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Multi-Tiered Classroom Management Intervention in a Middle School Classroom: Initial Investigation of CW-FIT-Middle School Tier 1 and Self-Management

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Abstract

Middle school students with social and behavioral concerns need additional support. The current study investigated the effects of Class-Wide Function-related Intervention Teams adapted for middle school contexts (CW-FIT MS) and self-management (SM) in a sixth-grade reading class. CW-FIT MS was implemented, subsequently, for students with data indicating additional support was needed, and a self-management component was added to intensify the intervention (CW-FIT MS w/ SM). A single-subject multiple baseline design was implemented across four student participants, and the on-task student behavior as well as the teacher-student relationship were examined to assess the effects of the intervention. Results indicated improved on-task behavior for three of four students with the implementation of the self-management intervention, demonstrating promising maintenance effects. Preliminary data showed an overall improvement in the teacher-student relationship. Both teachers and students reported positive perceptions about the intervention, consistent with earlier findings in CW-FIT MS studies. Limitations and areas for future research are addressed.

Keywords

middle school, self-management intervention, on-task behavior, teacher-student relationship

Initial Investigation of the Effects of CW-FIT Middle School

Educating students in middle school is a unique balance of providing effective instruction while maintaining a positive classroom environment at a time when students are at risk of becoming disengaged in their education and experiencing tense or strained relationships with their teachers (Pianta et al., 2012; Symonds & Hargraves, 2016). School-wide Positive Behavior Support (SWPBS) addresses these challenges in middle school with a multi-tiered framework and continuum of evidence-based strategies (Caldarella et al., 2011; Horner et al., 2009). Classroom-level positive behavior supports (i.e., classroom management) build upon SWPBS, specifically targeting these challenges to boost student engagement and promote positive interactions in the classroom (Reinke et al., 2012). Despite the apparent alignment of classroom management strategies within a SWPBS framework to specific challenges of middle school students, research into application of classroom management in this setting has been limited.

Class-Wide Function-related Intervention Teams (CW-FIT) is a promising classroom management intervention with a growing body of literature demonstrating improvement in middle school classroom engagement and prosocial behavior (e.g., Caldarella et al., 2019; Speight et al., 2020). As the evidence grows for the effectiveness of CW-FIT for most students in middle school classrooms, it is evident that, like other classroom management strategies, CW-FIT alone will not meet the needs of all students in the classroom (Orr et al., 2020; Wills et al., 2019). The smaller percentage of students who do not fully respond to CW-FIT are likely to be those at most risk for disengagement and strained teacher-student relationships (Pianta et al., 2012; Symonds & Hargraves, 2016). Further investigation is needed into the inclusion of supplemental interventions to

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target engagement of middle school students who do not initially respond to CW-FIT, and to evaluate the impact of these supplemental interventions on teacher-student relationships (Wills et al., 2019).

Class-Wide Function-Related Intervention Teams-Middle School (CW-FIT MS)

CW-FIT integrates with exisiting SWPBS structures as a classroom-level positive behavior support to improve student behavior through effective classroom management in elementary school settings (Kamps et al., 2015). CW-FIT utilizes a class-wide interdependent group contingency bolstered by multiple empirically validated classroom management strategies, including teaching classroom rules/expectations, reinforcement of prosocial skills, and extinction of likely reinforcements for problem behaviors. In keeping with SWPBS tiered systems of support, CW-FIT calls for the use of self-management and functional behavior assessment for students who need additional support beyond the class-wide intervention (Kamps et al., 2015).

The effects of CW-FIT have been investigated for over a decade in various classroom settings, diverse geographical locations, and socioeconomic areas, and with students from several age groups, multiple ethnicities, and various disability categories (e.g., Monson et al., 2020). CW-FIT elementary intervention research has demonstrated high social validity and broad positive outcomes on student class-wide on-task behaviors and teacher praise to reprimand ratios, and also has been demonstrated to improve behaviors for students at risk for/or with EBD (e.g., Wills et al., 2016).

In recent years, CW-FIT has been adapted for middle school settings using focus-group discussion and pilot studies (Wills et al., 2019). The components and the evidence-based strategies of the middle school and the elementary version are the same, but the implementation of CW-FIT Middle School (CW-FIT MS) strategies was adapted to address the contextual demands common in a middle school environment (Caldarella et al., 2019). In particular, the class expectations, the number of lessons on teaching class expectations, the frequency of acknowledging positive behaviors, as well as the training and coaching a teacher received to conduct intervention were adapted for CW-FIT MS (Caldarella et al., 2019; Wills et al., 2019).

Several single case studies demonstrated positive effects of CW-FIT MS to improve class-wide engagement, on-task behaviors of target students, and teacher praise along with reductions in student disruptive behavior (Caldarella et al., 2019; Orr et al., 2020; Speight et al., 2020; Wills et al., 2019) when the middle school adaptations were implemented with fidelity. High teacher satisfaction and feasibility were reported across all CW-FIT MS intervention studies, indicating the intervention has strong social validity.

CW-FIT With Self-Management

Self-management interventions are seen as valuable for classroom management practices with students who need additional support beyond primary level interventions (Kamps et al., 2015). Self-management is an evidence-based practice that can be provided within a framework of tiered intervention and is often used as a Tier 2 or Tier 3 support. It includes multiple components (e.g., self-monitoring, self-evaluation, and strategy instruction) and has been utilized across various settings and age groups (Bruhn et al., 2015). Self-management interventions allow the student to act as the intervention agent and minimize the necessity for teacher-delivered corrective feedback, which can contribute to negative teacher-student relationships (Reinecke et al., 2018). In addition, the versatility of self-management allows for intervention intensification through simple adaptions (e.g., adjustments to interval length, supplemental reinforcement, prompts, etc.) should students not immediately respond to the intervention (Bruhn et al., 2020). Two recent studies documented the positive effects of the inclusion of self-management within successful CW-FIT implementation in elementary populations. Kamps et al. (2015) investigated the effects of self-management on fourth- and fifth-grade students who needed more intensive support in addition to the CW-FIT intervention. Results revealed increases in the students' overall engagement and a more positive classroom environment. More recently, Wu et al. (2019) found supplementing CW-FIT with self-management (CW-FIT w/ SM) was much more effective in increasing the on-task behavior and decreasing the disruptive behavior of a student with an autism spectrum disorder than implementing CW-FIT alone. The procedure and outcome of the CW-FIT w/ SM intervention were well-received by the general education teacher and the students.

Research Purpose

The existing evidence from elementary settings supports the effectiveness of self-management as a supplemental intervention to CW-FIT and suggests behaviors of a student and teacher are modifiable with intervention at both the individual and class-wide levels. Although existing studies of CW-FIT MS demonstrated positive outcomes for students and teachers, the effects of CW-FIT MS including the SM component (CW-FIT MS w/ SM) among secondary level students have not been investigated. The current study aimed to extend the previous study by examining the effects of the CW-FIT MS w/ SM after CW-FIT MS intervention implementation in a sixth-grade classroom. In addition, while the connection between self-management interventions and teacher-student relationships has been discussed in the literature, limited empirical investigation into this topic is available. Moreover, given the impact of positive teacher-student relationships in middle school, the current

study aimed to investigate change in teacher-student relationship with the application of a self-management intervention. Three research questions were addressed:

Research Question 1: What is the impact of CW-FIT MS w/ SM on the on-task behaviors of individual students identified as non-responders to CW-FIT implementation?
Research Question 2: What is the impact of CW-FIT MS w/ SM on teacher-student relationships?
Research Question 3: Do the teachers and students find CW-FIT MS w/ SM to be socially valid to increase engagement and learning?

Method

Participants and Setting

This study was conducted in one sixth-grade middle school classroom in an urban Midwestern U.S. city. The school served 648 students, 73% of whom received free or reduced-price lunch. The majority of the students were White (41.2%), followed by Black (18.8%), Hispanic (17.1%), and multiracial (14.4%). Scores of the School-wide Evaluation Tool (SET; Sugai et al., 2001) were reported by school administration to be at 80% or higher over a period of 10 years, demonstrating strong and consistent fidelity of Tier 1 SWPBS supports. The school further reported ongoing use of check-in/check-out as a school-wide Tier 2 intervention (Hawken & Horner, 2003). In addition, during the first 8 weeks of the 2019 school year a social-emotional learning curriculum (i.e., Second Step; Committee for Children, 1997) was implemented schoolwide to teach students conflict resolution skills.

The participating master's level teacher was a 29-year-old White female with 4 years of teaching experience and 1 year of prior experience implementing CW-FIT MS. At the beginning of the 2019 school year, the teacher implemented CW-FIT MS in a reading class that consisted of 25 students: 15 males and 10 females; 64% White, 16% Black, and 12% Hispanic students. CW-FIT MS was implemented during the required independent seatwork. During this 30-40 min period students were typically engaged in independent reading from self- or teacher-selected materials or occasionally practiced specific reading strategies while reading.

After implementing CW-FIT MS for several weeks, the teacher contacted the research team to ask if more intensive intervention was available to help students not responding to CW-FIT MS intervention. The teacher was asked to use a CW-FIT MS Self-Management Intervention Referral form to nominate students who continued to exhibit off-task behavior after the implementation of the CW-FIT MS intervention. Six students were identified by the teacher because of their low engagement during independent seatwork. Teachers rated the extent to which the students responded to CW-FIT MS on a 4-point Likert-type type scale, ranging from 1 (*poor*) to 4 (*great*). The results showed that all six students were rated *poor* (1) to *some* (2), indicating they were candidates for more intensive support. Of the six identified students, four parental consents were obtained for the students to participate in this study. At the time of the study, no student received special education services or had a 504 plan.

The four participating students (target students) were 11 to 12 years old. Two were boys (Students 1 and 3) and two were girls (Students 2 and 4). Three students were White and one was Hispanic (i.e., Student 2). Before the study, the on-task behavior of each of the students was lower than 65% of intervals (range = 48%–61% of intervals) as measured by momentary time sampling with 30 s intervals across three 10-min observations on different days during independent reading activity.

Measures and Data Collection

The dependent variables of this study included the primary variable of on-task behaviors of the target students and an exploratory variable of the teacher-student relationship. The observations were conducted during the first 20 min of independent reading session to gain consistent representation of student performance in the classroom environment.

On-task behavior of target students. The on-task behavior of each target student was defined as students (a) silently reading teacher- or self-selected reading materials, (b) writing academic notes, and (c) raising a hand and quietly waiting for help. The on-task behaviors were observed using momentary time sampling at 30 s intervals. At the end of each interval, the observers visually scanned each target student and marked on-task or off-task on a form. The percentage of intervals of on-task behaviors was calculated as the total number of on-task intervals divided by total number of observed intervals (i.e., 40) for each target student.

Teacher-student relationship. The Teacher-Student Relationship Scale (TSR)–Teacher and Student Form (Gehlbach et al., 2012) included a Positivity subscale (9 items) and a Negativity subscale (5 items). The teacher completed the scale with each student, rating their relationship. The items were rated using a 5-point scale: *not at all/almost never* (1), *slightly/once in a while* (2), *somewhat/sometimes* (3), *quite/frequently* (4), and *extremely/almost all the time* (5). The positive scale total score range was 0 to 45 points, with higher scores indicating more favorable teacher-student relationship. The negative scale total score range was 0 to 25 points, and lower scores were more favorable. Brinkworth et al. (2018) conducted factor analysis to examine the construct validity of TSR for students from Grades 6 through 12, and the results supported the fitness of the

two-subscale model (comparative fit index [CFI] = .93, root-mean-square error of approximation [RMSEA] = .058). They also reported coefficient alphas for the teacher positivity subscale (α = .90) as well as the teacher negativity scale (α = .78), and the alphas were .92 and .78 for the student positivity and negativity subscales, respectively. At the beginning and the end of the current study, the teacher and each student participant completed the TSR scale. The teacher provided the TSR-student form to each student in an envelope with instructions to complete and return the instrument in the same envelope to maintain privacy of responses. Students were informed their answers would be seen only by research staff and that the teacher would not see their responses. All students completed and returned the survey within 24 hours of receiving it.

Intervention fidelity. During the baseline condition, the CW-FIT MS fidelity checklist developed by Wills et al. (2019) was used at the end of each observation session (i.e., 100% of the baseline sessions) to monitor the fidelity of CW-FIT MS. Eight components of the CW-FIT MS procedure (e.g., team point chart displayed, pre-corrects on skills at the beginning of CW-FIT MS, and timer used and set at appropriate intervals) were listed on the checklist (Wills et al., 2019). Each component was scored on a 4-point scale, ranging from 0 (*not present*) to 3 (*full implementation*). The fidelity was calculated by total fidelity score/total possible score multiplied by 100%. The mean of CW-FIT MS fidelity was 97.9% (range = 87.5% to 100%), indicating a high quality of CW-FIT MS implementation.

During the intervention and maintenance conditions, a second fidelity checklist was included to measure self-management implementation for each target student and the teacher for 90.6% of the observation sessions (i.e., every session starting from Day 13 for Student 1, and every session except for Day 42 for Students 2, 3, and 4). The self-management fidelity checklist measured one student- specific implementation component (i.e., student monitored behavior) and two teacher-specific implementation components (i.e., teacher prompted self-monitoring and teacher checked accuracy) as suggested by Bruhn et al. (2015). These items were weighted to capture varying degrees of implementation: 0 (*not present*), 1 (*student monitored and teacher prompted less than 50% of all intervals; teacher checked group accuracy at the end of reading session*), 2 (*student monitored and teacher prompted at least 50% of all intervals; teacher checked individual accuracy at the end of reading session*), and 3 (*student monitored and teacher prompted at each interval; teacher checked individual accuracy during reading session).* A score of 3 would indicate full implementation for a target student, and a score of 6 would indicate full teacher implementation. The fidelity score was converted into a percentage by dividing the score recorded by the observer by the total possible score. The percentage was calculated separately for individual target students and for the teacher. The interobserver agreement for fidelity was examined for 24% of the observation sessions across experimental conditions with 100% agreement. During the intensification condition for Student 2, the fidelity of the adapations was monitored and noted on the fidelity observation form.

The student-implementation average fidelity was 92.4% (Student 1 M = 92.6%; Student 2 M = 88.1%; Student 3 M = 91.7%; Student 4 M = 97.2%) during intervention condition and 84.5% (range = 66.7%–100%) during the maintenance condition for Students 1, 3, and 4. The teacher-implementation average fidelity for the self-management component was 68% (range = 50.9%–84.7%) during the intervention condition and 74.2% (range = 66.7%–80.3%) during the maintenance condition. During the intensification condition for Student 2, the average fidelity of student implementation was 83.3% (range = 66.7%–100%); the average fidelity of teacher implementation for the self-management component was 70.8% (range = 66.7%–83.3%), with the teacher accurately implementing the adaptations 3 of 4 sessions.

Interobserver agreement. The first and third authors were trained in the participating classroom to take data on dependent variables and to monitor fidelity with paper-pencil recording sheets until reaching 85% reliability across three observations. Interobserver agreement (IOA) was examined on an average of 29% observations across all phases and four target students (range = 22%–61%). The IOA for on-task behavior was calculated by dividing the number of agreements by the number of agreements plus disagreements between two observers and multiplying by 100. IOA was high and consistent with above 90% (range = 82.5%–100%) mean agreement across all phases and target students.

Social validity. At the end of the study, the teacher and four students filled out a social validity survey that addressed the procedure, outcome, and cost-benefit of the intervention (teacher survey only). The authors adapted the social validity survey used in prior CW-FIT studies (Wills et al., 2019). The teacher survey (non-validated) included seven items and the student survey had six items. The items used a 4-point Likert-type-scale: *very true* (4), *mostly true* (3), *somewhat true* (2), and *not true* (1). The adaptations of the student and teacher social validity survey included (a) focusing on implementing self-management, (b) deleting the two open-ended questions, and (c) adding questions about cost-benefit of the intervention to the teacher survey (i.e., feasibility of preparation time, minimum modification, resources spent was worthwhile).

Research Design

A multiple-baseline across four participants design was applied in which the intervention was introduced at

different times to provide four opportunities to demonstrate experimental control. CW-FIT MS w/ SM was implemented during an independent reading period and the students' on-task behaviors were monitored to determine the effects of the intervention. The experiment included a baseline, intervention, and maintenance or intensification condition for each student participant. Data were collected every school day during the independent reading activity, except for special events (e.g., celebration and makeup assignments days). The order that students received the intervention was randomly assigned using Microsoft Excel random selection. The intervention was initiated with the first target student while the other target students remained in the baseline. The condition change decisions were based on the primary dependent variable of on-task behavior. Data collection of one condition continued until a clear and predictable pattern of data could be identified.

Procedures

Baseline. During baseline, the teacher implemented the CW-FIT MS intervention throughout the 30- to 40-min independent reading activity, including setting up clear class expectations and daily goals, providing a group contingency, and using differential reinforcement at each 5-min interval and at the end of the class. The class expectations were reading silently or independently practicing reading strategies. Students were asked to raise a hand to ask questions and wait for the teacher's help. The class was organized in six teams with three to five students in each team, with participant students placed on separate teams. The teacher created an 8- × 15-inch point chart on the whiteboard at the front of the room and asked one student to record the points when the teacher verbally praised specific groups. At the beginning of independent reading time, the teacher asked one student from the class to help manage the timer and to choose a reward for the class (e.g., candy, music, or free time). The teacher then wrote down the reward above the point chart and set a goal for the teams to earn the reward. The goal for on-task behavior was set at the beginning of the CW-FIT MS intervention on a daily basis, ranging from 60% to 80% of the opportunities a team could earn points (e.g., getting six points during eight times of teacher feedback) across intervention days. A timer was set as a reminder for the teacher to provide specific and positive feedback (i.e., praise) for teams who met class expectations at 5-min intervals, resulting in six to eight opportunites for praise during the 30- to 40-min activity. The target students' on-task behavior and the fidelity of CW-FIT MS implementation were observed during baseline, and the overall fidelity of CW-FIT MS intervention was high. Baseline data were collected until a stable or a decreasing trend was observed during visual analysis across three or more consecutive data points for each participant.

Intervention

Training for self-management. The training was provided by the first and third authors, who had extensive experience coaching teachers to implement CW-FIT and CW-FIT MS. The teacher received a one-time training, approximately 15 min, prior to the self-management intervention. During the training, the authors explained the components of self-management, the procedure of implementing self-management along with CW-FIT MS, as well as the teacher's role during intervention condition. Procedures included continuing implementing CW-FIT MS, providing group prompts for all self-managers to monitor and to record their behavior at the end of each 5-min interval, checking the accuracy of target students' recording at least once during independent reading, and providing individual rewards for the target students who met the class goal. Specifically, the teacher was asked to walk around the class to check the accuracy of recording at least once during each independent reading session. If the teacher noticed a student's recording was inconsistent with her observation, the teacher was asked to provide a discrete gestural prompt for the student to change their rating by stopping next to the student's desk and gently tapping on the recording sheet. The trainers provided examples of prompts and practiced with the teacher until the teacher felt comfortable incorporating the self-management components into CW-FIT MS intervention. The teacher received a 2- to 3-min reminder about the procedure when a target student started the self-management intervention. If the teacher's implementation fidelity was lower than 60% for 3 out of 5 days for an individual student, a 5-min coaching session was provided to remind the teacher to prompt the target students to self-monitor their behaviors and to check the accuracy of the student's recording at least once during the reading session.

On the first day of the intervention, each target student was trained to conduct self-management of their on-task behaviors. Two to five additional peer-model students were selected from each team to join the self-management training to avoid stigmatizing the target students. Specifically, Student 1 was trained with five peer-model students; Student 2 was trained with three peer models, Student 3 had four peer models, and Student 4 had two peer models. The training lasted for 10 to 15 min at the beginning of reading in the school library. The self-management training for each target student was 1 to 2 weeks apart and followed the same procedure. First, the trainers introduced the concept of "self-management" and discussed the rationale of self-management with the self-managers. Next, the class expectations and examples of on-task behaviors were reviewed and the self-management point sheet was introduced. The self-managers then briefly practiced self-monitoring for three to four 30-s intervals, during which the trainer checked the accuracy of recording and the self-managers provided each other feedback. The practice continued until the target

student got three consecutive correct recordings on their sheet. Finally, the trainers explained the implementation of self-management during independent seatwork activity along with CW-FIT MS intervention. A 3- to 5-min small-group booster training session was conducted by the first and third authors when target students did not engage in SM for more than three consecutive days. Due to holidays, sickness, snow days, and in-school suspensions, the student booster sessions were conducted ranging from once every other week (i.e., Student 4) to once in 5 weeks (i.e., Student 1) across the four target students.

Self-management intervention. The teacher continued implementing CW-FIT MS as described in baseline and incorporated self-management (i.e., CW-FIT MS w/ SM) during the intervention condition. At the beginning of the independent reading, a 4- × 5.5-inch point sheet was given to self-managers (including target students and 2 to 5 selected peer models for the teams). The goal for a self-manager, to earn an individual reward for being on-task, was the same as the class goal. The self-managers were asked to monitor and record their behavior during the previous interval every 5 min when prompted by the teacher (i.e., "Self-managers please give yourself a point if you were on-task in the last 5 minutes") as the timer went off. At the end of the reading session, self-managers turned in their sheets to the teacher and chose a reward if they met the goal. The individual rewards chosen by self-managers included free time, free time with a friend, music time, school points, and candy. The researchers added the second target student to the intervention after completing self-management training for the second target student with another five peers. While the first and second target students conducted self-management, the other two target students remained in baseline. The same criteria for changing experimental conditions and the same self-management procedures were sequentially applied to each target student during the intervention.

If a counter-therapeutic trend was observed across three or more consecutive on-task data points during the intervention condition, the teacher implementation fidelity data were reviewed and a coaching session for approximately 10 min was provided, should these data fall below 60%. The prodecures with the lowest implementation fidelity were reviewed during coaching to strengthen implementation. In addition, the teacher was asked to implement important SM components suggested by Bruhn et al. (2015), including (a) providing the target student with individual verbal or gesture prompts (e.g., point to the SM sheet or say, "Remember to give yourself a check if you were on-task") at least three times during the intervention and (b) discussing an individualized reward with the target student before a reading session as a priming strategey before initiating the intervention.

If on-task data continued to demonstrate a decreasing trend and/or persistent variability for three consecutive data points after coaching, the student implementation fidelity data were reviewed in addition to teacher implementation. Individual student's SM recording was compared to the observers' data for accuracy checks. An intensified self-management condition (i.e., INTS SM) was introduced to include effective adaptations to self-management intervention practices (e.g., accuracy checks and reinforcement; Bruhn et al., 2020) as needed. The teacher received another 10-min coaching session to include reinforcement for the target student's accurate recording of their performance and to provide individualized verbal or gesture feedback (e.g., attention) at least five times during the self-management intensification condition.

Maintenance. Maintenance data were collected 1 to 2 weeks after the last data point was collected for the intervention condition except for Student 2. During maintenance, the teacher was encouraged to continue implementing CW-FIT MS w/ SM with research participants and peers during independent reading. No booster training was available for the target students and the teacher during maintenance. The target students' on-task behavior and the fidelity of implementation were recorded one day a week for 1 to 3 weeks.

Analysis

Visual analysis was applied to analyze the graphed data of the primary dependent variable. The changes in level, trend, and variability within the experimental conditions, consistency of data in similar phases across conditions (Ledford & Gast, 2018), and immediacy of effect were assessed by comparing the average of the final three baseline data points to the average of the first three intervention data points (What Works Clearinghouse [WWC], 2017). Tau for nonoverlap with baseline trend control (Tau-*U*) were described for each target student. Tau-*U* scores above .80 indicated very large effect of the intervention, .60 to .80 showed large effect, .20 to .60 was moderate effect, and scores of .20 or lower showed a weak or small effect (Vannest & Ninci, 2015).

The exploratory investigation of the teacher-student relationship was analyzed by calculating the change between the pre- and post-intervention mean item scores across participants to reflect the directional change in positive and negative perceptions following intervention (Gehlbach et al., 2012). The mean score for each subscale was determined by calculating the total score for all items in the subscale and dividing by the number of items. The mean score was used to calculate the post-intervention score changes by subtracting the post-intervention mean score from the pre-intervention mean score (see Table 1).

Table 1. Teacher-Student Relationship (TSR) Scale Responses.

	Student 1		Student 2		Student 3		Student 4	
Respondent	Pre	Post	Pre	Post	Pre	Post	Pre	Post
				Positive perception TSR scores				
Student	3.56	3.67	3.22	4.11	3.11	3.33	3.0	4.22
Post Score Change		+.11		+.89		+.22		+1.22
Teacher	2.89	3.67	2.78	2.56	3.33	3.33	2.33	3.11
Post Score Change		+.89		−.22		NC		+.78
				Negative perception TSR scores				
Student	2.60	1.80	3.00	3.00	2.60	2.20	3.40	3.00
Post Score Change		−.80		NC		−.40		−.40
Teacher	1.40	1.00	3.20	2.60	3.20	2.20	3.20	1.8
Post Score Change		−.40		−.60		−1.00		−1.40

Note. Pre- and Post-intervention TSR scores are displayed and the change in post-intervention scores from pre-intervention indicated in the row below. Scores range from 1 to 5, with scores of 5 indicating the highest positive perception score and the highest negative perception score. NC = no change was observed between pre- and post-intervention TSR scores.

Results

On-Task Behavior of Target Students

Figure 1 illustrates the results of the effects of CW-FIT MS intensified with the self-management intervention on the percentage of on-task intervals for the four Grade 6 participants, as well as the teacher's implementation fidelity of SM components. Although the teacher implemented the CW-FIT MS intervention with high fidelity during baseline, all four participants showed low levels of on-task behavior with some to high variability. Student 1's on-task behavior was variable (M = 58.6%, range = 40%–80% of intervals) showing an increasing trend at the beginning of the baseline; however, the final two points of baseline demonstrated a contra-therapeutic trend. When CW-FIT MS w/ SM was implemented during the intervention condition, Student 1's on-task behavior increased in level (M = 92.0%, range = 73%–100% of intervals) and showed stability. An immediacy of effect was demonstrated in an increase from the average of the last three baseline data points (M = 64%) to the average of the first three intervention data points (M = 92%). Tau-U scores suggested a very large intervention effect (Tau-U = .97; p = .00). During the maintenance condition, data were collected 2 and 3 weeks after the intervention condition. The percentage of Student 1's on-task behavior maintained at a high level with an average of 100% of intervals.

Student 2 engaged in on-task behaviors with high variability during baseline (M = 32.9%; range = 0%–72.5% of intervals), with the data points showing a contra-therapeutic trend. When the intervention was introduced, Student 2's on-task behavior increased in level (M = 69.9%). An immediacy of effect was demonstrated in the increase from the average of the last three baseline data points (M = 26%) to the average of the first three intervention data points (M = 81%), however the presence of three outlier data points (Days 20, 25, 29) indicated persistent variability (range = 15%–97.2% of intervals). Tau-U scores suggested a large intervention effect (Tau-U = .65; p = .00). After the second teacher coaching session (Day 31), Student 2's on-task behavior showed an immediacy of effect in the increase from the average of the previous three intervention data points (M = 26%) to the average of next three intervention data points (M = 81%) but still with variability (range = 48.5%–85% of intervals) and a slightly decreasing trend. In the intensification condition (i.e., INTS SM condition), Student 2's average percentage of on-task behavior showed an immediate increase in level and reduced variability, ranging from 65%–100% of intervals as a result of the intensification adaptations.

Student 3's on-task behavior also showed high variability during baseline (M = 45.6%; range = 0%–97.5% of intervals). The baseline data started with an increasing trend but the last five data points of baseline demonstrated a contra-therapeutic trend. When self-management was introduced, Student 3's on-task behavior increased in level (M = 86.1%, range = 76.9%–100% of intervals) and showed stability with a slightly descending trend. An immediacy of effect was demonstrated in the increase from the average of the last three baseline data points (M = 26%) to the average of the first three intervention data points (M = 92%). Tau-U scores suggested a very large intervention effect (Tau-U =

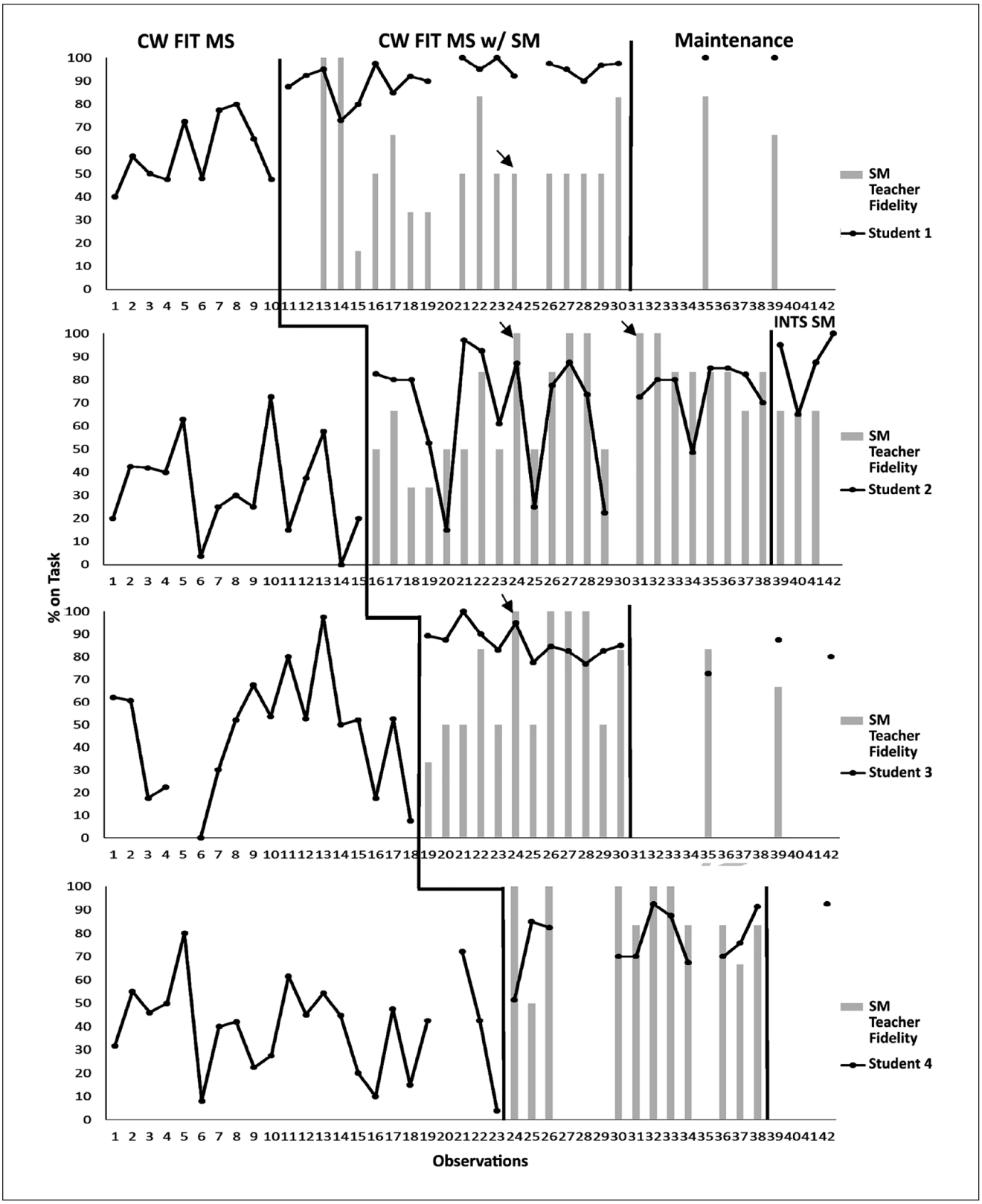

Figure 1. Percentage of on-task intervals across participants.
Note. CW-FIT MS = CW-FIT Middle School; SM = self-management; INTS SM = intensified self-management; disconnected line within a phase = sick day or in-school suspension; coaching.

.87; $p = .00$). During the maintenance condition, data were collected 2 weeks after the intervention condition for 3 consecutive weeks. The percentage of Student 3's on-task behavior maintained at a stable level ($M = 80\%$, range = 72.5%–87.5% of intervals).

Student 4's on-task behavior was variable during baseline ($M = 39.2\%$; range = 3.84%–80% of intervals), with the final two data points demonstrating a descending trend. During the intervention condition, the data increased from baseline starting at the second intervention data point, demonstrating a higher level ($M = 76.7\%$; range = 51.3%–92.5% of intervals) and stability, with the final three data points indicating a gradually increasing trend. Tau-U scores suggested a very large intervention effect (Tau-$U = .88$; $p = .00$). One maintenance data point was collected 1 week after the intervention condition due to the limitation of a pending school break. The percentage of Student 4's on-task behavior was high (92.5% of intervals) during the maintenance condition.

Teacher-student relationship. Table 1 presents the change in mean scores of the Teacher-Student Relationship (TSR) Scale completed by the teacher and target students at the end of the study. Overall, the students' positive perceptions increased from pre- to post-test scores across all target students whereas the teacher's change in positive perceptions of students was variable. A decrease in negative perceptions was reported by the teacher across all four students and was identified by three of four students; the fourth student showed no change in negative perception.

Student 1's positive perception scores increased by .11 (pre $M = 3.56$, post $M = 3.67$) and their negativity scores decreased by .80 (pre $M = 2.60$, post $M = 1.80$). Teacher scores regarding Student 1 demonstrated a .89 increase in positive perceptions (pre $M = 2.89$, post $M = 3.67$), and a decrease of .40 in negativity scores (pre $M = 1.40$, post $M = 1.00$). Of note, the teacher post-intervention positive perception scores for Student 1 were the highest of all students and the negative perception scores were the lowest, indicating the teacher had relatively high positive perceptions and low negative perceptions of this student following intervention.

Student 2 demonstrated a .89 increase in positive perception (pre $M = 3.22$, post $M = 4.11$), while negativity scores remained stable (pre $M = 3.00$, post $M = 3.00$). Teacher positive perception decreased by .22 (pre $M = 2.78$, post $M = 2.60$), indicating the teacher reported a less positive perception of Student 2 following intervention. Negative perception responses reported by the teacher decreased by .60 (pre $M = 3.20$, post $M = 2.60$) due to a decrease in negative perception reported on items related to disruptive behavior. The teacher reported the lowest positive perception and highest negative perception following intervention for Student 2, suggesting the teacher had relatively fewer positive perceptions and more negative perceptions of this student.

Student 3's self-report scores increased by .22 from pre- to post-test on the positive perception scale (pre $M = 3.11$, post $M = 3.33$) and decreased by .40 on the negative perception scale (pre $M = 2.60$, post $M = 2.20$). The teacher-report positive perceptions remained stable (pre $M = 3.33$, post $M = 3.33$) following intervention, though positive perception was relatively high pre-intervention. Negative teacher perceptions decreased by 1.00 (pre $M = 3.2$, post $M = 2.2$), which can be attributed to a three-point decrease from pre- to post-test on "ignoring what the teacher says" and difficult interactions items.

Student 4's pre- and post-mean positive perception scores indicate a 1.22 increase (pre $M = 3.00$, post $M = 4.22$), demonstrating the highest mean score positive perception and the largest increase from pre- to post-test of all target students. A decrease of .40 was seen on the negative perception scale (pre $M = 3.40$, post $M = 3.00$). The teacher reported a increase in positive perceptions of .78 (pre $M = 2.33$, post $M = 3.11$) and a 1.4 decrease in negative perception (pre $M = 3.20$, post $M = 1.80$). This decrease was the largest mean decrease in teacher scores across all students.

Social validity. The teacher and students rated their overall satisfaction with the procedure, outcome, and/or cost-benefit of the intervention as *very true, mostly true*, or *somewhat true*. The teacher reported the following items as *very true*: adequate training, feasible preparation, cost-benefit, and satisfaction of overall outcome. The teacher reported mostly true to the other three items: easy to learn SM, easy to implement, and target students' on-task behavior acceptable during SM. All target students scored *very true* on the overall outcome of the intervention and completed more work items. Two of four target students responded *very true* that the intervention was easy to use and the other two responded *mostly true*. Three of four students indicated receiving adequate training and having acceptable on-task behavior during intervention items as *mostly true*. One student rated the receiving adequate training item as *very true* and another student rated having acceptable on-task behavior during intervention as *very true*. All but one target student responded *very true* that the intervention was easy to learn (one reported *somewhat true*). Overall, the teacher and target students were positive about the feasibility and effects of the intervention.

Discussion

This study evaluated the feasibility and effects of self-management as a supplement to CW-FIT MS intervention. Findings showed the change of the on-task behaviors of four sixth-grade students in a reading class to be positive, consistent with previous elementary CW-FIT w/ SM studies. In addition, an overall improvement in teacher-student relationships between participating students and the classroom

teacher was observed. Further, the intervention was rated as socially valid by students and teachers. Findings are discussed below.

On-Task Behavior

The four target students showed immediate improvements in on-task behavior during CW-FIT MS w/ SM condition. Findings confirm the application and effects of a multi-tiered approach to providing a continuum of support to individual behaviors (e.g., Kamps et al., 2015) for students who are unresponsive to classroom-level positive behavior interventions. Further, the study contributes to the existing literature by justifying the use of more intensive intervention after implementing CW-FIT MS with high fidelity, as suggested by Bruhn et al. (2020) and Kamps et al. (2015). For Student 2, whose on-task behavior was variable during the intervention condition, the researchers reviewed the fidelity data and coached the teacher to improve implementation. However, with the improvement of teacher implementation after coaching, the on-task behavior of Student 2 still demonstrated a decreasing trend. The data suggested that there was no consistent pattern between the teacher implementation fidelity and the on-task behavior of the target students. These findings have interesting implications for the teacher's role in a self-management interventions. Because the function of Student 2's behavior was not formally assessed, the stimuli that influenced the variability of the student's behavior were not clear. Consistent with exemplars in the literature (Bruhn et al., 2020), the intensifications of the intervention (i.e., prompt, reinforcement discussion, and teacher training for matching) for Student 2 appeared to be promising. However, more data points should be collected to examine the effects of the intensifications of the self-management component.

Teacher-Student Relationships

This study was the first CW-FIT MS study exploring the changes of the TSR scores after the intervention. Measuring student and teacher relationship allows in-depth understanding about the potential intervention effects beyond middle school students' on-task behaviors. While the overall teacher-student relationship improved following invention for three of the four students, differentiations in the teacher's percention following intervention were apparent. Prior to intervention, the teacher's positive perceptions of Students 2 and 4 were the lowest among the 4 students. Following intervention, the teacher's positive perceptions improved for Student 4, who responded more consistently to the intervention, while this perception decreased for Student 2, who did not readily respond to the intervention. Similarly, the teacher demonstrated realtively high negative perception scores prior to implementation for Students 2, 3, and 4. These negative perceptions decreased more following intervention for Students 3 and 4, who responded well to the intervention, compared to the teacher's negative perceptions of Student 2, who required more intensive intervention. More research is needed to examine the causal relationship between student behaviors and teacher-student relationships along with the contextual variables, such as increased demands associated with implementation intensification that could influence this relationship.

Social Validity

This study contributes to existing CW-FIT studies by examining the social validity of self-management components. The results of teacher and student surveys support the social validity beyond CW-FIT MS intervention (e.g., Monson et al., 2020) to CW-FIT MS w/ SM intervention. Notably, although the teacher reported *mostly true* to the self-management procedure (i.e., easy to learn; easy to implement), the fidelity data indicated that the teacher needed additional coaching to implement self-management components with high fidelity. The inconclusive relationship between teacher implementation fidelity and student on-task behavior suggests a direction for future research.

Limitations and Areas for Future Research

Although the preliminary results seem promising, several limitations were identified during the initial investigation of the effects of CW-FIT MS w/ SM intervention. The participants of this study consisted of only one teacher and four target students in one sixth-grade classroom. Future studies including more teachers and student participants across multiple contexts would help increase the generalizability of the study and investigate the relationship between students' behavior change and the change of teacher-student relationship.

The second limitation of this study pertains to the absence of academic assessment as an outcome measure. In the current study, the CW-FIT MS w/ SM was implemented by the teacher during independent reading, during which the class was asked to read silently and to take reading notes. Although students' reading notes were graded by the teacher every week, the requirement of the notes and the grading criteria varied throughout the intervention and thus limited the analysis of grades and the quality of student assignments (e.g., number of words written in the notes). Future studies may consider collecting other data, such as standardized reading assessments or reading test scores, to provide more comprehensive information about the effects on students' academic performance.

The third limitation noticed in this study was the fixed termination of the study due to winter break, prohibiting collection of additional data points to reflect Student 2's on-task behavior during the intensification condition. Student 2 demonstrated persistent variability across baseline and the

intervention condition, requiring adaptations to the self-management intervention based on the suggested literature (e.g., Bruhn et al., 2020). The final data points collected before the termination demonstrated an increasing trend in on-task behavior, though additional data points may have invited more comprehensive analysis of the change in level and trend, variability, and overlap to determine if the effect remained over time.

Finally, the self-management training for target students was conducted by the researchers in this study. Future studies may explore the feasibility and effects of the intervention if the training were provided by classroom teachers. In addition, the amount of and procedures for self-management training for teachers, especially the teacher's role in implementing self-management within the context of CW-FIT MS, may require further investigation given the inconclusive relationship between teacher implementation fidelity and student on-task behavior. Two implementation omissions were recorded throughout the study: First, the teacher did not consistently prompt self-managers to monitor their on-task behaviors at every interval; and second, the accuracy of the recording was checked after class instead of during class. While these omissions may have impacted the performance of Student 2 and were targeted during the first intensification phase, these omissions did not seem to impact Students 1, 3, or 4, who all responded positively to the intervention. Overall, more research is needed to further examine the effects of multi-tiered CW-FIT MS and CW-FIT MS w/ SM intervention on behavioral and academic outcomes given the limitations of this study.

Conclusion

Preliminary results of this study are consistent with previous findings documenting the effects of adding self-management as a supplemental intervention to class-wide intervention in elementary schools. Current findings provide evidence that the CW-FIT MS w/ SM intervention is feasible in a general education reading class and demonstrates moderate effects on the behaviors of students who did not respond to classwide intervention. Preliminary data suggest improvement in teacher-student relationships for CW-FIT MS w/ SM intervention responders.

Author's Note

The opinions presented in this paper are those of the authors, and no endorsement by the agency is intended or implied.

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