

PEER ACCEPTANCE AND MOTIVATION AS MEDIATORS OF THE RELATIONSHIPS
BETWEEN STUDENTS' SOCIAL SKILLS AND ACADEMICS

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ABSTRACT

Primary goals of early elementary school are to teach children academic knowledge in reading and math. During this time, children also continue to develop their social skills, which can be learned from interactions with their peers. Several studies have shown a positive relationship between children's social skills and academic achievement; however, the mechanisms through which this relationship occurs is not well known. Two possible mechanisms are peer acceptance and academic motivation. The current study examines the relationship between social skills and academic competencies over time and tests peer acceptance and academic motivation as sequential mediators of the relationship. Participants were 190 early elementary school students. Children's social skills were found to be a significant predictor of math and reading competencies over time. Results also indicated significant indirect effects linking social skills to academic competence through the mediators of peer acceptance and academic motivation in models for both math and reading.

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I would like to dedicate this project to my parents, Chris and Michelle. I am deeply thankful for both of you instilling in me the values of hard work, grit, compassion and respect for others, and a love of learning and its importance. Your boundless support and guidance has meant so much to me, and I would not be where I am at today without it. With gratitude and love.

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CHAPTER ONE. INTRODUCTION

Over the past few decades in the United States, there has been a fervent push to increase the academic demands placed on children, so that they can optimally compete on the global education stage (Wilgus, 2019). These demands have come in the form of higher accountability, which include nationwide testing standards (Koyama, 2013). This has led to teachers teaching specifically for these tests, which can leave struggling students behind (Tanner, 2013). A focus on academic rigor has shadowed the importance of social-emotional learning (SEL) skills that should also have a place to be taught in the classroom, and are important for student success and thriving. SEL is “the ability to understand, manage, and express the social and emotional aspects of one’s life” (Elias, 1997, p. 2). Fortunately, there’s been increased teaching of SEL skills to students (Allbright et al., 2019).

A component of SEL is teaching social skills. Studies have shown that those who have good social skills are more likely to have higher levels of psychological well-being (e.g., Aikawa et al., 2007; Demir et al., 2012). Additionally, several studies have also shown a positive relationship between children’s social skills and academic achievement (DiPerna & Elliott, 1999; Malecki & Elliott, 2002; Miles & Stipek, 2006; Wentzel, 1993). Although primary goals of early elementary school are to teach children academic knowledge in reading and math, children also continue to develop their social skills, which can be learned from interactions with teachers and their peers. The positive relationship between children’s social skills and academic achievement point to the obligation to teach both skills in the classroom. There is still a paucity of knowledge of how this relationship works.

The purpose of the current study is to better understand the relationship between children’s social skills and academic competence. Peer acceptance and academic motivation will

be examined as possible mechanisms of this relationship. There are no studies to the author's knowledge that have tested these two variables as possible mediators. The proposed study will specifically examine this relationship with participants from kindergarten and first grade.

This study is guided by two psychological theories, Self-Determination Theory (SDT) and Social Cognitive Theory (SCT), as a unified theoretical framework. SDT is a theory of human motivation that examines the psychological needs that are the determinants of behavior (Ryan & Deci, 2017). Deci and Ryan (1985) proposed that there are three psychological needs for human behavior. They are autonomy, competence, and relatedness.

Autonomy is the ability to self-regulate experiences and the actions with them (Ryan & Deci, 2017). Children may not have a fully developed sense of autonomy, but they still have the ability to think about actions they perform (NICHD Early Child Care Research Network, 2008). Children can have the desire to come to school and to be engaged with their interests and their peers, which can be volitionally powered. When children are able to be autonomous in the school setting, they are also more likely to feel competent with their choices (Bandura, 1994). Deci and Ryan's (1985) second psychological need is competence. The feeling of competence is important for a person to be able to operate at their best ability. This is especially important for children in elementary school. It is a new environment that has new demands. If children continually feel that they cannot learn a new subject or skill, they may begin to feel inadequate. This can lead to lower self-esteem, engagement, and motivation (Schwinger et al., 2014). The third psychological need in SDT is relatedness. This encompasses the feeling of being connected with other people, and that there is a sense of being cared for (Ryan & Deci, 2017). If children have relatedness with those in their class, they are more likely to feel like they belong and that they have something to contribute to the class. Elementary students who have positive relationships with

their teachers have higher academic achievement in middle school (Hamre & Pianta, 2001). The social bonds that children develop with their teachers and peers in the classroom, by way of social skills, can possibly lead to peer acceptance and higher motivation, inciting further academic achievement.

SCT is a psychological theory that posits that social interactions are important components that guide behavior (Bandura, 2001; 1977). The theory is based on the conceptual framework of triadic reciprocity, which holds that there are three influences that create behavior. The influences are personal, behavioral, and environmental processes (Bandura, 1986). Bandura (2001) contends that humans are agentic, in that they aren't only reactive, but contribute to their own behavior by self-organizing and self-regulating. This relates to Ryan and Deci's (2017) psychological need of autonomy. In addition, humans develop within a social environment where the three influences have bidirectionality with each other. SCT is based on Bandura's (1977) previous formulation of Social Learning Theory that posited that learning can occur by watching others perform and model tasks. A major tenant of SCT is self-efficacy, which is a belief that one has about themselves that they can perform or master a certain task or skill (Bandura, 1986). Children with higher levels of self-efficacy have been found to have higher levels of motivation (Usher et al., 2019). Considering that the social environment and self-efficacy are crucial for children's healthy development, good social skills could lead to peer acceptance and motivation.

Academic Competence

For children to have success and achievement in the classroom, they need to be academically competent. Academic competence can be defined "as a multidimensional construct consisting of the skills, attitudes, and behaviors of students that contribute to success in the

classroom” (DiPerna & Elliott, 2002, p. 293). According to DiPerna and Elliott’s (2002) Academic Competence Model, there are two domains that contribute to academic competence, which are academic skills and academic enablers. Academic skills consist of reading, math, and critical thinking. This study will focus on reading and math competence. These are core skills that are taught within elementary schools. Academic enablers include interpersonal skills, motivation, study skills, and engagement. These are the behaviors and skills needed to be an active participant in the classroom, so that academic skills can be fully mastered. Although academic competence is not identical to academic achievement, the two constructs complement each other by examining student success. Academic competence is needed for academic achievement, where academic achievement is usually measured by grades, GPA, and scores on standardized tests. In this study, the two terms will be used interchangeably, when referring to the literature. From this view, one can observe that children’s socioeconomic status (SES) and sex can affect academic achievement. Many studies have shown that SES is a fundamental predictor of students’ academic achievement (e.g., Kim & Quinn, 2013; Sirin, 2005; White, 1982). Children with lower SES are more likely to have lower academic achievement (Caldas & Bankston, 1997). Furthermore, sex differences have been found in academic achievement. In a study with kindergartners, girls were found to have better reading skills than boys (Chatterji, 2006). This gap has been found to persist later on throughout schooling (Trzesniewski et al., 2006). An opposite finding has been found with math skills, in that boys tend to outperform girls on tests in elementary school (Penner & Paret, 2008).

Social Skills

The ability of early elementary children to positively interact with their peers and teachers is crucial for their success in school (Meier et al., 2006). Children facilitate interactions

with others through social skills. Social skills can be defined as “a set of competencies that (1) facilitate initiating and maintaining positive social relationships, (2) contribute to peer acceptance and friendship development, (3) result in satisfactory school adjustment, and (4) allow individuals to cope with and adapt to the demands of the social environment” (Gresham et al. 2006, p. 364). Social skills children learn that promote prosocial behavior include forming friendships with other children, apologizing when something wrong happens, conflict resolution, sharing, and helping others (Jones et al., 2015). Social skills can be referenced as a component of SEL that integrates with other components of SEL (Denham & Brown, 2010).

As children enter the school environment, social interactions increase. To help facilitate positive social interactions and develop increased social skills, a child’s effortful self-regulation must be attuned. Correlations higher than .90 have been found between children’s effortful self-regulation and social competence (Spinrad et al., 2006). An example of children utilizing effortful self-regulation to cultivate social skill development would be when two children have conflict with each other. A child with a higher level of social skills would be able to regulate his or her own emotions along with the child’s emotions they have conflict with, such as anger (Bergin et al., 2003; Eisenberg & Spinrad, 2004). Self-regulatory ability in this situation would help with conflict resolution. Social skills do not only affect how children interact with each other, but also can affect academic outcomes.

Children’s social skills have been found to have a positive relationship with academic achievement (e.g., DiPerna & Elliott, 1999; Miles & Stipek, 2006). In a study by Wentzel (1993) that examined the relationship between middle school students’ social behavior and academic competence, it was found that both antisocial and prosocial behavior significantly correlate with GPA and standardized test scores. Social behavior was also found to be significantly related to

teacher preference scores of students and their academic behavior. When IQ, sex, race, family structure, and absences from school were controlled in the regression models, social behaviors still were significant predictors of students' grades. A longitudinal study conducted with students in third and fourth grades found that social skills were positively predictive of academic achievement from fall to spring in the same academic year (Malecki & Elliott, 2002). The same relationship did not hold for students who exhibited problem behaviors; there was a negative predictive relationship (Malecki & Elliott, 2002). In a study with 4- and 6-year-olds who were low-income, social skills were associated with literacy achievement in first, third, and fifth grades (Miles & Stipek, 2006). Additionally, DiPrete and Jennings (2012) found that social and behavioral skills of elementary students have a significant relationship with academic skills (math and reading) over time. Results also indicated girls have higher levels of social and behavioral skills than boys, which persists throughout the first six years of their school years (DiPrete & Jennings, 2012).

Peer Acceptance

The level of a child's social skills can either lead to possible peer acceptance or peer rejection in the classroom. Children who are accepted by their peers are more likely to have prosocial behaviors, be more sociable, and have less aggressive behavior (Beazidou & Botsoglou, 2016). The opposite holds for children who are rejected by their peers; they can be less compliant, more aggressive, and socially withdrawn (Asher & Dodge, 1986; Godleski et al., 2015). Peer acceptance can be defined as the liking of children by their peers, where they are often chosen to play with and engage in tasks with their peers (Wentzel et al., 2020).

Peer acceptance in the classroom can affect children's academic outcomes. Children who have a positive academic reputation with peers, as measured by peer nominations, are more

likely to have higher teacher-rated academic skills (Gest et al., 2005). Similarly, peer acceptance has been linked to academic achievement, such as children's grades and test scores (Flook et al., 2005; Wilson et al., 2011). Peer acceptance and academic achievement have found to be stable over time for elementary students. DeRosier and Lloyd (2011) found that social acceptance, measured by peers in the fall of a school year, predicted math and reading grade point averages in the spring of the same academic year. Children with better social skills are less likely to be rejected by their peers, and in turn, are more likely to have higher academic achievement.

Motivation

Another possible factor that might affect the relationship between children's social skills and academic achievement is academic motivation. Academic motivation refers to behavior that involves persistence of tasks that are academically skill-oriented and goal-directed (Schunk et al., 2014). Academic motivation can be comprised of intrinsic or mastery, and extrinsic motivation. Intrinsic motivation occurs when an activity, and the behavior produced by it, are internally enjoyable to the individual (Locke & Schattke, 2019). Extrinsic motivation is present when a behavior is externally rewarded to the self (Locke & Schattke, 2019). In a longitudinal study with young children, ages 7-9, academic intrinsic motivation was found to be positively related to academic achievement, which included measures of children's grades, subject knowledge, and how well they performed academically in math and reading as rated by teachers (Gottfried, 1990). Third graders who have higher levels of motivation also have been found to have higher grades in reading and math (Coates Broussard & Garrison, 2004). Furthermore, motivation is an academic enabler in DiPerna and Elliott's (2002) Academic Competence Model that was discussed previously. Motivation as an academic enabler has been found to predict academic achievement with elementary students (DiPerna et al., 2005). Additionally, motivation does not

only relate to academic achievement. Wentzel et al. (2020) have found that motivation mediates the relationship between peer acceptance and academic achievement. Children who are accepted by their peers may feel more belongingness within the classroom context, which may lead to higher levels of academic motivation (Ryan & Deci, 2017).

Purpose

The evidence that supports a positive relationship between children's social skills and academic achievement is strong (DiPerna & Elliott, 1999; Malecki & Elliott, 2002; Miles & Stipek, 2006; Wentzel, 1993). However, most of these studies only support a correlational relationship and do not try to understand the mechanisms that foster it. This study will add to the literature by further examining the relationship between children's social skills and academic competence by using a longitudinal design. It will also test peer acceptance and academic motivation as sequential mediators of the relationship between social skills and academic achievement. There are no current studies that have done this. Peer social acceptance has been found to be positively related to academic achievement, along with motivation mediating this relationship, but social skills have not been added to these pathways to better understand these relationships (Wentzel et al., 2020). The main purpose of this study is to better understand the relationship between children's social skills and academic competence, and how peer acceptance and academic motivation might be possible mechanisms of this relationship.

Research Questions

The current study will address multiple questions regarding the relationship between children's reading and math academic competencies and their social skills, and how peer acceptance in the classroom and academic motivation might mediate this relationship. More specifically, these questions are (1) Controlling for sex and SES, how does the level of children's

social skills affect their math and reading competencies across time? (2) Controlling for sex and SES, does peer acceptance in the classroom and academic motivation mediate the relationships between children's social skills and their math and reading competencies across time? (3) Controlling for sex and SES, does motivation mediate the relationship between peer acceptance and math and reading competencies?

CHAPTER TWO. METHODS

Procedure

The data for this study come from a larger study that utilized five public elementary schools in an Upper Midwest city that implemented the Early Risers (ER) “Skills for Success” preventive intervention program over a 2-year period (Hektner, 2011). The schools had similar demographics, with predominately White students, and about half of the participants were in kindergarten and half were in first grade. Out of the five schools, two schools were assigned as controls and three were randomly assigned to implement the ER program.

The ER program is a prevention program that focuses on children in early elementary school who display disruptive behavior and poor adjustment, which could lead to the development of more serious conduct problems (August et al., 2007). The program is theory-based and teaches children appropriate self-regulation and social skills, while also teaching academic skills. Data from the current study came from an extension of the program by an added element of a buddy system. Children who were well-adjusted were paired with children who had behavioral difficulties (Hektner et al., 2017).

For recruitment of participants in the prevention program evaluation study where the data for the current study originated from, informed consent forms for parents were sent home to all kindergarten and first grade students ($N = 777$) from the five elementary schools. 525 students returned informed consent forms back to their teachers; this was a response rate of 67.6%.

Children who received parental consent were rated by their teachers with the Behavioral Assessment System for Children-2 Teacher Rating Scale (BASC-2-TRS; Reynold & Kamphaus, 2004), where the “Aggression” and “Social Withdrawal” subscales were used. Children who scored a T score of 60 or higher (50 is the national norm) on either of the subscales were labeled

as children “with difficulties” (WD), and children who scored below 60 on both subscales were labeled as “well-adjusted” (WA). 190 children who met criteria for either WD or WA were asked to participate in the study.

Participants

The current study had 190 children from kindergarten (48.4%) and first grade (51.6%) as participants. The average age of participants was 6.7 years old, with an age range from 6-8. There were slightly more girls in the sample, 52.4%, compared to boys. The majority of participants were White, 89.7%. Parent’s average-level SES, calculated by using the Hollingshead Index of Social Position (ISP), was $M = 47.39$, ($SD = 13.28$). The ISP uses three socioeconomic factors, which are education, income, and occupation to determine a person’s SES level (Hollingshead, 1975).

Table 1

Means, Percentages, and Standard Deviations of Demographic Variables

Variable	M or %	SD
Age	6.70	.65
Parent SES	47.39	13.28
% Kindergarten	48.4%	
% Male	47.6%	
% Non-white	10.3%	

Measures

Math and reading competencies

The Academic Competence Evaluation Scale-Teacher Form (ACES; DiPerna & Elliott, 1999; 2000) was used to measure children’s math and reading competencies. Subscales of the ACES consist of academic enablers and academic skills. To measure children’s math and reading competencies, the academic skills subscales of “Reading” and “Math” were used. The “Reading”

subscale assesses children's proficiency in skills that pertain to reading and language arts. It has 11 items that teachers rate children on, which includes statements such as "Reading comprehension," "Spelling," and "Reading fluency." The "Math" subscale measures children's skills in numeracy and utilization of concepts in math. It has 8 items, which include statements such as "Computation," "Measurement," and "Using numbers to solve daily problems." The items on both subscales are rated on a 5-point Likert scale ranging from 1 (*far below*) to 5 (*far above*). Teachers are directed to "Please rate the student's academic skills in comparison with the grade-level expectations at your school" (DiPerna & Elliott, 2000). With K-5 students, internal reliability for the "Reading" subscale has been reported as $\alpha = .98$, while the "Math" subscale has ranged from $\alpha = .97$ to $\alpha = .98$ (DiPerna & Elliott, 2000).

Social skills

The instrument that was used to measure children's social skills was the Behavior Assessment System for Children-Second Edition, Teacher Report Scale (BASC-2-TRS; Reynolds & Kamphaus, 2004). The subscale of "Social Skills" ($\alpha = .93$) was utilized and contains 8 items. The items include statements, such as "Offers help to other children," "Tries to bring out the best in other people," and "Compliments others." The teacher-rated scales are on a 4-point Likert scale ranging from 0 (*never*) to 3 (*almost always*). Teachers responded to each item that describes how each student has behaved in the last several months.

Peer acceptance

Sociometric data was collected from the participants and from their classmates to obtain a peer acceptance score (liked most nominations minus liked least nominations). This was done on an individual basis, where children were shown photos of their classmates by a research assistant. Children could name as few or as many classmates in either the liked most or liked

least categories. Nominations were standardized within class and gender. This methodology has been promoted as a standard for obtaining peer acceptance scores (Coie et al., 1982).

Academic motivation

The ACES teacher rating subscale of motivation was utilized to measure children's academic motivation (DiPerna & Elliott, 2000). The subscale of "Motivation" consists of 11 items. The items include statements, such as "Persists when task is difficult," "Is goal-oriented," and "Attempts to improve on previous performance." The scales are on a 5-point Likert scale ranging from 1 (*never*) to 5 (*almost always*). Internal reliability for this subscale for K-5 students has been reported from $\alpha = .98$ to $\alpha = .97$ (DiPerna & Elliott, 2000).

Analyses

First analytic strategy

In regards to research question (1), multilevel modeling (MLM) analyses were utilized to examine how children's social skills might affect their math and reading competencies across time. Two models were created to conduct analyses; one was a math competencies model and the other was a reading competencies model. Math and reading competencies were entered as the outcome variables in their respective models. The Level 1 covariance structure was first analyzed for both models to provide bases for concurrent models. An autoregressive structure with homogeneous variances (AR1) was first tried, but Rho was found to be non-significant for the math model, $p = .933$, and non-significant for the reading model, $p = .500$. The covariance structure was changed to scaled identity for the rest of the models. The Level 2 covariance structure that was utilized for both math and reading models was variance components (VC). Base models were created, first with linear time, then with quadratic time. Both linear and

quadratic time were entered in the models as fixed and random to determine if the trajectories of math and reading competencies systematically varied between individuals.

The predictor of social skills at baseline, which was treated as a time-varying variable, and control variables of sex and SES were added to the base model next to see if there were significant main effects. Social skills was first entered into the models as fixed, and then it was tried as random. Interactions between time, predictor, and controls were analyzed as well: $(time * social\ skills)$, $(time * sex)$, and $(time * social\ skills * sex)$. These interactions were included to determine whether sex moderates the effect of social skills on changes in academic competence over time. Finally, comparisons between models were made using Akaike's Information Criterion (AIC).

Missing data

There was missing data in the data set; however, it was not likely to be associated with the levels of social skills and academic competencies themselves. Data could have been missing due to attrition over the time of the study. Students could have moved to other school districts. The data in the dataset was most likely Missing At Random (MAR). This means that multilevel modeling could be continued without biased estimates.

Second analytic strategy

For research questions (2) and (3), longitudinal path analyses were conducted with Mplus. Estimates of indirect effects and their standard errors were calculated using bootstrapping with 10,000 iterations. Social skills and peer acceptance were entered into the models from baseline (Time 0) and motivation was entered from Time 1. Both reading and math competencies were the dependent variables in the models and are from Time 2. SES and sex were controlled.

CHAPTER THREE. RESULTS

Results from First Analytic Strategy

Math competencies

In the initial base model, linear time was entered as fixed and random, with a random intercept. There was no significant linear change in math competency over time, $\beta = .44$, $p = .094$. There was also no significant variance in linear slopes over time across individuals, $p = .640$. Quadratic time was entered into the model to determine whether the average trajectory of math competencies was nonlinear. Quadratic time entered as fixed was significant, $\beta = 1.62$, $p < .001$. When quadratic time was entered as random, it was not significant, as the model did not converge. In the final base model, linear time and quadratic time were kept in the model only as fixed and not random, and were both significant (see Table 2). The average baseline score for math competencies was 48.99, and scores varied significantly across individuals. Linear time was significant, which meant that children's average-level math competency scores significantly changed over time. Additionally, since quadratic time was significant the trajectories of children's average-level math competency scores were non-linear. The trajectory of the scores declined initially from the baseline and then increased.

In the next model, the social skills variable was added as a predictor, and SES and sex were added as covariates. The social skills predictor was added to the model as fixed and as random. The fixed effect was significant, $\beta = .15$, $p < .001$, and the variance of the random component was not, $\beta = .004$, $p = .827$. An interaction of linear time and social skills was entered next to examine if the effect of social skills on math competency varied across time. It was not significant, $\beta = -.01$, $p = .610$. The social skills variable was kept in the model as fixed and the

interaction was dropped, due to its non-significance. The results indicated that social skills was positively related to math competency, but this effect did not significantly vary across time.

The SES covariate was added next to the model as fixed. It was significant, $\beta = .20, p < .001$. An interaction of time and social skills was entered again, with SES holding as a control, but it was not significant, $\beta = .008, p = .789$. The male covariate was added next to the model as fixed. It was not significant, $\beta = .82, p = .447$. Two interactions were examined. The first interaction was with male covariate and social skills, which was not significant, $\beta = -.09, p = .158$. The second interaction was with time and social skills. This interaction was also not significant, $\beta = .008, p = .789$.

Results of the final model indicate that children do vary in their average baseline math competency scores, and that the scores at each time point significantly varied from one another. Results are listed in Table 2. The average baseline math competency score was 49.04. The linear trajectory of the scores was negative. However, the inclusion of the quadratic time variable in the model was positive, which indicates that scores will increase over later time points. The overall trajectory of scores with the combination of both time variables is curvilinear. Social skills scores were a significant predictor of math competency scores. A child with a high social skills score is more likely to have a higher math competency score. Examination of the AIC between the base model and the final model was performed. The AIC for the base model was 3114.756, and 2638.002 for the final model. The AIC of the final model is smaller than the base model, which means that the final model was a better fitting model.

Reading competencies

In the initial base model, like the math model, linear time was entered as fixed and random, with a random intercept. There was significant linear change in reading competency

over time, $\beta = .58, p < .007$. There was no significant variance in linear slopes over time across individuals, $p = .855$. Quadratic time was next entered as fixed into the model, and was significant, $\beta = 1.61, p < .000$. When quadratic time was entered as random it was not significant, $p = .810$. In the final base model, linear time and quadratic time were kept in the model only as fixed, and were both significant (see Table 3). The average baseline score for reading competencies was 49.82, and individuals had significantly varying level scores. Linear time was significant, which meant that children's average reading competency scores significantly changed over time. The addition of quadratic time as significant also indicates that the trajectories are non-linear; like the math competency scores, reading declined from baseline and then improved over time.

Table 2

Estimates of Fixed Effects on Math Competency

Parameter	Model 1		Model 2		Model 3		Model 4		Model 5	
	Est	<i>p</i>	Est	<i>p</i>	Est	<i>p</i>	Est	<i>p</i>	Est	<i>p</i>
Intercept	48.55	<.001	48.99	<.001	48.94	<.001	49.44	<.001	49.04	<.001
Time	.44	.094	-2.81	.005	-2.36	.019	-3.02	.004	-3.02	.004
TimeSquare			1.62	.001	1.41	.004	1.70	.001	1.70	.001
Social Skills					.15	<.001	.12	<.001	.12	<.001
SES							.20	<.001	.19	<.001
Sex									.82	.447

In the next model for reading, social skills was added as a predictor variable and SES and sex were added as covariates. The social skills predictor was added to the model as fixed and as random. The fixed effect was significant, $\beta = .12, p < .000$, and the variance of the random component was not, as the model did not converge. An interaction of linear time and social skills was entered next. It was not significant, $\beta = .006, p = .775$). The predictor was kept in the model

as fixed, and the interaction was dropped. The predictor indicated that children's social skills was positively related to reading competency, but the effect did not significantly vary across time.

The SES covariate was added next to the reading model as fixed. It was significant, $\beta = .14, p < .001$. An interaction of time and social skills was entered again, with SES as a control, but it was not significant, $\beta = .03, p = .142$. The male covariate was added next to the model as fixed. It was not significant, $\beta = -.21, p = .837$. An interaction with the male covariate and social skills was entered next, which was not significant, $\beta = -.05, p = .412$. Another interaction with time and social skills was entered, but with both sex and SES as controls. This interaction was also not significant, $\beta = .03, p = .142$.

Results of the reading competency model are almost identical to the math competency model. Results of the final model indicate that children do vary in their average-level baseline reading competency scores, and that the scores at each time point significantly varied from one another. Results are listed in Table 3. The average baseline reading competency score was 50.16. Again, the linear trajectory of the scores was negative, but the inclusion of quadratic time with a positive coefficient indicates that the overall trajectory is curvilinear and turns positive over time. Social skills scores were a significant predictor of reading competency scores. A child with a high social skills score is more likely to have a higher reading competency score. The AIC for the base model was 2986.418, and 2515.520 for the final model, which indicates that the final model was a better fitting model.

Summary of findings

In relation to research question 1, when controlling for sex and SES, the level of children's social skills does affect their math and reading competencies across time. For both the math and reading models, social skills had a positive effect on competency scores. Children who

have higher average-level social skills are also more likely to have higher average-level math and reading competencies over time, even when sex and SES are controlled. The models also indicated that the trajectories of this relationship for each child are curvilinear, and that scores at each time point are significantly different from one another.

Table 3

Estimates of Fixed Effects on Reading Competency

Parameter	Model 1		Model 2		Model 3		Model 4		Model 5	
	Est	<i>p</i>	Est	<i>p</i>	Est	<i>p</i>	Est	<i>p</i>	Est	<i>p</i>
Intercept	49.34	<.001	49.82	<.001	49.76	<.001	50.06	<.001	50.16	<.001
Time	.58	.007	-2.66	.001	-2.29	.003	-2.92	<.001	-2.92	<.001
TimeSquare			1.61	<.001	1.44	<.001	1.75	<.001	1.75	<.001
Social Skills					.12	<.001	.09	.001	.09	.001
SES							.14	<.001	.14	<.001
Sex									-.21	.837

Equations for the final models

Level 1 Equation:

$$Y_{ti} = \pi_{0i} + \pi_{1i}(\text{Time}_{ti}) + \pi_{2i}(\text{TimeSq}_{ti}) + \pi_{3i}(\text{Social Skills}) + \varepsilon_{ti}$$

Level 2 Equations:

$$\pi_{0i} = \beta_{00} + r_{0i}$$

$$\pi_{1i} = \beta_{10}$$

$$\pi_{2i} = \beta_{20}$$

$$\pi_{3i} = \beta_{30}$$

Combined Equation:

$$Y_{ti} = \beta_{00} + \beta_{10}(\text{Time}_{ti}) + \beta_{20}(\text{TimeSq}_{ti}) + \beta_{30}(\text{Social Skills}_{ti}) + \varepsilon_{ti} + r_{0i}$$

Results from Second Analytic Strategy

Math competencies

For the longitudinal path analyses, correlations between study variables were first examined (see Table 4). The results of the math model for the second analytic strategy are depicted in Figure 1. Results indicated significant effects from baseline social skills to peer acceptance, and from peer acceptance to math competencies at Time 2. The indirect effect of social skills on math competencies through the mediator of peer acceptance was .007, $p = .756$. With the mediators present in this model, the direct effect of social skills on math competency was found to be not significant. Results also showed an indirect effect through motivation, .097, $p = .036$. Finally, there was a two-step indirect effect, from social skills to peer acceptance to motivation to math competency, .027, $p = .095$.

Table 4

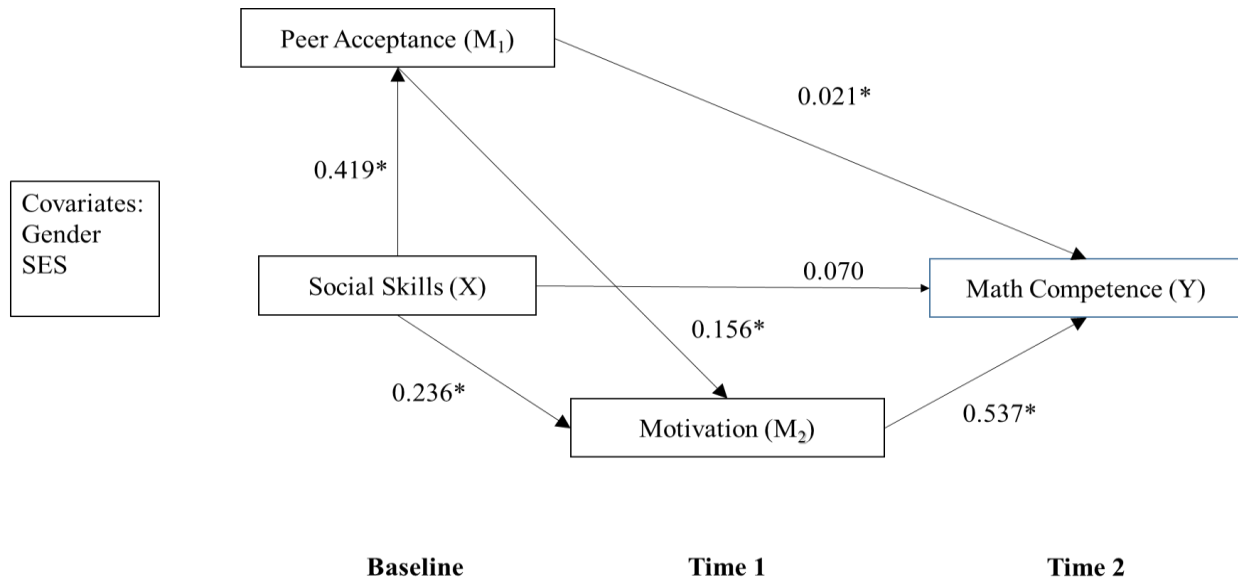
Means, Standard Deviations, and Correlations among Variables

Variable	1	2	3	4	5	6	7	<i>M</i>	<i>SD</i>
1. Sex	-								
2. SES	.01	-						47.39	13.28
3. Acceptance (B)	.12	.23**	-					.83	4.64
4. Social Skills (B)	.25**	.27**	.46**	-				50.52	11.03
5. Motivation (T1)	.01	.22*	.24**	.31**	-			45.27	6.51
6. Math (T2)	.06	.37**	.21**	.32**	.65**	-		49.99	8.20
7. Reading (T2)	.05	.33**	.27**	.32**	.69**	.81**	-	51.14	7.64

Note. B = Baseline. T1 = Time 1. T2 = Time 2. SES = Socioeconomic Status. Sex is coded as 0 = Female; 1 = Male. * $p < .05$, ** $p < .01$

Figure 1

Path Diagram with Math Competency as the Outcome



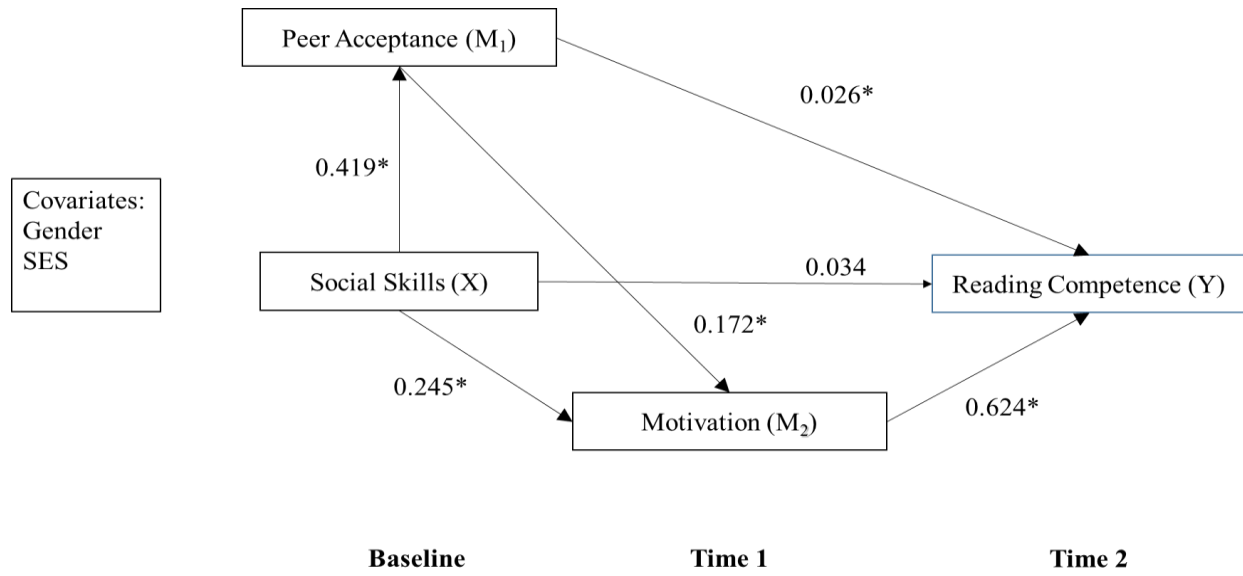
* $p < .05$

Reading competencies

The results of the reading model for the second analytic strategy are depicted in Figure 2. Results indicated significant effects from baseline social skills to peer acceptance, and from peer acceptance to reading competencies at Time 2. The indirect effect of social skills on reading competencies through the mediator of peer acceptance was .008, $p = .695$. With the mediators present in this model, the direct effect of social skills on reading competency was found to be not significant. Results also showed an indirect effect through motivation, .111, $p = .021$. Finally, there was a two-step indirect effect, from social skills to peer acceptance to motivation to reading competency, .033, $p = .065$.

Figure 2

Path Diagram with Reading Competency as the Outcome



* $p < .05$

CHAPTER FOUR. DISCUSSION

This study examined the relationship between children's social skills and their math and reading competencies over time, and assessed peer acceptance and academic motivation as sequential mediators of this relationship, while sex and SES were controlled. Data from a sample of 190 early elementary school students, and three time points over two academic years was utilized. Results of this study can be applied to classroom settings and prevention intervention programs that focus on promoting children's social skills development. Furthermore, the results can inform reading specialists and Title I teachers. Children below grade level in math and reading should also be assessed for social skill deficits. If students have deficits in reading or math, and additionally in social skills, the child could best be served by addressing the academic and social skills together. Simply addressing their academic issues may be enough.

Trajectory of Academic Competencies with Social Skills

In relation to research question one, the effect of children's social skills on academic competencies across time, children's social skills was found to be a significant positive predictor of math and reading competencies. This finding is consistent with previous research that has found similar longitudinal relationships between social skills and academic achievement (e.g., DePrete & Jennings, 2012; Malecki & Elliott, 2002; Miles & Stipek, 2006). This study is the first to specifically use academic competencies as a dependent variable, instead of academic achievement (e.g., GPA, test scores, grades).

Interestingly, the trajectory of academic competency scores was curvilinear. From baseline, trajectories of scores declined and then increased. This could be due to the time points at which the data were collected. Baseline data were collected in the spring of the academic year, and Time 1 and Time 2 were collected in the following academic year (i.e., fall, spring), leaving

a summer gap with no academic instruction between baseline and Time 1 scores. Children in the summer months are typically academically inactive. This can lead to a decline in academic skills, which is often referred to as summer slide (Cooper et al., 1996; Nicholson & Tiru, 2019). To better understand the trajectory of academic competency scores, future studies could examine whether or not social skills hold a degree of buffering against decreased academic skills in months when children are not academically active.

Peer Acceptance and Academic Motivation as Mediators

In regards to research questions two and three, peer acceptance and academic motivation were found to be mediators of the relationship between children's social skills and academic competencies. Moreover, peer acceptance and motivation were found to be sequential mediators, where in the models, motivation at Time 1 was dependent upon peer acceptance at baseline. These findings relate to the theoretical framework that guides this study, which consisted of SDT and SCT. These theories promote positive social interactions that conduce positive well-being and learning. Children who feel secure and connected with their peers have a sense of relatedness with them. They are accepted among their peers. This in turn can create a desire to be more like their peers and pick up similar goals and interests (Ryan & Deci, 2000). In an academic setting, examples of goals could be becoming a better reader or faster at multiplication tables, which could be reinforced among peers in the classroom. Positive interactions with peers and being goal-directed from this standpoint could lead to academic motivation and further academic achievement. Moreover, Wentzel et al. (2020) found that motivation mediated the relationship between peer acceptance and academic achievement.

Although academic self-concept was not in the path models tested in this study, it can be regarded as a "pseudo" variable in the model, by way of the theoretical framework, and can

possibly better help explain the model results. Academic self-concept is the way in which children view their abilities in a school context that consists of cognitive structures and perceptions (Becker & Neumann, 2018; Lohbeck et al., 2017). A child with a more positive academic self-concept feels like they are more competent in the tasks they choose (Jacobs et al., 2002). This can lead to higher self-esteem, and possibly finding more enjoyment and motivation with different tasks (Bandura, 1994). In addition, peer acceptance can lead to higher self-esteem (Coplan et al., 2004). Flook et al. (2005) found that 4th grade students who lack peer acceptance, also have lower academic self-concepts. Children who view themselves as being good at a particular task perform better and with more confidence with that task as well (Bandura, 1994). The relationships are mutual.

These details about academic self-concept fit well into the models that were tested in this study. They support the three psychological needs that SDT posits: autonomy, competence, and relatedness. They also support the tenet of self-efficacy in SCT. Academic self-concept could be a possible additional sequential mediator, so that the steps in the causal chain would consist of peer acceptance leading to greater academic self-concept, which would in turn lead to greater motivation. Academic self-concept can be viewed as the psychological component within this relationship. Future studies should examine academic self-concept as another sequential mediator in these models to better understand the relationship between children's social skills and academic competencies.

Strengths and Limitations

A strength of this study is that it utilized longitudinal data. First, this approach allowed for examination of the relationship between children's social skills and academic competencies across three time points that spanned two academic years. The use of longitudinal data

contributed to a better understanding of the trajectory of children's math and reading competency scores, while adding social skills as a predictor. Utilizing only cross-sectional data in studies do not allow examining the individual trajectories of this relationship. Second, while better understanding the relationship between children's social skills and academic competencies over time, the data also highlighted the possible mechanisms of peer acceptance and academic motivation that help to contribute to the relationship. The significant results from the sequential analyses of the mediation models emphasize the importance of testing peer acceptance and academic motivation at different time points.

The study does have limitations that should be addressed. The sample of children in this study was homogeneous with about 90% of participants being White. Participants were also from an urban area, where only children from public schools were examined. Most of the children were also from low to middle class families. These limitations highlight the risks of generalizing the results to a wider population. Future studies need to include a more diverse sample of children from varying geographic areas and income levels, along with varying types of schools. Studies with these divergent components will help us better understand the generalizability of the results of this study.

Other limitations of this study are attrition of participant data and multiple teacher raters. Longitudinal data is a strength of this study, but there is attrition of participant data. As discussed earlier, data are likely missing at random. This does not affect the MLM models, as much as it does the longitudinal path analyses. Missing data in the path analyses are deleted from the sample, so a smaller sample size is used. Multiple teacher raters is also a limitation. At baseline in the spring of the academic year one teacher rated children on their social skills and academic competencies. As children moved into the next academic year, another teacher rated children at

Time 1 (fall) and Time 2 (spring) consecutively. In all, two teachers rated children, which could result in different ratings.

Implications

This study found that children's social skills predict academic competencies across time, and that peer acceptance and academic motivation are mechanisms through which this relationship occurs. Although these findings are valuable, more research is needed to better understand the longitudinal trajectories of these relationships. Future research should focus on children of varying ages by following them from early childhood through adulthood. It is only from a longitudinal study of this magnitude that we can better ascertain the importance of social skills on academics, and how they might affect other outcomes in adulthood, such as well-being and economic factors. Other mediators, such as academic self-concept, should also be tested.

This study also highlights the importance of social skills to academic achievement in the classroom, specifically for early elementary students. The mounting evidence (e.g., DiPerna & Elliott, 1999; Malecki & Elliott, 2002; Miles & Stipek, 2006), including this study, make it clear that not only should teachers focus on academics in the classroom, but also on SEL. It is urged for teachers, principals, school counselors, parents, and policy makers to make a push to incorporate standards for curriculum that support the integration of SEL programming within all classrooms. Another applied implication of this study is to tailor prevention intervention programs to specifically focus on ways to promote peer acceptance. Understanding that peer rejection can possibly lead to deleterious outcomes for children, programs need to cultivate and promote specific and strong relationship building skills of children with heightened risk of behavioral problems. These implications illuminate that children should not develop in pre-determined silos where they are taught only social skills or only academic skills; these skills

should be taught together at the same time in the same spaces. This weaving will allow a more holistic approach to child development, which can give a better opportunity for all children to flourish.

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