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SELF-REGULATION PREDICTING SOCIAL COMPETENCY

**Through the Elementary School Years: Self-Regulation Predicting Social Competence
With Student-Teacher Relationships As Mediators**

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Abstract

Using a longitudinal, nationally representative dataset, ECLS-K:2011, research was conducted to determine the predictive relationship between Self-Regulation in kindergarten and first-grade years and Social Competency in the third- and fourth-grade years of elementary school. Along with this, Student-Teacher Relationships were studied to determine if they could mediate the relationship between Self-Regulation and Social Competency. These aspects have been extensively studied individually in previous research, but this study looks at how these aspects work together and the implications that these relationships have. The current study documented that a) Working Memory predicts indices of Behavioral Engagement and Internalizing Behavior Problems in the classroom, b) Prosocial Behavior is predicted by closeness in Student-Teacher Relationships, and Loneliness is predicted by conflict in Student-Teacher Relationships and c) Prosocial Behavior is predicted by the degree of closeness in Student-Teacher Relationships through Self-Regulatory aspects of cognitive flexibility, attentional focus, and working memory in kindergarten. The findings of the current study highlight the importance of early and close Student-Teacher Relationships and how these relationships can mediate the aspects of self-regulation and social competency.

Introduction

Education is an incredibly diverse field, with all educators and their students have a wide variety of individual needs. Aspects such as self-regulation, executive function, and effortful control in early childhood are used to predict certain traits that could become relevant in the future. Self-regulation is seen as the developmental integration of cognition and emotion during early childhood (Blair & Razza, 2007). Executive function can be defined as the control of cognitive self-regulatory processes with a focus on automatic aspects of regulation and emotional reactivity (Blair & Razza, 2007). Effortful control, on the other hand, is the ability to inhibit a dominant response in favor of a subdominant response and therefore leads to the regulation of approach and withdrawal behaviors when faced with rewards or punishments (Blair & Razza, 2007).

These traits are used to predict behaviors in children as they grow older, as well as a prediction for their academic ability and relationships they form with their teachers. For example, in a study done by Blair and Razza, researchers found that “for mathematics knowledge and letter knowledge, self-regulation measured both in preschool and in kindergarten accounted for significant variation. Teacher-reported effortful control and the inhibitory control aspect of executive function were positively associated with mathematics ability and with the letter knowledge aspect of emerging literacy” (Blair & Razza, 2007, p. 657). Because literacy and mathematics ability are essential to a child’s success in school, research must be done to determine which factors in self-regulation and teacher-student relations affect the skills required for early academic success.

Teacher-Student Relationships

Teacher-student relationships have been studied heavily as explanations and predictors of certain behaviors and abilities of students in school. In a study done by Cadima, Doumen, Verschueren, and Buyse, children's inhibitory control was observed at the beginning of kindergarten along with teacher-child relationship quality, and then again at the end of kindergarten and in first-grade (Montroy, Bowles, Skibbe & Foster, 2014). This study found that teachers perceived children as having higher levels of behavioral engagement in classroom learning if they had high levels of self-regulation skills (Montroy, Bowles, Skibbe & Foster, 2014).

In a similar study, researchers Hamre and Pianta found that early teacher-child relationships are predictors of academic and behavioral outcomes throughout early elementary school with mediated effects through the eighth grade (Hamre & Pianta, 2001). Interestingly, this study also found that despite significant behavior problems, children who developed relationships with their kindergarten teachers marked by low levels of negativity were more likely to avoid future behavioral difficulties (Hamre & Pianta, 2001). Regardless of academic skills or behavior problems, positive student-teacher relationships matter for the future of a child. Teacher-student relationships can also predict behavior problems. Found in a study by Pianta and Stuhlman on student-teacher relationships, "more conflict and less closeness were associated with higher levels of perceived child internalizing problems" (Hamre & Pianta, 2001, p. 452). Along with this, positive teacher-child relationships that include support and care leads to higher levels of behavioral engagement for the child (De Laet et al., 2015).

Another aspect of teacher-student relationships is the demographics of the school in which the teacher teaches, and the student attends. In a study by Pianta, Jerome, and Hamre, the trends of teacher-student relationships were examined for 878 children from kindergarten

through sixth grade. It was found that different teachers' ratings of both conflict and closeness were moderately stable between kindergarten and sixth grade, but that there were decreases in closeness in the later years of the study (Jerome, Hamre & Pianta, 2009). Also, "children who began school with lower achievement scores not only started with greater conflict and less closeness but continued to have lower-quality relationships with teachers at each time point through sixth grade" (Jerome, Hamre & Pianta, 2009, p. 935). It is also important to note that children who identified as Black started kindergarten with higher average teacher perceptions of conflict, and the gap between teacher ratings of conflict between these children and white children grew more significant toward middle elementary school years (Jerome, Hamre & Pianta, 2009). One must take into account the demographics to determine why individual teachers rate their closeness or conflict with students in the way that they do.

Self-Regulation

Self-regulation is an essential predictor of behaviors and academic abilities in students. In a study conducted by Montroy, Bowles, Skibbe, and Foster, social skills, social functioning, and problem behaviors in preschool students were observed in order to find the relationship between preschool self-regulation and literacy and math achievement. According to researchers, "one way that self-regulation may be linked to academic achievement is that self-regulation supports children's ability to initiate positive interactions with others, and these positive interactions facilitate learning" (Montroy et al., 2014, p. 300). High levels of self-regulation in preschoolers can predict student-teacher relationships and academic ability further down the line. In this study, it was found that children with higher levels of behavioral self-regulation in preschool exhibited fewer behavior problems, and therefore, were associated with more significant gains in

literacy skills throughout the year (Montroy et al., 2014). On the other hand, children with low self-regulation skills were reported to act more impulsively, throw more tantrums, and bully other students more often than children with higher levels of self-regulation (Montroy et al., 2014). Lower-self regulation skills in preschool-aged children could begin a trend of weak student-teacher relationships for a child due to the problem behaviors and disruptions those with lower self-regulation skills potentially cause in the classroom.

Executive functioning is crucial to success in school. In a 2-year longitudinal study measuring executive functions, it was found that executive functioning was predictive of learning-related behaviors (Neuenschwander, Röthlisberger, Cimeli & Roebbers, 2012). It can be inferred from this that executive function enables children to stay on task in the face of decreased motivation and/or distractions (Neuenschwander et al., 2012). Students with higher executive functioning were also found to be more successful in their first years of school and received higher grades than those with less well-developed executive functioning (Neuenschwander et al., 2012). These cognitive self-regulatory processes within executive functioning can help to predict behaviors such as external and internal behavior problems and behavioral engagement.

While executive functioning and effortful control are closely related to one another, effortful control considers the nature of the conditions under which control is required (Blair & Razza, 2007). Teacher-reported effortful control in students was associated with mathematics ability and letter knowledge within emerging literacy, even when taking into account objective predictors of child academic competence (Blair & Razza, 2007). In a study that looked at children's emotion-related regulation, such as effortful control, it was found that resilience was predicted by earlier effortful control, which, in turn, predicted children's popularity (Spinrad et al., 2006).

Social Competence

Prosocial behavior refers to “any voluntary behavior that is intended to help or benefit another individual or group” (Coyne et al., 2018, p.1870), such as sharing, helping, and complimenting. Prosocial behavior is connected to many positive outcomes, such as life satisfaction, positive relationships, social coherence, personal growth, and self-acceptance (Coyne et al., 2018). This behavior plays an incredibly important part of the relationships that a child forms with others.

Many children experience loneliness in school at one time or another. In this instance, loneliness is seen as a result of social needs going unmet along with unsatisfactory interpersonal relationships (Jobe-Shields et al., 2011). Peer functioning can lead to feelings of loneliness in children, more accurately defined as friendships, victimization, social withdrawal, and group standing (Jobe-Shields et al., 2011). Feelings of loneliness are not stable over time and change often throughout the elementary school years. It is clear, however, that children who experience more loneliness are at risk for poor development in various ways (Jobe-Shields et al., 2011).

Behavioral engagement in the classroom refers to the extent in which a child participates in learning activities and non-academic activities in school, if and how they display positive conduct, how often they attend school, and the amount of effort and concentration put into school work (Da Laet et al., 2015). A lack of behavioral engagement in school has been connected to lower academic performance and a higher risk of failing in elementary, middle, and high school (Da Laet et al., 2015). Behavioral engagement is also connected to the prevalence of a child’s externalizing or internalizing behaviors.

Externalizing behavior problems in children are defined through levels of aggression, antisocial behavior, impulsivity, and defiance (Hinshaw, 2011). Attentional problems found in

those with externalizing behavior problems often have adverse effects on development, language delays, conduct issues, and peer relationships (Hinshaw, 1992). On the other hand, internalizing behavior problems are similar to the symptoms found in those with anxiety and depression (Fan, 2011). Internalizing problems are described as the overregulation of negative emotions (Fan, 2011). While externalizing behaviors are seen as more stable than internalizing behaviors (Hinshaw, 1992), both of these types of behavior problems can lead to mental health issues in adolescents and adults and can affect childhood development and educational success (Fan, 2011).

Present Study

In the current study, I will explore how aspects such as attentional focus, inhibitory control, working memory, and cognitive flexibility in kindergarten and first grade can predict prosocial behavior, loneliness, behavioral engagement, obvious behavior problems, and internal behavior problems in the third and fourth grades. Along with this, I will be looking at student-teacher conflict and closeness measures to determine whether the relationships moderate the results. Lastly, I hope to discover if there is a specific point in time where teacher-student relationships matter most in the elementary school grades. The specific research questions are as follows:

1. What is the predictive relationship between self-regulation in kindergarten and indices of social competence in later elementary school?
2. What is the association between aspects of the student-teacher relationship and indices of social competence in later elementary school?

3a. Is the association between self-regulation and later socially competent behavior better explained when accounting for (i.e., mediated by) aspects of the student-teacher relationship?

3b. Do aspects of the student-teacher relationship at different points in time (i.e., second - fourth grade) mediate the relationship between self-regulation in kindergarten and later socially competent behavior?

As a whole, I hypothesize that the early relationships formed and the early self-regulatory skills for a student will have a significant impact on later their later behaviors throughout elementary school and beyond. More specifically, I hypothesize that children who demonstrate greater self-regulation in kindergarten would also demonstrate more socially competent and less socially incompetent behaviors in later elementary school. I also hypothesize that children who have a close relationship with their classroom teacher would be more socially competent in later elementary school and that children who experience greater conflict with their classroom teacher will demonstrate less socially competent behavior in later elementary school. Additionally, I hypothesize that aspects of the student-teacher relationship will be more critical at earlier years; thus, I hypothesize that these aspects of the Student-Teacher Relationship will evidence a stronger effect the lower the grade.

While many studies look at the relations between a few of the aspects that I plan to study, there are very few that look at all of them as well as the mediation of teacher-student relationships. By looking at longitudinal data, I hope to determine which of these aspects, if any, predict third and fourth-grade outcomes such as prosocial behavior, loneliness, behavioral engagement, and externalizing and internalizing behavior problems.

Method

Participants

In the ECLS-K:2011, a cohort of children was followed from their kindergarten year (2011-2012) through the 2015-2016 school year. The sample included both children who were entering kindergarten for the first time and those who were repeating kindergarten. During the 2011-2012 school year, approximately 18,170 kindergarteners from about 1,310 schools and their parents, school administrators, teachers, and before-and-after-school care providers participated in the study (Tourangeau et al., 2018). Such sampling allows for the results from the base year wave of data collection to be nationally representative. As described in the Data Analytic Plan section, the use of sample weight (W8C18P_2T280) and accompanying replicate weights allows for the current sample consisting of 9,506 participants to maintain the ability to be nationally representative (Tourangeau et al., 2018).

Procedure

Although data was collected biannually (i.e., fall and spring of each year) from a range of sources (e.g., child, parent, teacher, school administrator, etc.), the current analyses examine only child- and teacher-reported child data in either the fall or spring of a given year. Specifically, cognitive self-regulation was assessed in the fall of the child's kindergarten year with four distinct measures, each tapping a distinct aspect of self-regulation (cognitive flexibility, working memory, attentional focus, and inhibitory control).

Teachers of the participating children were asked to complete measures of the STR in the spring of the kindergarten, first- and second-grade years, as well as rate the degree in which the

child was demonstrating internalizing and externalizing, respectively, behavior problems in both the spring of third and fourth grade. Newly implemented in the third and fourth-grade waves of data collection with the ECLS-K:2011, third-grade children were asked to respond to three questions tapping prosocial behavior, and fourth-grade participants were also interviewed and asked a series of questions assessing their perceptions of their loneliness and behavioral engagement (Tourangeau et al., 2018).

Measures

Self-Regulation

To assess the four aspects of self-regulatory behavior in the current study, a combination of both direct and teacher-report assessments were utilized. To assess cognitive flexibility, children were administered the Dimensional Change Card Sort (Zelazo, 2006), where children are tasked with sorting laminated picture cards based on increasingly complex fashion. Higher scores reflect greater cognitive flexibility in participants. Test-retest reliabilities over a 2- to 3-week delay have been documented to range between $r = .48$ to $.44$, respectively (Nesbitt et al., 2015). Research has demonstrated that the DCCS correlates with other direct assessment measures of cognitive self-regulation (Hongwanishkul, Happaney, Lee, & Zelazo, 2005; Zelazo, 2006).

The cognitive self-regulation aspects of working memory were assessed through the Numbers Reversed subtest of the *Woodcock-Johnson III Tests of Cognitive Abilities* (Woodcock, McGrew, & Mather, 2001) was administered. According to the test publishers, the median split-half reliability for the Numbers Reversed subtest was $.87$. Additionally, both construct and content validity for both the Numbers Reversed subtest and the *Woodcock-Johnson III Tests of Cognitive*

Abilities, in general, is supported by CHC theory and a congruent factor structure (Schrank, McGrew, & Woodcock, 2001).

The Child Behavior Questionnaire-Short Form (CBQ-SF; Putnam & Rothbart, 2006) was completed by teachers to assess children's abilities to focus their attention and inhibit impulses. Teachers rated the child on a 7-point Likert scale (1=extremely untrue of your child, 7=extremely true of your child). The 12 items utilized from the CBQ-SF in the current study assessed Effortful Control, a construct with considerable overlap with other measures of cognitive self-regulation (see Liew, 2012; also see Zhou, Chen, & Main, 2012) and subsumed within our conceptualization of cognitive self-regulation. Specifically, teachers completed the Attentional Focus and Inhibitory Control scales of the CBQ-SF. As reported in the ECLS-K:2011 *User's Manual* (Tourangeau et al., 2017), both the Attentional Focus and Inhibitory Control scales demonstrated excellent internal consistency ($\alpha = .87$). Prior research with the CBQ has demonstrated evidence of convergent and discriminant validity (e.g., Putnam & Rothbart, 2006; Rotenberg, Michalik, Eisenberg, & Betts, 2008). For both scales, higher scores indicate greater self-regulatory behavior in the child, as reported by the teacher.

Student-Teacher Relationships

The student-teacher relationships were determined through the Student-Teacher Relationship Scale (STRS; Pianta, 2001) in a 15-item, teacher-reported measure of closeness and conflict between the teacher and child. In the spring of kindergarten, spring of first grade, and spring of second grade, the teacher was presented with 15 descriptive statements about his or her relationship with the ECLS-K:2011 child and asked to indicate the degree to which each statement applied to their relationship using a 5-point scale ranging from "definitely does not

apply” to “definitely applies.” The Closeness scale score is the average rating on the eight items included in the STRS and measures the affection, warmth, and open communication that the teacher experiences with the student. The Conflict scale is a measure of the teacher’s perception of the negative and conflictual aspects of the teacher’s relationship with the student. In the current study, internal consistency values for Closeness in the student-teacher relationship were $\alpha = .89, .86, \& .87$, in the spring of kindergarten, first grade, & second grade, respectively (Tourangeau et al., 2018). In terms of Conflict, internal consistency values were $\alpha = .89, .89, \& .90$, in the spring of kindergarten, first grade, & second grade, respectively.

Social Competence

Socially competent behavior was assessed through five indices in the current study, each providing a different, yet informative perspective in regards to the behavioral profile of the child.

Prosocial Behavior, Behavioral Engagement, & Loneliness

Children were interviewed in both the third- and fourth-grade and items provided a snapshot in regards to the child’s perceptions of their prosocial behavior, degree of behavioral engagement, and how lonely they felt, based on several existing scales (see Tourangeau et al., 2018). Using a 5-point Likert scale (1= Never, 5= Very Often), in third grade, three items were asked to assess Prosocial Behavior (e.g., “I cheer up upset classmates”) and demonstrated excellent internal consistency value ($\alpha = .99$). Using the same 5-point Likert type scale, children in fourth grade were asked 5 items that tapped into Behavioral Engagement (e.g., “I try hard to do well in school”) and 3 items measuring Loneliness (e.g., “I feel left out at school). Reliability estimates for Behavioral Engagement and Loneliness were both $\alpha = .99$ in the current sample. For

Prosocial Behavior and Behavioral Engagement, higher values indicate greater social competence, whereas higher values on the Loneliness scale better reflect an index of social incompetence.

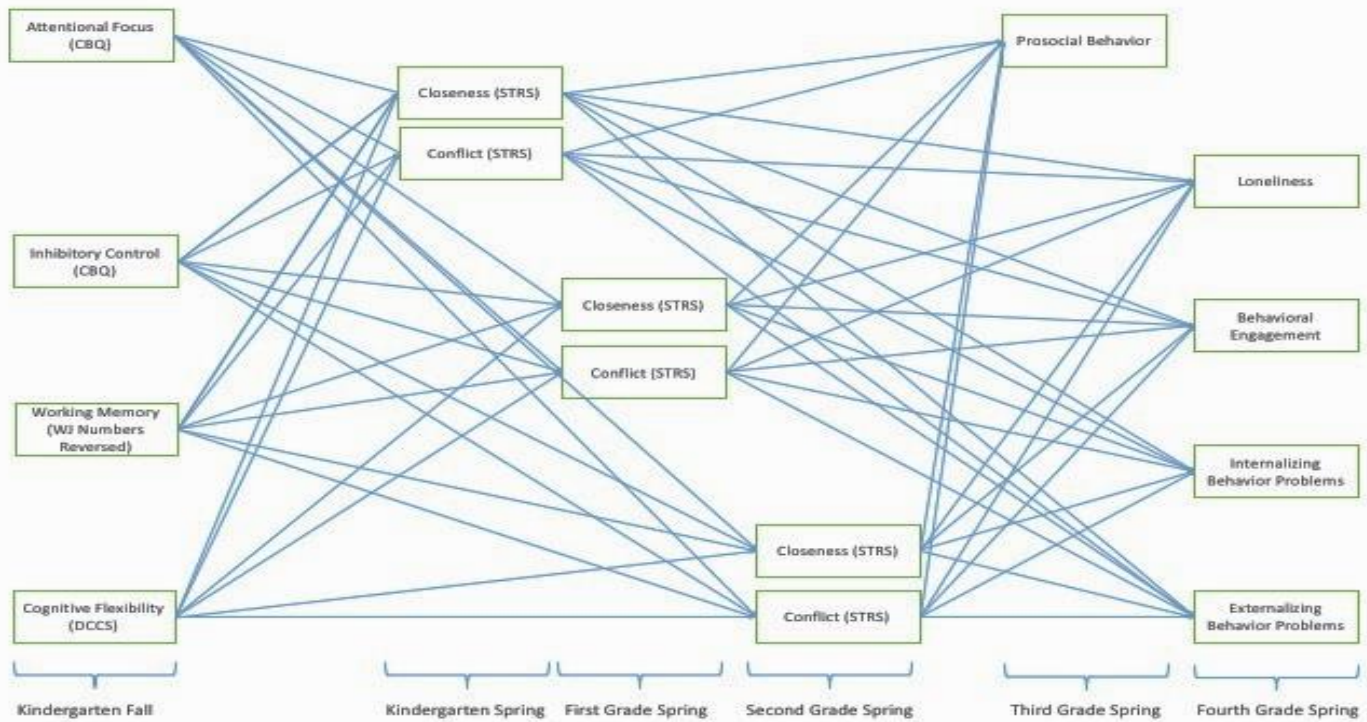
Internalizing & Externalizing Behavior Problems

The ECLS-K:2011 utilized items developed for the SSRS (*Gresham & Elliott, 1990*) to assess aspects of internalizing and externalizing behavior problems, which I have conceptualized as reflecting a *lack of* social competence. These items were included in the child-level questionnaires completed by the teachers. Responses were based on a 4-point Likert scale (i.e., 1-4) where higher values correspond to greater exhibited behavior. From the SSRS questionnaire, two scales were developed assessing the degree to which children are or are not exhibiting socially competent behavior: Externalizing Behavior Problems (6 items) and Internalizing Behavior Problems (4 items). Reported in the *User's Manual for the ECLS-K:2011 Kindergarten-First Grade Data File and Electronic Codebook* (Tourangeau et al., 2018), internal consistency values were calculated at each data collection period and ranged from good to excellent. Internal consistency values for the teacher scales across the third- and fourth-grade collection periods were ($\alpha = .87$) for both Externalizing Behavior Problems scales and ($\alpha = .78 - .79$) for Internalizing Behavior Problems. In addition, criterion-related validity has been documented between the SSRS and the *Child Behavior Checklist* (Achenbach & Edelbrock, 1983; Bandon, Calkins, & Keane, 2010).

Data Analytic Plan

To investigate the direct and indirect effects of cognitive self-regulation on later indices of socially competent behavior and cascading effects through dimensions of the student-teacher relationship, a path analytic framework was conducted using MPlus version 8.1 (Muthén & Muthén, 2018). When working with complex survey data such as the ECLS-K:2011, special measures were undertaken to reduce bias in the estimation of standard error estimates so as to maintain the nationally-representative nature of the base year of data collection. Accordingly, the TYPE=COMPLEX function was applied to accommodate for the large, longitudinal sample. Additionally, as recommended in the ECLS-K:2011 *User's Manual*, the Jackknife2 replication method with corresponding replication weights were utilized to correct the standard errors in the path model (Tourangeau et al., 2018). As one of the objectives of the current study was to examine potential indirect effects exhibited by cognitive self-regulatory aspects on later social competence through aspects of the STR, the MODEL INDIRECT function was employed to estimate direct and both specific and total indirect parameter estimates. Furthermore, consistent with Hayes (2009), BOOTSTRAP=5000 was utilized to repeatedly resample the sampling distribution of the indirect effect to obtain accurate point estimates. Bias-corrected confidence intervals (CIs) were obtained for all analyses through the CINTERVAL (BCBOOTSTRAP) command. Missing data were accounted for through the maximum likelihood estimator. In all models, both the gender and age of the child (in months in the fall of kindergarten) were entered as covariates. In addition, unlike the indices of Loneliness, Prosocial Behavior, and Behavioral Engagement, which were only assessed in the spring of fourth grade (i.e., once in the current dataset), data on internalizing and externalizing behavior problems were available from the prior year (i.e., spring of third grade). They were additionally entered in as covariates when predicting the focal internalizing and externalizing behavior problems outcomes in the spring of fourth

grade. For measures of the STR in second and first grade, prior available estimates were also entered as covariates (e.g., for STR Closeness in second grade, Closeness in first grade and kindergarten were controlled for). Our conceptual path model can be seen in Figure 1.



Results

Descriptive statistics for the current sample can be found in Table 1.

RQ1:

To address the first research question, multiple regression analyses were utilized to estimate the direct effects between aspects of self-regulation in the fall of kindergarten and later indices of socially competent behavior. In the current study, two direct effects between self-regulation and later socially competent behavior were found. When predicting Behavioral

Engagement, working memory was a significant positive predictor ($\beta = .148, p < .05$).

Additionally, internalizing behavior problems were significantly predicted by working memory ($\beta = -.057, p < .05$). Results indicated that self-regulatory aspects did not predict the social competence outcomes of prosocial behavior, loneliness, or externalizing behavior problems.

RQ2:

To evaluate whether aspects of the student-teacher relationship were predictive of later socially competent behavior, multiple regression was used. Regression results indicated that Prosocial Behavior was significantly predicted by Closeness in the STR in the spring of kindergarten ($\beta = .261, p < .01$) and marginally predicted by Closeness in both the spring of first grade ($\beta = .231, p = .10$) and second grade ($\beta = .241, p = .053$). Loneliness was significantly predicted by the degree of Conflict in the STR, but only in the spring of first grade ($\beta = .380, p < .05$). No aspect of the STR was a significant predictor of Behavioral Engagement, Internalizing Behavior Problems, or Externalizing Behavior Problems; however, the predictive relationship between Conflict in the spring of first grade and Externalizing Behavior Problems did approach significance ($\beta = .138, p = .062$).

RQ3a/b:

To assess whether there were significant mediating effects between aspects of self-regulation and later social competence through aspects of the STR, indirect effects were analyzed using bias-corrected bootstrapping procedures. Results of the present analyses revealed that significant indirect effects were predicting Prosocial behavior through the degree of Closeness in the STR in the spring of kindergarten for the self-regulatory aspects of cognitive flexibility

(assessed via DCCS) ($p < .05$), attentional focus ($p < .01$), and working memory ($p < .05$). There was also a significant indirect effect between NRW and Prosocial behavior through the degree of Closeness in the STR in the spring of first grade ($p = 0.05$). When evaluating the degree of loneliness reported by children, only one indirect effect was significant, between Inhibitory Control and loneliness, through the STR aspect of Closeness in the spring of Kindergarten ($p < .05$). Furthermore, results indicated that neither Closeness nor Conflict in the STR significantly mediated the relations between any of the self-regulatory constructs and the behavioral engagement, internalizing behavior, and externalizing behavior outcomes.

An analysis of covariates indicated that gender effects were found predicting Prosocial Behavior ($\beta = -.328, p < .01$), Loneliness ($\beta = -0.663, p < .01$), Closeness in kindergarten ($\beta = -.137, p < .01$) and first grade ($\beta = -.128, p < .01$), Conflict in kindergarten ($\beta = .062, p < .01$) and second grade ($\beta = .082, p < .01$). Age was a significant predictor of Conflict in kindergarten ($\beta = .048, p < .01$). Additionally, for both Internalizing and Externalizing Behavior Problems, prior reports from the previous year (i.e., third grade spring), each significantly predicted later scores for Internalizing Behavior Problems ($\beta = .325, p < .01$) and Externalizing Behavior Problems ($\beta = .403, p < .01$), respectively.

Discussion

This study was conducted to find the relationship between self-regulatory processes and social competence throughout the elementary school years, with a focus on student-teacher relationships and how those relationships can mediate outcomes throughout these years. Teachers know how important it is to build relationships with their students, but it is essential to study the effects these relationships can have on students' outcomes throughout their first years

in school. Many of the aspects in this study can also help to predict student behavior for many years following elementary school and into adolescence and adulthood. It is incredibly important to study which factors within social competency, self-regulation, and student-teacher relationships contribute to developing strong literacy and mathematics abilities in the classroom.

The goal of the first research question was to find the predictive relationship between working memory and social competence. The results show that working memory positively predicted indices of behavioral engagement and internalizing behavior problems. As expected, working memory was a positive predictor for behavioral engagement in the classroom. As working memory is an aspect of self-regulation, this result is reflected in previous research that found that their teachers perceived children with higher self-regulation skills as showing higher levels of behavioral engagement in classroom learning (Cadima et al., 2015). Along with this, working memory also predicted internalizing behavior problems similar to the results of another study, which reported that children with low inhibitory control and low performance in working memory tasks have higher levels of internalizing and emotional behavior problems (Vuontela, 2015). Surprisingly, self-regulatory aspects did not predict social competence outcomes of prosocial behavior, loneliness, or externalizing behavior problems. The aspects of prosocial behavior, loneliness, and externalizing behavior problems could be caused by various factors in a child's life and not necessarily be represented by their working memory. These aspects, such as loneliness, can vary greatly due to different aspects of a child's social life in school and the relationship that they form with others. It is also important to note that previous research has found that children who show signs of externalizing behavior problems at an early age may exhibit different stability in reactive control or effortful control over time, which can affect the findings in longitudinal models (Spinrad et al., 2006).

Second, student-teacher relationships were studied to determine if there was any association between the relationships and indices of social competence in later elementary school. It was found that prosocial behavior was significantly predicted by student-teacher closeness in the spring of the kindergarten year and moderately predicted by closeness in the spring of both first and second grades. These results prove to be consistent through past research, which has found that prosocial and self-regulation skills such as waiting for his/her turn, paying attention in class, and inhibiting off-task behavior leads to closer positive student-teacher relationships (Cadima et al., 2015). Loneliness was predicted by student-teacher conflict at only one period of time, the spring of first grade. Regarding the specific period that student-teacher conflict predicted loneliness, this may be because feelings of loneliness are not stable over time and change often throughout elementary school years (Jobe-Shields et al., 2011), and student-teacher relationships depend heavily on the personalities of the different teachers each year and the fact that some teachers are inherently more skilled in forming meaningful relationships with their students than others (Jerome et al., 2009). Student-teacher relationships in no way predicted Behavioral Engagement, Internalizing Behavior Problems, or Externalizing Behavior Problems. However, the predictive relationship of student-teacher conflict in first-grade spring and Externalizing Behavior Problems did reach significance. It can be hypothesized that student-teacher relationships did not predict behavioral engagement because those relationships are rarely built if the student does not exhibit strong behavioral engagement in the first place. The same could be hypothesized for externalizing and internalizing behavior problems. Students with initial behavior problems often struggle to form strong relationships with their teachers, so it is understandable why the student-teacher relationship would not predict these behavior problems or behavioral engagement. It has also been found by previous research that student-teacher

relationships may be reported differently depending on the behavior of an entire class and cannot accurately reflect the individual relationships (Cadima et al., 2015), which could also contribute to the results found in this study.

Although there is a clear association between self-regulation and later socially competent behavior, it is essential to examine if this relationship is better explained when accounting for aspects of the student-teacher relationship. It was found in looking at student-teacher relationships as mediators that significant indirect effects were predicting Prosocial Behavior through the degree of closeness in student-teacher relationships in the spring of kindergarten for the self-regulatory aspects of cognitive flexibility, attentional focus, and working memory assessed by DCCS. These results are similar to those in previous studies showing that prosocial behavior and STR are very intertwined and that teachers who promote close relationships with their students help to foster prosocial behavior in their classroom (Ferreira et al., 2016).

Lastly, it is necessary to determine the different points in time that student-teacher relationships can mediate the relationship between self-regulation in kindergarten and later socially competent behavior. There was a significant indirect effect found between NRW and prosocial behavior through the degree of Closeness in student-teacher relationships in the spring of first grade. There was a significant direct effect between Inhibitory control and loneliness through the measure of the student-teacher relationship in the spring of kindergarten. Neither Closeness nor Conflict in the student-teacher relationship significantly mediated the relations between any self-regulatory constructs and behavioral engagement, externalizing behavior, and internalizing behavior outcomes. There are many reasons why these relationships were not predicted by student-teacher Conflict or Closeness, such as the fact that student-teacher relationships differ much based on the age of the students. Closer student-teacher relationships

are often formed in kindergarten and first grade than in the later grades of elementary school (Jerome et al., 2009), where more conflict could come into play. Along with this, there are differences in what teaching looks like in various grades and by various teachers. In summary, student-teacher relationship closeness was found to be a more important mediator early on in school.

Limitations and conclusions

Because this study used secondary data, I could not control which measures were used. For example, DCCS was used to assess cognitive flexibility, and Numbers Reversed was used to assess working memory, both of which could not be controlled due to using a previously completed dataset. Along with this, there was no control over what time period certain aspects of self-regulation or social competency was assessed. The indices of Loneliness, Prosocial Behavior, and Behavioral Engagement were only assessed in the spring of fourth grade, although these assessments could have potentially been helpful to have throughout previous grades as well. It is also important when analyzing a dataset such as this one to take into account the race differences in students and their teachers, as well as the economic status of the families included in the study. In the current study, these aspects were not explicitly looked at.

Another limitation presented in doing this research is the cumbersome nature of such a large, longitudinal dataset. Although it is essential to study this type of data, the analysis is complicated and takes a significant amount of time and expertise. This dataset was created to be nationally representative, but the amount of data included can be difficult to navigate and separate.

As a whole, the findings of this study highlight the importance of new, positive Student-Teacher Relationships. Prosocial Behavior can be encouraged through these relationships, and these strong relationships can promote higher levels of behavioral engagement in the classroom. As previously mentioned, aspects such as behavioral engagement, prosocial behavior, effortful control, and self-regulation predict future behaviors throughout school-aged years such as literacy and math ability, as well as mental health aspects that carry over into adolescence and adulthood. The results of this study show the meaningful relationship between early aspects of self-regulation and how these aspects help to predict social competency in later elementary school years and beyond. Student-teacher relationships affect this relationship in that socially competent behaviors can depend on more than early self-regulation skills, such as the closeness and/or conflict felt between a student and their teacher. Early-grade teachers must be aware that their actions and the relationships that they build with their students can affect the ways that their students interact with others for the rest of their lives.

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