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Contribution of children's reading motivation and prosocial efficacy to reading growth

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ABSTRACT

The purpose of this study was to explore the relationships among summer reading camp participants' initial prosocial efficacy, reading motivation, and their reading skill changes. Despite the theoretical explanation of social and emotional learning (SEL), there is a lack of empirical studies demonstrating the complex relationships and processes among students' social-emotional competencies and beneficial academic learning outcomes. The Freedom Schools reading camp provides learning opportunities during the summer vacation for children primarily from low-income families and minoritized racial and ethnic backgrounds. This study tested the linear relationship between students' initial reading motivation and reading growth with prosocial efficacy as a moderator ($n = 67$). We found that initial intrinsic regulation was related to students' reading comprehension skill growth, and prosocial efficacy moderated the relationship between reading skill changes and intrinsic regulation. Results provided clues about how students' efficacy for prosocial behavior could explain the relationship between students' reading motivation and reading growth.

Social and emotional learning (SEL) perspectives focus on students' well-being and how to help students become caring and knowledgeable adults (Cohen, 2006; Zins & Elias, 2007). Scholars pointed out that through learning experiences based on positive social relationships, students can have positive perspectives and attitudes toward learning (Farrington et al., 2012; Zins et al., 2007). Students with higher social and emotional competencies interact with others more effectively, and they take advantage of more learning opportunities in the classroom (Jones & Kahn, 2017). Although many theoretical ideas have supported academic benefits related to students' social and emotional ability, previous studies have not fully explained how social and emotional ability positively contributes to better learning growth in K-12 students. In previous empirical studies, the effects of SEL programs in K-12 are inconsistent. Some SEL interventions contributed to students' better academic outcomes (Hammer et al., 2018; Linares et al., 2005), while others did not (Ashdown & Bernard, 2012; Jones et al., 2010; Kiviruusu et al., 2016; Rucinski et al., 2018). In order to better understand the mechanism of students' social and emotional competencies on academic success, additional research is needed that considers how social- and emotional-related variables might interact in complex ways in specific implementation contexts.

Self-determination is a fundamental factor of psychological well-being and actualizing human potential (Ryan, Deci, 2000b). Deci et al. (2013) explain that "intrinsic motivation is maintained and enhanced when social contexts support satisfaction of the basic psychological needs, but is undermined by conditions such as controlling use of rewards, threats of punishment, and controlling evaluations" (p. 126). For example, feeling related to others (i.e., relatedness) is an important factor related to basic psychological needs and for increasing human self-determination (Ryan, Deci, 2000b). The pedagogical approach of SEL highlights that supporting prosocial classroom climates and positive relationships with others in schools advances students' educational excellence. The importance of building prosocial classroom climates is connected with students' satisfaction of the need for relatedness. Previous research has found that students who are more intrinsically motivated to learn are more prosocial and feel more connected to others (Ryan & Deci, 2017; Solomon et al., 2000). We suggest that students with higher prosocial efficacy may be more likely to have their psychological need for relatedness filled and to learn more because they can effectively engage in collaborative learning activities.

In the current study, it was investigated how elementary and middle school students' initial prosocial efficacy (i.e., their confidence in being able to implement positive social skills) and reading motivation were related to reading skill gains in Freedom Schools summer reading camp.

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The participants in Freedom Schools are predominantly African American children, who are eligible for free or reduced-price lunch. The Freedom Schools summer reading camp and its curriculum designed by the Children's Defense Fund focus on social action (e.g., understanding others, caring for others, and taking action to make a better community) using culturally relevant pedagogy and texts (Roehrig et al., 2018). The Children's Defense Fund is a nonprofit organization that focuses on child advocacy and educational research. The reading camp provides books with diverse characters that are written by diverse authors. Collaborative group activities and discussions are major instructional methods in the Freedom Schools reading camp (Petty et al., 2017). For this reason, students may have more opportunities to use their interpersonal skills in the Freedom Schools learning context compared to during the regular school year. If students have stronger self-efficacy in their interpersonal skills, they might be more active learners in the Freedom Schools setting. Therefore, we assumed that the collaborative learning environment in Freedom Schools would contribute to better reading achievement for those children.

We anticipated that the collaborative learning environment in Freedom Schools would sustain students' autonomous motivation and engagement in reading activities. This mechanism has been shown to promote reading achievement in previous studies (Marshik et al., 2017; Wang et al., 2019). Moreover, the summer camp promotes caring for others and taking action to make a better community, which aligns very well with intrinsic life goals, in particular sense of community, which also promotes learning and psychological well-being (see Froiland, 2018; Froiland & Worrell, 2017; Kasser & Ryan, 1996). As noted by many prior studies, changes in students' social-emotional development and motivation are often gradual and need to be tracked through multiple years of educational experiences (Farrington et al., 2012; Rimm-Kaufman & Chiu, 2007; Wang et al., 2019). Social and emotional learning skills are best developed through longitudinal interventions across childhood and adolescence (Jones & Kahn, 2017). For these reasons, we focused on how students' initial prosocial efficacy and initial intrinsic regulation may contribute to changes in reading skill in the Freedom Schools context, rather than focus on changes in social-emotional factors. Thus, we tested the direct effects of reading motivation and prosocial efficacy on summer reading growth as well as whether prosocial efficacy moderated the relationship between reading motivation and changes in reading skills.

1. Background

1.1. Social and emotional competencies and effective learning

The classroom setting can provide an effective learning environment for school-age children (Bergin, 2018; Yan et al., 2011). Students experience emotional attachment and develop prosocial skills through various communications in a classroom (Wentzel & McNamara, 1999). SEL scholars theorize that when students enhance their social and emotional competencies, they become better-prepared learners (Bridgeland et al., 2013; Jones & Kahn, 2017). Jones and Kahn pointed out that “the quality and depth of student learning is enhanced when students have opportunities to interact with others and make meaningful connections to subject material” (p. 5). SEL scholars, thus, have paid attention to the interrelation between social, emotional, and cognitive skills of human development (Devaney et al., 2005; Farrington et al., 2012).

One goal of SEL research is to reveal how students' social and emotional competencies can be involved in effective learning. SEL scholars highlight that students' intrapersonal skills (i.e., self-regulation, self-efficacy, and learning attitudes) and interpersonal skills (i.e., effective communication and cooperation) are related to their better academic outcomes in schools (Hammer et al., 2018; Jones et al., 2010; Linares et al., 2005). For example, a reading motivation study by Guthrie et al. (2004) highlighted the motivation support provided by collaborative work in a reading classroom. According to their explanations, students in the Concept-Oriented Reading Instruction (CORI) with active social interaction showed higher reading comprehension levels than the traditional instruction group. However, other scholars still argue that social and emotional competencies rarely connect to students' higher academic achievement as much as other intellectual ability factors (Day & Carroll, 2004; Mestre et al., 2006). An empirical study by Masland and Lease (2013) also reported that appraisals of affect and belongingness regarding the academic peer group were not directly associated with elementary students' academic achievement. Based on these conflicting results and the Freedom Schools learning contexts, in this study, we intended to explore the interaction effect between children's prosocial efficacy and learning motivation on learning growth.

Many SEL studies have focused on students' interpersonal skills because they represent social and emotional competencies of students in learning contexts. These skills, such as negotiation, communication skills, and positivity, could contribute to building good relationships in schools (Bergin, 2018; Jennings & Greenberg, 2009; Shechtman & Abu Yaman, 2012; Wentzel & McNamara, 1999). The prior studies focused on the children's positive behaviors in a classroom and how those prosocial behaviors were related to their academic emotions and learning outcomes. However, there are no studies about students' self-efficacy beliefs regarding prosocial behaviors. Self-efficacy beliefs are important because they affect people's feelings, thoughts, and behaviors (Bandura, 1993). If students have high self-efficacy beliefs regarding prosocial behaviors, they may tend to think and act more prosocially. We focused on children's prosocial efficacy, which is their confidence in being able to implement positive social skills, to explain students' social and emotional ability. In our moderation models, we hypothesized that prosocial efficacy would moderate the relationship between children's initial reading motivation and reading skill gains.

Moreover, some studies highlight positive academic changes in a particular group of children. The advantages of higher social and emotional competencies tend to be more meaningful in the groups that need support to promote learning motivation and academic standards (Ashdown & Bernard, 2012;Bridgeland et al., 2013 ; Hammer et al., 2018). For example, teachers perceived that students with a higher risk for conduct problems showed improvement in academic skills in the SEL intervention group (Jones et al., 2010). Teachers involved with other SEL school curricula also reported that they perceived greater academic impacts on students, with low motivation and from low-income families, by increasing the students' learning engagement in the classroom and reducing absenteeism (Bridgeland et al., 2013; Hammer et al., 2018). Based on the various SEL effects on academic outcomes in different student groups, we considered testing the moderation effect of social-emotional competencies on academic achievement factors.

1.2. Self-determination and academic success

The definition of reading motivation varies across studies. Therefore, given our chosen framework, we chose to focus on previous investigations of students' reading motivation based on SDT in the following review. According to Ryan, Deci (2000a, 2000b), self-determination is an important criterion to explain positive motivation aspects that promote human behaviors. In SDT, learning motivation can be explained in the self-determination continuum: intrinsic regulation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation. On the self-determination continuum, intrinsic motivation is associated with intrinsic regulation (i.e., positive emotions); on the other hand, extrinsic motivation is related to external regulation (e.g., expectations of rewards and avoiding punishment), introjected regulation (e.g., avoiding negative feelings, such as guilt), and identified regulation (i.e., personal importance and values) (De Naeghel et al., 2014). However, phenomenologically, intrinsic and identified regulation have different reasons for motivation, and they may have different effects (Guay et al., 2010). Therefore, in this study,

we also explained the learners' reading motivation with separated variables based on a continuum of self-determination. For example, children at the K-6 level may have meaningful learning motivation based on positive emotions (e.g., intrinsic regulation) rather than the value or importance of the tasks themselves (e.g., identified regulation). Intrinsic regulation is related to positive emotional perceptions, such as enjoyment and interest (Ryan, Deci, 2000a). Previous empirical studies have indicated that intrinsic motivation is linked to high reading achievement of children (De Naeghel et al., 2012; Froiland & Oros, 2014; Orkin et al., 2018; Taboada et al., 2009). Reeve (2016) highlighted that promoting intrinsic motivation can support children who are disengaged or have low performance. When teachers provide autonomy-supportive teaching (increasing positive emotions), students can have more opportunities to be engaged in learning activities.

In child reading research, Taboada et al. (2009) found that children's intrinsic reading motivation was the most reliable predictor for students' reading levels, controlling for other environmental factors and their fundamental literacy skills. Moreover, De Naeghel et al. (2012) reported that elementary students' intrinsic reading motivation had positive correlations with students' reading frequency, reading engagement, reading comprehension, and reading self-concept. Children with autonomy-supporting teaching conditions had higher gains in reading skills and task-engagement levels than a comparison group provided external rewards (Orkin et al., 2018). Froiland and Oros (2014) found that intrinsic motivation to read promoted reading growth from 5th to 8th grade, while controlling for prior reading achievement, SES, and sex; also extrinsic motivation predicted reading development in concert with intrinsic motivation. A meta-analysis study by McBreen and Savage (2021) reported that motivational reading interventions (k = 49) significantly affect promoting K-12 students' overall reading motivation as well as reading achievement. The results of the meta-analysis study were noteworthy to estimate the direct association between intrinsic motivation and reading skill growth based on the SDT.

Conversely, in the previous studies, external regulation showed more complex relationships to reading outcomes. For example, providing rewards was positively correlated with children's reading frequency but negatively correlated with reading comprehension scores and reading self-concept (De Naeghel et al., 2012). Guay et al. (2010) investigated reading motivation of 1st grade through 3rd-grade elementary students and found students' intrinsic regulation positively correlated with their external regulation at 1st and 2nd grade. However, they were negatively correlated in 3rd grade. This means the relationship between students' motivation and achievement may vary depending on their grade level and development.

1.3. Study purpose and research questions

This study aimed to explore the relationships among initial reading motivation, prosocial efficacy, and reading growth in the Freedom Schools reading camp. Students' initial intrinsic regulation was hypothesized as a key predictor of their reading skill growth. The SEL framework highlights that students with better social and emotional competencies tend to have more learning opportunities through group discussions and collaborative work (Bergin, 2018). Similarly, Freedom Schools reading classes encourage student-centered activities and communication. Therefore, we tested a potential interaction effect between students' initial prosocial efficacy and initial intrinsic regulation on reading skill growth with a moderation model. The following research question guided this study: 1) To what extent does students' initial intrinsic regulation predict their reading skill growth? 2) To what extent does students' initial prosocial efficacy moderate the relationship between their initial intrinsic regulation and reading skill growth?

2. Method

2.1. Reading program context

Freedom Schools camp is a unique summer program focused on preventing reading loss during out-of-school time. The reading program was designed to help students from underserved groups, who have fewer learning opportunities during the summer, to prevent summer reading loss (Mesa et al., 2021). Freedom Schools, which follow an intergenerational model, differ from many other summer reading programs because they target a wide range of grade levels (often K-12) at one site. The participants are divided into leveled reading classes according to their grade completed (e.g., Level 1: K to grade 2; Level 2: grades 3 to 5, Level 3: grades 6 to 8). The sites where we conducted this research served only students who had completed grades kindergarten through 8. According to Children's Defense Fund guidelines which provide the summer reading curriculum in this study, kindergarten students are not included in reading assessments. Thus, the final dataset only included students in the range of grades 1 through 8.

This reading program uses multicultural books focused on the history of African Americans and civil rights. The program promotes positive attitudes about students' own culture and empowers them to make meaningful changes in their communities. The fundamental pedagogical direction of the reading program is guided by the SEL framework (Children's Defense Fund, 2020). The integrated reading curriculum in Freedom Schools is designed to facilitate respectful discussions and social interactions for students about the social issues covered in the books of the summer reading camp. The weekly themes are how to make a difference in myself (Week 1), family (Week 2), community (Week 3), country (Week 4), world (Week 5), and hope (Week 6); but the class uses different books depending on reading level.

The majority of learning activities in the reading curriculum at Freedom Schools are based on group work such as read-aloud and collaborative group work. In the program, students have rich discussions on civic engagement topics. Decoding and comprehension strategies are not directly taught, except for explicit vocabulary instruction needed to understand books. The multicultural books and supplementary materials were used as the tools for the group discussion and encouraged students to have their own voice on the discussed issues. The summer reading program includes a free reading time every day, when children can select their own books and read or discuss the topic with peers. The classrooms and curriculum are intentionally implemented in ways that are different from traditional school experiences. In each class, the teacher and students develop and agree upon a classroom contract to support respectful interactions. Additionally, if students are tired or choose not to engage with an emotionally charged topic in a book (e.g., the death of a parent), then students are given the freedom to excuse themselves from the discussion.

2.2. Participants

The reading camp was not a mandatory program; thus, some students dropped out each week and did not return. The final participants in the current study remained in the reading program through the last week and completed the reading test in the final week. There was a total of 67 participants with parental consent and complete Basic Reading Inventory (BRI) tests. In this study, the outcome variable was reading skill gains, which were calculated from pre and posttest administrations of the BRI. Among participants with complete BRI data, there were some missing cases of predictor (i.e., initial reading motivation) or moderator (i.e., initial prosocial efficacy) variables. Among the whole group of participants, the complete proportions of each survey were 77.6% on reading motivation ($n = 52$) and 92.5% on prosocial efficacy ($n = 62$). Participants with missing predictors or moderators were not excluded from the final data. Instead of excluding the missing cases, to increase statistical power, we applied the estimation of full information

maximum likelihood in the statistical analyses.

There were similar numbers of male and female participants in the final dataset: 47.8% male (n = 32) and 52.2% female (n = 35). The participating Freedom Schools campers represented three different level classes: Level 1 (grades 1–2, n = 25, 37.3%), Level 2 (grades 3–5, n = 22, 32.8%), and Level 3 (grades 6–8, n = 20, 29.9%). The proportion of gender at each level was as follows (Male: Female): Level 1 (n = 12, 48%: n = 13, 52%), Level 2 (n = 10, 45.5%: n = 12, 54.5%), and Level 3 (n = 10, 50%: n = 10, 50%). Most of the participants were African American (n = 63), and 80.5% of participants (n = 54) were eligible for free or reduced-price lunch.

2.3. Data collection

The data collection processes followed the approved Institutional Review Boards protocol for the larger Freedom Schools evaluation. Parents could choose to provide consent for their children's survey and test data to be used for research. For Level 1 participants, the researchers provided one-on-one administration and guidance for all questionnaires. Group-administration of questionnaires was conducted with Level 2 and 3 participants. For this study, data were collected from participants at two Freedom Schools summer camps in North Florida[1] in 2018 and 2019. Data were collected in the same way each year and combined, excluding the cases of 2019 returners from the final dataset. The 2018 camp was conducted at two locations (i.e., at a research school and a community church), and the 2019 camp was held at one site (the research school).

2.4. Measures

2.4.1. Prosocial efficacy survey

Previous studies using observations of prosocial behavioral tendencies in classrooms found that fewer prosocial behaviors were observed in adolescents than young children (Bergin, 2018; Scourfield et al., 2004). As prosocial behavior has been observed to decline with adolescence and self-reports of prosocial behavior might be subject to social desirability bias, participants' prosocial propensity in this study was assessed not via observations but via self-reports of social awareness and confidence (Eisenberg et al., 2015).

Prosocial efficacy is students' confidence in their ability to implement prosocial behaviors. In a previous study, the 12-item prosocial efficacy survey, developed by Roehrig et al. (2018) to assess Freedom Schools participants' prosocial efficacy, was reported to have acceptable internal consistency between 0.75 and 0.85. In the current dataset, the prosocial efficacy survey had a Cronbach α of 0.83. Students' rated their prosocial efficacy on 12 items using a 100-point confidence rating scale ranging from 0 to 100, with 10 point increments and faces representing very sad, somewhat sad, neutral, somewhat happy, and very happy emotions anchoring the 0, 25, 50, 75, and 100 points on the visual scale. Examples of prosocial efficacy items include: *I can make friends easily* and *I can be a good friend*.

2.4.2. Reading Motivation Inventory (RMI)

The RMI consists of 13 questions, which came from the Academic Self-Regulation Questionnaire (SRQ-A; Deci et al., 1992). In previous research, the Cronbach αs of the SRQ-A's subscales were reported between 0.66 and 0.82 (Ryan & Connell, 1989). In this study, the inventory was used to measured students' a) autonomous motivation: intrinsic regulation (3 items; Cronbach α = 0.596) and identified regulation (3 items; Cronbach α = 0.778), and b) controlled motivation: introjected regulation (4 items; Cronbach α = 0.825) and external regulation (3 items; Cronbach α = 0.642) toward reading activities. The participants rated items on a 4-point frequency scale accompanied by pictures of pizza cut in thirds matched with *never* (an empty box), *sometimes* (one piece of pizza), *most of the time* (two pieces of pizza), and *always* (a full pizza), which respectively were scored as 1, 2, 3, and 4. Examples of autonomous motivation items include: *I read because it's fun* and *I read because I want to learn new things*. Examples of controlled motivation items include: *I do my reading because I want the people to think I'm a good student* and *I do my reading because that's the rule*. The initial score of each reading motivation subscale (at pretest) was used in the data analysis.

2.4.3. Basic Reading Inventory (BRI)

The BRI test is an informal reading assessment developed by Johns (2012). It provides an estimate of the grade-level of three dimensions of students' reading skills: 1) word recognition (word recognition in isolation), 2) passage fluency (word recognition in context), and 3) comprehension (answering comprehension questions). The change in the mean of each reading skill subscale (posttest - pretest) was used in the data analysis. The Children's Defense Fund uses the BRI for program evaluation purposes, the BRI has been widely used to evaluate students' reading skills within the scope of K-12.

In this study, the BRI test was administered one-on-one with each student by researchers with previous training and experience administering the BRI, following Children's Defense Fund's rules for administration (e.g., differences in pronunciation due to dialect were allowed). The independent level (no more than two errors) for word list reading was recorded. The passage fluency and comprehension tests were stopped when students met frustration level (when they had more than the specified number of errors), at which point we recorded the grade level of the prior, lower-level passage they successfully completed.

Because our sample included students from multiple grade levels, we standardized scores for each reading dimension to provide information about whether the student's reading skills were higher or lower than the grade-level they just completed. Negative scores mean that students performed below the expected scores of their grade-level group. On the other hand, positive scores indicate that students show above grade-level reading skills. In this study, we calculated students' reading skill gain scores by subtracting their standardized pretest scores from their standardized posttest scores.

Because the BRI covers grade levels K-12 and includes two forms (A and B), the reliability of the BRI was reported as ranges. The alternative form reliability of word recognition between Forms A and B were reported as 0.76 through 0.95 (Johns, 2012). The passage fluency reliability of Forms A and B were reported as 0.75 through 0.91 for students in the 3rd through 5th grades (Bieber, 2011). The alternative form reliability of comprehension questions between Forms A and B was reported as 0.79 through 0.81 (Johns & L'Allier, 2004).

2.5. Data analysis

A moderation model focuses on the different interaction effects between predictor and outcome variables through a moderator (Baron & Kenny, 1986). In this study, we calculated the correlations among the variables; then, the main effects of the two predictions were calculated based on regression models. Next, we tested whether initial prosocial efficacy moderated the effect of initial reading motivation on reading gains.

In order to study the impact of the moderator, we used the moderation models to analyze the relationship between the predictor variable and the outcome variable (Hayes, 2017). We fit a basic regression model: $Y = \beta_0 + \beta_1 * X + \beta_2 * Z + \beta_3 * X * Z + \epsilon$ (i.e., Y: outcome; X: predictor, Z: moderator, and X*Z: interaction between predictor and moderator). Because the regression coefficients for the predictor's main effect and the interaction effect were not standardized, the mean centering method is

[1] Data from the North Florida Freedom Schools are collected annually during the summer literacy program. Multiple studies have been conducted using data from different variables and years. The current study uses the pretest reading motivation data from 22 participants whose posttest reading motivation data were included in Ha et al. (2021).

recommended in the analyses of the moderation effect. Additionally, using the mean centering method in moderation models where the predictor and moderator have different scales of measurement makes it easier to interpret the interaction effect between them (Hayes, 2017). Also, in order to determine the relationship between the predictor and the outcome, the moderation effects were examined at three values of prosocial efficacy (e.g., at the mean, 1 *SD* above, and 1 *SD* below).

We tested moderation models with variables of initial reading motivation (predictor) and change in reading skills (outcome) through a moderator of prosocial efficacy (see Fig. 1). We tested 4 moderation models including all combinations of the four reading motivation subscales[2] (i.e., external regulation, introjected regulation, identified regulation, and intrinsic regulation) and students' combined reading level changes (i.e., changes in word recognition, passage fluency, and reading comprehension were summed). In the moderation models, we set the outcome variable as the combined reading change score because we wanted to explore why students' may benefit differently from the same learning experiences rather than predict who had higher reading scores at the posttest. Thus, we estimated whether prosocial efficacy and motivational factors can explain students' reading changes.

The moderation models were based on multiple regression analyses. We used *SPSS v.25* to get correlation results of the variables and *R* software to obtain the results of the moderation models and the graphs. Specifically, this study used the *R* package '*lavaan*' and '*mice*' for latent variable analysis for multi-regression models with missing cases, and the package '*effectsize*' applied for the parameter standardization and centering in the moderation model analyses.

3. Results

3.1. Preliminary analyses

Descriptive results, including the means and standard deviations of the moderator, the predictors, and outcomes related to the tested moderation models, are presented in Table 1. The participants' initial prosocial efficacy and reading motivation subscale scores tended to be high. In the dataset, there were no serious issues regarding skewness or kurtosis. The average change scores in reading skills were all positive. For example, the average passage fluency change score was 0.37, representing about 15-weeks' worth in reading growth during the 6-week summer camp. Students' reading skill changes were descriptively higher in the categories of passage fluency and reading comprehension compared to word recognition.

Table 2 presents correlation patterns among the variables of initial prosocial efficacy, initial reading motivation subscales, and reading skill changes. The initial prosocial efficacy variable, which is a moderator in this study, did not show any significant correlation with other variables. The main variables of initial prosocial efficacy, initial reading motivation, and reading skill changes were not significantly correlated with each other; however, significant positive relationships were found between change of sub-factors of reading skill and between sub-factors of initial reading motivation. For example, students' initial external regulation had positive correlations with introjected regulation ($r = 0.569$, $p < .001$) and identified regulation ($r = 0.404$, $p < .01$). The identified regulation scores at pretest showed a positive correlation with intrinsic regulation ($r = 0.520$, $p < .001$). Students' changes in passage fluency had significant positive relationships with changes in word recognition ($r = 0.260$, $p < .05$) and reading comprehension ($r = 0.933$, $p < .001$). However, there was no significant correlation between reading changes in word recognition and reading comprehension level. Of the interrelationships between reading skill changes and the motivation variables, only students' initial intrinsic regulation was significantly correlated with changes in reading comprehension ($r = 0.308$, $p < .05$).

3.2. Moderation model results

We tested the moderation effect of initial prosocial efficacy in regression models with initial reading motivation sub-factors as predictors and reading skill changes as the outcome variables. Table 3 shows the results of the models for changes in total BRI level.

Table 3 shows the estimates of the moderation models for the outcome of changes in total BRI. The interaction effect between initial intrinsic regulation and initial prosocial efficacy on changes in total BRI was significant ($t = 2.170$, $p < .05$). In model 4 of Table 3, the effect size f^2[3] of the overall model was medium at 0.216. The power (1- β err prob.) was higher than 0.886 in the given data set (α err prob. = 0.05, $n = 67$, *#predictors* = 3). Thus, we concluded that this moderation model was sufficiently powered to explain the students' gains in total BRI score. The R^2 value for each predictor was as follows: 0.043 for initial intrinsic regulation, 0.013 for prosocial efficacy, 0.091 for the interaction of the two predictors, representing small to medium effect sizes. Students with higher initial prosocial efficacy showed a positive relationship between intrinsic regulation and changes in combined reading skills. Those with the mean level of initial prosocial efficacy showed a positive linear relationship between intrinsic regulation and reading skill changes. However, intrinsic regulation in the low initial prosocial efficacy group showed descriptively less change in total reading skill change scores. There was no significant interaction effect between prosocial efficacy and the other types of initial reading motivation (i.e., external regulation, introjected regulation, and identified regulation) on the total BRI change scores (see Fig. 2 for External regulation).

4. Discussion

The major goal of this study was to explore how some students more effectively develop their reading skills under similar academic conditions. Based on the common findings from previous child reading studies (Guay et al., 2010; Marshik et al., 2017; Solomon et al., 2000), this study explored two research questions. First, we tested to what extent students' initial intrinsic regulation has a meaningful linear relationship with reading skill growth. Second, we explored to what extent students' initial prosocial efficacy has a moderating effect on improved reading skills depending upon their intrinsic regulation (i.e., positive emotional satisfaction).

With respect to the first question, we analyzed the linear relationships between four types of motivational regulation and students' reading skill changes. Similar to the results of several previous studies exploring elementary children's reading motivation, in this study, only intrinsic regulation was significantly related to students' positive reading achievements; the rest of the motivational sub-factors showed no significant association (Guay et al., 2010; Schaffner & Schiefele, 2016). The other extrinsic motivational subfactors (e.g., external regulation, introjected regulation, and identified regulation) were not significant predictors to reading gains of summer program participants. When students are motivated with positive emotions related to social interactions in classrooms, there are more valuable long-term effects on their learning (Jennings & Greenberg, 2009). Our findings are consistent

[2] In SDT, intrinsic and identified regulation can be combined to represent autonomous motivation, and introjected and external regulation to represent controlled motivation. We ran the moderation models using composite scores of the individual regulation subscales to represent autonomous and controlled motivation. There were no significant direct or moderation effects, so we ran the moderation models again using the four individual motivation regulation subscales (i.e., external regulation, introjected regulation, identified regulation, and intrinsic regulation), the results of which are reported in this paper.

[3] In a multiple regression model, the effect size of the overall model is reported with the Cohen's f^2. Cohen (1988) presented the criterion of effect size f^2 at 0.02 (small), 0.15 (medium), and 0.35 (large).

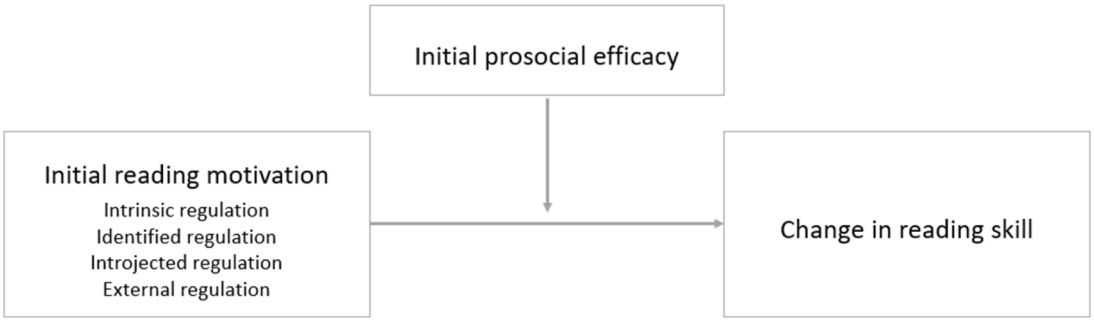

Fig. 1. The four moderation models tested.

Table 1
Descriptive results of variables.

							Skewness		Kurtosis	
	M	*SD*	*n*	*Range*	*Min.*	*Max.*	Estimate	*SE*	Estimate	*SE*
Initial prosocial efficacy	80.55	14.64	62	62.86	37.14	100.00	−0.81	0.30	0.04	0.60
Initial external regulation	2.62	0.96	52	3.00	1.00	4.00	0.16	0.33	−1.00	0.66
Initial introjected regulation	2.46	1.02	52	3.00	1.00	4.00	0.01	0.34	−1.23	0.66
Initial identified regulation	2.85	0.90	52	3.00	1.00	4.00	−0.57	0.33	−0.50	0.66
Initial intrinsic regulation	2.72	0.95	52	3.33	1.00	4.00	−0.13	0.33	−0.99	0.66
Changes in word recognition	0.15	1.55	67	9.00	−4.00	5.00	0.27	0.29	1.46	0.58
Changes in passage fluency	0.37	1.70	67	9.00	−4.00	5.00	0.30	0.29	0.44	0.58
Changes in comprehension	0.34	1.73	67	10.00	−5.00	5.00	0.26	0.29	1.33	0.58
Changes in BRI total[a]	0.87	4.04	67	21.00	−9.00	12.00	0.69	0.29	0.95	0.58

[a] Combined scores of changes in word recognition, passage fluency, and comprehension.

Table 2
Correlations among the variables.

	1	2	3	4	5	6	7	8	9
1. Initial Prosocial Efficacy	1								
Initial reading motivation									
2. External Regulation	−0.085	1							
3. Introjected Regulation	0.017	0.569***	1						
4. Identified Regulation	−0.088	0.404**	0.142	1					
5. Intrinsic Regulation	−0.107	0.032	0.021	0.520***	1				
Reading skill changes									
6. in word recognition	0.124	−0.011	−0.103	0.156	−0.019	1			
7. in passage fluency	0.061	0.068	−0.010	0.106	0.243	0.260*	1		
8. in comprehension	0.098	−0.007	0.020	0.075	0.308*	0.218	0.933***	1	
9. in BRI total[a]	0.116	0.021	−0.036	0.136	0.223	0.586***	0.920***	0.905***	1

* $p < .05$.
** $p < .01$.
*** $p < .001$.

with prior research demonstrating intrinsic reading motivation (i.e., positive emotions) is a meaningful factor that contributes to students' effective reading (De Naeghel et al., 2012; Koestner et al., 2008).

On the other hand, in the current dataset, extrinsic motivational factors are not associated with students' reading growth. This non-significant finding was not unexpected. Henderlong and Lepper (2002) highlighted that extrinsic rewards had limited benefits on learning motivation; only when students believed that praise or reward would continue in the future did reward or praise contribute to students' intrinsic motivation. The participants in this study were from grades 1–8, and in the case of younger learners, external rewards may be related to potentially positive emotions (i.e., intrinsic regulation). However, more than 60% of the students in this study were in grades 3–8, and thus, for those students, self-determined choices rather than teachers' compensation and rewards would have motivated them to read.

In research question two, we hypothesized that positive emotional satisfaction (i.e., intrinsic regulation) and students' prosocial efficacy would have a synergistic effect on their reading skill growth. Thus, we explored the interaction effect of students' motivational regulation and prosocial efficacy on their reading skills. The Freedom Schools' reading contexts include many discussion activities and collaborative group work (Petty et al., 2017). Thus, if students began their summer reading camp with high prosocial efficacy beliefs, their reading outcomes might be affected by various social contexts in classrooms, such as friendships, belonging, and social interactions. In a group of students with high prosocial efficacy, social satisfaction in reading experience and their reading skill gains may show a significant linear relationship compared to others with low prosocial efficacy.

Further, with respect to the significant moderation effect of students' prosocial efficacy, we can understand the different results in previous SEL studies on the direct relation between students' social-emotional

Table 3
Moderation model testing results of students' BRIs changes.

Outcome	Predictor (initial reading motivation)	Variables in moderation model	B	β	*SE*	*t*	*p*
Changes in total BRI level (Y)	1. External regulation	(Intercept)		1.345	0.633	2.127	0.039*
		External regulation (X)	−0.058	−0.262	0.669	−0.392	0.697
		Initial PE (Z)	0.159	0.045	0.042	1.075	0.288
		External*Initial PE (X*Z)	−0.119	−0.036	0.044	−0.807	0.424
	2. Introjected regulation	(Intercept)		1.427	0.639	2.233	0.031*
		Introjected regulation (X)	−0.111	−0.470	0.629	−0.747	0.459
		Initial PE (Z)	0.183	0.053	0.044	1.205	0.235
		Introjected*Initial PE (X*Z)	−0.107	−0.033	0.047	−0.702	0.486
	3. Identified regulation	(Intercept)		1.409	0.629	2.241	0.030*
		Identified regulation (X)	0.158	0.720	0.673	1.069	0.291
		Initial PE (Z)	0.182	0.051	0.042	1.230	0.225
		Identified*Initial PE (X*Z)	0.037	0.010	0.042	0.248	0.806
	4. Intrinsic regulation	(Intercept)		1.497	0.585	2.558	0.014*
		Intrinsic regulation (X)	0.276	1.222	0.611	1.999	0.052
		Initial PE (Z)	0.141	0.040	0.039	1.006	0.320
		Intrinsic*Initial PE (X*Z)	0.303	0.090	0.042	2.170	0.035*

Note. *$p < .05$. **$p < .01$. ***$p < .001$. PE = prosocial efficacy.
Y: outcome; X: predictor, Z: moderator, and X*Z: interaction between a predictor and a moderator.

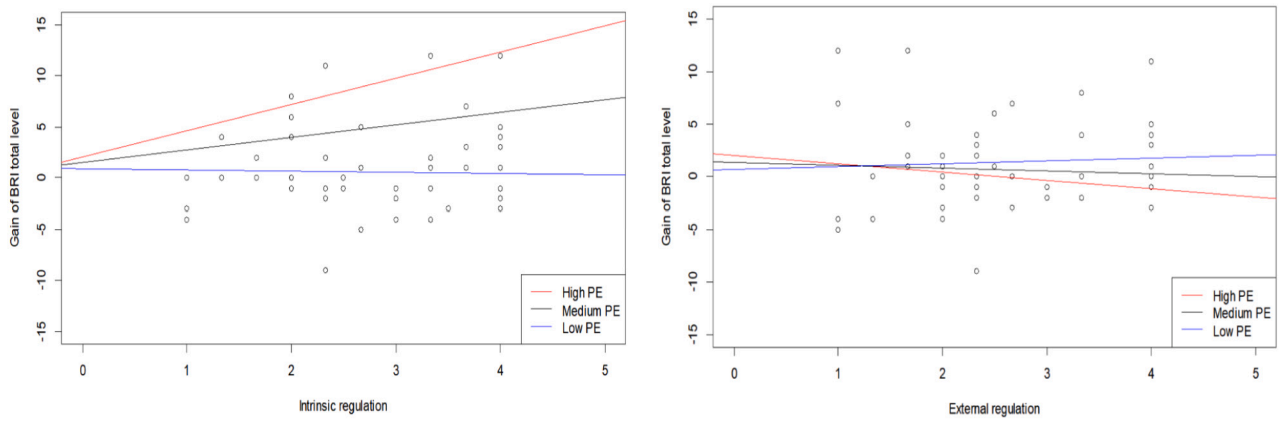

Fig. 2. Moderation effect of prosocial efficacy between intrinsic/external regulation and changes in total BRI scores.

skills and academic outcomes. Traditionally, SEL intervention studies have hypothesized that promoting social and emotional competencies predicts higher academic performance. However, some experimental studies call that assumption into question, as direct links between social and emotional competencies and academic performance were not found (Bierman et al., 2008; Jones et al., 2010). Likewise, in this study, students' initial prosocial efficacy did not have a direct relationship with reading outcomes, such as reading motivation or reading skill growth. In the summer reading program, our analytic model supported that students' prosocial efficacy could significantly moderate students' intrinsic regulation and their reading growth. Satisfaction from positive social relationships may contribute to effective learning under supporting students' intrinsic regulation in classrooms (Deci et al., 2013).

4.1. Limitations

Related to generalizability, the learning environment our results may apply to should be carefully considered given that this study was conducted in a culturally relevant summer camp and results by self-reported surveys with a small number of items. First, to measure child reading motivation, we used the Academic Self-Regulation Questionnaire (Deci et al., 1992) that was developed by SDT pioneers and broadly used in educational research. However, the acceptable but low internal consistency we obtained using the intrinsic and external regulation scales needs to be carefully considered in interpreting the results. Second, Freedom Schools aims to provide learning opportunities during out-of-school time for children who are traditionally underserved. Both the 6-week summer reading camp and participation in the study were voluntary (e.g., high dropout rates[4]), and the study results came from a small subsample with complete data and consent. Due to these sampling constraints, we were limited in the number of variables we could include in our moderation models while maintaining sufficient statistical power. With a larger sample, more predictors (e.g., demographic information, class level, and attendance) can be considered in advanced statistical models. Third, we analyzed results assuming similar attendance rates for participants who completed the six-week reading camp and the final reading assessment. However, since daily attendance may affect students' reading outcomes, future studies with larger samples should consider collecting daily attendance records of students and including attendance as an additional predictor in the final model. Fourth, this study only focused on predicting changes in academic skills from social (prosocial efficacy) and emotional (reading motivation) variables without assessing cognitive variables (i.e., attention, memory, and perception). Additional research based on the SEL framework should explore all three components to provide richer interpretations about students' learning growth (Jones & Kahn, 2017). Furthermore, the reading assessment used in this study was not developed or normed for populations of underserved students, and the word lists and passages do

[4] Students without posttest reading scores did not complete the six-week camp. We compared reading baselines between for students with and without posttest BRI participation. Their BRI pretest results were not significantly different [$t(87) = -0.206$; $p = 838$].

not reflect the social-emotional and multicultural issues and vocabulary of the Freedom Schools curriculum. Therefore, the BRI may not be sensitive to some changes in reading skills.

4.2. Implications of the study and future research

Given that the role of learning is to support students' developmental growth, teachers' instruction should focus on supporting sustained positive changes rather than temporary behavioral outcomes. Further, scholars are concerned about using frequent external rewards because learning experiences controlled by external conditions may undermine students' self-determination (e.g., reduce intrinsic motivation) (Deci et al., 2001; Scott-Rigby et al., 1992). Therefore, our suggestion for classroom teaching is that teachers focus more on developing intrinsic motivation. To enhance students' self-determination, teachers need to help them become immersed in reading activities related to their interests and reduce learning experiences under the control of external factors.

We recommend that future studies explore changes in social, emotional, and cognitive skills overtime in summer camp reading contexts. Many SEL scholars have pointed out that changes in students' social-emotional skills and their impact on learning need to be studied longitudinally (Hammer et al., 2018; Jones & Kahn, 2017). In future studies, using data from additional years could allow researchers to track the growth of students, who participate in Freedom Schools camp during multiple summers, across multiple variables. The camp returners will provide opportunities for researchers to track whether gains made in reading, prosocial efficacy, and reading motivation at Freedom Schools carry over across years or provide an advantage for learning during the regular school year.

In addition, the integrated reading curriculum at Freedom Schools is based on culturally relevant reading education that was designed for both summer literacy and cultural enrichment for K-12 children from multicultural backgrounds. Since this study focused on learners' social and emotional competencies and learning growth, we did not directly investigate the culturally relevant curriculum. In interviews, many students mentioned texts about African American history when describing positive reading experiences at camp. Reading about African American people helped them to become immersed in the stories and empathize with the characters. Other studies at Freedom Schools have focused on learners' cultural context and its potential impacts on the learners' reading motivation (see Ha et al., 2021).

Despite recent SEL experiments (e.g., Hammer et al., 2018; Kiviruusu et al., 2016; Rucinski et al., 2018) and many theoretical suggestions, there is still a need for more research to identify evidence-based practices that support students' social and emotional development. Helping students work productively with their peers would be a good example of promoting a prosocial classroom climate. Teachers can provide opportunities for collaborative problem-solving in class, which may give students insights about the value of collaboration and support better cognitive thinking skills (Häkkinen et al., 2017). These opportunities may include diverse group work, such as collaborative tasks with a common goal and small group discussions. 'Open-ended' and 'loosely-structured' discussions may be most productive, especially teachers can help students to respect various opinions and reach better solutions (Bergin, 2018).

5. Conclusion

The findings of this research provide insights for elementary and middle school teachers about how supporting students' intrinsic regulation and prosocial efficacy may also make a positive interaction effect on students' positive reading growth. Overall, this study suggests that if teachers support children's positive emotional experiences (e.g., intrinsic regulation) by encouraging students to have social interactions and to build up positive relationships, students may have effective reading experiences under these classrooms. This study's findings support the idea that teachers need to focus on not only students' reading achievement but positive social interactions and friendships as well for effective learning.

Declaration of competing interest

We wish to confirm that there are no known conflicts of interest associated with this manuscript.

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