CORE Matters: A Bullying Intervention Pilot Study

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Abstract

While bullying is a serious concern for students and educators alike, empirically tested interventions are needed. This study examined the impact of a bullying intervention curriculum at a public middle school in the Midwest. This intervention, CORE Matters, was designed to reduce bullying behaviors, foster a greater sense of community cohesion and trust in the school, improve school climate, and increase student self-esteem. As such, the intervention required participation of teachers, administrators, students, and outside experts. CORE Matters was modeled after theoretical frameworks of socioemotional learning and Bloom's taxonomy. Additionally, components of This We Believe outlining successful schools were considered. Uniquely contributing to this intervention is the inclusion of martial arts instruction. The intervention was taught as a whole, integrated model. The t-tests indicated significant differences between the control and intervention groups on measures of school climate, student self-esteem, and school cohesion and trust. Students in the intervention group scored higher in measures of self-esteem and rated their schools more positively on measures of cohesion and trust and climate.

Keywords: bullying, resilience, middle school

School-based violence remains a public health issue in the United States. Students involved in violent situations at school are classified as offenders, victims, or witnesses and the Centers for Disease Control and Prevention (CDC 2014) reported that, in 2014, more than 200,000 school-aged youth sustained non-fatal injuries from physical assaults. One of the more common forms of school-based violence is bullying: intentionally aggressive and often repetitive behavior by one individual or group.
against another in which there exists an inequality in power or status (Ashbaugh & Cornell, 2008). Bullying can occur in many ways, including verbal aggression, physical assault, relational bullying (e.g., spreading rumors and actively excluding others), and online/cyber bullying through text messaging and social media sites (Rettew & Pawlowski, 2016). Although research suggests that bullying has decreased over the last few decades (Finkelhor, Turner, Shattuck, & Hamby, 2013; Waasdorp, Pas, Zablotsky, & Bradshaw, 2017), 20% of students still reported being bullied in some form at school within the last year (Kann et al., 2016).

Aggressive behavior and peer-bullying can even occur among toddlers and preschoolers (CDC, 2014; Kirves & Sajaniemi, 2012). Early childhood risk factors for youth violence include lack of social skills, impulsive behavior, poor emotional control, and ineffective problem-solving skills (David-Ferdon et al., 2016). Juxtaposed with past views of bullying as a “rite of passage,” a contemporary understanding reflects the idea that this prevalent phenomenon has lasting psychological and physical ramifications on perpetrators as well as victims. Those who both bully others and are victims themselves (i.e., bully-victims) display the highest level of problems (Lereya, Samara, & Wolke, 2013). Studies show that early exposure to youth aggression and violence increases the risk for future problems like violence perpetration and victimization, substance use, high-risk sexual behavior, and school dropout (David-Ferdon et al., 2016). Moreover, youth who are bullied are at an increased risk for anxiety, stress, depression, and suicide (David-Ferdon et al., 2016; Hertz, Donato, & Wright, 2013; Hinduja & Patchin, 2010).

This study examined the impact of a bullying intervention curriculum at a public middle school in the Midwest. This intervention, COREMatters, was designed to reduce bullying behaviors, foster a greater sense of community cohesion and trust in the school, improve school climate, and increase student self-esteem. COREMatters was modeled after theoretical frameworks of socioemotional learning and Bloom’s taxonomy and included martial arts instruction. Additionally, components of This We Believe (National Middle School Association [NMSA], 2010) outlining successful schools were considered. The intervention was taught as a whole, integrated model and required participation of teachers, administrators, students, and outside experts.

**Bullying Interventions and Social-Emotional Learning**

A systematic review of school-based interventions aimed at reducing bullying revealed that only 40% of curriculum-based interventions were effective in reducing youth aggression and bullying (Vreeman & Carroll, 2007). Furthermore, some interventions actually produced an increase in bullying among certain populations. In contrast, studies indicate that whole-school interventions are more effective, especially programs that include social-emotional learning (SEL) as a key component for addressing bullying at the individual and peer levels (Smith & Low, 2013; Ttofi & Farrington, 2011). Accordingly, the importance of SEL is recognized at the state, district, and national levels. The National Association of State Boards of Education (NASBE; 2013) noted the significance of cultivating healthy social-emotional development to combat bullying and foster school and life successes of children and youth. The Collaborative for Academic, Social, and Emotional Learning (CASEL; 2015)—a leader in the domain of social and emotional development—stressed the impact that social and emotional health can have on student learning and asserted that it is imperative to teach children how to effectively “manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions” (p. 1).

According to CASEL, effective SEL programs foster five key competencies: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. These competencies facilitate academic learning as well as other positive outcomes, such as fewer negative behaviors, more positive attitudes, and reduced stress (CASEL, 2015; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Taylor, Oberle, Durlak, & Weissberg, 2017).

**Self-awareness** involves recognition of personal feelings, thoughts, and values and how they influence behavior as well as understanding personal strengths and challenges and developing optimal self-confidence and self-efficacy. **Self-management** encompasses the ability to regulate internal processes (i.e., impulse control and stress management) and effectively work to achieve goals through self-discipline and self-motivation. **Social awareness** stresses the importance of empathy, respect, and appreciation of diversity. Similarly, the **relationship skills** competency highlights...
prosocial behaviors such as effective communication and engagement with others, relationship-building, and teamwork. Finally, responsible decision-making refers to the ability to consider safety, ethics, social norms, and potential consequences when solving problems and making choices (CASEL, 2015).

Social and emotional competencies are especially salient during adolescence. Associated with the onset of puberty, this transitional period from childhood to adulthood is accompanied by physical, social-emotional, and cognitive transformations that can contribute to intrapersonal and interpersonal challenges. Hormone levels in the brain and body drastically change during puberty, which is associated with altered peer and parent–child social relationships (Paikoff & Brooks-Gunn, 1991), heightened sensitivity to social-emotional cues (Ferri, Bress, Eaton, & Proudfit, 2014; Somerville, Kim, Johnstone, Alexander, & Whalen, 2004), increased rates of psychopathology (Dearoff et al., 2007), and other challenges. Adolescence is arguably one of the most stressful periods of development for many individuals. However, the aim of CASEL’s core SEL competencies is to mitigate some of these challenges by teaching skills that are applied both within the individual as well as interpersonally in various settings such as school, at home, and in the community.

There are more than 200 SEL programs in operation (Taylor et al., 2017). Research suggests that many, if not all, of the core competencies of SEL can be integrated with and taught through physical education (Ciotto & Gagnon, 2018; Jacobs & Wright, 2014; Lu & Buchanan, 2014), athletics (Bean, Whitley, & Gould, 2014; Gordon, Jacobs, & Wright, 2016; Samalot-Rivera & Porretta, 2013; Tracy & Erkut, 2002; Van Boekel et al., 2016), contemplative and mindfulness practices like yoga and meditation (Butzer, Bury, Telles, & Khalsa, 2016), and martial arts (Lakes & Hoyt, 2004; Milligan et al., 2017).

Although SEL is taught using various approaches, student age appears to influence effectiveness. Research indicates that older adolescents are more resistant to changing their social-emotional skills than younger children (Durlak et al., 2011). There are sensitive periods for imparting cognitive and SEL skills in children most effectively, typically during early and middle childhood. This may be, in part, because as patterns of behavior are more practiced, they become ingrained within an individual and more difficult to alter or extinguish.

As such, character development (i.e., SEL) programs that target older adolescents are not as effective as programs that target younger adolescents and children (Heckman & Kautz, 2013). Moreover, follow-up periods for programs that target older adolescents are typically not as lengthy as those for early childhood and elementary programs, and the benefits of interventions for older adolescents taper off after a few years because those programs are designed to only temporarily alter their environment and motivation to change during the intervention (Heckman & Kautz, 2013). Thus, it stands to reason that SEL programs that (a) target students before high school, and/or (b) provide incentives for adolescents to maintain prosocial behavior well after the completion of the program are the most promising.

Martial Arts as an Intervention

While the practice of martial arts effectively improves various areas of physical fitness, favorable outcomes extend to discipline and character growth (Lakes & Hoyt, 2004). Additionally, martial arts are associated with positive affective benefits, such as higher self-esteem, emotional stability, assertiveness, and self-confidence (Cho, Kim, & Roh, 2017; Liu et al., 2015; Weiser, Kutz, Kutz, & Weiser, 1995). Social benefits of martial arts training include learning cope with challenging situations, such as competition and perceptions of disadvantage (Weiser et al., 1995); increased respect; and positive effects on the development of sociability (Finkenberg, 1990; Roh, Cho, & So, 2018). Finally, martial arts study has cognitive benefits including increased concentration and awareness as well as improved executive function (Cho, Kim, et al., 2017; Diamond & Lee, 2011; Lakes et al., 2013).

Although evidence on the benefits of martial arts study is ample in the literature, research examining martial arts as interventions for violence, aggression, and bullying is sparse and inconsistent. Some evidence suggests no significant association between martial arts participation and juvenile anger and aggression (Gubbel, van der Stouwe, Spruit, & Stams, 2016), while other research indicates that martial arts are associated with higher levels of anger and violence (Lotfian, Ziaee, Amini, & Mansournia, 2011; Mutz, 2012; Ziaee, Lotfian, Amini, Mansournia, & Memari, 2012). Still other research asserts that martial arts are associated with decreased externalizing behaviors (Harwood, Lavidor, & Rassovsky, 2017; Twemlow et al., 2008; Vertonghen...
& Theeboom, 2010). This inconsistency also extends to views of moderating factors.

**Moderating Factors**

Researchers generally agree that instructor approach is a moderating factor in the association of martial arts and externalizing behaviors (Milligan et al., 2017). With instructors that promote peace, mindfulness, acceptance, and respect, lower levels of student aggression and violence are observed (Harwood et al., 2017; Milligan et al., 2017). Some evidence indicates age is also a moderating factor with substantial differences observed in gains of self-regulation in younger compared to older children (Lakes & Hoyt, 2004). Type of martial arts studied may be another moderating factor in the association with aggression and violence. Classical martial arts styles such as karate have traditionally been associated with less aggression than boxing or judo (Gubbels et al., 2016). Further, Milligan et al. (2017) found that when integrated with mindfulness approaches, such as increased acceptance of the present moment as well as awareness of thoughts and bodily sensations, even mixed martial arts (MMA)—traditionally viewed as an aggressive style of martial arts—was associated with social and emotional benefits (Milligan et al., 2017).

Accordingly, Harwood et al. (2017) conducted a meta-analysis of 12 studies examining the effects of martial arts study on anger, aggression, and violence. Both traditional and modern styles of martial arts including karate, aikido, judo, taekwondo, as well as custom and integrated styles such as “Mindfulness martial arts,” “Leadership Education through Athletic Development (LEAD) martial arts,” and “gentle warrior martial arts” were reviewed. The meta-analysis revealed that the type of martial arts studied did not significantly lessen the positive effects of aggression-reducing interventions if grounded in customary ancient martial arts practices such as internal reflection, ancient philosophies, and breathing practices. For instance, “controlled behaviors”, “repetitive movements”, and “respect” were among the several common themes present during the interventions. The authors concluded that martial arts “is a potentially worthwhile intervention for youth at risk of externalizing behavior problems” (Harwood et al., 2017, p. 99).

**Mechanisms**

Researchers acknowledge the dearth of studies that examine the mechanisms underlying cognitive and social-emotional improvements related to martial arts study (Cho, So, & Roh, 2017; Harwood et al., 2017). Nevertheless, at the neurocognitive level, scientists suggest that an increase in the levels of neuroplasticity-related growth factors contribute to improvement in cognitive functioning (Cho, So, et al., 2017; Kaunhoven & Dorjee, 2017). Evidence also indicates that positive emotional state (Kaunhoven & Dorjee, 2017), self-regulation (Kaunhoven & Dorjee, 2017; Lakes & Hoyt; Milligan et al., 2017; Milligan, Badali, & Spiroiu, 2015), and mindfulness (Greenberg & Harris, 2012; Kaunhoven & Dorjee, 2017; Milligan et al., 2015) are key processes that undergird positive outcomes of martial arts study. Diamond and Ling (2016) postulated that executive function could be affected directly through training or indirectly by reducing negative circumstances and increasing positive ones. It is possible that martial arts interventions improve executive function. Alternatively, exercise (e.g., martial arts) reduces stress, improves sleep, increases joy, and enhances social inclusion and belonging, which in turn enhances executive function. As such, the improvement may be due to alleviating negative situations (Diamond & Ling, 2016).

**Alignment with This We Believe**

The focus of this pilot study was a bullying intervention program (COREMatters)—a cohesive and multifaceted intervention with a curriculum that directly addresses components of SEL, problem solving, and improving the school environment. In 2010, NMSA released This We Believe: Keys to Educating Young Adolescents, which described necessary components for successful schools and successful learners (NMSA, 2010). The essential attributes and characteristics outlined in This We Believe serve as a guide for educational programs to aid students in achieving goals, COREMatters addressed many of these elements. The attribute of empowering provides students with skills and knowledge to feel a sense of agency and control of self and life, and COREMatters had a strong focus on SEL, particularly student self-esteem and responsibility. Additionally, this intervention encompassed two Culture and Community Characteristics: This intervention was deliberate in its inclusion of school staff and administrators in order to create an “inviting, safe, inclusive, and supportive” school environment, and the use of this intervention demonstrated a “health and wellness” focus of the
participating schools and classrooms. Additionally, the intervention offered an exploratory, integrative, and relevant curriculum using multiple learning and teaching approaches, which addressed two points under Curriculum, Instruction, and Assessment Characteristics of desired educational programs.

Method

Participants
Participants included students in fourth and fifth grades and seventh and eighth grades at a public school in the Midwest (N = 404). Institutional Review Board approval was granted through a regional university. Informed consent was collected from administrators and teachers at the school location. Informed consent was also collected from parents of participating minors in the study. Additionally, participating students signed a Child Assent Form prior to beginning the COREMatters curriculum and data collection. Some classes served as the control group and completed the surveys but did not complete the CoreMatters curriculum. Other classes were designated as intervention groups and participated in the CoreMatters curriculum. Designation of intervention and control classes were made by the school based on pseudo-random placement. The control group (n = 228) was comprised of 54.4% male and 45.6% female students. Children identified as multi-racial (35.1%), White (15.8%), Black (11.4%), American Indiana/Alaskan (3.1%), and other (34.6%). The intervention group had 47.2% male and 52.8% female students. Children in the intervention group are identified as multi-racial (18.4%), White (34.1%), Black (21.3%), American Indiana/Alaskan (1.1%), and other (24.1%). Grade distribution for the control group and intervention groups respectively were as follows: fourth grade (21.1%; 25%); fifth grade (26.8%; 26.1%); seventh grade (21.9%; 24.4%); eighth grade (30.3%; 24.4%). None of the demographic between-group differences was significant. Due to the size differential in the intervention and control groups, Levene’s Test for Equality of Variance was performed for all variables in the analysis. When equal variance was not demonstrated, this was corrected using the Welch-Satterthwaite method prior to interpretation of results.

Procedures and Measures
Participating students completed a survey packet that included demographic items and items drawn from various sources, including the Connor Davidson Resilience Scale and the Bullying Compendium, a collection of bullying, victimization, and perpetration surveys compiled and published by the National Center for Injury Prevention and Control of the Centers for Disease Control and Prevention. The specific items used for the COREMatters project were taken from the Bullying subscale (α = .87) and the Victim subscale (α = .88) of the Illinois Bully Scale, the Prosocial subscale of the Child Social Behavior Questionnaire (α = .68), the Social Cohesion and Trust subscale (α = .84) of the Student School Survey. Items were also utilized from the School Climate Bullying Survey and the Connor-Davidson Resilience Scale. The Illinois Bully Scale items addressed frequency of bullying (e.g., “I upset other students for the fun of it.”) and victimization (e.g., “Other students made fun of me.”) behaviors. Response levels consisted of 0 (never), 1 (one or two times), 2 (three or four times), 3 (five or six times), and 4 (seven or more times). Items chosen from the Child Behavior Checklist examined prosocial behavior, asking how often the items were true (e.g., “How often are you nice to another child in your class who is sad or unhappy?”). Response categories were 1 (never), 2 (not very often), 3 (sometimes), 4 (very often), and 5 (always). Items used from the Student School Survey focused on school cohesiveness and climate (e.g., “This is a pretty close-knit school where everyone looks out for each other.”). These items were measured on a five-point Likert scale with 1 (strongly disagree) to 5 (strongly agree). The School Climate Bullying Survey asked students to report on bullying activities at the school (e.g., “Students get teased about their clothing.”). Six items were used from this survey and were assessed on a four-point scale, 1 (strongly disagree), 2 (disagree), 3 (agree), and 4 (strongly agree). The 25-item Connor-Davidson Resilience Scale was used in full (e.g., “I am not easily discouraged by failure.”). Response categories were 0 (not true), 1 (rarely true), 2 (sometimes true), 3 (often true), and 4 (true nearly all the time). Additionally, six items measuring disrespect were included. These items were created by the COREMatters project managers and did not undergo prior screening. The items (e.g., “It is okay to interrupt someone when they are talking.”) assessed on a six-point scale with 1 (very strongly disagree), 2 (mostly disagree), 3 (slightly disagree), 4 (slightly agree), 5 (mostly agree), and 6 (very strongly agree).

The COREMatters curriculum was team-taught by a law enforcement officer and a master of martial arts.
The curriculum consisted of 45-minute classes taught once per week over the course of 13 weeks. The curriculum was created by the COREMatters team and aligns with Illinois State Learning Standards in physical education and social/emotional wellness, with particular focus on cognitive, affective, and psychomotor domains of educational activities. The curriculum was developed using principles of Bloom’s taxonomy. Instruction focused on discipline and respect for self and others and was primarily taught using a combination of discussion and martial arts, specifically taekwondo. Students engaged in role-play activities and were instructed to focus on the lessons they learned regarding self-control and problem-solving. Each lesson included a stated goal and numbered objectives.

The first lesson was an introduction to the curriculum, rules, and code of conduct. The focus of lesson 2 was Ownership, which focused on responsibility, respect, and mastery of skills. Lesson 3 introduced the Core. This lesson demonstrated both the physical and metaphorical importance of a strong core in dealing with life’s circumstances. Lesson 4 centered on identity and internal values. Character/Self Respect were emphasized for lesson 5. Lesson 6 expressed the importance of Control and the connection between physical control and inner empowerment. The next lesson was Decision Making. In this lesson students created a safe decision plan to enable them the confidence to respond appropriately to negative situations. Lesson 8, Decision Making Practice, was an opportunity to apply the plan in real-life (or simulated) situations. Lesson 9 introduced the idea of Power. Power was described as confidence and ability to stand up for individual rights. Next, Tools of Assertiveness were discussed, particularly how being assertive in a situation may help decrease student feelings of insecurity. Lesson 11 was the application portion, Assertiveness Practice, in which students used repetitive practice to instill the concepts of assertiveness. Lesson 12, Bullying, gave students direct information about bullying and how to decrease it as well as the opportunity to role play bullying situations with attention to reaction and empowerment. In the final lesson, Final Bow, students incorporated and applied all the techniques they had learned and discussed their personal growth in various areas.

Results
The appropriate items were reverse coded and subscale means were determined. Subscale means, standard deviations, and Pearson bivariate correlations for the subscales are reported in Table 1. Alphas were also assessed for the subscales. Internal consistency for the prosocial subscale was .80. The Victim and Bully subscales of the Reduced Aggression and Victim Scale also showed high internal consistency (α = .89 and α = .82, respectively). The items from the Illinois Bully Scale were also split into Victim (α = .90) and Bully (α = .76) subscales. Reliability statistics for the School Climate and the Self-esteem scales were lower (α = .63 and α = .61) and warrant critical evaluation for further analysis. The School Cohesion and Trust subscale had high internal consistency (α = .89). Lastly, the Resilience scale displayed high internal consistency (α = .92).

Next, independent t tests were performed to determine whether the COREMatters curriculum group significantly differed from the control group on the subscale measures. A significant difference (t(324) = 3.03, p = 0.003) was observed for the School Cohesion and Trust subscale, demonstrating higher levels of cohesion and trust for the intervention group (M = 3.69, SD = .74) compared to the control group (M = 3.90, SD = .58).

A significant difference was also observed for the Self-Esteem scale (t(402) = −2.98, p = 0.003). Student self-esteem was higher in the intervention group (M = 3.88, SD = .64) than the control group (M = 3.68, SD = .67). Lastly, a significant difference was observed for the School Climate scale (t(402) = 2.21, p = 0.028). School Climate had higher scores by the control group (M = 2.18, SD = .52) than the intervention group (M = 2.06, SD = .62).

Discussion
The results of this study suggest that the COREMatters program did have a significant impact on the student experience. In particular, significantly higher self-esteem measures observed in the intervention group are consistent with research utilizing physical activity as an intervention tool. Other research has supported physical activity as an intervention, specifically in school-based settings, to increase student self-esteem (Ahn & Fedewa, 2011; Eekland, Heian, Hagen, Abbott, & Nordheim, 2004; Liu, M. et al., 2015). As the physical activity component of the COREMatters program was based on martial arts, it is reasonable to assume the martial arts physical activity from this program was influential in the increase of student self-esteem.
Table 1
Correlations and Descriptive Statistics for Scales Used in the COREMatters Analyses (N = 404)

| Variables       | Mean | SD  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   |
|-----------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1. Prosocial    | 3.71 | .73 |     |     |     |     |     |     |     |     |     |
| 2. MSsct        | 3.81 | .66 | .34**|     |     |     |     |     |     |     |     |
| 3. Bully        | .18  | .32 | -.24**| -.24**|     |     |     |     |     |     |     |
| 4. Victim       | .72  | 1.00| .10*| -.16| .29**|     |     |     |     |     |     |
| 5. Self-esteem  | 3.77 | .66 | .14**| .23**| -.18**| -.28**|     |     |     |     |     |
| 6. Resilience   | 2.73 | .69 | .31**| .35**| -.06| -.11*| -.38**|     |     |     |     |
| 7. RAV          | .62  | .82 | -.01| -.22**| .45**| .78**| -.30**| -.17**|     |     |     |
| 8. Disrespect   | 1.36 | .71 | -.19**| -.20**| .26**| .02| -.05| -.16**| .13*|     |     |
| 9. School Climate| 2.13 | .57 | .03| -.21**| .08| .27**| -.21**| -.15**| -.21**| -.13**|     |

* *p < .05.
** *p < .01.
Because the COREMatters program was a multidimensional curriculum, the significant difference in self-esteem scores between the intervention and the control groups was likely to have been the result of the program as a whole rather than a single component. This particular issue is relevant for all significant findings. Because the program was an integrated curriculum of martial arts training and education, the observed effects cannot be attributed to only one of these program components. However, the current study lends support to the efficacy of both educational and physical training interventions in a school-based setting.

Secondly, the mean scores for school climate were significantly higher in the control group. Because of the wording and scale of these items (i.e., four-point scale from 1 = strongly disagree to 4 = strongly agree), a higher score on this scale indicates a negative school climate. School climate, or the “quality and character of school life” is characterized by the school experiences of students, parents, teachers, and other staff (National School Climate Council; NSCC, 2018). Grounded in social disorganization theory (Shaw & McKay, 1942) and social control theory (Hirschi, 1969), school climate is an important component of bullying prevention (Gendron, Williams, & Guerra, 2011; Yang, Sharkey, Reed, Chen, & Dowdy, 2018), with aspects such as positive relationships among students and teachers and negative attitudes toward bullying being most salient (Wang, Berry, & Swearer, 2013). These findings suggest that the COREMatters program positively impacted the school climate, or the student perception of school climate. In particular, students in the intervention group reported less teasing of other students based on categories such as clothing, appearance, and race.

Lastly, the intervention group was significantly higher in ratings on the School Cohesion and Trust subscale, on which higher scores indicate more cohesion and trust. This scale contained items related to student and faculty behavior and attitudes, as well as the general sense of belonging. Higher scores indicate that students in the intervention group felt a greater sense of belonging and viewed their school as a safe place. In addition, these students had more favorable views of their teachers and administrators than the control group. Further, a sense of belonging may decrease negative behaviors, such as bullying in a school setting (Osterman, 2010). In all, these group differences suggest that although further research and further studies are warranted, the COREMatters curriculum had a positive impact on various areas of concern in school settings and on the students’ development.

### Limitations

Mayer and Salavoy’s (1993) as well as Goleman’s (2006) work on emotional and social intelligence has underpinned best practices of SEL (as cited in Domino, 2013); the present study supports the importance of bullying and self-esteem interventions grounded in these theories. While these findings contribute to self-esteem, bullying, and SEL literature, it is important to discuss limitations of the study. Although there were significant results for self-esteem, school cohesion, and trust, as well as trends for overall bullying, it is beyond the scope of this study to posit the specific mechanisms of change that underlie the positive outcomes of the COREMatters intervention. It is important to note that the COREMatters program included physical training as well as educational and other skills training. This research did not conclude whether the program as a whole or any of the individual components were most influential in the results observed. Further, other research has asserted that neuroplasticity-related growth factors (Cho, So, et al., 2017; Kaunhoven & Dorjee, 2017), positive emotional state (Kaunhoven & Dorjee, 2017), self-regulation (Kaunhoven & Dorjee, 2017; Milligan et al., 2015), and mindfulness (Greenberg & Harris, 2012; Kaunhoven & Dorjee, 2017; Milligan et al., 2015) may contribute to cognitive and social-emotional improvements associated with interventions that include or are comprised of martial arts. Future studies that clarify the mechanisms of improvement are needed.

Surprisingly, the COREMatters curriculum did not produce a significant decrease on the bullying behaviors scale but was observed in other scales that assessed specific bullying or teasing behaviors. Although decrease on this measure was expected to occur primarily as a result of the inclusion of martial arts training, it is important to note that students in the intervention group were not separated based on experiences as victims or perpetrators of bullying or aggressive behavior. As such, students with a variety of experiences (e.g., as victim, as bully, as witness) were included in both the control and intervention groups. The martial arts training received as part of this curriculum specifically focused on self-control and restraint, which are skills relevant to all children.
specifically those engaging in bullying behaviors. It is possible that a reduction on this measure was not observed because of the duration of the intervention. Daniels and Thornton (1990) noted that length of training had a significant effect on martial artists. In particular, while individuals initially attracted to martial arts were more hostile, this hostility declined with duration of training. Thus, it is possible that increasing the length of the COREMatters intervention may yield significant decreases in bullying behaviors.

Additionally, two of the scales finding significant results did have lower than expected alpha values. While the use of Cronbach’s alpha is common (Schmitt, 1996), its application in research is quite varied. This work used Cronbach’s alpha as a measure of internal consistency for the various scales used in the analysis. While this is a common and appropriate method of assessing scale reliability, Herman (2015) argued that internal consistency is underestimated for small scales. The self-esteem scale and the school climate scale both had fewer than 10 items, which may partially account for the slightly lower Cronbach’s values. Alpha values generally increase with the size of the instrument (Schmitt, 1996), but adding more items simply for the sake of increasing this value is not always advisable. In some cases, further examination of the items can reveal patterns not immediately obvious. In such cases, decreasing an already small instrument may actually increase the reliability statistic. For example, when only the items of the School Climate scale related to student behavior were checked for reliability, the alpha value of the scale increased (α = .76). This suggests that the scale is a reliable measure of school climate perception as it relates to students but may not be a reliable measure of student awareness of teacher or adult helping behaviors. Essentially, students are more likely to have reliable perceptions of peers than of adults.

Scale size is not the only issue relating to problems with alpha values in research. Other issues are also important for understanding the significance or impact of the current findings. For example, cut-off levels have great variability in the published research. Taber (2017) analyzed alpha-related issues in peer-reviewed publications and noted a lack of consistency in both terminology and values presented as acceptable/sufficient, reasonable/adequate, moderate/satisfactory, and good/high. In the review, which began with 69 published works from high-ranking journals, variations of “acceptable/sufficient” to “high” alpha values ranged from .45 to .98. Taken together, these reliability issues, though important to consider, do not substantially detract from the significance of the findings and the assertion that more research into the COREMatters curriculum is warranted.

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