Evaluating the Zones of Regulation Intervention® to Improve the Self-Control of Elementary Students

Student performance and learning expectations for elementary-age children in kindergarten through fifth grade encompass both academic and social/emotional learning (SEL) core competencies (Collaborative for Social and Emotional Learning [CASEL], 2015; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). Academic and social/emotional challenges can result when students lack the critical SEL skill of self-control. Low self-control, is defined by the following characteristics: (a) impulsivity and inability to delay gratification, (b) lack of persistence, tenacity, or diligence, (c) partaking in novelty or risk-seeking activities, (d) little value of intellectual ability, (e) self-centeredness, and (f) volatile temper (Gottfredson & Hirschi, 1990). While Gottfredson and Hirschi place emphasis on potential criminal outcomes due to lack of self-control, the spectrum of related hardships in schools includes disruptive behaviors that detract from instructional time, have the capacity to diminish academic outcomes, and tarnish student-teacher relationships (Lane, Givner, & Pierson, 2004; Oakes et al., 2012). Whether exhibited together or in isolation, characteristics of low self-control can present as delinquent, antisocial, and problematic behaviors, which can negatively impact a child's functioning across academic and social/emotional domains (Piquero, Jennings, & Farrington, 2010). Therefore, providing interventions to improve the level of self-control for elementary-aged students and reduce disruptive behaviors when deficits are observed is imperative.

There is robust evidence for the use of specialized group interventions to improve self-control (Lane, Oakes, & Menzies, 2014). For example, a meta-analysis by Wilson and Lipsey (2006) indicated positive reductions in aggressive and disruptive behavior of students participating in Secondary/Tier 2 social information processing interventions that included general cognitive-behavioral, anger management, social problem solving, perspective taking, and behavior modification modalities. Additional studies report that behaviorally oriented interventions that target self-control have been found to produce positive outcomes (Piquero et al., 2010; Stoltz, Londen, Deković, Castro, & Prinzie, 2012; Waschbusch, Pelham, & Massetti, 2005; Wilson & Lipsey, 2006). Still other studies have found that cognitively-oriented interventions produce positive outcomes improving self-control (Augustyniak, Brooks, Rinaldo, Bogner, & Hodges, 2009; Lemberger & Clemens, 2012; Liber, De Boo, Huizenga, & Prins, 2013; Piquero et al., 2010; Stoltz et al., 2012; Wilson & Lipsey, 2006; Wilson & Lipsey, 2007). Taken in combination, cognitive- and behaviorally-oriented Secondary/Tier 2 interventions have been found to improve self-control and reduce the disruptive behavior of elementary-aged students.

Utilizing a systematic cognitive-behavioral approach, the Zones of Regulation® (Kuypers, 2011) curriculum targets self-regulation or self-control. Concepts taught in the Zones® curriculum encompass helping students identify their feelings, understand that their behavior impacts others around them, and improve coping strategies to manage their feelings and behavioral responses (Kuypers, 2011). To date, only two studies have been conducted on the Zones® implemented as a Universal/Tier 1 intervention. Using an AB single-subject experimental design, Yack (n.d.) observed improvements in self-regulation and on-task behavior in the eight kindergarten students studied, whereas Rush University and the School Association of Special Education in DuPage County (Kuypers, 2018) found no statistically significant improvements on measures of self-control or ability to identify emotions for preschool children receiving the Zones® intervention in their quasi-experimental, longitudinal, correlational and predictive single group study.

Despite this lack of rigorous studies and empirical evidence of effectiveness, the Zones® curriculum was launched by Kuypers (2011) and has gained popularity in Tier 1, Tier, 2, and Tier 3 educational settings across North America and around the world (Garcia Winner & Kuypers, 2017). A concerning research to practice gap persists between the 100,000 copies of the Zones® curriculum sold and implemented across the globe (Kuypers, 2018) and the methodological limitations of the current Zones® research base. While the orientation and identified goals of the Zones® aligns with the evidence supporting cognitive- and behaviorally-oriented Secondary/Tier 2 interventions that improve self-control, a dearth of evidence for classifying the Zones® as an empirically supported Secondary/Tier 2 intervention remains. As such, the current study is the first known study to evaluate the Zones® as a Secondary/Tier 2 group intervention that was facilitated by school social workers and involved elementary-age students who were identified based on universal behavioral screening measures.

Method

Participants

Following institutional review board approval from the University of Tennessee-Knoxville, this study was conducted at five elementary schools serving students in grades kindergarten through 5th grade in a large suburban school district located in the Midwest during the 2016/2017 school year. As can be seen in Table 1, the study included 63 students in either 2nd or 3rd grade who were predominantly male (65.1%), identified as White (81%) and were being educated in the general education setting (77.8%). Additional information regarding student selection is provided in the Procedures section.

Table 1
Baseline equivalence of demographic characteristics and screening measures

	Total (N = 63) N (%)	Intervention (*n* = 33) n (%)	Control (*n* = 30) n (%)	Test statistic	*p*-value
Demographic characteristic					
School				1.42	.840
A	12 (19%)	7 (11.1%)	5 (7.9%)		
B	18 (28.6%)	8 (12.7%)	10 (15.9%)		
C	11 (17.5%)	7 (11.1%)	4 (6.4%)		
D	13 (20.6%)	7 (11.1%)	6 (9.5%)		
E	9 (14.3%)	4 (6.4%)	5 (7.9%)		
Grade				.610	.435
2nd Grade	40 (63.5%)	19 (30.2%)	21 (33.3%)		
3rd Grade	23 (36.5%)	14 (22.2%)	9 (14.3%)		
Gender				.063	.801
Male	41 (65.1%)	21 (33.3%)	20 (31.7%)		
Female	22 (34.9%)	12 (19.1%)	10 (15.9%)		
Ethnicity				7.11*	.069
Asian/Pacific Islander	7 (11.1%)	4 (6.3%)	3 (4.8%)		
Black, not Hispanic	4 (6.3%)	4 (6.3%)	0 (0%)		
White, not Hispanic	51 (81%)	24 (38.1%)	27 (42.9%)		
Two or more races	1(1.6%)	1 (1.6%)	0 (0%)		
English Language Learner				1.33*	.249
Yes	4 (6.3%)	1 (1.6%)	3 (4.8%)		
No	59 (93.7%)	32 (50.8%)	27 (42.8%)		
Special Education				1.02	.312
Yes	14 (22.2%)	9 (14.3%)	5 (7.9%)		
No	49 (77.8%)	24 (38.1%)	25 (39.7%)		
Free & Reduced Lunch				.014	.904
Yes	32 (50.8%)	17 (27%)	15 (23.8%)		
No	31 (49.2%)	16 (25.4%)	15 (23.8%)		
Screening measure					
SRSS				.816	.418
SCRS				1.842	.070

Note. Reported test statistics are *t* for continuous and χ^2 for dichotomous measures.
* indicates likelihood data ratio was used to report χ^2 due to low cell counts violating assumptions.

Measures

The Student Risk Screening Scale (SRSS) (Drummond, 1994) universal behavior screening tool was utilized as a screening tool and to assess outcomes. The SRSS is a teacher-reported measure of student risk that results in a total score from the following seven items: Steal, Lie/Cheat/Sneak, Behavior Problem, Peer Rejection, Low Academic Achievement, Negative Attitude, and Aggressive Behavior. Total scores ranging from 0 – 3, 4 – 8, and 9 - 21 place children at the low-, moderate-, and high-risk categories. The SRSS has been found to be reliable and valid for students in kindergarten through sixth grade (Oakes, Lane, Cox, & Messenger, 2014), with strong internal consistency ($\alpha > .85$) and test-retest stability ($r = .69$ - $.79$, $p < .0001$). Ratings on the SRSS have construct validity in that they are associated with teacher ratings of students' self-control skills (Menzies & Lane, 2012).

The Self-Control Rating Scale (SCRS) (Fischer & Corcoran, 2007; Kendall & Wilcox, 1979) was utilized to measure the level of students' self-control. The SCRS includes 33 items designed to measure the extent to which a child's behavior can be described as self-controlling versus impulsive (Fischer & Corcoran, 2007; Kendall & Wilcox, 1979). The SCRS has been studied with several samples of elementary-school-age children and has demonstrated excellent internal consistency ($\alpha = .98$) and good stability with test-retest correlation ($r = .84$, $p < .05$) (Fischer & Corcoran, 2007; Kendall & Wilcox, 1979). Scores on the SCRS can range from 33 to 231; students are presumed to have increased difficulties with self-control the higher their summative score on the SCRS (Kendall & Wilcox, 1979). Boys have typically scored significantly higher than girls, and persons scoring at or above 160 to 165 are said to be candidates for treatment for difficulties with self-control (Fischer & Corcoran, 2007; Kendall & Wilcox, 1979).

Procedures

The school social workers at five participating school sites identified a grade-level teaching group willing to participate in the study. Each participating teacher completed the SSRS for each child in their classroom and subsequently sent invitations to participate to the parents/guardians of students who scored in the moderate or high range on the SRSS; 71 letters were sent home and permission was received from 64 parents/guardians. When parents/guardians consented to participate, assent for participation was obtained from the students; 63 students assented to participate. Participating students ($N = 63$) were randomly assigned to participate in either the intervention group ($n = 33$) receiving the Secondary/Tier 2 Zones® curriculum or to the control group ($n = 30$). The classroom teacher's rating of each student participant's level of disruptive behavior (SRSS) and level of self-control (SCRS) was collected pre- and post-intervention. Post-intervention scores were obtained within two weeks

of the intervention's conclusion. Student pre-assessment screening scores on the SRSS also served as the baseline data for disruptive behavior. Student baseline data on level of self-control using the SCRS was collected from classroom teachers after randomization, thus the teachers were knowledgeable about the purpose of the study.

Secondary/Tier 2 Zones of Regulation® group intervention description

Relying upon previous experience implementing the Zones® (Kuypers, 2011), the researcher and building-level school social workers identified the 12 specific lessons that would be utilized in the study's six-week intervention period (a full listing of the Zones® curriculum and the specific lessons used in the study is available in Appendix A.) Each of the 12 Zones® sessions, conducted by a school social worker, was approximately 30 minutes in duration. The Zones® intervention groups were scheduled at intervals of two group sessions per week and held in the school social worker's office to maintain student confidentiality.

Statistical Analysis

Equivalency between the Zones® intervention group and the control group at baseline was evaluated by comparing between group differences on the student demographic characteristics and screening measures using chi-square and independent samples t-test (see Table 1). Baseline differences between the intervention and the control group were tested for both the SRSS and the SCRS with independent samples t-tests. To assess posttest differences, the general linear regression model included a covariate (i.e. the baseline values of the outcome measures for disruptive behavior and self-control) and a dichotomous predictor for student placement in the intervention condition (i.e. Zones® intervention group or control group). Finally, following guidance from What Works Clearinghouse (WWC), Hedge's *g* was calculated to analyze the effect size associated with the student-level outcomes evaluated in this study (WWC, 2017). According to WWC (2017), guidelines for interpreting effect sizes indicate that effect sizes of .2 are small, .5 are medium, and .8 are large.

Results

As referenced in Table 1, the chi-square and independent samples t-test used to establish baseline equivalence indicated no statistically significant differences between students in the intervention or control condition with regard to baseline levels of disruptive behavior or demographic variables. Full results, including baseline and post-test intervention means, standard deviations, general linear model, and effect size outcomes of the Zones® intervention group with the control group are illustrated in Table 2

(UCLA: Statistical Consulting Group, 2020). After controlling for baseline scores, the treatment group and control group did not differ significantly on either the disruptive behavior measure nor the self-control measure at post-test. Students randomized to the Zones® intervention group did not evidence statistically significant reductions in disruptive behavior (*M*[*SD*] = 7.85[3.61] vs. 6.18[3.84]) nor significant improvements in self-control (*M*[*SD*] = 158.73[*22.98*] vs. 151.94[*31.67*]) based on outcome measures solicited from teachers. Figure 1 displays the pre-post differences in SRSS scores and Figure 2 shows pre-post differences in SCRS scores. The effect sizes for disruptive behavior (g = .04) and self-control (g = .26) fall with the small range. We conducted an ex post facto power analysis and found that for the SRSS there was an observed power of 0.139 and for the SCRS the observed power was 0.08. As such, there is the risk of a Type II error in suggesting there was no differences pre and post between the two group on these two measures.

Figure 1
Pre-post SRSS

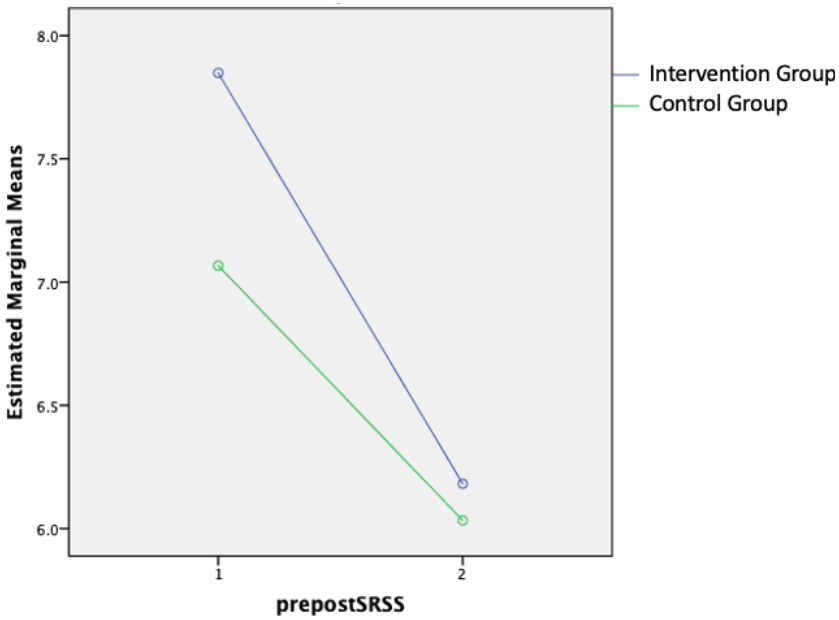

Figure 2
Pre-post SCRS

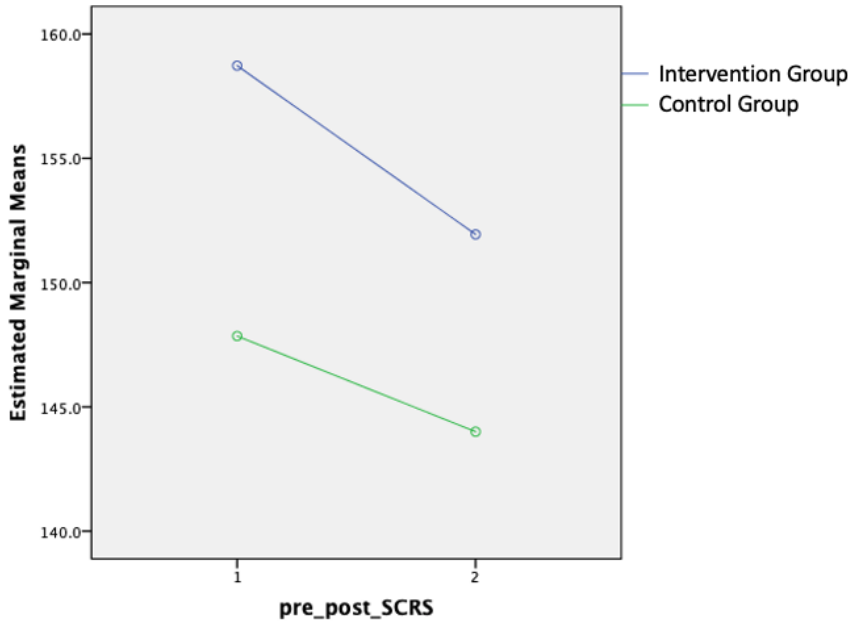

Table 2
Baseline and post-intervention means and standard deviation for outcome measures by condition and regression results.

	Control (n= 30)		Intervention (n = 33)		Condition effect		Effect size
Domain/ measure	Baseline M(*SD*)	Post-intervention M(*SD*)	Baseline M(*SD*)	Post-intervention M(*SD*)	Test statistic	*p*-value	Hedge's *g*
Disruptive behavior							
SRSS	7.07 (*4.0*)	6.03 (*3.64*)	7.85 (*3.61*)	6.18 (*3.84*)	.769	.384	.04
Self-control							
SCRS	147.85 (*23.88*)	144 (*30.23*)	158.73 (*22.98*)	151.94 (*31.67*)	.265	.609	.26

Discussion

This study evaluated the outcomes of the Zones® (Kuypers, 2011) to reduce the disruptive behavior and improve the level of self-control of identified elementary students as a Secondary/Tier 2 intervention. Overall, results of this study indicated that student participation in the Zones® Secondary/Tier 2 group did not have a statistically significant impact on student's measured level of disruptive behavior or level of self-control. Further, the effect size suggests the impact on disruptive behavior was negligible while the effect size for self-control, while still in the small range, demonstrates this application of the Zones® intervention may well have resulted in clinically significant changes.

The rigorous randomized controlled trial utilized in this study addresses an identified need in the school social work literature (Franklin, Kim, & Tripodi, 2009) and begins to fill the void between extensive implementation of the Zones® intervention and the empirical evidence needed to justify its use as an evidence-based practice. Replication of this and other studies into the Zones® are critical given how implementation of the curriculum continues to outpace its evidence of effectiveness.

Limitations and Implications

Despite its rigorous design, the results of this study must be considered in light of the study limitations. First, the sample was limited due to the school social workers at the five participating school sites identifying a grade-level teaching group to participate in the study. Second, this study did not include a formative evaluation component, which is important given the lack of empirical support for Zones®. Specifically, inclusion of efforts to assess the social validity of the Zones® intervention and the school social workers implementation fidelity would have helped to contextualize our summative evaluation results.

Third, this study would have been strengthened if it had included additional outcome measures. For example, inclusion of archival school records such as attendance, behavior (office discipline referrals, suspensions, expulsions, etc.), or standardized assessment data would have provided a broader assessment perspective on Zones® outcomes.

Fourth, the study sample limited the utility of the evaluation. While the intervention and control group were demographically balanced, the limited diversity of the student sample does not adequately reflect the overall diversity of students in public educational settings and the small sample utilized in this study confines outcome generalizations. Additionally, the classroom teachers reporting on student measures in the study often had students participating in both the intervention and control group. Therefore, it is possible that diffusion of the intervention, compensatory rivalry, or

a halo effect impacted observed student outcomes (Rubin & Babbie, 2011).

Fifth, it is important to note these findings are based on the implementation of only 12 of the 18 lessons in the Zones® curriculum sequence, which may have influenced outcomes on measures of disruptive behavior and self-control. Children may need full exposure to the curriculum and more time for adequate practice of the skills they learn in a Zones® group with the school social worker before behavioral changes are observed (Wyman et al., 2010).

Finally as reported in the Results section, the findings of no differences pre and post between the two group on these two measures must be tempered by the low statistical power to detect differences pre and post on the two measures.

Future Research on the Zones of Regulation®

We have several recommendations for future research regarding the Zones® as a Secondary/Tier 2 intervention. First, outcome measures should assess proximal outcomes encompassing student attendance, behavior, and coursework when applicable (Lane et al., 2014; Oakes et al., 2014). Additionally, soliciting input from multiple respondents knowledgeable about the student, such as parents/guardians and the students' themselves, could expand the assessment perspective on student outcomes associated with the Zones®. Second, future studies on the effectiveness of the Zones® should have larger student samples to allow for outcome generalizations beyond the study and to ensure adequate power for statistical analysis**.** Third, evaluations should include a formative evaluation component that includes an assessment of implementation fidelity as well as social validity. Since completion of this study, the Zones® publisher, SocialThinking (2017) released implementation and fidelity guidance stating that use of the Zones® in general education settings requires a minimum of two 20-minute sessions per week to adequately cover concepts in the full 18-lesson sequence (Kuypers, 2011) and that the intervention's duration should be spread over five months. While movement among lessons within the curriculum remains flexible, future research into the Zones® (Kuypers, 2011) should consult this guidance when evaluating the curriculum's full scope and sequence for students in Secondary/Tier 2 interventions within MTSS models (Kelly, Raines, Stone, & Frey, 2010; Lane et al., 2014; SocialThinking, 2017). Additional research efforts should explore the social validity of the Zones® to meet the identified needs of disruptive students, their classroom teachers, and school social workers.

Conclusion

Approximately three to four students per classroom are typically identified as having delinquent, antisocial, and problematic

disruptive behaviors in educational settings (Brauner & Stephens, 2006; Satcher, 2004; Thompson, 2014). Not only do these students struggle behaviorally, but they are also likely to grapple with academic underachievement (Walker, 2004). Given the popularity and large-scale implementation of the Zones® in educational settings (Kuypers, 2011) to reduce disruptive behavior and improve self-control, it is imperative that future research into school social workers' use of the Zones® explore the social validity of the intervention. This study was the first known summative evaluation of school social workers facilitating the Zones® as a Secondary/Tier 2 group intervention for elementary students identified for disruptive behavior concerns following universal behavioral screening in a school setting. As such, this study provides valuable input for future research and the practice of school social work, as well as perspectives regarding the implementation for the Zones® (Kuypers, 2011) within MTSS school social work practice settings.

Appendix A

Zones of Regulation® Lesson Sequence (* = utilized in the study)

Lesson 1*	Creating Wall Posters of The Zones®
Lesson 2*	Zones® Bingo
Lesson 3*	The Zones® in Video
Lesson 4*	The Zones® in Me
Lesson 5*	Understanding Different Perspectives
Lesson 6*	Me in My Zones®
Lesson 7	How Do I Feel?
Lesson 8	My Zones® Across the Day
Lesson 9*	Caution! Triggers Ahead
Lesson 10	Exploring Sensory Support Tools
Lesson 11*	Exploring Tools for Calming
Lesson 12*	Exploring Tools—Thinking Strategies (Size of the Problem)
Lesson 12*	Exploring Tools—Thinking Strategies (Inner Coach versus Inner Critic)
Lesson 12*	Exploring Tools—Thinking Strategies (Superflex versus Rock Brain)
Lesson 13	The Toolbox
Lesson 14	When to Use Yellow Zone Tools
Lesson 15	Stop and Use a Tool
Lesson 16	Tracking My Tools
Lesson 17	STOP, OPT, and GO
Lesson 18*	Celebrating My Use of Tools

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