugai, 2011). For example, when teachers learn to provide increased praise during core instructional time, students give more correct responses, spend more time on task, and display fewer DBs (Sutherland, Wehby, & Copeland, 2000). Furthermore, research suggests that the type of attention (e.g., praise) teachers provide during interactions with students predicts positive student outcomes (Hamre & Pianta, 2005). Specifically, across different age groups and disability categories, teachers' use of specific praise has been shown to significantly affect a range of academic-related behaviors. These behaviors include following directions (Goetz, Holmberg, & LeBlanc, 1975), time on task (Sutherland et al., 2000), and accuracy and completion of academic work (Sutherland & Wehby, 2001). Although prior research has recommended praise and positive teacher–student interactions as promising behavior management strategies (e.g., Nelson & Roberts, 2000; Shores, Gunter, & Jack, 1993; Sugai & Horner, 2002; Sutherland et al., 2000; Wehby, Symons, Canale, & Go, 1998), few published articles have focused exclusively on the ratio of positive-to-negative teacher–student interactions and even fewer have used experimental designs to examine its impact (Wheldall, 2005). Extant research is also limited to studies of individual students with emotional and behavioral disorders, with no research examining application in general education classrooms as a prevention strategy.

## The Magic Ratio: 5:1 Ratio of Positive-to-Negative Interactions

Researchers from other fields have studied the ratio of positive-to-negative interactions in the context of specific relationships. For example, John Gottman (1994) studied the nature of interactions among married couples and found significant associations between quality of interactions and marriage outcomes. His research demonstrated that many couples engage in significantly more negative interactions than positive interactions and that this predicts divorce (Gottman & Levenson, 2000). Moreover, couples that maintained roughly a 5:1 ratio of positive-to-negative interactions (referred to as the 5:1 ratio hereafter) were able to repair damage to the relationship and maintain stable marital relationships (Gottman, Coan, Carrere, & Swanson, 1998). That is, for every criticism or complaint, there should be at least five specific compliments, approval statements, or positive comments. A similar concept has been further explored in other fields, including business and medicine, with a similar goal: increasing the ratio of positive-to-negative interactions to reinforce desired behavior, improve relationships, and ultimately achieve better outcomes (Cunningham & Geller, 2008; Schultz, Milner, Hanson, & Winter, 2011).

Research from cognitive psychology offers insight into why many people tend to fixate on the negative. Findings from this field reveal a natural tendency for people to devote more attention to stimuli that are incongruent with their expectations (i.e., stimuli that stand out) than stimuli that are congruent with their expectations (i.e., stimuli that do not stand out; Wright & Ward, 2008). Furthermore, psychological research has demonstrated that people are prone to attending to negative events, interactions, and personal qualities of others than positive ones (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). In fact, research suggests that people are prewired to focus on disruptive, irritating, dangerous, or stress-inducing stimuli over other stimuli (Taylor, 1991). Logically speaking, teachers will pay more attention to disruptive, inappropriate behaviors that are inconsistent with their expectations for behavior than to desirable, appropriate behaviors that are consistent with their expectations for behavior (Hargreaves, 2000). Consequently, teachers are likely to engage in a higher ratio of negative-to-positive interactions with students (Beaman & Wheldall, 2000; Heller & White, 1975; Shores, Jack, et al., 1993; Van Acker, Grant, & Henry, 1996).

Engaging in high rates of positive interactions, relative to negative ones, may not come naturally for some teachers. Therefore, it is essential to instruct and support teachers in developing these skills and habits to promote better classroom management and a more positive classroom climate. Although several researchers have endorsed the 5:1 ratio (sometimes referred to as the 4:1 ratio in the literature) in conjunction with positive behavioral intervention and supports (e.g., Horner, Sugai, Todd, & Lewis-Palmer, 2005; Reinke, Herman, & Stormont, 2013), no experimental research to date has examined whether training teachers on the 5:1 ratio can produce improvements in students' classroom behavior. The extant empirical literature has largely investigated the use of behavior specific praise for individual students (e.g., Sutherland et al., 2000) or group-based contingency (e.g., Hansen & Lignugaris-Kraft, 2005), not a classwide strategy implemented in general education classrooms to increase teachers' ratio of positive-to-negative interactions with their students.

## Purpose of the Present Study

The present study sought to address this gap in the literature and had a twofold purpose: (a) to develop a feasible and contextually appropriate method of training and supporting teachers to increase their ratios of positive-to-negative interactions with students and (b) to experimentally examine the effects of the 5:1 ratio on student classroom behavior. By investigating the impact of a widely discussed and relatively low-cost high-yield strategy that may improve student behavior and learning outcomes, this study contributes to the knowledge base of classroom management and universal prevention practices. It was hypothesized that training teachers to increase their ratio of positive-to-negative interactions (i.e., 5:1 ratio) with students would increase

academic engagement and reduce overall rates of DB. The following specific research questions guided this study:

**Research Question 1:** To what extent did teachers in the intervention condition demonstrate improvements in their ratios of positive-to-negative interactions with students relative to those in the control condition?
**Research Question 2:** To what extent did academic engagement improve for students in the intervention condition relative to students in the control condition?
**Research Question 3:** To what extent did DB decrease for students in the intervention condition relative to students in the control condition?
**Research Question 4:** To what extent did teachers find the training on and delivery of the 5:1 ratio reasonable, acceptable, and effective?

## Method

### Setting and Participants

Participants were students in six classrooms from two schools (elementary and middle) within a public district located in the southeastern United States. Neither school was actively implementing schoolwide positive behavior support systems at the outset of the study. Participating classes were recruited using a multiple-gating procedure. For the first gate, site administrators nominated classrooms characterized by (a) high rates of disruptive and off-task behaviors and (b) teachers who over-used punitive measures to address student problem behaviors. The second gate consisted of direct observations to confirm that the students in the nominated classes were engaging in disruptive and off-task behaviors (see "Procedure" section, for description of observation procedures). In addition, direct observations were used to confirm a higher ratio of negative (e.g., reprimands, corrective statements, and disapprovals) to positive (e.g., praise statements, thumbs-up, pat on the back, high five) teacher–student interactions in nominated classes. Classes were considered for participation if observations indicated off-task behavior for greater than 30% of the observed intervals and a higher ratio of negative-to-positive teacher–student interactions. In total, six classes—four in elementary school (two fourth-grade classes and two fifth-grade classes) and two in middle school (seventh-grade and eighth-grade language arts classes)—passed through all the gates. Prior to commencing this study, informed consent was obtained from the teachers and the parents of all students. Using a passive consent process, none of the parents objected to their child participating in this study.

A total of 159 students and six teachers participated in this study. Participating students were predominantly male ($n = 81$; 51%) and in elementary school ($n = 105$; 66%). The ethnic breakdown of the student participants was 49% African American, 47% Caucasian, and 4% Other. In addition, 68% of the participating students qualified for free and reduced lunch, 13% for special education services, and 8% were English language learners. With regard to the teachers, all six held a bachelor's degree and were certified as highly qualified. Five of the teachers were Caucasian and one was African American. Their average age was 32.3 years ($SD = 3.2$; minimum = 24 and maximum = 48), and on average, they had 6.2 years ($SD = 4.7$; minimum = 1 and maximum = 24) of teaching experience.

### Procedure

A quasi-experimental randomized-block design was used to examine whether training teachers in the 5:1 ratio could effectively increase the proportion of positive-to-negative teacher–student interactions. Baseline estimates of academic engaged time (AET) and free and reduced lunch were used to match and pair classrooms with comparable characteristics. Each class within the pair was randomly assigned to either the intervention or control condition. Results indicated that groups were comparable at baseline in terms of the ratio of negative-to-positive teacher–student interactions, $t(1) = 0.94$, $p = .38$, classwide AET, $t(1) = -1.06$, $p = .25$, DB, $t(1) = -1.48$, $p = .16$, and free and reduced lunch, $t(1) = 0.82$, $p = .58$.

Trained behavioral consultants (i.e., four behavior specialists working within the school system) collected pre-, mid-, and post-observational data, with approximately 1 month elapsing between each data collection. Training for teachers in the intervention group occurred during two 45-min sessions between pre- and mid-observational data. Specifically, teachers were instructed to (a) focus attention on positive behaviors that lead to classroom success rather than on problem behaviors, (b) deliver specific verbal praise and approval statements, and (c) engage in verbal and nonverbal positive interactions (e.g., questions about students' interests, empathy statements, appropriate jokes, etc.) with students contingent upon students' demonstration of appropriate behaviors. The first author delivered the training with assistance of the school administrators at each site.

Training sessions utilized a tell-show-do approach in which teachers were first taught the strategies (i.e., tell), then saw them modeled (i.e., show), and finally given opportunities to practice and receive feedback based on their performance (i.e., do). To complete the training, teachers had to score 100% on a competency exam. The competency exam assessed their understanding of the 5:1 ratio and how to deliver it classwide. Teachers who did not receive 100% ($n = 2$) engaged in additional interactive discussion with the trainer to remediate any confusion and ensure comprehension of how to deliver 5:1 ratio. Teachers in the intervention group also received MotivAider® that prompted

them to deliver praise and positive non-verbal interactions. A MotivAider® is a programmable device, worn on a belt, or pocket that emits silent pulsing signals at periodical, preset intervals, cuing teachers to deliver praise statements to students exhibiting expected classroom behaviors. Teachers in the intervention group wore the MotivAider® for 2 hr of class instructional time each day. On average, they received 24 prompts per day on a 5-min Variable Interval schedule. To facilitate fidelity of implementation and efficacy through self-monitoring, teachers were also instructed to tally their positive-to-negative interactions once per day during a 30-min instructional period. Investigators checked for completion of the self-monitoring logs, but did not examine each log for accuracy. Given the possibility that the extra attention allocated to teachers in the intervention condition could influence outcomes, an attention control group was created such that teachers in the control group received a degree of attention comparable with those in the intervention group (Lindquist, Wyman, Talley, Findorff, & Gross, 2007). More precisely, teachers in the attention control condition met with their administrators and engaged in discussions about classroom management each time the intervention group received training.

## Measures

*Teacher ratio of positive-to-negative interactions.* Professional behavioral consultants conducted direct observations of teacher behavior to obtain estimates of the ratio of positive-to-negative teacher–student interactions. One observation was conducted in each class during the pre-, mid-, and post-data collection periods. Observations took place during a variety of core academic subjects and at various times during the school day. Each observation lasted 45 min. Intervention teachers wore the MotivAider® during the classroom observations.

Observers utilized an event recording procedure, which called for categorizing every observed teacher–student interaction as either positive, negative, or neutral. Positive interactions were defined as exchanges between a teacher and student(s) that consisted of contingent and non-contingent verbal praise or non-verbal positive gestures (e.g., thumbs-up, pat on the back, fist bump, etc.). The specific definition for praise included any verbal statement or gesture that indicated teacher approval of a desired student behavior (Reinke, Lewis-Palmer, & Merrell, 2008). Negative interactions were defined as disapproval statements (e.g., no, stop, do not, quit), reprimands, or other punitive interactions (e.g., shaking head no, thumbs-down, pointing toward door to leave the room). Neutral interactions included directions, requests, answers to questions, or other interactions without positive or negative valence. For example, a teacher displaying a thumbs-up gesture paired with the statement, "Great job class—I like how quickly you put your books away and quietly walked to the door" would constitute a positive interaction. Alternatively, a teacher telling a student to stop a behavior and warning of a disciplinary consequence would be categorized as a negative interaction.

Prior to conducting the observations, three graduate students received training on observing and recording ratios. The graduate students knew the aims of the study but were blind to the conditions of each teacher. After reviewing the coding definitions, the graduate students practiced conducting observations in classrooms, and results were compared with the first author who served as the anchor coder. Before beginning baseline data collection, observers had to reach at least 90% agreement on a 30-min classroom observation. Interobserver agreement (IOA) was collected and calculated on 20% of the observation sessions across the pre-, mid-, and post-data collection periods. Results revealed an average IOA of 86% (minimum = 68%, maximum = 96%), which is considered an acceptable level of agreement among different raters (Bailey & Burch, 2002). The kappa coefficients for positive and negative interactions were .58 and .62, respectively, which are considered to be acceptable (Cohen, 1960).

*Classwide and individual student behavioral observations.* To record classwide and individual student behavior, a behavioral observation system was developed based on the Behavioral Observation of Students in Schools (BOSS; Shapiro, 2004). The behavioral coding categories consisted of AET and DB. AET was defined as instances when the student was paying attention to instruction by looking at the teacher or speaker or working on the academic task at hand. Examples of AET included writing, reading aloud, raising a hand and waiting patiently, talking to the teacher or other student about assigned material, and looking things up that were relevant to the assignment. DB was defined as behaviors that were not related to the task at hand and were disruptive to learning or the classroom environment. Examples of DB included blurting out of turn, talking to a peer or being out of one's seat when not permitted, drawing other peers off-task, or fidgeting with objects.

Each data collection period (pre, mid, and post) included two observations to provide a more representative indicator of student behavior. The average of the two observations served as the data point for that data collection period. The decision to conduct observations during the language arts period/block enhanced standardization across classrooms. With regard to recording format, AET was measured on a momentary time-sampling basis at the beginning of each interval, while DB was measured using a partial-interval recording format. Each observation had a 60-min duration, divided into 10-s intervals. To obtain classwide estimates of AET and DB, observers began with the student in the back right seat of the classroom and systematically moved one student to the left after each

**Table 1.** Descriptive Statistics for Intervention and Control Groups.

| | Pre | | | Mid | | | Post | | |
|---|---|---|---|---|---|---|---|---|---|
| Group | Ratio ±[a] | AET[b] *M* (*SD*) | DB[c] *M* (*SD*) | Ratio ± | AET *M* (*SD*) | DB *M* (*SD*) | Ratio ± | AET *M* (*SD*) | DB *M* (*SD*) |
| Intervention | 0.14:1 | 57% (19) | 14% (8) | 3.8:1 | 74% (14) | 4% (3) | 4.7:1 | 81% (12) | 3% (3) |
| Control | 0.13:1 | 54% (18) | 16% (9) | 0.18:1 | 55% (20) | 13% (7) | 0.17:1 | 57% (19) | 14% (8) |

*Note.* AET = academic engaged time; DB = disruptive behavior.
[a]Ratio of positive-to-negative interactions between teacher and students.
[b]Percent intervals academic engaged time.
[c]Percent intervals disruptive behavior.

interval. Upon reaching the end of the row, observers continued with the student at the far right of the next row. After making their way through all students in the class, observers repeated the same process until the observation time elapsed. Each observation session yielded roughly 360 classwide intervals and 16 intervals per student. This observation system enabled both the calculation of classwide and individual student estimates of AET and DB.

*Intervention acceptability.* Intervention acceptability was measured with the Intervention Rating Profile-15 (IRP-15), which is widely used to assess teachers' perceived acceptability of interventions (Martens, Witt, Elliott, & Darveaux, 1985). Teachers rated items using a 6-point scale, with responses that ranged from *strongly disagree* to *strongly agree*. The IRP-15 has demonstrated evidence supporting its reliability and validity (Lane et al., 2009).

### Data Analytic Approach

To evaluate the impact of increasing teachers' ratio of positive-to-negative interactions with students, descriptive and inferential statistics were calculated. Descriptive statistics included measures of central tendency and variability (*SD*, maximum, and minimum). With regard to inferential statistics, two mixed-factorial ANOVAs were calculated to assess the impact of the 5:1 ratio on AET and DB separately. To determine impact of the 5:1 ratio on student behavior, interaction effects from the mixed-factorial ANOVA were examined to assess how time (pre, mid, and post) was differentially affected by intervention condition (intervention vs. attention control). Last, to estimate the magnitude of the effect produced by the 5:1 ratio training and support, standardized mean difference effect sizes (SMDES) were computed. Specifically, the following formula was used as it controls for preexisting differences between intervention and control groups (Morris, 2008).

$$\text{SMDES} = \left[ \frac{\left(M_{post,T} - M_{pre,T}\right) - \left(M_{post,C} - M_{pre,C}\right)}{SD_{pre}} \right]. \quad (1)$$

This formula subtracts the control group's pre–post mean difference scores from the intervention group's pre–post mean difference scores and divides this result by the standard deviation of the pre-test scores. The resulting SMDES is interpreted in standard deviation units and allows for the comparison of intervention and control groups.

## Results

### Descriptive Statistics

The descriptive statistics are depicted in Table 1. Measures of central tendency indicated that at pre-test, students in the intervention and control classrooms were academically engaged on average for 57% and 54% of the time, respectively. Whereas the means were relatively stable for the control group across mid- ($M = 55\%$) and post-observations ($M = 57\%$), the means for the intervention group increased across mid- ($M = 74\%$) and post-observation ($M = 81\%$).

Ratios of positive-to-negative interactions were standardized across teachers and observation sessions to facilitate comparison. More specifically, all ratios reflected the number of positive interactions observed for every one negative interaction observed. For example, a ratio of 0.50:1 would indicate that the teacher delivered 0.5 positive interactions per negative interaction, or twice as many negative interactions as positive interactions. The average for the pre-, mid-, and post-observation ratios of positive-to-negative interactions for teachers in the intervention group was 0.14:1 for pre-observation ratio (minimum = 0.08:1 and maximum = 0.26:1), 3.8:1 for mid-observation ratio (minimum = 3.4:1 and maximum = 5.6:1), and 4.7:1 for post-observation ratio (minimum = 3.8:1 and maximum = 6.2:1). Conversely, teachers in the control group averaged 0.13:1 for pre-observation ratio (minimum = 0.04 and maximum = 0.34:1), 0.18:1 for mid-observation ratio (minimum = 0.05 and maximum = 0.32:1), and 0.17:1 for post-observation ratio (minimum = 0.11:1 and maximum = 0.37:1). Whereas teachers in the intervention group shifted their ratios over time from favoring negative interactions to favoring positive ones, teachers in the control group consistently displayed a low ratio of positive-to-negative interactions.

**Table 2.** Results of the Mixed-Factorial ANOVAs for Academic Engaged Time and Disruptive Behavior.

| Source | *df* | *F* | *p* value |
|---|---|---|---|
| Academic engaged time | | | |
| Time (within-subjects) | 2 | 23.45 | <.001 |
| Intervention group (between-subjects) | 1 | 135.18 | <.001 |
| Time × Intervention Group (interaction effect) | 2 | 12.69 | <.001 |
| Error | 300 | | |
| Disruptive behavior | | | |
| Time (within-subjects) | 2 | 63.97 | <.001 |
| Intervention group (between-subjects) | 1 | 22.70 | <.001 |
| Time × Intervention Group (interaction effect) | 2 | 60.30 | <.001 |
| Error | 300 | — | — |

### *Inferential Statistics*

*AET.* All assumptions with regard to performing a mixed-factorial ANOVA were assessed and met (i.e., sphericity, multivariate normality, homoscedasticity). The mixed-factorial ANOVA included one within-subjects factor (Time: pre-, mid-, and post-) and one between-subjects factor (Condition: intervention and control). The results of the mixed-factorial ANOVA are displayed in Table 2. The first step in analyzing the results was to assess the significance of the Time × Intervention Group interaction effect, given that a significant interaction effect renders the interpretation of the main effects invalid (Tabachnick & Fidell, 2007). Results indicate a statistically significant interaction effect between time and intervention group, $F(2, 300) = 5.22$, $p < .01$. Plotting the pre-, mid-, and post-means for the intervention and control groups (see Figure 1) aided with interpretation of the interaction effect. While both groups' means appeared equivalent at baseline, AET for the intervention group increased, while the AET for the control group remained relatively constant upon starting the intervention. The SMDES of 1.03 indicates that the change in the intervention group's mean AET was greater than the change in the control group's AET by more than one standard deviation. According to Cohen (1988), these represent large effects that should be noticeable by untrained observers.

*DB.* Again, all assumptions pertaining to performing a mixed-factorial ANOVA were assessed and met prior to conducting and interpreting the results (i.e., sphericity, multivariate normality, homoscedasticity). The results of the mixed-factorial ANOVA are displayed in Table 2. The first step consisted of testing for a Time × Intervention Group interaction, with results indicating a statistically significant effect, $F(2, 300) = 4.84$, $p < .01$. To interpret the significant interaction, the pre-, mid-, and post-means for the intervention and control groups were examined in Figure 2. Both groups were nearly equal in terms of their percentage of DB at baseline, and it was not until the introduction of the intervention that the DB for the intervention group decreased, while the DB for the control group remained stable. Similarly, the SMDES associated with the DB analysis was 0.96, which also indicates that there was more than one standard deviation difference between the change in the intervention group's mean DB when compared with the control group. As previously stated, Cohen (1988) asserted that effect sizes of this magnitude should be noticeable by untrained observers.

### *Social Validity*

Only the teachers in the intervention group were asked to complete the IRP-15 (Martens et al., 1985). Items could be rated from 1 (*strongly disagree*) to 6 (*strongly agree*). The results for the IRP-15 indicated that teachers found the 5:1 ratio strategy to be reasonable, acceptable, and effective. The average rating across all 15 items for the three teachers was 5.7 (minimum = 5.4 and maximum = 6.0), indicating that teachers either agreed or strongly agreed with items assessing the reasonableness, acceptability, and likely effectiveness of the strategy. Nine of the 15 items received an average of rating of six, indicating that the teachers strongly agreed with the statement. These items included, "This would be an acceptable intervention to prevent a children's problem behavior," "I would suggest this intervention to other teachers," "I would be willing to use this intervention in the classroom setting," "I like the procedures used in this intervention," "This strategy should prove to improve classroom behavior," "This intervention would not result in negative side-effects for students," "The intervention was a fair way to handle the students' behavior," "This intervention is reasonable for classroom problem behavior," and "This intervention is a good way to handle children's behavior proactively."

## Discussion

Teachers face multiple competing demands: deliver high-quality instruction, maintain student engagement, and prevent the occurrence of problem behaviors that interfere with learning. As a result, uncovering highly feasible and effective classroom management strategies that teachers can implement is critical. Unfortunately, research indicates that many teachers default to reactive, punitive measures to manage student classroom behavior—practices which have been associated with negative outcomes for both students and staff (Mayer, 1995; McIntosh, Filter, Bennett, Ryan, & Sugai, 2010; Nafpaktitis, Mayer, & Butterworth, 1985). PCM, however, represents a preventive approach for managing student

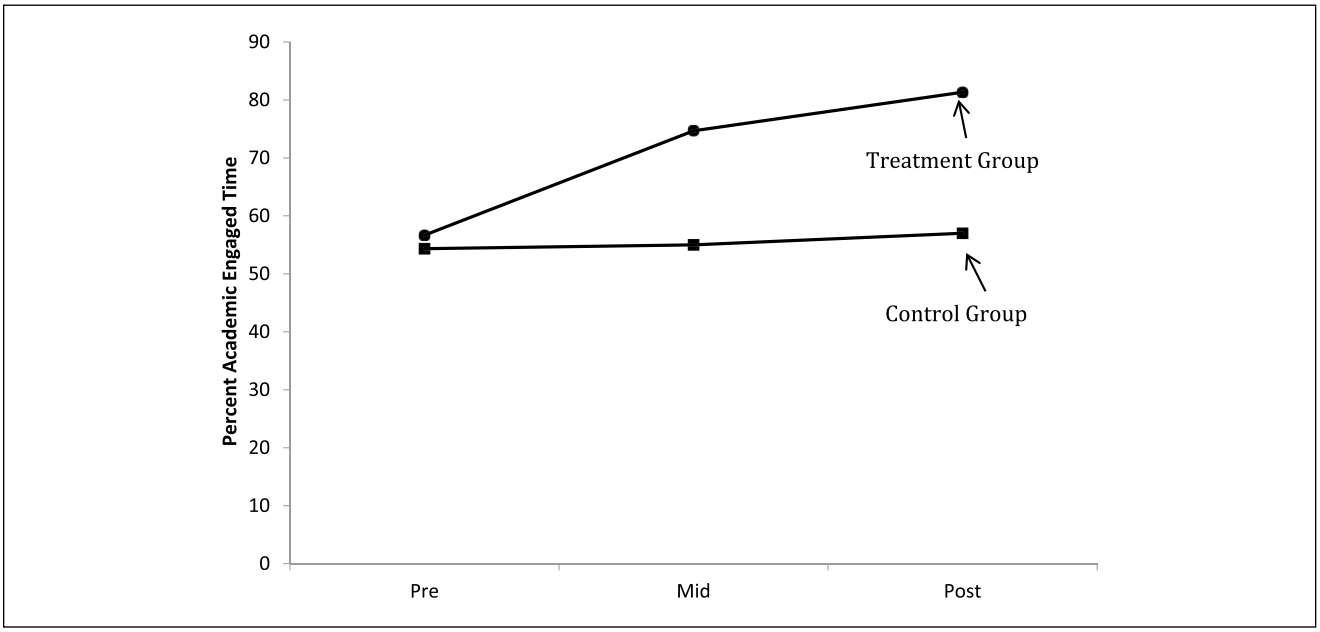


**Figure 1.** Percent intervals academic engaged time for intervention and control groups across pre, mid, and post.

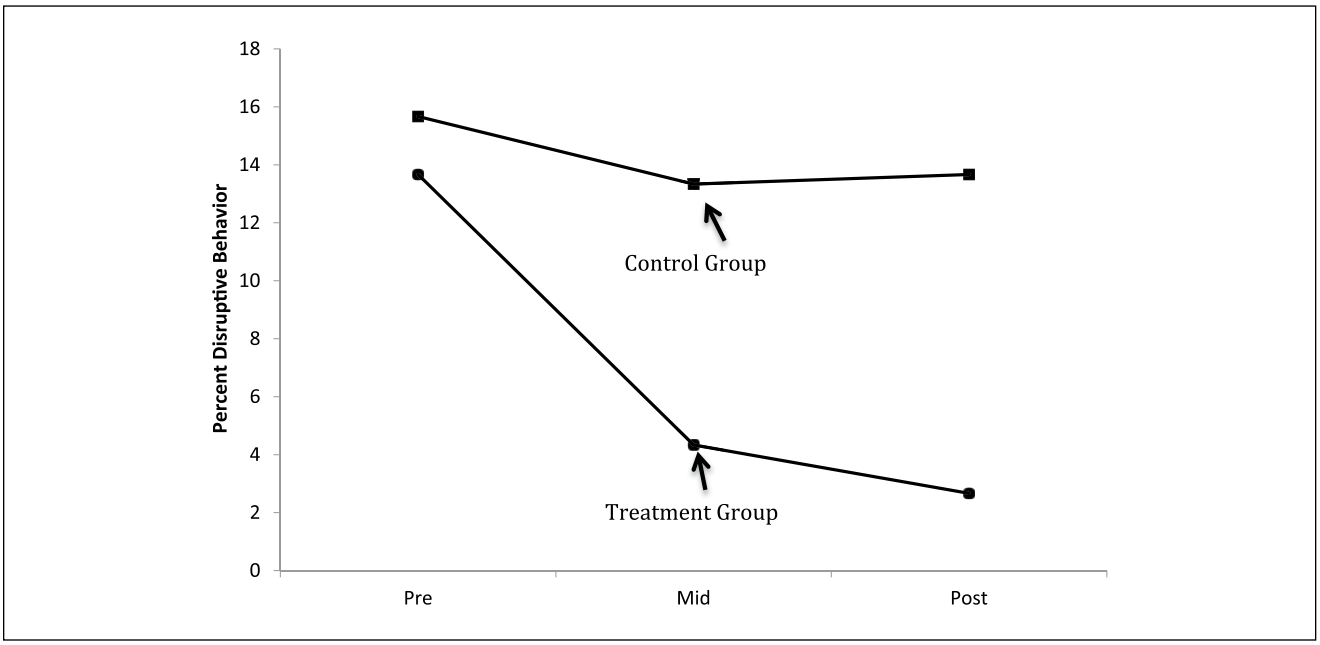


**Figure 2.** Percent intervals disruptive behavior for intervention and control groups across pre, mid, and post.

classroom behavior to maximize academic engagement (Rathvon, 2008). While prior research has identified several effective PCM strategies, limited experimental research has explored whether altering teachers' ratios of positive-to-negative interactions can reduce problem behaviors and promote better academic engagement as a classwide PCM strategy.

Given the tendency for some teachers to use punitive and reactive disciplinary strategies in response to classroom problem behaviors, coupled with prior research linking teachers' positive interactions to desirable outcomes, the present study sought to train teachers on a simple, structured PCM strategy called the 5:1 ratio. This strategy was designed

to increase teachers' ratios of positive-to-negative interactions with students to improve students' classroom behavior. Using a randomized-block pre–post control design, this study examined whether a brief training with ongoing implementation supports (i.e., self-monitoring form and a prompting device) could increase the ratios of positive-to-negative teacher–student interactions and correspondingly improve students' academic engagement and DB.

The results from this study indicated that the training on the 5:1 ratio resulted in significant improvements in teachers' ratios of positive-to-negative interactions for those in the intervention group relative to those in the attention control group. In addition, as hypothesized, students in the intervention classrooms were observed to exhibit significant reductions in DBs and increases in AET. In practical terms, students in the intervention group increased their academic engagement by an average of 22%, which corresponds to an extra 13.2 min of academic engagement per instructional hour or an additional hour over the course of a 5-hr instructional day. Over the course of a full school year, training teachers to increase their ratios of positive-to-negative interactions could potentially result in 180 additional hours of academic engagement (1 hr per day × 180 instructional days) for the average student. Considering that these estimates are averages, they could be an under- or overestimate depending on the individual student. Collectively, the results provide support for training teachers on the 5:1 ratio as a way to increase positive-to-negative teacher–student interactions and, ultimately, to improve student classroom behavior.

This study also assessed teachers' perceptions of the acceptability, feasibility, and effectiveness of training teachers to purposefully increase their positive-to-negative interactions with students. Findings from the social validity questionnaire suggested that teachers found the strategy to be feasible, acceptable, and effective. Moreover, teachers were found to implement the strategy with good fidelity under relatively natural educational conditions without strict oversight by researchers. Notably, several procedures used in this study could help account for the high degree of implementation fidelity. These include training teachers using a tell-show-do approach, having teachers complete a self-monitoring log to increase self-awareness, and providing teachers with a technological device that prompts them to deliver praise or positive recognition to an individual student or the class as a whole.

## Implications

The results of this study take on increased importance when considered in light of school-based universal prevention, teacher retention, and teacher preparation and training. With regard to school-based universal prevention efforts, many researchers lament that while national policies encourage the dissemination of evidence-based prevention programs (Atkins et al., 1998), few multicomponent programs get implemented successfully or with a high degree of fidelity (Atkins, Frazier, Adil, & Talbott, 2003). Research on systems change efforts in universal prevention has called for baby steps and the use of practical strategies that are likely to result in improved student outcomes (Fixsen, Blase, Naoom, & Wallace, 2009). Findings from the present study highlight the 5:1 ratio as a feasible and impactful intervention strategy that holds promise for overwhelmed teachers unequipped to adopt a complex, multi-component school- or classwide management system. This study shows that each teacher in a school, even those who are struggling or have a particularly difficult class, could be taught the 5:1 PCM strategy with relative ease and see a strong change in their students, and thus schoolwide, relatively quickly. For example, the 5:1 PCM strategy is consistent with schoolwide positive behavioral interventions and supports and could be a starting point for implementation to demonstrate results and incrementally build the model to scale.

These findings also have implications for improving teacher retention, given the link between behavior problems and teacher stress and burnout (Blasé, 1986; Borg & Riding, 1991; Marvel, Lyter, Peltola, Strizek, & Morton, 2006). Each year, thousands of teachers leave the profession, many of which do not feel adequately prepared for the job. This study revealed that teachers were clearly satisfied with the strategy and its outcomes, suggesting that the 5:1 strategy may improve the qualitative experience of teaching via the prevention of behavior problems and improvement of student academic engagement. School systems interested in retaining teachers should provide them with the necessary training to learn skills, like the 5:1 strategy, that help them increase academic engagement and manage student classroom behavior, which ultimately may reduce the stress that has been shown to be at the heart of teacher attrition (Yoon, 2002).

Teacher preparation programs should consider training teachers on quick and easy strategies, like the 5:1 ratio, that possess empirical support. This would help align training with what teachers rank as one of their biggest concerns—disruptive classroom behavior—yet they frequently report that they have not received the appropriate training to effectively manage behavior (Coalition for Psychology in Schools and Education, 2006). The ability to deliver praise and interact positively with students based on desirable behavior does not cost money nor require additional time from teachers. Rather, positive interactions are readily available dispensable and, therefore, should constitute a part of the curriculum of teacher preparation programs. Sadly, evidence-based classroom management procedures are often a missing ingredient in teacher preparation programs across the country (Begeny & Martens, 2006; Landau, 2001; Christofferson & Sullivan, 2015).

### Limitations

This study, like most, has limitations that readers should be aware of and pinpoint directions for future work. First, this study also did not examine whether teachers' ratio of positive-to-negative interactions would sustain after removing the use of the prompting device (i.e., MotivAider®), or, whether teachers would habituate overtime to the device, and therefore lose its cueing power. Future studies should examine whether teachers' ratio of positive-to-negative interactions becomes habitual with training and support, as well as whether positive outcomes would maintain once the supports for teachers are removed. Second, there are limitations with regard to the observational procedures utilized in this group-based study. There may have been contextual variations in the types of instructional conditions (e.g., whole group, small group, independent activities) during the language arts period, which may account for some of the variation within and between classrooms on the outcome measures. Future research could emphasize more rigorous by conducting observations under more precise and comparable instructional conditions across classrooms (e.g., observations during independent seatwork) to isolate the impact of the 5:1 ratio on student outcomes.

Third, this study included a relatively small sample of teachers ($N = 6$). The small size of the study limits the generalizability of the findings, despite the promising nature of the findings. The findings of this study should be replicated with additional teachers and students with different demographic characteristics. Also, multi-level modeling would have been a more sophisticated approach to statistical analysis, because random assignment to intervention and control occurred at the classroom level. However, to operate with sufficient statistical power when conducting a multilevel modeling analysis, significantly more classrooms would be needed to evaluate the effects at the classroom level. This study occurred without funding from an external agency and was part of normal teacher professional development activities within the schools. As a result, a larger scale design was beyond the scope of this study. Nevertheless, these findings should be replicated with more classrooms using more sophisticated statistical procedures that take into account the nested structure of the data.

## Conclusion

In sum, this study provides empirical support for increasing teachers' ratio of positive-to-negative interactions to improve academic engagement and decrease DB as part of proactive, prevention-oriented classroom management practices. Not only was the training on the 5:1 ratio found to be effective, but teachers also rated it as acceptable, feasible, and fair. Future research should continue to examine the positive impact of teachers' ratios of positive-to-negative interactions to identify the optimal ratio as well as continue to develop feasible and cost-effective PCM strategies that proactively manage student behavior and increase academic engagement.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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