ACADEMIC TASK AVOIDANCE AND ACHIEVEMENT AS PREDICTORS OF PEER STATUS DURING THE EARLY PRIMARY SCHOOL YEARS

by

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ABSTRACT

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Given the diverse and substantial developmental outcomes associated with low peer acceptance, it is important to research its potential predictors. However, the developmental antecedents are not likely restricted to simple, one-lagged links within the same domain. Rather, peer status may stem from a developmental sequence of effects across several domains, particularly across those that develop at the same time and in the same environment as peer status. A developmental cascade model is best used to capture sequential changes over time, across multiple domains, and during sensitive periods of development Academic motivation and achievement likely exemplify predictors that would affect peer status sequentially over time during the early primary school years. This study examined the developmental cascade of task avoidance, academic achievement, and peer acceptance using a sample of 545 (311 boys, 234 girls) Finnish students in the 1st through 4th grade (*M* = 7.67, *SD* = 0.31 years old at the outset).

Results showed that early task avoidance leads to a decline in achievement over time, which in turn leads to a decline in peer acceptance over time. In addition, low achievement leads to increases in task avoidance, which lead to declines in peer acceptance. The initial achievement cascade fit the model significantly better than did the initial achievement model. Results were similar for math and reading achievement. Control variables that included characteristics of the child as well as the child's school experience were added to the final model to enhance findings. Inclusion of covariates did not produce changes in the pattern of results. This study illustrates how peer acceptance can be affected by seemingly unrelated child behaviors that are exhibited years prior. Academic motivation problems should be identified and resolved early in schooling so that problems in peer acceptance do not arise later on. Given the importance of peer acceptance on a child's well-being, these findings have important implications for parents, teachers and practitioners.

ACADEMIC TASK AVOIDANCE AND ACHIEVEMENT AS PREDICTORS OF PEER STATUS DURING THE EARLY PRIMARY SCHOOL YEARS

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INTRODUCTION

Peer difficulties during middle childhood forecast a host of adjustment problems during adolescence and beyond, including poor social skills and psychological maladjustment (Asher, Parkhurst, Hymel, & Williams, 1990; Prinstein, Rancourt, Guerry, & Browne, 2011). But what forecasts peer difficulties? We know that aggression, social withdrawal, problem behaviors, such as delinquency and disruptiveness, and social information processing biases anticipate low rates of acceptance and high rates of rejection (Coie, Dodge, & Kupersmidt, 1990; Mostow, Izard, Fine, & Trentacosta, 2002). Less is known about the degree to which peer difficulties may have origins in school and academic difficulties, and the progression through which the association develops.

Academic achievement, beliefs, and behaviors may be important predictors of peer status for several reasons. First, children who succeed in domains highly valued by peers are apt to be well-liked and well-accepted (Vannatta, Garstein, Zeller, & Noll, 2009). Academic abilities are valued by peers, especially during the early school years (Véronneau,Vitaro, Brendgen, Dishion, & Tremblay, 2010). Academic behaviors are salient characteristics that are readily observable to classmates, which means they are likely to be incorporated into peer evaluations (Kandel, 1978). Finally, associations between academic behaviors and peer status are well founded, such that students who like school and work hard in school tend to do well and be liked by others, while rejected students are more likely to engage in task avoidant behaviors and do worse in school than other children (Coie et al., 1990). It follows, that academic behavior should influence peer status over time. The present study is designed to elaborate the pathways whereby task avoidance and poor academic achievement effect the development of peer acceptance.

Peer status difficulties may have origins in early school experiences, through behaviors such as academic performance and the avoidance of school work (Ladd, Birch, & Buhs, 1999; Wentzel, 2005). It is difficult to tease performance and engagement apart in older children because they are part of a vicious cycle: Avoiding tasks negatively affects performance, and poor performance gives rise to task avoidance (Groteluschen, Borkowski, & Hale, 1990). The developmental pathways are difficult to disentangle during the later school years. During the early school years, however, academic task avoidance and school performance are more easily separated because students have limited experience in the classroom and the extent of their academic abilities and limitations are not yet known. For this reason, the best time to identify the academic origins of peer status difficulties is during the earliest school years.

Using a longitudinal sample of Finnish elementary school students, I explored two alternate pathways whereby task avoidance and academic achievement lead to changes in peer status over time. The developmental models were initiated by academic behaviors observed during the early years of formal schooling and ended with the influence of academic behaviors on later peer acceptance. To determine if changes in peer acceptance are brought about due to task avoidance anticipating academic performance or academic performance anticipating task avoidance, the first model was initiated by task avoidance while the second model was initiated by academic achievement. The first model assessed how early task avoidance predicts changes in academic achievement over time, and how the changes academic achievement effect peer acceptance over time. The second model assessed how early academic achievement predicts changes in task avoidance over time, and how the changes task avoidance effect peer acceptance over time.

An Introduction to the Concept of Developmental Cascades

The antecedents of peer status are often modeled with single-lag models. In these instances, peer status is predicted by a social, cognitive, or behavioral characteristic measured during the time point immediately preceding the outcome measurement of status (e.g. Ladd, 1990). Single-lag models are easy to conceptualize and straightforward to design. Unfortunately, they are overly simplistic. It is difficult to identify the origins of peer difficulties because peer difficulties may exacerbate problems in variables used as predictors. The underlying characteristics that contribute to peer status are more complex than can usually be captured in a single-lab model, not only because it is difficult to disentangle the developmental origins of multiple predictors, but also because of the interactions that occur among these characteristics (Coie, Dodge, Kupersmidt, 1990; Masten & Cicchetti, 2010). Although these problems are well-known, few alternative strategies have been applied to the study of peer status.

In this study, I tested a cascade model of development. Developmental cascades are models in which early characteristics initiate a chain of events over time that spread across domains, modifying the course of development. Complex, sequential associations that extend across multiple domains are best captured using developmental cascade models. In these models, initial characteristics in one domain produce subsequent changes in a characteristic in a different domain, which, in turn, produce subsequent changes in characteristics in a third domain. Cascade models describe how problems can snowball over time, spreading across domains of development (Masten & Cicchetti, 2010). The models are also designed to identify developmentally specific transitions and incorporate sensitive periods of development. These models are therefore frequently used to explore complex developmental processes, such as the spread of developmental stressors or the development of internalizing problems (Martin, Conger, Scholfield, Dogan, Widaman, Donnellan, & Neppl, 2010; Masten, Roisman, Long, Burt, Obradovic, Riley, Boelcke-Stennes, & Tellegen, 2005).

Figure 1 illustrates a conceptual cascade model with three different domains and three waves of data. Stability paths control for prior levels of each characteristic, and correlation paths within each time control for the concurrent levels of each characteristic. As a result, lagged paths represent change over time, such that the antecedent variable predicts changes in the outcome variable. A typical cascade path (*a*) shows the progression of effects that result from the spread of problems in an initial domain to problems in a second domain and from there, to problems in a third domain.

Cascade models hold several advantages over traditional single-lag models. Developmental cascades illustrate the spread of effects across multiple developmental domains (Masten & Ciccetti, 2010). In contrast, single-lag models are designed to measure associations across one time point, and as a result are unable to model any instances of successive change, which require at least three time points. Furthermore, cascade models are theoretically-driven, employing a model-building process that maximizes power and parsimony. In contrast, single-lag models are often atheoretical, applying fully saturated models that decrease power and disregard parsimony.

Cascade models also hold advantages over traditional mediation models when exploring changes in the course of development over time. With concurrent or half-longitudinal mediation models, it is difficult to establish a developmental sequence of events because, similar to other concurrent or single-lag models, there is a lack of a full temporal sequence. Full longitudinal mediation models, on the other hand, require at least three time points and therefore have advantages similar to the cascade model. However, developmental cascades differ from full longitudinal mediation models because cascade models do not require associations between all variables in the model. For instance, the initial variable in a cascade model does not have to be associated with the outcome variable. In contrast, mediation models require an initially significant association between the initial predictor variable and the outcome variable (Baron & Kenny, 1986). Longitudinal mediation also requires an explanation of changes from Time 1 to Time 3 through Time 2, which is conceptually different from a model where problems spread and deepen. These requirements often limit the scope of mediation models. Significant over-time associations between variables in separate developmental domains are less frequently observed than are associations within a domain, particularly across the successive time points. As a consequence, longitudinal mediation models tend to focus on associations between more similar developmental domains over time. Most mediation models are not developmentally sensitive. They measure processes that are not specific to age periods.

In the present study, I used cascade models for the advantage of parsimoniously modelling successive developmental effects on a particular outcome across domains. Specifically, I analyzed the sequential effects that early school behaviors, such as academic task avoidance and academic achievement, have on development of peer status, including peer acceptance.

Developmental Cascades: Empirical Examples

Cascade models are commonly adopted to describe the origins of psychopathology. In one large study of over 1,000 participants, complex cascade effects were demonstrated across several domains from childhood to adolescence (Burt & Roisman, 2010). Early externalizing problems during childhood anticipated later declines in academic achievement, which, in turn, anticipated later declines in social skills, which culminated in increasing internalizing problems during adolescence. In another example, intervention efforts to improve the parenting skills of mothers demonstrated cascading effects that ultimately benefited children. The parenting intervention increased effective discipline, which reduced externalizing behaviors, which anticipated lower levels of substance use during adolescence (McClain, Wolchik, Winslow, Tein, Sandler, & Millsap, 2010).

Most studies that have applied cascade models to peer status have examined the domains of early social skills and social cognition, and early aggression and conduct problems. One study (Blandon, Calkins, Grimm, Keane, & O'Brien, 2010) began with conduct problems at age two, which predicted later social skills, which, in turn, anticipated peer acceptance, such that greater initial conduct problems led to poorer social skills, which led to lower levels of peer acceptance. Another study (Lansford, Malone, Dodge, Pettit, & Bates, 2010) illustrated a cascade model that began with social information processing during kindergarten, which predicted later aggression, which in turn, anticipated changes in peer rejection, such that aggressive cognitive biases led to aggressive behavior, which led to higher levels of peer rejection.

To my knowledge, the only study to include academic abilities and peer status in a cascade model used externalizing behaviors of children at age five as a starting point (Obradovic, Burt, & Masten, 2009). The results indicated that externalizing symptoms in childhood predicted declines in academic achievement in adolescence, which in turn anticipated declines in social competence (that included a measure of peer acceptance) in emerging adulthood, which finally predicted increases in internalizing symptoms in adulthood. There have not been any studies where researchers examine cascading effects of academic precursors on the development of peer acceptance.

Academic Behavior as a Precursor of Peer Status: Conceptual Models

Two forms of academic behavior have been postulated to contribute to peer status. The first is task avoidance, which describes how often a child avoids tasks that he or she does not like. This variable is sometimes framed as task engagement, which describes how often a child follows through on a task even though it is difficult. The second is academic achievement, which describes how well the child does in school or on tests of academic ability. Conceptual models describing the mechanisms whereby these behaviors interact with one another and whereby each may shape subsequent peer status are discussed.

Academic task avoidance and Academic achievement. The negative reinforcement loop describes the mechanisms whereby academic task avoidance affects academic achievement and academic achievement affects task avoidance. Groteluschen, Borkowski, and Hale (1990) describe a cycle in which students who avoid schoolwork do poorly in school and students who do poorly in school avoid schoolwork. Negative reinforcement drives the succession of task avoidance and poor achievement; students are reinforced to avoid tasks in which they do poorly because they avoid the negative consequences that stem from unintended failure, such as degradation of self-esteem and self-efficacy. Some students may exhibit passive task avoidance through learned helplessness, an achievement strategy in which, following failure, a person passively avoids tasks out of the belief that he or she has no control over the situation (Abramson, Seligman, & Teasdale, 1978). Other students may exhibit academic self-handicapping, wherein they actively avoid effort in order to preserve their self-esteem when they do poorly (Nurmi, Aunola, Salmela-Aro, & Lindroos, 2003). As a result of avoiding tasks designed to enhance academic skills, academic achievement declines, and avoidance of tasks continues.

Academic behaviors and peer status. There are several conceptual models that describe the mechanisms whereby task avoidance and academic achievement each affect peer status. Three will be reviewed here.

First, academic competence and task engagement can give rise to acceptance through academic reputations. Academic reputations describe the perceptions peers have about a child’s academic skills and achievement attitudes (Gest, Domitrovich, & Welsh, 2005). These reputations are fairly accurate and are developed through the peer observations. Elementary school children value academic achievement in peers (Coie, Dodge, & Kupersmidt, 1990). Doing well and being engaged in school should lead to a positive academic reputation, which, because it is valued, will lead to greater liking and high peer acceptance. Doing poorly in school and avoiding work should lead to a poor academic reputation. Lacking attributes prized by peers will lessen liking, resulting in low acceptance. Failure in school also comes with a social stigma, built into academic reputations, that may be a means by which poor performance in school leads to decreased peer acceptance (Coie & Krehbiel, 1984; Welsh, Parke, Widamin, & O'Neil, 2001).

Children who display academic competence are apt to be praised and supported by their teachers (Nurmi, 2012), and both the competence and teacher praise can lead to acceptance by peers who wish to bask in the reflected glory (Cialdini, Borden, Thorne, Walker, Freeman, & Sloan, 1976). Students bask in the reflected glory in order to reap the benefits of having a close peer who is both successful in school and receives the benefits of attention from the teacher. In addition, the positive regard that the teachers exhibit likely influences the acceptance of that student by others, especially in elementary school, when students are more influenced by the opinions of adults (Véronneau, Vitaro, Brendgen, Dishion, and Tremblay, 2010; Youniss & Smollar, 1985).

Finally, task avoidance anticipates low peer acceptance because of the off-task behaviors avoidant children tend to display. Students who are avoiding school tasks may be frustrated with the work, bored, or generally noncompliant; the often disrupt the class, behaving in a manner that leads to low peer acceptance (Welsh, Parke, Widamin, & O'Neil, 2001). Rule-breaking and other conduct problems do not conform to peer group norms during early primary school, and as a consequence, are rejected and/or have low peer acceptance (Juvonen, 1991). Further, peer acceptance implies friendship. Children who are not task avoidant themselves are less likely to be friends with someone who is off-task and disruptive. This suggests that off-task behaviors, and perhaps simply the act of being off-task, may have a negative effect on peer status.

Academic Behaviors as a Precursor to Peer Status: Empirical Findings

Task avoidance and achievement. Links between task avoidance and academic achievement are well established. Task avoidance is a prominent contributor to declines in academic achievement, whereas task engagement is an important prerequisite of academic achievement. Studies with elementary school students (Hughes, Luo, Kwok, & Loyd, 2008), high school students (Ainley, 1993), and college students (Nurmi, Aunola, Salmela-Aro, & Lindroos, 2003) all indicate that task avoidance is associated with academic achievement, such that task avoidance predicts lower achievement and lower achievement predicts continued task avoidance. For instance, elementary school students who exhibited low task engagement performed worse in school over time, and students who perform poorly in school became less engaged, overall (Hughes, Luo, & Loyd, 2008) and in terms of reading achievement (Onatsu-Arvilommi & Nurmi, 2000). In this study, poor math achievement predicted increasing task avoidance, but avoiding tasks did not predict later achievement.

Academic behaviors and peer status. Links between academic achievement and peer status have been demonstrated using several different achievement criteria, such as grades, standardized tests, teacher ratings, and perceived achievement using class play nominations. School grades have been linked to later peer acceptance among children in China (Chen, Rubin, & Li, 1997), Canada (Véronneau,Vitaro, Brendgen, Dishion, & Tremblay, 2010), and the United States (Vannatta, Garstein, Zeller, & Noll, 2009; Welsh, Parke, Widaman, & O’Neil, 2001). In each case, poorer academic achievement led to lower peer acceptance and higher peer rejection. For instance, Chen et al. (1997) found that lower academic achievement predicted decreases in peer acceptance in a sample of

Chinese students who were 10 or 12 years old at the outset. Further, Véronneau, et al. (2010) found that primary students perceived to be high in academic achievement were also more accepted, and less rejected, by their peers from grades two through six. Finally, Ladd (1990) also found that academic achievement affected peer preference in a sample of students in Kindergarten. In this study, however, the association dissolved when age, gender, and preschool experiences were included in analyses as control variables.

Less is known about the links between academic task avoidance and later peer status. Coie et al. (1990) explains that avoiding tasks and disengaging from school are associated with and decreased peer acceptance. Further, Hughes and Kwok (2006) found that classroom engagement, measured by effort, attention, persistence, and participation in the classroom, positively predicted peer acceptance in a sample of first grade students. This association held after controlling for child aggression, child problem behavior, and teacher support of the child.

Building a Cascade Model of Peer Status

In sum, we know that task avoidance is linked to academic achievement in the early school years, we know that academic achievement is linked to task avoidance in the early school years, and we know that academic achievement is linked to peer acceptance in the early school years. We do not know whether task avoidance and academic achievement work sequentially to affect peer acceptance, and if they do, what initiates the series of changes.

Two alternative cascade models were tested. In the first model, task avoidance at the outset of primary school predicted changes in academic achievement over time, and changes in academic achievement, in turn, predicted changes in peer acceptance over time. In the second model, academic achievement at the outset of primary school predicted changes in task avoidance, and changes in academic task avoidance, in turn, predicted changes in peer acceptance. In each model, two separate cascade lags were analyzed that spanned across different time points. The earlier cascade began with the academic variable of interest in the first year of primary school and extending to the peer acceptance outcome in the third year of school. The later cascade began with the academic variable of interest in the second year of primary school and extending to the peer acceptance outcome in the fourth year of school. In each case, the timing encapsulated by the cascade model was important because the model was built in accordance with the developmentally sensitive periods of academic behaviors and peer acceptance. Academic predictors initiated the cascades at the outset of school, when task avoidance and academic achievement are first formed. Peer acceptance outcomes concluded the cascades in the middle of primary school, before peer status becomes fixed in later childhood (Jiang & Cillessen, 2005).

Confounding Factors

Several characteristics of the child and of his or her school experiences may affect task avoidance, school achievement, and peer status. These characteristics were included in analyses as control variables to rule out alternative explanations for cascade sequences. The covariates can be grouped into two general categories: (1) the characteristics of the child, such as gender and behavior problems and (2) characteristics of school experiences, such as parent involvement with school and the child’s pre-school exposure. These characteristics are important because they may contribute to differences in mean levels of study variables as well as to differing patterns of associations between study variables.

Many characteristics of the child have found to be associated with academic behaviors and peer status, and may therefore alter associations between the variables in the cascade model. For instance, gender differences have been found in associations between achievement and acceptance, such that links are stronger for girls than for boys, likely because achievement is more salient in the peer relationships of the former than in those of the latter (Rose & Rudolph, 2006). In addition, gender may also moderate the association between school achievement and peer acceptance (Ladd, 1990). Behavior problems are another child characteristic that could potentially confound the association between task avoidance, academic problems, and peer acceptance. Conduct problems, for instance, have been linked to both low achievement and poor peer status (Masten & Cicchetti, 2010) and these problems can attenuate the association between task engagement and achievement (Hughes, Luo, and Loyd, 2008). In addition, students with conduct and attention problems have a tendency to quickly give up and engage in off-task behavior, which leads to poor achievement, off-task behavior, and peer difficulties (DuPaul & Weyandt, 2014). Children who experience internalizing difficulties, such as anxiety, may have different patterns of results, as anxiety may confound associations due to being associated with lower academic achievement and peer acceptance (Henricsson & Rydell, 2006). The child's attitudes about school may influence associations among the study variables. For instance, children who are interested in the school subject or children who hold their abilities in high regard may not only have higher academic achievement, but may also be more engaged (Pajares & Schunk, 2001). Having a friend may also affect associations among the study variables. Children who are well-accepted have friends in school, and having friends in school increases feelings of belongingness that are associated with increased school performance and greater school engagement (Wentzel & Caldwell, 1997).

Several characteristics of the child's school experience also have the potential to effect the associations among the cascade variables. One of these characteristics includes prior exposure with early childhood education. Children who have attended preschool not only perform better in elementary school, but are also more sociable than children who did not attended preschool. Indeed, one study finds that preschool experience ameliorated the association between school avoidance and peer preference in Kindergarten (Ladd, 1990). Another characteristic of the child's school experience includes parental involvement with the school. Children with parents who are involved with the child's school and teachers tend to do well in school and have more friends.

Hypotheses for the Current Study

The proposed study tested two cascade models of peer status to better understand the spread of problems from school related behaviors to peer status across the primary school years.

Model 1. The first model describes a developmental cascade initiated by early task avoidance. In this model, task avoidance at the outset of primary school should predict lower academic achievement over time. Lower academic achievement should, in turn, predict lower levels of peer acceptance over time. This initial task avoidance model incorporated two cascades, an early cascade that spans first grade to third grade, and a later cascade that spans second grade to fourth grade. In the early cascade, task avoidance in first grade should predict declines in academic achievement over the course of first grade to second grade. Lower academic achievement in second grade should, in turn, predict declines in peer acceptance from second to third grade. In the later cascade, task avoidance in second grade should predict declines in academic achievement over the course of second grade to third grade. Lower academic achievement in third grade should, in turn, predict declines in peer acceptance from third to fourth grade. Similar results are expected for the early cascade and the later cascade, as both incorporated the developmentally sensitive period for academic and peer acceptance characteristics. Reading achievement and math achievement was assessed separately, but similar results were expected.

Model 2. The first model describes a developmental cascade initiated by early academic achievement. In this model, poor academic achievement at the outset of primary school should predict higher task avoidance over time. Higher task avoidance should, in turn, predict lower levels of peer acceptance over time. This initial academic achievement model incorporated two cascades, an early cascade that spans first grade to third grade, and a later cascade that spans second grade to fourth grade. In the early cascade, poor academic achievement in first grade should predict increases in task avoidance over the course of first grade to second grade. Increased task avoidance in second grade should, in turn, predict declines in peer acceptance from second to third grade. In the later cascade, poor academic achievement in second grade should predict increases in task avoidance over the course of second grade to third grade. Increased task avoidance in third grade should, in turn, predict declines in peer acceptance from third to fourth grade. Similar results are expected for the early cascade and the later cascade, as both incorporated the developmentally sensitive period for academic and peer acceptance characteristics. Reading achievement and math achievement was assessed separately, but similar results were expected.

Control variables. Confounding factors were included in subsequent models to help rule out alternative explanations for problem sequences. These variables included characteristics of the child and characteristics of the child's school experience. Characteristics of the child include conduct problems, emotional problems, hyperactivity, self-concept in reading and math, interest in reading and math, and participation in reciprocated friendships with school peers. Characteristics of the school experience include the duration of exposure to day care or pre-school, and the parent's participation with their child's school and teacher. I expected that these confounding variables would be associated with study variables and may even attenuate some patterns of association, but I did not expect them to alter the cascade sequence identified.

Moderator. Gender was tested as a moderator of the associations between task avoidance and academic achievement, task avoidance and peer acceptance, and academic achievement and peer acceptance. Although previous research has found that the association between academic achievement and peer acceptance was moderated by gender in older children, I expected that gender would not moderate any associations in the cascade models.

METHOD

Participants

Participants were drawn from the ongoing First Steps study (*Interaction and Learning within Students-Parent-Teacher Triangle*; Lerkkanen, Niemi,Poikkeus, Poskiparta, Siekkinen, & Nurmi, 2006). First Steps is a longitudinal study that began in 2006 to assess academic achievement across the primary school years. The study includes over 2000 students from four municipalities across Finland. The participants in the present study were drawn from a subsample of students for whom teacher and parent reports were available. The final sample included 545 students (311 boys, 234 girls) who were in 1st grade at the outset of the investigation (range= 6 to 8 years old, M = 7.67, SD = 0.31). This sample did not significantly differ on age, gender, achievement, or peer acceptance from those who were not included in this study.

Most students (96.2%) spoke Finnish at home. Of those who reported family structure, most students were from households with two biological parents (78.2%), with the remainder from step-parent or single parent households (7% and 14.8%, respectively). Of the 99% of parents who completed basic education, 6.2% did not obtain a higher degree, 30.7% completed upper secondary schooling, 35.7% obtained a bachelor’s or vocational college degree, and 27.4% obtained a master’s degree or higher.

Instruments

Peer nominations. Students were provided with a roster of the names of all students in the class and asked to circle the names of three classmates “with whom they liked to spend time" and three classmates "with whom they did not like to spend time" (Laursen, Bukowski, Aunola, & Nurmi, 2007; Poikkeus, 2008). Other-sex nominations were permitted. *Peer acceptance* was calculated as the sum of all incoming liked most nominations for each child. Scores were standardized using a regression-based approach that controls for class size (Velásquez, Bukowksi, & Saldarriaga, 2013). *Reciprocated friends* were also identified using peer nominations. Dyads in which both students concurrently nominated one another as a liked nomination were labeled as reciprocated friends.

Academic achievement. Students completed the Basic Arithmetic Test (Aunola & Räsänen, 2007) to assess *math achievement*. During this test, students solved as many written math problems as they could in three-minutes. Each year, the assessment was the same length and included the same set of basic questions, with some advanced, age-appropriate questions replacing easier questions in 4th grade. Students completed a technical reading test (Lindeman, 1998) to assess accuracy and fluency in *reading achievement*. The assessment is a nationally standardized test of reading achievement. During this test, students chose which of four given sentences correctly described a picture in a two-minute time limit. Each year, the assessment was the same length and included the same set of basic questions, with some advanced, age-appropriate questions replacing easier questions. Internal reliability for these variables was acceptable (Zhang, Räsänen, Aunola, Lerkkanen, & Nurmi, 2013).

Academic task avoidance. Teachers completed the Behavioral Strategy Rating Scale (BSRS; Aunola, Nurmi, Parrila, & Onatsu-Arvilommi, 2000) that assessed task avoidant behavior of target students (see Appendix A). The assessment consisted of seven items rated on a scale ranging from 1 (*not at all*) to 5 (*to a great extent*). Internal reliability was good (α = 0.92).

Confounding variables. Several characteristics of the child and the child's education were included as covariates in the model.

Teacher reports of conduct problems were measured using a subscale of the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997) that evaluated behavior problems (see Appendix B). Conduct problems were assessed with five items rated on a scale ranging from 1 (n*ot true*) to 3 (c*ertainly true*). Internal reliability was acceptable (α = .74 to .79).

Teacher reports of emotional problems were measured using a subscale of the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997) that evaluated anxiety and internalizing symptoms (see Appendix C). Emotional problems were assessed with five items rated on a scale ranging from 1(*not true*) to 3 (*certainly true*). Internal reliability was good (α = .75 to .76).

Teacher reports of hyperactivity were measured using a subscale of the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997) that evaluated restlessness (see Appendix D). Hyperactivity was assessed with five items rated on a scale ranging from 1(*not true*) to 3 (*certainly true*). Internal reliability was good (α = .84 to .89).

Interest in math and *interest in reading* were measured using a one item measure for each subject. Children rated their interest on a scale ranging from 1(*does not like at all*) to 5 (*likes very much*). The variables were stable over time (reading r = .32 to .49; math r = .40 to .58).

Self-concept in math and *self-concept in reading* were measured using a one item measure for each subject. Children rated their ability relative to the rest of the class on a scale ranging from 1(*best)* to 10 (*worst*). The variables were stable over time (reading r = .37 to .51; math r = .44 to .57).

Parent reports of cooperation with school was measured using a short version of the Family Involvement Questionnaire (Fantuzzo, Tighe, & Childs, 2000) that evaluated the extent to which parents participated in the classroom (see Appendix E). Cooperation with the school using seven items rated on a scale ranging from 1 (*not at all*) to 5 (*very often*). Internal reliability was good (α = .80 to .85).

Participation in preschool was measured using parent-report that evaluated the duration and quality of the child's previous preschool education. Participation was measured using three items that measured the number of hours per day the child was enrolled in preschool, the number of months the child was in preschool, and the quality of the preschool care.

Procedure

Students, parents, and teachers completed questionnaires during the spring of each year. Parents and teachers provided written consent to participate in the study. Trained researchers administered questionnaires to the participating students during regular school hours. Parents completed measures at home and returned them by mail. All students in participating classrooms completed the peer nomination and academic achievement portions of the study. A subsample of approximately one-fourth of this sample was selected to receive additional questions. The parents and teachers of this subsample also received questions that focused on these students.

Plan of Analysis

Path analyses were conducted using Mplus version 7 (Muthén & Muthén, 1998-2012). An average of 5.78% (0%-11.33%) of the data were missing on task avoidance, reading achievement, math achievement, and peer acceptance at each time point. Little's MCAR test ensured that data were missing completely at random, $\chi^2(311) = 210.96$, $p > .05$ (Little, 1988). Missing data was handled using full information maximum likelihood (FIML) procedures.

Cascade model selection. Two sets of competing cascade models were analyzed. The first model, an initial academic task avoidance model, tested the first hypothesis that initial academic task avoidance predicts changes in academic achievement, which then predicts changes in peer status. The second model, an initial academic achievement model, tested the second hypothesis that initial academic achievement predicts changes in academic task avoidance, which then predicts changes in peer status.

Each cascade model was analyzed step-by-step, building from a simple stability model to a more complex, theory-based causal model. The best-fitting and most parsimonious model was selected as the final model. Fit was assessed using the root-mean-square error (RMSEA), the comparative fit index (CFI), and the chi-square test of model fit. An acceptable model fit is one in which the RMSEA is less than .08, the CFI is greater than .95, and the chi-square statistic is non-significant, although this latter guideline is not required for models with a large sample size. Chi-square difference tests compared the model fit of the stability models to that of the cascade models.

Initial academic task avoidance model. In order to test the hypothesis that academic task avoidance initiates a cascade that results in peer difficulties, this first model tested a cascade sequence whereby high initial task avoidance predicts declining math and reading achievement over the course of the next year, which in turn predicts declining peer acceptance. The model building procedure is illustrated in Figures 2 and 3. The first, most parsimonious model is pictured in Figure 2. This model includes stability paths for academic task avoidance, achievement, and peer status as well as concurrent correlations between the variables at each time point.

The next step involved the addition of the hypothesized cascade paths (Figure 3). In the Step 2 model, paths from academic task avoidance at Time T to achievement at Time $T+1$ (path a) and from achievement at Time $T+1$ to peer status at Time $T+2$ (path b) was be added to the Step 1 model. Model fit was assessed and compared to that of the Step 1 model using a chi-square difference test.

In order to increase power and simplify the final model, cascade paths that are equivalent across time were constrained to equality (e.g. the path from 1st grade task avoidance to 2nd grade academic achievement was set equal to the path from 2nd grade task avoidance to 3rd grade academic achievement). If model fit did not significantly decline, then over-time constraints were retained.

Finally, in order to ensure that all essential paths were included in the cascade model after the second step of the model building process, supplemental analyses were conducted to examine changes in model fit with the addition of auxiliary paths. Paths that were equivalent across time were added to the model simultaneously. First, paths predicting academic achievement from task avoidance were added to the model and changes in model fit were assessed. Then, paths predicting peer acceptance from academic achievement were added to the model and changes in model fit were assessed.

Auxiliary paths that considerably improved model fit, following the guidelines suggested by Little (2013), were retained in the model. According to Little, when the fit of the theoretically-driven model is acceptable, supplemental paths should only be added if the inclusion of the paths improves the chi-square value by 10% or if the p-value obtained from the chi-square difference test is less than 0.001.

Initial academic achievement model. In order to test the hypothesis that academic abilities initiate a cascade that results in peer difficulties, this second model tested the possible cascade whereby high initial task avoidance predicts declining math and reading achievement over the course of the next year, which in turn predicts declining peer acceptance. The model building procedure is illustrated in Figures 4 and 5. The first, most parsimonious model is pictured in Figure 4. This model includes stability paths for achievement, academic task avoidance, and peer status as well as concurrent correlations between the variables at each time point.

The next step involves the addition of the hypothesized cascade paths (Figure 5). In the Step 2 model, paths from achievement at Time *T* to academic task avoidance at Time *T+1* (path a) and from academic task avoidance at Time *T+1* to peer status at Time *T+2* (path b) were added to the Step 1 model. Model fit was assessed and compared to that of the Step 1 model using a chi-square difference test.

In order to increase power and simplify the final model, cascade paths that are equivalent across time were constrained to equality (e.g. the path from 1st grade academic achievement to 2nd grade task avoidance were set equal to the path from 2nd grade academic achievement to 3rd grade task avoidance). If model fit did not significantly decline, then over-time constraints were retained.

Finally, in order to ensure that all essential paths were included in the cascade model after the second step of the model building process, supplemental analyses were conducted to examine changes in model fit with the addition of auxiliary paths. Paths that were equivalent across time were added to the model simultaneously. First, paths predicting task avoidance from academic achievement were added to the model and changes in model fit were assessed. Then, paths predicting peer acceptance from task avoidance were added to the model and changes in model fit were assessed. Auxiliary paths that considerably improved model fit, following the guidelines suggested by Little (2013), were retained in the model. According to Little, when the fit of the theoretically-driven model is acceptable, supplemental paths should only be added if the inclusion of the paths improves the chi-square value by 10% or if the p-value obtained from the chi-square difference test is less than 0.001.

Cascade model comparisons. Initial task avoidance models were compared to the initial academic achievement models using Sample-size Adjusted Bayesian Information Criterion (SABIC). SABIC allows for the comparison of non-nested models that include the same variables (Raftery, 1995). Smaller SABIC values are associated with better fitting models. SABIC values that differ between 6 and 10 points reveal strong evidence of differences in model fit. SABIC values that differ more than 10 reveal decisive evidence of difference in model fit.

Control variables. To determine whether cascade paths are a product of a few cases with extreme scores on individual differences control variables, conduct problems, hyperactivity, parent cooperation with school, and participation in preschool were added to the final model as covariates. At each time point, the time varying covariates were correlated with all concurrent variables in the model. Similarity in the patterns of significant path and the appropriateness of the model fit were analyzed and compared to the main model.

Moderators. Separate multiple group comparisons determined whether there are gender differences in the final model. To assess the potential moderator, the model were fit to each sample, and parameters were constrained across groups. Two sets of constraints were applied to the final model, beginning with the most parsimonious. The first set of constraints was applied to all causal paths in the model. The second set of constraints was applied only to stability paths. Following each set of constraints, model fit of the constrained model was compared to that of the unconstrained model. Chi-square differences in model fit determined if there are any significant group differences. Non-significant chi-square differences indicate invariance of the model across groups.

RESULTS

Preliminary Analyses

Descriptive statistics and mean level differences. Descriptive statistics for the main study variables are presented in Table 1. Descriptive statistics for the additional control variables are presented in Table 2. Separate 2 (sex) X 4 (time: 1st grade, 2nd grade, 3rd grade, and 4th grade) repeated measures ANOVAs were conducted with task avoidance, math achievement, reading achievement, and peer acceptance as the dependent variables. Missing data were imputed so that the full sample could be used in preliminary analyses. A total of 20 imputed datasets were created using an EM algorithm with 25 iterations. Values were averaged across imputations. Analyses using imputed and non-imputed datasets yielded similar results.

There was a significant main effect of time on task avoidance, $F(1, 543) = 23.53$, $p < .001$, $\eta p_2 = 0.04$. Task avoidance significantly decreased over time (1st Grade M = 2.69, SD = 1.13; 2nd Grade M = 2.69, SD = 1.09; 3rd Grade M = 2.61, SD = 1.09; 4th Grade M = 2.49, SD = 1.00). Task avoidance was significantly lower in 4th grade compared to 1st and 2nd grade. There was a significant main effect of gender on task avoidance, $F(1, 543) = 74.73$, $p < .001$, $\eta p_2 = 0.12$. Boys were higher on task avoidance (M = 2.89, SD = 1.12) than girls (M = 2.26, SE = 1.04). There was not a significant interaction of gender and changes in task avoidance over time.

There was a significant main effect of time on reading achievement, $F(1, 543)$ = 3621.76, $p < .001$, $\eta p_2 = 0.87$. Reading achievement significantly increased each year across 1st through 4th grade (1st Grade *M* = 16.14, *SD* = 8.80; 2nd Grade *M* = 22.69, *SD* = 7.63; 3rd Grade *M* = 33.72, *SD* = 8.74; 4th Grade *M* = 34.54, *SD* = 8.73). There was a significant main effect of gender on reading achievement, $F(1, 543) = 11.95$, $p = .001$, $\eta p_2 = 0.02$. Girls were higher on reading achievement (*M* = 28.02, *SD* = 11.11) than boys (*M* = 25.84, *SE* = 9.64). There was not a significant interaction of gender and changes in reading achievement over time.

There was a significant main effect of time on math achievement, $F(1, 543) = 5737.77$, $p < .001$, $\eta p_2 = 0.91$. Math achievement significantly increased each year across 1st through 4th grade (1st Grade *M* = 9.73, *SD* = 4.24; 2nd Grade *M* = 15.10, *SD* = 4.97; 3rd Grade *M* = 18.86, *SD* = 4.87; 4th Grade *M* = 22.25, *SD* = 4.16). There was not a main effect of gender on math achievement, nor an interaction of gender and changes in math achievement over time.

There was a significant main effect of time on peer acceptance, $F(1, 543) = 4.52$, $p < .05$, $\eta p_2 = 0.01$. Peer acceptance significantly decreased across 1st through 4th grade (1st Grade *M* = 2.00, *SD* = 1.61; 2nd Grade *M* = 1.94, *SD* = 1.59; 3rd Grade *M* = 1.85, *SD* = 1.62; 4th Grade *M* = 1.86, *SD* = 1.43). Peer acceptance was significantly higher in 1st grade compared to 4th grade. There was a significant main effect of gender on peer acceptance, $F(1, 543) = 9.80$, $p <.01$, $\eta p_2 = 0.02$. Girls were more accepted by their peers (*M* = 2.10, *SD* = 1.87) than boys (*M* = 1.77, *SE* = 1.63). There was not a significant interaction of gender and changes in peer acceptance over time.

Interclass correlations. Concurrent and longitudinal correlations between main study variables are presented in Table 3. Task avoidance, reading achievement, math achievement, and peer acceptance were stable over time ($r = .50$ to $.73$, $p < .01$). Task avoidance was negatively associated with reading achievement, math achievement, and peer acceptance concurrently ($r = -.16$ to $-.43$, $p < .01$) and over time ($r = -.23$ to $-.40$, $p < .01$). Reading achievement was positively associated with math achievement and peer acceptance concurrently ($r = .20$ to $.50$, $p < .01$) and over time ($r = .23$ to $.49$, $p < .01$). Math achievement was positively associated with peer acceptance concurrently ($r = .21$ to $.27$, $p < .01$) and over time ($r = .17$ to $.25$, $p < .01$).

Concurrent correlations between main study variables and control variables are presented in Table 4. Task avoidance was positively associated with conduct problems ($r = .53$ to $.59$, $p < .01$), emotional problems ($r = .17$ to $.25$, $p < .01$), hyperactivity ($r = .17$ to $.25$, $p < .01$), and low self-concept in reading ($r = .78$ to $.81$, $p < .01$). Task avoidance was negatively associated with interest in reading ($r = .15$ to $.23$, $p < .01$) and number of reciprocated friends ($r = .19$ to $.32$, $p < .01$). Reading achievement was positively associated with the number of reciprocated friendships ($r = .17$ to $.31$, $p < .01$). Reading achievement was negatively associated with emotional problems ($r = -.11$ to $-.13$, $p < .05$), hyperactivity ($r = -.17$ to $-.22$, $p < .01$) and low self-concept in reading ($r = -.20$ to $-.31$, $p < .01$). Math achievement was positively associated with the number of reciprocated friendships ($r = .14$ to $.29$, $p < .01$) and interest in math ($r = .12$ to $.24$, $p < .01$). Math achievement was negatively associated with emotional problems ($r = -.12$ to $-.15$, $p < .05$), hyperactivity ($r = -.21$ to $-.31$, $p < .01$), low self-concept in reading ($r = -.12$ to $-.26$, $p < .01$), and low self-concept in math ($r = -.19$ to $-.35$, $p < .01$). Peer acceptance was positively associated with the number of reciprocated friendships ($r = .77$ to $.82$, $p < .01$) and parent cooperation with school ($r = .12$ to $.15$, $p < .05$). Peer acceptance was negatively associated with conduct problems (r = -.11 to -.23, $p < .01$), emotional problems (r = -.12 to -.17, $p < .01$), and hyperactivity (r = -.16 to -.25, $p < .01$).

Cascade Models

Initial task avoidance cascades. Cascade models initiated by early task avoidance were conducted separately for reading achievement and math achievement.

Reading achievement. Step 1 in the model building process included stability paths and concurrent correlations between task avoidance, reading achievement, and peer acceptance. The model fit the data, $\chi^2(39, N = 545) = 143.30$, $p < .01$, $CFI = .96$, $RMSEA = .07$. Study variables were stable over time and intercorrelated within time. Step 2 in the model building process included stability paths, concurrent correlations, and cascade paths from early task avoidance to later peer acceptance, through reading achievement. The model fit the data, $\chi^2(35, N = 545) = 124.04$, $p < .01$, $CFI = .97$, $RMSEA = .06$. The model from Step 2 fit the data significantly better than did the model from Step 1, $\Delta\chi^2(4, N = 545) = 19.26$, $p < .05$. In the cascade spanning 1st grade to 3rd grade, task avoidance in 1st grade predicted declines in academic achievement from 1st grade to 2nd grade. Lower reading achievement in 2nd grade predicted declines in peer acceptance from 2nd grade to 3rd grade. In the cascade spanning 2nd grade to 4th grade, task avoidance in 2nd grade predicted declines in academic achievement from 2nd grade to 3rd grade. Lower reading achievement in 3rd grade predicted declines in peer acceptance from 3rd grade to 4th grade.

Separately, equivalent sets of stability paths and cascade paths were constrained to be equal over time. Constraining the set of task avoidance stability paths to be equal ($\Delta\chi^2(2, N = 545) = .82$, $p > .05$) and the set of peer acceptance stability paths to be equal

($\Delta\chi^2(2, N = 545) = 2.84$, $p > .05$) did not significantly worsen model fit. Constraining the set of reading achievement stability paths to be equal ($\Delta\chi^2(2, N = 545) = 11.56$, $p < .01$) significantly worsened model fit. Constraining the set of cascade paths from early task avoidance to later reading achievement to be equal ($\Delta\chi^2(1, N = 545) = .52$, $p > .05$) and the set of cascade paths from reading achievement to later peer acceptance to be equal ($\Delta\chi^2(1, N = 545) = .01$, $p > .05$) did not significantly worsen model fit. As a result, all time constraints remained in the model with the exception of the reading achievement stability paths. The final cascade model is presented in Figure 6.

Supplementary analyses ensured that the final cascade model was the best-fitting, most parsimonious model. Sets of additional paths not incorporated in the hypothesized cascade model were separately added to ensure critical paths were not excluded. The sets of auxiliary paths included those from peer acceptance to task avoidance, those from peer acceptance to reading achievement, those from reading achievement to task avoidance, and the remaining paths from 1st grade reading achievement to 2nd grade peer acceptance and from 3rd grade task avoidance to 4th grade reading achievement. Inclusion of any of these sets of paths did not increase the χ^2 goodness-of-fit value by 10%, and therefore remained excluded from the model. Next, control variables were added to the model. The same pattern of results emerged for the cascade model. However, model fit was poor with the inclusion of the covariates ($\chi^2(647, N = 545) = 1902.91$, $p < .01$, $CFI = .87$, $RMSEA = .06$), so they were not included in the final model. Finally, multiple group comparisons revealed that gender did not moderate findings. Model fit did not significantly decline when sets of equivalent paths were separately constrained to be equal across gender ($\Delta\chi^2(2, N = 545) = .29$ to 1.37, $p > .05$).

Math achievement. Step 1 in the model building process included stability paths and concurrent correlations between task avoidance, math achievement, and peer acceptance. The model fit the data, $\chi^2(39, N = 545) = 161.22, p < .05$, *CFI* = .96, *RMSEA* = .08. Study variables were stable over time and intercorrelated within time. Step 2 in the model building process included stability paths, concurrent correlations, and cascade paths from early task avoidance to later peer acceptance, through math achievement. The model fit the data, $\chi^2(35, N = 545) = 105.69, p < .05$, *CFI* = .98, *RMSEA* = .06. The model from Step 2 fit the data significantly better than did the model from Step 1, $\Delta\chi^2(4, N = 545) = 55.53, p < .01$. In the cascade spanning 1st grade to 3rd grade, task avoidance in 1st grade predicted declines in academic achievement from 1st grade to 2nd grade. Lower math achievement in 2nd grade predicted declines in peer acceptance from 2nd grade to 3rd grade. In the cascade spanning 2nd grade to 4th grade, task avoidance in 2nd grade predicted declines in academic achievement from 2nd grade to 3rd grade. Lower math achievement in 3rd grade predicted declines in peer acceptance from 3rd grade to 4th grade.

Separately, equivalent sets of stability paths and cascade paths were constrained to be equal over time. Constraining the set of task avoidance stability paths to be equal ($\Delta\chi^2(2, N = 545) = .39, p > .05$) and the set of peer acceptance stability paths to be equal ($\Delta\chi^2(2, N = 545) = 2.70, p > .05$) did not significantly worsen model fit. Constraining the set of math achievement stability paths to be equal ($\Delta\chi^2(2, N = 545) = 49.25, p < .01$) significantly worsened model fit. Constraining the set of cascade paths from early task avoidance to later math achievement to be equal ($\Delta\chi^2(1, N = 545) = .41, p > .05$) and the set of cascade paths from math achievement to later peer acceptance to be equal ($\Delta\chi^2$(1, *N*

= 545) = .01, $p > .05$) did not significantly worsen model fit. As a result, all time constraints remained in the model with the exception of the math achievement stability paths. The final cascade model is presented in Figure 7.

Supplementary analyses ensured that the final cascade model was the best-fitting, most parsimonious model. Sets of additional paths not incorporated in the hypothesized cascade model were separately added to ensure critical paths were not excluded. The sets of auxiliary paths included those from peer acceptance to task avoidance, those from peer acceptance to math achievement, those from math achievement to task avoidance, and the remaining paths from 1st grade math achievement to 2nd grade peer acceptance and from 3rd grade task avoidance to 4th grade math achievement. Inclusion of any of these sets of paths did not increase the χ^2 goodness-of-fit value by 10%, and therefore remained excluded from the model. Next, control variables were added to the model. The same pattern of results emerged for the cascade model. However, model fit was poor with the inclusion of the covariates ($\chi^2(648, N = 545) = 2177.07$, $p < .01$, $CFI = .86$, $RMSEA = .07$), so they were not included in the final model. Finally, multiple group comparisons revealed that gender did not moderate findings. Model fit did not significantly decline when sets of equivalent paths were separately constrained to be equal across gender ($\Delta\chi^2(2, N = 545) = .20$ to 1.55, $p > .05$).

Initial academic achievement cascades. Cascade models initiated by early academic achievement were conducted separately for reading achievement and math achievement.

Reading achievement. Step 1 in the model building process included stability paths and concurrent correlations between task avoidance, reading achievement, and peer acceptance. The model fit the data, $\chi^2(39, N = 545) = 143.30, p < .01, CFI = .96, RMSEA = .07$. Study variables were stable over time and intercorrelated within time. Step 2 in the model building process included stability paths, concurrent correlations, and cascade paths from early reading achievement to later peer acceptance, through task avoidance. The model fit the data, $\chi^2(35, N = 545) = 124.10, p < .01, CFI = .97, RMSEA = .07$. The model from Step 2 fit the data significantly better than did the model from Step 1, $\Delta\chi^2(4, N = 545) = 19.20, p < .05$. In the cascade spanning 1st grade to 3rd grade, low reading achievement in 1st grade predicted increases in task avoidance from 1st grade to 2nd grade. Increased task avoidance in 2nd grade predicted declines in peer acceptance from 2nd grade to 3rd grade. In the cascade spanning 2nd grade to 4th grade, lower reading achievement in 2nd grade predicted increases in task avoidance from 2nd grade to 3rd grade. Increased task avoidance in 3rd grade predicted declines in peer acceptance from 3rd grade to 4th grade.

Separately, equivalent sets of stability paths and cascade paths were constrained to be equal over time. Constraining the set of task avoidance stability paths to be equal ($\Delta\chi^2(2, N = 545) = .93, p > .05$) and the set of peer acceptance stability paths to be equal ($\Delta\chi^2(2, N = 545) = .94, p > .05$) did not significantly worsen model fit. Constraining the set of reading achievement stability paths to be equal ($\Delta\chi^2(2, N = 545) = 12.85, p < .01$) significantly worsened model fit. Constraining the set of cascade paths from early reading achievement to later task avoidance to be equal ($\Delta\chi^2(1, N = 545) = .50, p > .05$) and the set of cascade paths from task avoidance to later peer acceptance to be equal ($\Delta\chi^2(1, N = 545) = .56, p > .05$) did not significantly worsen model fit. As a result, all time constraints remained in the model with the exception with reading stability paths. The final cascade model is presented in Figure 8.

Supplementary analyses ensured that the final cascade model was the best-fitting, most parsimonious model. Sets of additional paths not incorporated in the hypothesized cascade model were separately added to ensure critical paths were not excluded. The sets of auxiliary paths included those from peer acceptance to task avoidance, those from peer acceptance to reading achievement, those from task avoidance to reading achievement, and the remaining paths from 1st grade task avoidance to 2nd grade peer acceptance and from 3rd grade reading achievement to 4th grade reading achievement. Inclusion of any of these sets of paths did not increase the χ^2 goodness-of-fit value by 10%, and therefore remained excluded from the model. Next, control variables were added to the model. The same pattern of results emerged for the cascade model. However, model fit was poor with the inclusion of the covariates ($\chi^2(648, N = 545) = 1916.23$, $p < .01$, *CFI* = .87, *RMSEA* = .06), so they were not included in the final model. Finally, multiple group comparisons revealed that gender did not moderate findings. Model fit did not significantly decline when sets of equivalent paths were separately constrained to be equal across gender ($\Delta\chi^2(2, N = 545) = .08$ to 1.57, $p > .05$).

Math achievement. Step 1 in the model building process included stability paths and concurrent correlations between task avoidance, math achievement, and peer acceptance. The model fit the data, $\chi^2(39, N = 545) = 161.22$, $p < .05$, *CFI* = .96, *RMSEA* = .08. Study variables were stable over time and intercorrelated within time. Step 2 in the model building process included stability paths, concurrent correlations, and cascade paths from early math achievement to later peer acceptance, through task avoidance. The model fit the data, $\chi^2(35, N = 545) = 146.47, p < .05$, *CFI* = 96, *RMSEA* = .08. The model from Step 2 fit the data significantly better than did the model from Step 1, $\Delta\chi^2(4, N = 545) = 14.75, p < .05$. In the cascade spanning 1st grade to 3rd grade, low math achievement in 1st grade predicted increases in task avoidance from 1st grade to 2nd grade. Increased task avoidance in 2nd grade predicted declines in peer acceptance from 2nd grade to 3rd grade. In the cascade spanning 2nd grade to 4th grade, lower math achievement in 2nd grade predicted increases in task avoidance from 2nd grade to 3rd grade. Increased task avoidance in 3rd grade predicted declines in peer acceptance from 3rd grade to 4th grade.

Separately, equivalent sets of stability paths and cascade paths were constrained to be equal over time. Constraining the set of task avoidance stability paths to be equal ($\Delta\chi^2(2, N = 545) = .88, p > .05$) and the set of peer acceptance stability paths to be equal ($\Delta\chi^2(2, N = 545) = .93, p > .05$) did not significantly worsen model fit. Constraining the set of math achievement stability paths be equal ($\Delta\chi^2(2, N = 545) = 31.63, p < .01$) significantly worsened model fit. Constraining the set of cascade paths from early math achievement to later task avoidance to be equal ($\Delta\chi^2(1, N = 545) = .51, p > .05$) and the set of cascade paths from task avoidance to later peer acceptance to be equal ($\Delta\chi^2(1, N = 545) = .56, p > .05$) did not significantly worsen model fit. As a result, all time constraints remained in the model with the exception of the math achievement stability paths. The final cascade model is presented in Figure 9.

Supplementary analyses ensured that the final cascade model was the best-fitting, most parsimonious model. Sets of additional paths not incorporated in the hypothesized cascade model were separately added to ensure critical paths were not excluded. The sets of auxiliary paths included those from peer acceptance to task avoidance, those from peer acceptance to math achievement, those from task avoidance to math achievement, and the remaining paths from 1st grade task avoidance to 2nd grade peer acceptance and from 3rd grade math achievement to 4th grade math achievement. Inclusion of any of these sets of paths did not increase the χ^2 goodness-of-fit value by 10%, and therefore remained excluded from the model. Next, control variables were added to the model. The same pattern of results emerged for the cascade model. However, model fit was poor with the inclusion of the covariates ($\chi^2(648, N = 545) = 2200.36$, $p < .01$, $CFI = .86$, $RMSEA = .07$), so they were not included in the final model. Finally, multiple group comparisons revealed that gender did not moderate findings. Model fit did not significantly decline when sets of equivalent paths were separately constrained to be equal across gender ($\Delta\chi^2(2, N = 545) = .10$ to 1.57, $p > .05$).

Model Comparisons

Initial task avoidance models were compared to initial academic achievement models using the Sample-size Adjusted Bayesian Information Criterion (SABIC). For models incorporating reading achievement, initial task avoidance models fit the data significantly better than initial academic achievement models ($\Delta SABIC = 9.32$). For models incorporating math achievement, initial task avoidance models fit the data significantly better than initial academic achievement models ($\Delta SABIC = 27.87$).

DISCUSSION

The purpose of this study was to examine how academic behaviors influence later peer acceptance during the first years of primary school, a time when peer reputations and peer status are in considerable flux. The findings extend prior research suggesting that avoidance of school work results in poor achievement in school (i.e. Hughes, Luo, Kwok, & Loyd, 2008) and that poor achievement in school results in problems with peers (i.e. Welsh, Parke, Widaman, & O'Neil, 2001). The present study is unique in that it is the first to test the sequence of these two associations. The results revealed a cascade of effects on peer status whereby avoiding school work during the first year of primary school leads to declines in academic achievement, which in turn leads to declines in peer acceptance. The findings are important because they highlight the importance of early school motivations, and illustrate the sequential effects that poor academic motivation and low achievement have on peer acceptance during the first years of school.

A Cascade of Problems Predicts Poor Peer Acceptance

Two sets of cascade models were tested to identify the academic origins of peer acceptance difficulties. In the first model, initial task avoidance predicted declines in achievement, which in turn predicted declines in peer acceptance. In the second model, initial achievement predicted changes in task avoidance, which in turn predicted changes in peer status. The cascade model that ran from task avoidance to peer acceptance through academic achievement provided a better fit to the data and a more coherent theoretical framework than the model that initiated with academic achievement.

Therefore, these findings imply that, for many children, task avoidance is the start of school difficulties, which give rise to later peer problems. Of course, the findings do not rule out transactional relations between task avoidance and school difficulties. Task avoidant children may perform poorly at the outset of school, and initial school difficulties may reinforce the tendency to avoid school work. It is clear, however, that school difficulties are a stronger predictor of peer problems than is task avoidance.

The results highlight the academic origins of peer acceptance. We know that anxiety and aggression play a large role in shaping the degree to which children are accepted by their peers (Coie, Dodge, Kupersmidt, 1990; Nyberg, Henricsson, & Rydell, 2008). Children who are anxious or aggressive are less accepted and more rejected by their peers than other children. These characteristics are among the most salient and consistent predictors of peer status. Results from the present study indicate that status is also built upon academic characteristics that affect a child's reputation. It is important to note that these academic contributions to peer acceptance are independent of anxiety and aggression. In other words, academic motivations and academic achievement explain a unique portion of the variance in peer acceptance that characteristics like anxiety and aggression do not explain.

The present study is novel in several different ways. First, according to Hartup (2001), even though they both unfold in the same classroom setting, academic precursors of peer acceptance are rarely studied. Many studies have examined the effects of peer status on academic achievement; relatively few have examined the effects academic achievement has on peer status, and even fewer have considered this association at the outset of formal schooling. Studies that have addressed effects that the academic domain has on peer acceptance during the outset of schooling are typically limited to two waves of data (Ladd, 1990). None have examined over-time associations between academic avoidance, academic achievement, and peer acceptance in the same, longitudinal model, following the patterns of influence across most of the primary school years. The sequential cascade framework is another unique facet of this study. Although several previous studies have illustrated that peer status is affected by cascades involving, none have included academic motivation and academic achievement as predictors or control variables.

The present study describes the sequential effects that academic task avoidance and academic achievement have on peer acceptance in a full-longitudinal cascade model, beginning at the outset of primary school and controlling for other characteristics that have been shown to predict peer acceptance. The importance of each of these aspects is discussed below.

Academic characteristics are important predictors of peer status for several reasons. According to Ladd (1999), social and academic domains are interrelated, such that problems in one domain may lead to problems in the other. Because both academic characteristics and peer status develop quickly during the first years of school, at the same time and in the same setting, the two characteristics likely shape one another. Additionally, academic characteristics are important predictors of peer status because they are salient characteristics valued by peers. Children who succeed in domains valued by peers, such as academic achievement (Véronneau, et al., 2010), are apt to be well-liked and accepted (Vannatta, Garstein, Zeller, & Noll, 2009). As a result, those who are engaged in their school work and who do well in school will be better accepted by their peers than those who disengage from school work and do poorly in school.

Little is known about the sequence of events that leads from academic troubles to poor peer acceptance. Peer status is a multidimensional characteristic that is affected by a multitude of child characteristics, likely in a multidimensional framework (Coie, Dodge, Kupersmidt, 1990; Masten & Cicchetti, 2010; Nyberg, Henricsson, & Rydell, 2008). Simply examining the effect each academic domain has on peer status separately will yield simple results that do not capture the complexity of peer status development. Incorporating academic motivations, academic achievement, and peer acceptance in a full-longitudinal model will allow for analyzing the complex, sequential effects academic domains have on one another and on peer status over time.

Understanding the association between academic characteristics and the development of peer status is especially important at the outset of schooling. Social relationships change when children enter school and peers become more important (Eccles, 1999; Hartup, 1983). It is during this time that peer status is especially fluid, becoming increasingly more stable as children progress through primary school and into secondary school (Jiang & Cillessen, 2005). The malleability of early peer status suggests that the first school years are an important period for the establishment of peer reputations. Thus, the measurement and timing of the cascade sequence are crucial. Earlier assessments of peer status are less than certain in terms of long-term outcomes, while later assessments are primarily a reflection of constant stability.

Supplemental Findings

Supplemental analyses provided support for the assertion that there is a developmental cascade of changes that progress through academic motivation and achievement to peer status. These analyses included the addition of multiple control variables to the model, as well as the comparison of the cascade effect between boys and girls.

The inclusion of numerous control variables in the final cascade model did not change the patterns of significance of the cascade effects. Control variables included characteristics of the child and the child's school experience that were previously shown to affect each of the motivation, academic, and/or peer status domains. Characteristics of the child included conduct problems, emotional problems, hyperactivity, attitude toward school, interest in math and reading, self-esteem, and having a friend. Characteristics of the child's school experience included preschool attendance, teacher's affect toward the child, and the parent's cooperation with the school. These variables were related to at least one of the main study variables, but their inclusion did not produce difference in the patterns of results of the cascade model. Given that variables consistently associated with peer acceptance, like conduct problems and emotional problems, did not mitigate the effects of the cascade from academic behaviors to peer acceptance, it follows that academic motivation and achievement explain unique aspects of peer acceptance. Addressing the more common behavioral and emotional causes of low peer acceptance but ignoring the academic precursors will not fully remedy peer problems.

Finally, gender was included as a moderator of the main cascade model, but there was no evidence of gender differences in the associations concurrently or over time.

Although previous research has shown gender differences in the association between achievement and acceptance (Rose & Rudolph, 2006), the findings were based on older children. The authors explain the findings in terms of differences in the salience of academic behaviors, such that girls tend to discuss achievement with their friends more than boys. This gender difference in the salience of academic achievement may not be found in young children. The absence of sex difference bolsters the generalizability of the main findings to all primary school children, regardless of gender.

Implications

Knowing the sequential effects of academic behaviors on peer status is central to our understanding of the origins and mechanisms of peer acceptance and holds considerable practical significance for parents, teachers, and practitioners. Fortunately, school problems are relatively easy to identify, and can be done so early and often in development. This availability allows for easy identification of academic motivation and achievement problems, and is an important tool for the application of the findings of this study. Unfortunately, task avoidance is not routinely measured, although certainly teachers are in a position to do so.

Teachers must be aware that early problems in school motivation can lead not only to declines in later academic achievement, but also to declines in later peer status. The negative sequential changes that occur over several years can perhaps be interrupted by identifying academic problems early and taking steps to address and fix the motivational problems that are at the root of school troubles. Although this is undoubtedly important throughout primary school, it is especially important for early primary school teachers, so that adverse effects can be counteracted before peer status becomes fixed. Providing an environment that promotes academic motivation, facilitates teacher-parent communication, and identifies and rectifies problems quickly could help stop the cascade before it begins.

Similarly, parents should be aware of the importance of addressing early deficits in academic motivation and school achievement. Parental monitoring of school work and motivation is quite important in this aspect, especially early in schooling, before academic troubles mount. Parents should be sure that children are engaged in classwork, and should take steps to recognize poor academic behaviors, such as discussing their child's motivation and abilities with the teacher, monitoring their children's homework and grades. Providing a home environment that encourages academic success will promote motivation and achievement at the outset.

Practitioners can also incorporate the findings of this study in practice, when counseling children who are not accepted by their peers. Because peer status is associated with positive psychological characteristics and developmental well-being, it is important for practitioners to address concerns in academic behaviors to avoid later peer problems. The findings show that academic motivation and achievement predict peer acceptance uniquely, over and above the characteristics that are more explicitly related to peer status, such as conduct problems and internalizing. As a result, working to improve school motivation and achievement early in a child's schooling are important aspects to be included in the counseling work done to enhance peer status. Practitioners should work with teachers to identify children with poor motivation early and implement effective interactions to promote interest in school.

Study Strengths

A main strength of this study is the manner in which conceptually driven models are tested. Cascade models are built from the bottom up rather than the top down, as other modelling procedures often proceed. Therefore, it is important to have a theoretically driven model of the sequence and timing of events in a cascade. Cascade models assume that problems spread from one domain to the next during vulnerable periods of development. For this reason, it was important to frame the cascade model in the appropriate developmental period. Theory driven hypothesis testing provide several strengths. First, there is *a priori* reasoning for every association in the model, an important principle of statistical and scientific methods. Second, associations that did not fit the theoretical framework were excluded from the model, increasing power and, more importantly for this study, parsimony. According to Little (2013), associations that do not fit theoretical guidelines should not be included in the model unless there are significant reasons to do so. As such, supplemental analyses revealed that inclusion of the non-theoretical paths did not improve the model, providing evidence that the conceptual cascade model was the best-fitting, most parsimonious model. Finally, conceptual consideration informed the structure of the final model when the limits of statistical differentiation were reached. This provision allowed for the conclusion that task avoidance initiates the cascade process.

The richness of the data is another strength of the study. Participants were drawn from several different schools across Finland, increasing the generalizability of the results. The high participation rate further enhances the generalizability. The sample was large, providing sufficient power to examine complex longitudinal models. Finally, each variable in the cascade model was obtained by different reporters. This sets the study apart because it removes shared reporter variance. Task avoidance was obtained by teacher report, academic achievement was obtained through standardized testing, and peer acceptance was obtained by peer reports. The diversity in the sources of information diminishes the possibility that the results are a product of reporting bias. Moreover, the use of nationally standardized tests to measure achievement provides an objective measure that reduces reporting errors, therefore enhancing confidence in the results.

The supplemental analyses are an additional source of strength. For instance, testing non-hypothesized paths for inclusion in the model provided further support for the conclusions. Beginning with a theoretically informed model, it is necessary to be sure that paths excluded from this model are done so under the correct circumstances. Ensuring that model fit does not significantly increase with the inclusion of other paths ensures the model is not ignoring relevant and potentially important associations. An additional strength is the inclusion of control variables. Assessing the contributions of individual and school-related variables helped rule out the possibility that the results identified were an artifact of associations with potential confounding variables.

A final strength in the analyses is the incorporation of two cascade paths in the same model: One initiating with task avoidance in 1^{st} grade and the other initiating with task avoidance in 2^{nd} grade. Duplicating cascade information across two consecutive time spans has several benefits. First, it provides evidence that the results can be replicated, bolstering the evidence that a cascade effect exists. Second, examining the cascade across two different start points shows that the initiation of the developmental cascade continues past the first year of school. Displays of task avoidance in the first year of school set off a progression of changes in later achievement and peer acceptance, and so do displays of task avoidance in the second year of school. It is important, then, to continue monitoring and remedying task avoidant behavior at least throughout the first years of primary school.

Study Limitations

This study is not without limitations. First, data were only available until 4th grade. This time frame limits the analysis to academic predictors early in schooling and only includes primary school children. As a result, analyses cannot be applied to adolescence, when peers and peer acceptance becomes more important. However, we know that early school and peer experiences may set a foundation for peer status in childhood and adolescence (Jiang & Cillessen, 2005; Véronneau et al., 2010), and assessing the predictors of peer status before it becomes fixed later in childhood are important. That said, the results do not speak to the question of whether the paths continue in later years (as is suspected) or are limited to the critical early school years cannot be determined.

Second, the data were collected in Finland, which may limit the generalizability of results in several ways. First, in the Finnish primary school system, students move from one grade to the next with the same group of peers. This presumably limits the generalizability of results for children who do not remain with the same students throughout primary school. Additionally, because the Finnish schooling system is among the best in the world (OECD, 2001), associations with academic variables may differ in other cultures. For instance, academic achievement may be a more important factor of peer evaluations in Finland than in cultures where achievement is not as exceptional.

However, because academic achievement is important in most cultures, and the association between achievement and acceptance has been found in many cultures (i.e. Chen, Rubin, & Li, 1997; Welsh, Parke, Widaman, & O'Neil, 2001), similar results are expected. Finally, the advantages of this sample may be offset by the ethnic and socioeconomic homogeneity of the participants. It remains to be seen whether the findings will generalize to youth in large diverse cities with more heterogeneous populations.

A final limitation is that the analyses only examined cascade effects that progressed through academic behaviors. Although many potential confounds were included as control variables, some variables that have previously been found to anticipant low acceptance, such as social competence (Mostow, Izard, Fine, & Trentacosta, 2003), were not available for this study. That said, the current model controls for most characteristics that affect peer acceptance and school achievement, and the main cascade findings still held. Further, the analyses examine a time period that is extremely relevant to the development of academic and peer factors, so it follows that academic factors are of unique importance and explain sufficient variance in peer acceptance.

Conclusions

Unique to this study is the use of the cascade model to study the progression of changes through academic precursors to peer acceptance during the developmentally sensitive period in early primary school. Consistent with previous studies, findings provide support for the notion that a predilection for avoiding school task negatively impacts school performance (Hughes, Luo, Kwok, & Loyd, 2008) and that doing poorly in school negatively impacts acceptance by peers (Welsh, Parke, Widaman, & O'Neil, 2001). By applying a developmentally sequential framework, this study extends previous work examining the association between the academic and peer status domains, providing support for the progression of change through academic task avoidance and academic achievement to peer acceptance outcomes. Findings show this pattern initiates specifically with academic task avoidance, a factor that may not intuitively be related to peer status. Task avoidance initiates the sequence of effects in not only the first year of schooling, but continuing to at least the second year as well. These results have important implications for parents, teachers, and practitioners. It is important to encourage young children to be motivated to complete their school work at the outset of schooling to prevent declines in academic achievement and peer acceptance.

APPENDICES

APPENDIX A

Academic Task Avoidance Questionnaire

A. Please do your assessment on the child's work and actions by evaluating every issue in a continuum of 1 to 5. It is important in the assessment to answer according to your impression of the child. It is useful to think that this is an assessment continuum where at best you can give an approximate description of the situation. For instance, you should not spend time on thinking which is the right choice between two adjacent numbers (e.g. 1 or 2; 4 or 5). You should also not avoid using the extreme ends of the scale. Some of the questions are intentionally somewhat similar.

		Not at all				Very Much/Quickly
1.	If difficulties arise in the activity or assignment, does the child easily start doing something else?	1	2	3	4	5
2.	Does the child actively try to manage even the difficult situations or assignments? (reversed scored)	1	2	3	4	5
3.	Does the child easily give up trying?	1	2	3	4	5
4.	Does the child show activity or endurance in her/his actions or assignments? (reverse scored)	1	2	3	4	5
5.	Does the child easily blame her/himself for failures?	1	2	3	4	5
6.	If the assignment or activity does not go well, does the child begin to busy her/himself with this and that?	1	2	3	4	5
7.	Does the child easily come up with different explanations for her/his failure or difficulties?	1	2	3	4	5

APPENDIX B

Strengths and Difficulties Questionnaire- Conduct Problems subscale

For each item, please mark the box for Not True, Somewhat True, or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of the child's behavior over the last six months or this school year.

1. Often has temper tantrums or hot tempers.
2. Generally obedient, usually does what adults request. (reverse scored)
3. Often fights with other students or bullies them.
4. Often lies or cheats.
5. Steals from home, school, or elsewhere.

Response format:

1. *Not true*
2. *Somewhat True*
3. *Certainly True*

APPENDIX C

Strengths and Difficulties Questionnaire- Emotional Problems subscale

For each item, please mark the box for Not True, Somewhat True, or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of the child's behavior over the last six months or this school year.

1. Often complains of headaches.
2. Many worries, often seems worried.
3. Often unhappy, down-hearted or tearful.
4. Nervous or clingy in new situations.
5. Many fears, easily scared.

Response format:

1. *Not true*
2. *Somewhat True*
3. *Certainly True*

APPENDIX D

Strengths and Difficulties Questionnaire- Hyperactivity subscale

For each item, please mark the box for Not True, Somewhat True, or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of the child's behavior over the last six months or this school year.

1. Restless, overactive, cannot stay still for long.
2. Constantly fidgeting or squirming.
3. Easily distracted, concentration wanders.
4. Thinks things out before acting. (reverse scored)
5. Sees tasks through to the end, good attention span. (reverse scored)

Response format:

1. *Not true*
2. *Somewhat True*
3. *Certainly True*

APPENDIX E

Parent Cooperation with School/Teacher

1. I participate in planning classroom activities with the teacher.
2. I talk with other parents about school meetings and events.
3. I feel that parents in my child's classroom support each other.
4. I talk with my child's teacher about how I can support my child with school assignments.
5. I attend conferences with the teacher to talk about my child's learning or behavior
6. I participant in parent and family social activities with the teacher.
7. I participate in the planning of some classroom activities with the teacher.

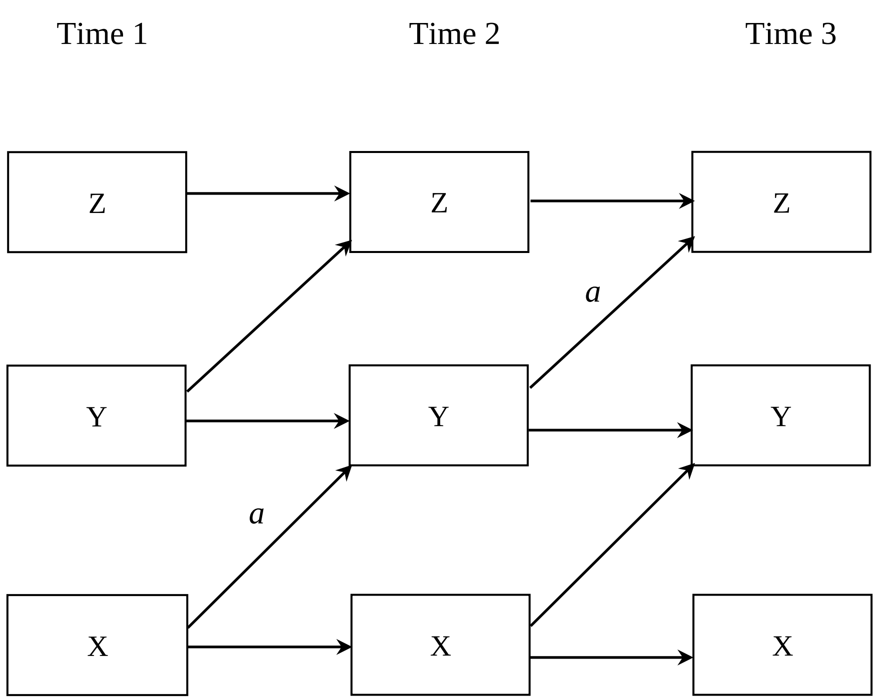
Response format:

1. *Not at All*
2. *Rarely*
3. *Sometimes*
4. *Frequently*
5. *Very Often*

APPENDIX F

Tables and Figures

Figure 1. General Cascade Model of Development across Three Time Points



Note. X, Y, and Z are variables measured at each time point. The developmental cascade path (*a*) represents the progression of effects from initial levels of variable X to changes in variable Y to changes in outcome variable Z. Concurrent correlations are hypothesized but not pictured.

Table 1

Descriptive Statistics for Study Variables

Variable	*M*	*SD*	*Min*	*Max*
1st Grade				
Task Avoidance	2.69	1.13	1.00	5.00
Reading Achievement	16.13	8.79	0.00	50.00
Math Achievement	9.73	4.25	0.00	28.00
Peer Acceptance	2.00	1.61	0.00	8.00
2nd Grade				
Task Avoidance	2.70	1.09	1.00	5.00
Reading Achievement	22.69	7.63	3.00	58.00
Math Achievement	15.10	4.98	2.00	28.00
Peer Acceptance	1.94	1.59	0.00	7.00
3rd Grade				
Task Avoidance	2.61	1.06	1.00	5.00
Reading Achievement	33.72	8.74	5.00	58.00
Math Achievement	18.73	4.87	2.00	28.00
Peer Acceptance	1.85	1.62	0.00	9.00
4th Grade				
Task Avoidance	2.49	1.00	1.00	5.00
Reading Achievement	34.54	8.73	0.00	64.00
Math Achievement	22.26	4.16	6.00	31.00
Peer Acceptance	1.86	1.43	0.00	8.00

Note. *N*=545. Task avoidance was rated on a scale from 1 (*not at all*) to 5 (*very much*).

Table 2

Descriptive Statistics for Control Variables

Variable	*M*	*SD*	*Min*	*Max*
1st Grade				
Conduct Problems	1.29	0.40	1.00	3.00
Emotional Problems	1.32	0.38	1.00	3.00
Hyperactivity	1.75	0.62	1.00	3.00
Low Self-concept: Reading	3.74	2.15	1.00	10.00
Low Self-concept: Math	3.23	2.16	1.00	10.00
Interest: Reading	3.65	1.24	1.00	5.00
Interest: Math	4.17	1.17	1.00	5.00
Reciprocated Friends	1.12	0.99	0.00	3.00
Parental Cooperation	2.94	0.61	1.43	5.00
Duration of Preschool	26.78	19.67	1.50	72.00
2nd Grade				
Conduct Problems	1.31	0.41	1.00	2.80
Emotional Problems	1.31	0.38	1.00	3.00
Hyperactivity	1.74	0.61	1.00	3.00
Low Self-concept: Reading	4.20	1.87	1.00	10.00
Low Self-concept: Math	3.67	2.11	1.00	10.00
Interest: Reading	3.25	1.24	1.00	5.00
Interest: Math	3.89	1.24	1.00	5.00
Reciprocated Friends	1.18	1.04	0.00	3.00
Parental Cooperation	2.92	0.58	1.43	4.86

Note. N=545. Conduct problems, emotional problems, and hyperactivity were rated on a scale from 1 (*not true*) to 3 (*certainly true*). Self-concept was rated on a scale from 1 (*best*) to 10 (*worst*). Interest was rated on a scale from 1 (*does not like*) to 5 (*likes very much*). Parental cooperation was rated on a scale from 1 (*not at all*) to 5 (*very often*).

Table 2 (*continued*)

Descriptive Statistics for Control Variables

Variable	*M*	*SD*	*Min*	*Max*
3rd Grade				
Conduct Problems	1.29	0.38	1.00	3.00
Emotional Problems	1.30	0.37	1.00	3.00
Hyperactivity	1.70	0.60	1.00	3.00
Low Self-concept: Reading	4.33	1.71	1.00	10.00
Low Self-concept: Math	3.90	1.71	1.00	10.00
Interest: Reading	3.08	1.15	1.00	5.00
Interest: Math	3.70	1.31	1.00	5.00
Reciprocated Friends	1.12	1.03	0.00	3.00
Parental Cooperation	2.84	0.59	1.21	4.67
4th Grade				
Conduct Problems	1.28	0.35	1.00	3.00
Emotional Problems	1.28	0.35	1.00	3.00
Hyperactivity	1.68	0.59	1.00	3.00
Low Self-concept: Reading	4.33	1.72	1.00	10.00
Low Self-concept: Math	4.30	1.87	1.00	10.00
Interest: Reading	3.07	1.09	1.00	5.00
Interest: Math	3.44	1.26	1.00	5.00
Reciprocated Friends	1.20	0.97	0.00	3.00
Parental Cooperation	2.83	0.60	1.14	4.43

Note. *N*=545. Conduct problems, emotional problems, and hyperactivity were rated on a scale from 1 (*not true*) to 3 (*certainly true*). Self-concept was rated on a scale from 1 (*best*) to 10 (*worst*). Interest was rated on a scale from 1 (*does not like*) to 5 (*likes very much*). The number of reciprocated friends had a potential range of 0 to 3. Parental cooperation was rated on a scale from 1 (*not at all*) to 5 (*very often*).

Table 3

Concurrent and Longitudinal Interclass Correlations between Study Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1st Grade															
1. Task Avoidance	-														
2. Reading Achievement	-.26	-													
3. Math Achievement	-.29	.50	-												
4. Peer Acceptance	-.17	.20	.21	-											
2nd Grade															
5. Task Avoidance	.64	-.24	-.40	-.23	-										
6. Reading Achievement	-.24	.73	.46	.20	-.26	-									
7. Math Achievement	-.28	.45	.72	.22	-.43	.47	-								
8. Peer Acceptance	-.24	.24	.24	.51	-.32	.31	.27	-							
3rd Grade															
9. Task Avoidance	.58	-.28	-.38	-.23	.71	-.27	-.37	-.32	-						
10. Reading Achievement	-.23	.61	.40	.18	-.26	.70	.43	.21	-.28	-					
11. Math Achievement	-.23	.44	.64	.20	-.37	.49	.73	.24	-.30	.49	-				
12. Peer Acceptance	-.24	.28	.21	.38	-.27	.23	.21	.54	-.29	.23	.21	-			
4th Grade															
13. Task Avoidance	.54	-.18	-.31	-.17	.64	-.18	-.39	-.20	.71	-.21	.37	-.21	-		
14. Reading Achievement	-.26	.61	.45	.15	-.28	.68	.45	.24	-.27	.71	.50	.24	-.22	-	
15. Math Achievement	-.27	.42	.61	.21	-.37	.44	.69	.27	-.40	.45	.77	.23	-.35	.50	-
16. Peer Acceptance	-.23	.26	.17	.44	-.25	.26	.21	.55	-.29	.26	.25	.63	-.16	.25	.24

Note. *N*=547. Task avoidance was rated on a scale from 1 (*not at all*) to 5 (*very much*) Correlations are all significant at $p < .01$.

Table 4

Interclass Correlations of Model Variables and Covariates by Grade

	1. Task Avoidance	2. Reading Achievement	3. Math Achievement	4. Peer Acceptance
1st Grade				
5. Conduct Problems	.53**	-.03	-.08	-.14**
6. Emotional Problems	.25**	-.07	-.15**	-.16**
7. Hyperactivity	.78**	-.22**	-.21**	-.16**
8. Low Self-concept: Reading	.15**	-.28**	-.10*	.04
9. Low Self-concept: Math	.01	.01	-.22**	.04
10. Interest: Reading	-.16**	.06	.06	.08
11. Interest: Math	-.01	-.08	.13**	-.05
12. Reciprocated Friends	-.19**	.20**	.18**	.77**
13. Parental Cooperation	-.02	-.02	-.03	.07
14. Duration Preschool	.01	-.02	.03	-.01
2nd Grade				
5. Conduct Problems	.54**	-.05	-.07	-.23**
6. Emotional Problems	.17**	-.11*	-.12**	-.17**
7. Hyperactivity	.78**	-.19**	-.31**	-.25**
8. Low Self-concept: Reading	.16**	-.22**	-.12**	-.01
9. Low Self-concept: Math	-.06	.03	-.19**	.07
10. Interest: Reading	-.15**	.10*	-.01	.02
11. Interest: Math	-.01	-.04	.12**	-.03
12. Reciprocated Friends	-.32**	.31**	.29**	.81**
13. Parental Cooperation	.01	.05	-.01	.12*

Note. *N*=545. Conduct problems, emotional problems, and hyperactivity were rated on a scale from 1 (*not true*) to 3 (*certainly true*). Self-concept was rated on a scale from 1 (*best*) to 10 (*worst*). Interest was rated on a scale from 1 (*does not like*) to 5 (*likes very much*). Parental cooperation was rated on a scale from 1 (*not at all*) to 5 (*very often*). *p < .05, **p < .01.

Table 4 (*continued*)

Interclass Correlations of Model Variables and Covariates by Grade

	1. Task Avoidance	2. Reading Achievement	3. Math Achievement	4. Peer Acceptance
3rd Grade				
5. Conduct Problems	.59**	-.02	-.10*	-.18**
6. Emotional Problems	.21**	-.13**	-.12*	-.12*
7. Hyperactivity	.81**	-.17**	-.26**	-.23**
8. Low Self-concept: Reading	.20**	-.30**	-.16**	-.02
9. Low Self-concept: Math	.10*	-.07	-.29**	-.09*
10. Interest: Reading	-..24**	.07	.03	.09*
11. Interest: Math	-.10*	-.07	.21**	-.05
12. Reciprocated Friends	-.26**	.17**	.14**	.81**
13. Parental Cooperation	-.08	.12*	.05	.10*
4th Grade				
5. Conduct Problems	.55**	-.03	-.17**	-.11*
6. Emotional Problems	.21**	-.12*	-.15**	-.17**
7. Hyperactivity	.81**	-.20**	-.29**	-.17**
8. Low Self-concept: Reading	.17**	-.30**	-.12**	.01
9. Low Self-concept: Math	.20**	-.10*	-.35**	.09*
10. Interest: Reading	-.23**	.12**	.07	.09*
11. Interest: Math	-.08	-.02	.24**	-.07
12. Reciprocated Friends	-.15**	.21**	.24**	.82**
13. Parental Cooperation	-.02	.03	.01	.15**

Note. N=545. Conduct problems, emotional problems, and hyperactivity were rated on a scale from 1 (*not true*) to 3 (*certainly true*). Self-concept was rated on a scale from 1 (*best*) to 10 (*worst*). Interest was rated on a scale from 1 (*does not like*) to 5 (*likes very much*). Parental cooperation was rated on a scale from 1 (*not at all*) to 5 (*very often*). $*p < .05$, $**p < .01$.

Figure 2. Step 1 in the Model Building Process of the Initial Academic Task Avoidance Model: Stability Paths and Concurrent Correlations

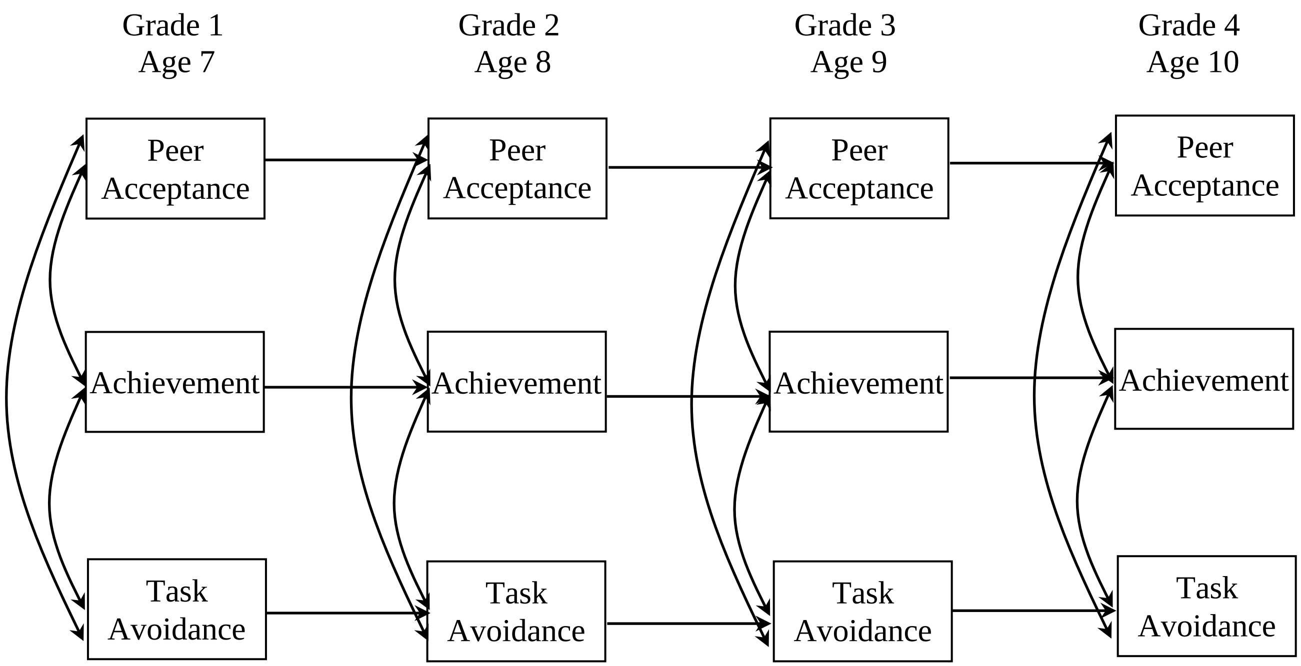
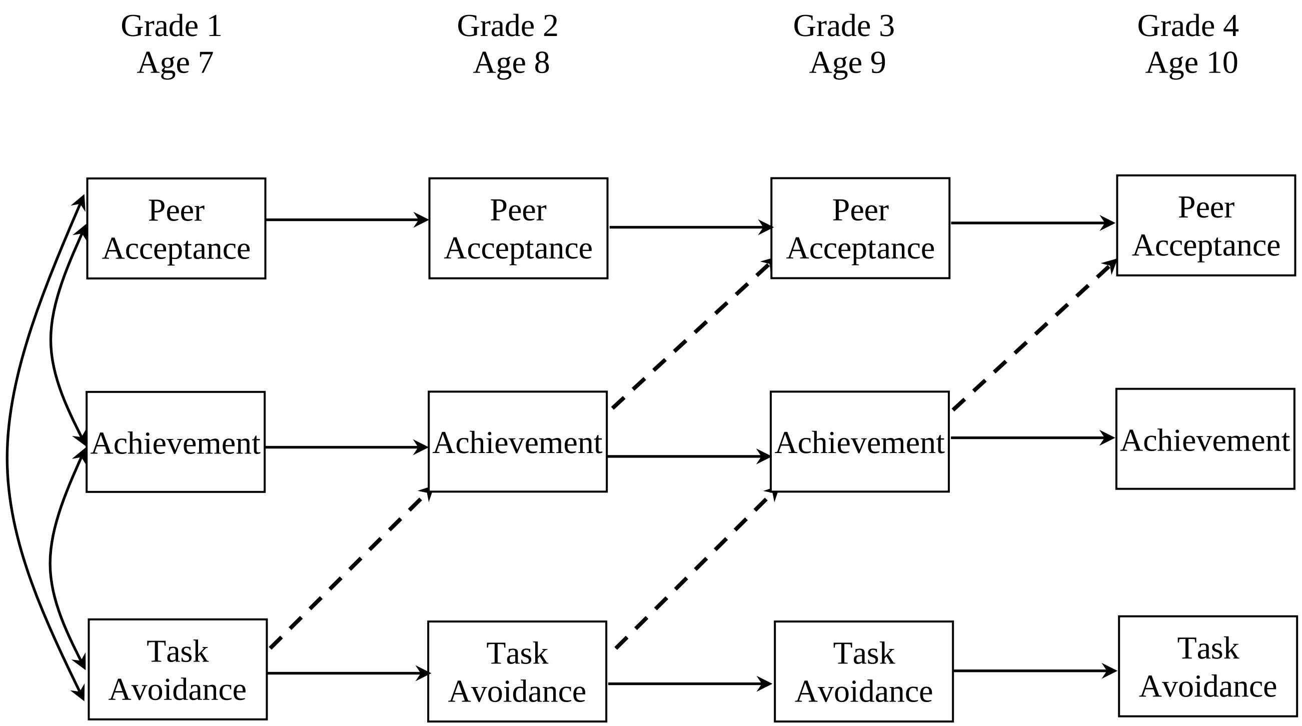


Figure 3. Step 2 in the Model Building Process of the Initial Academic Task Avoidance Model: Cascade Paths



Note. Cascade paths are presented as dashed lines. Concurrent correlations are not depicted.

Figure 4. Step 1 in the Model Building Process of the Initial Academic Achievement Model: Stability Paths and Concurrent Correlations.

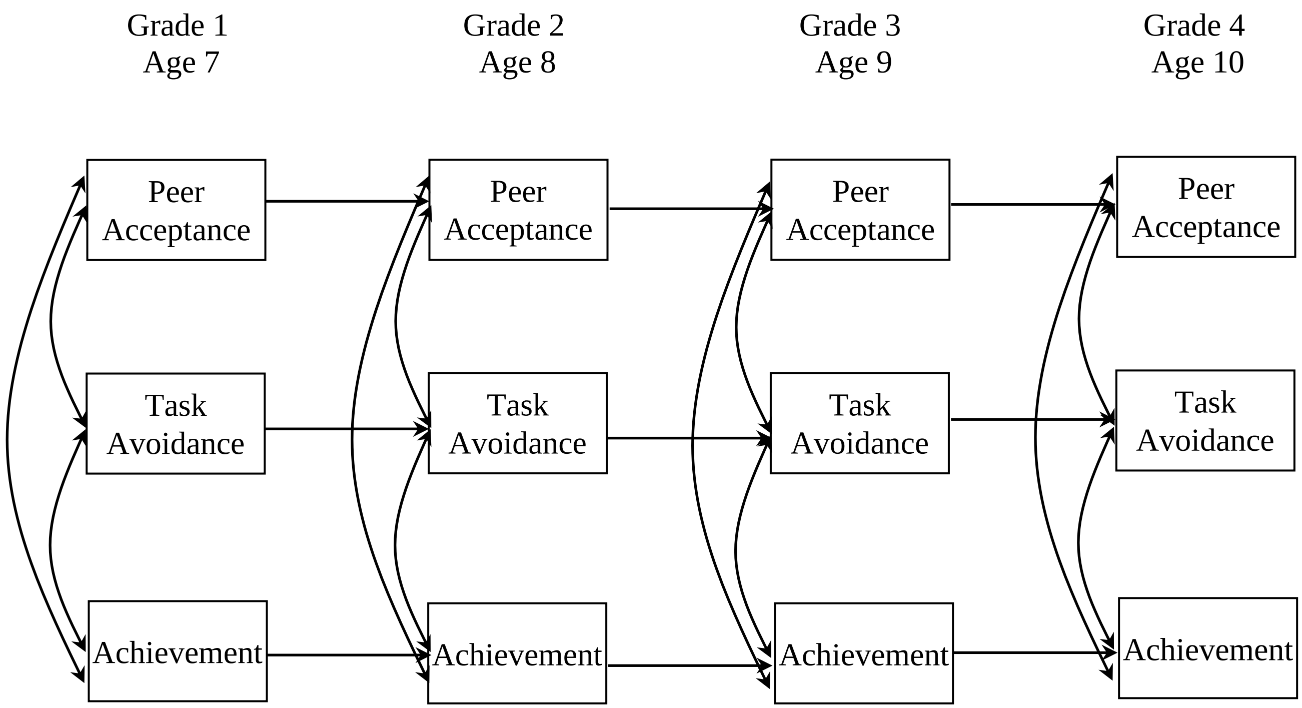
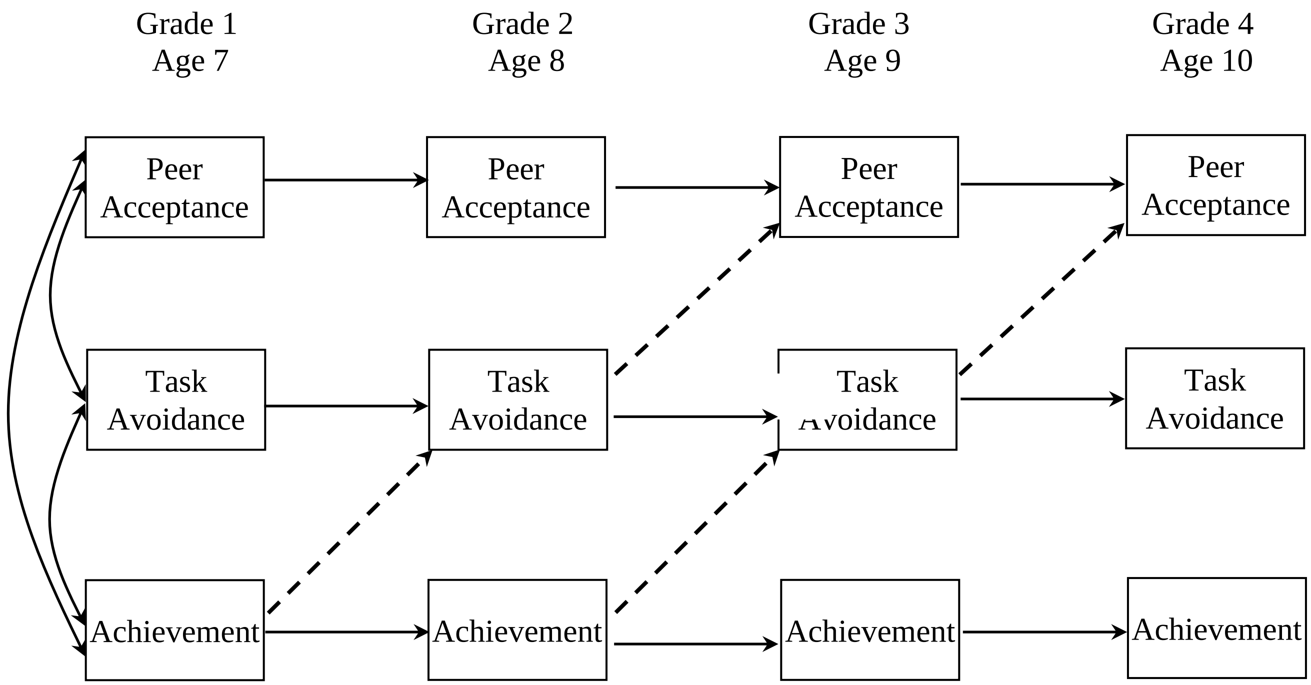
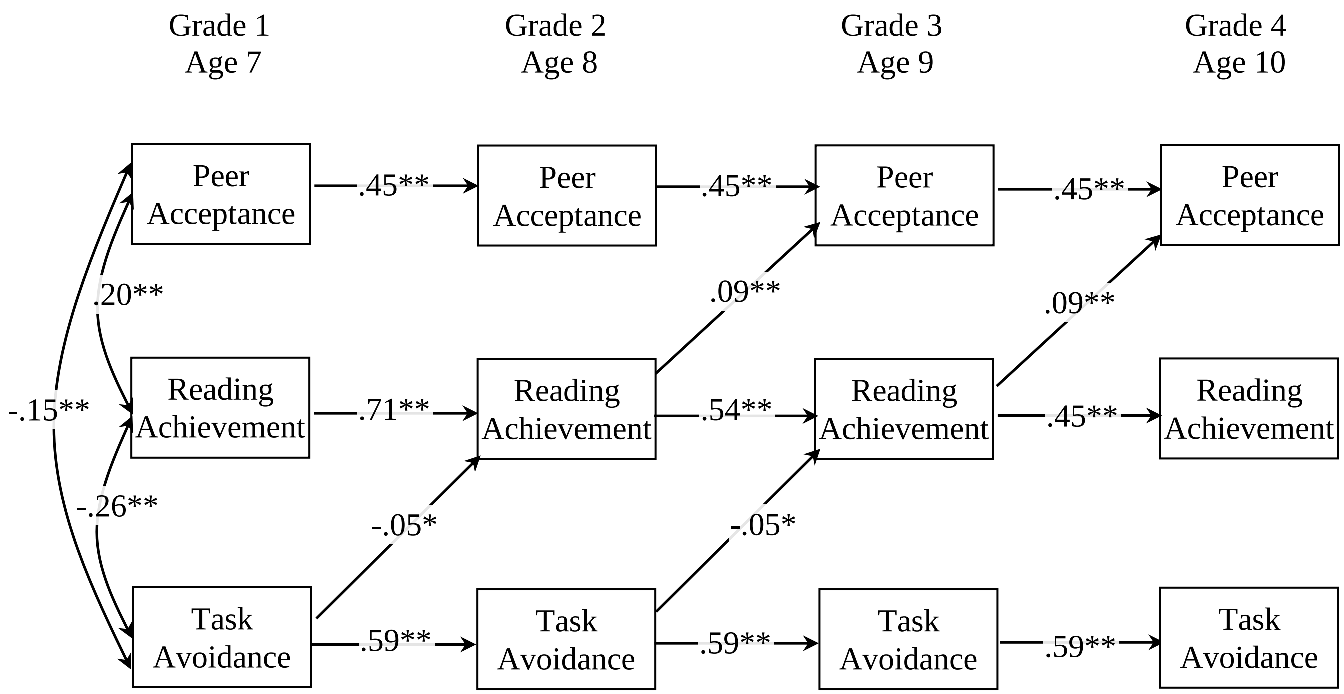


Figure 5. Step 2 in the Model Building Process of the Initial Academic Achievement Model: Cascade Paths



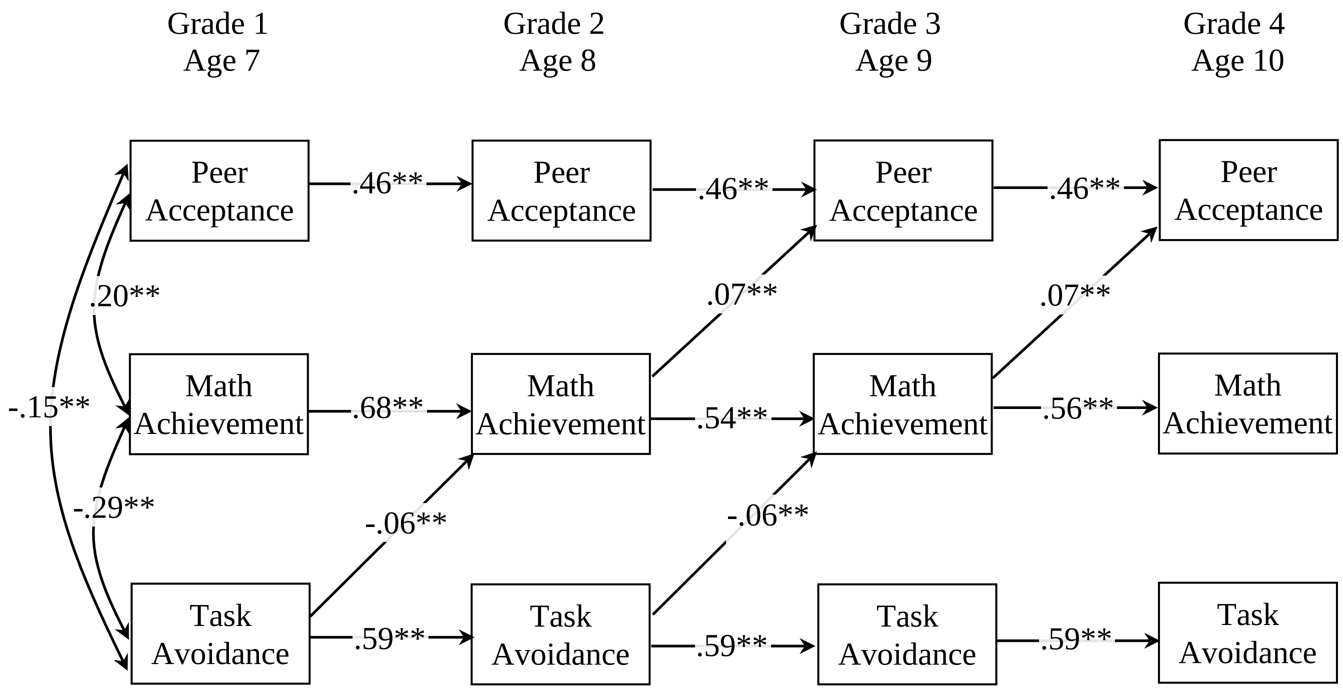
Note. Cascade paths are presented as dashed lines. Concurrent correlations are not depicted.

Figure 6. Final Cascade Model from Initial Task Avoidance to Reading Achievement to Peer Acceptance.



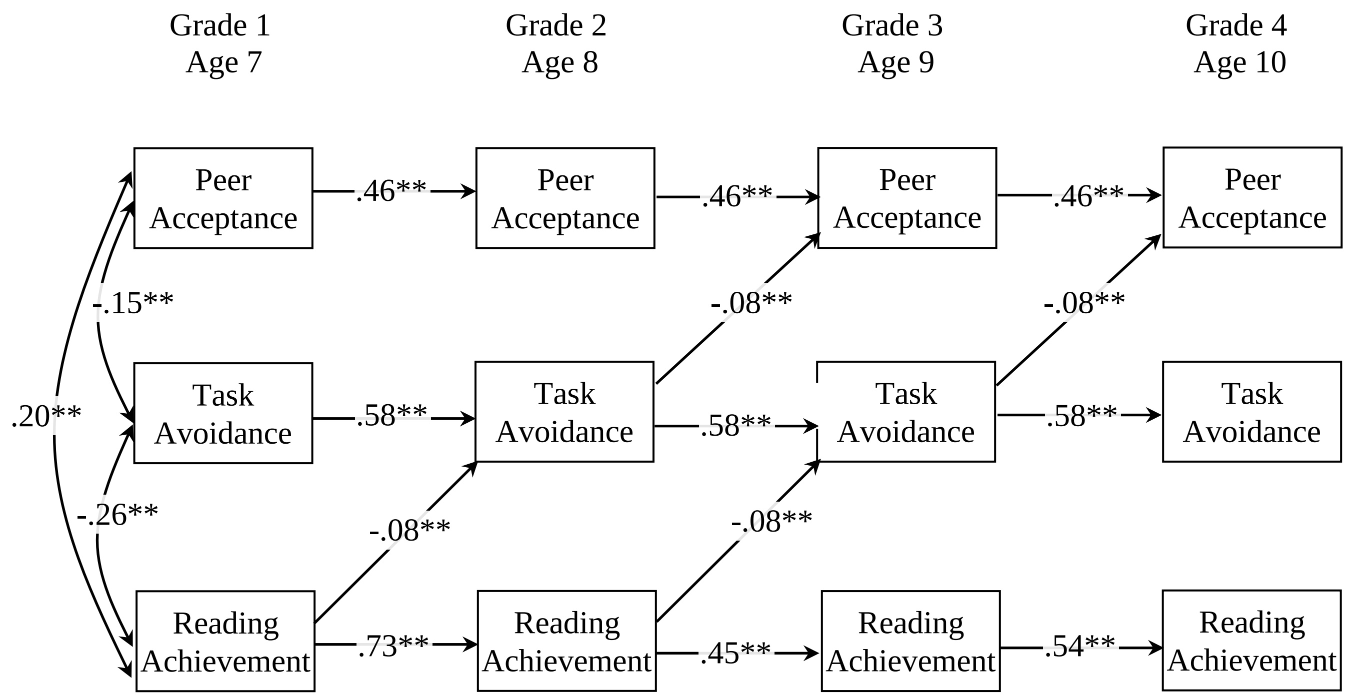
Note. *n*=545. Concurrent correlations are not depicted. The model fit the data, $\chi^2(43, N = 545) = 134.77$, $p < .01$, $CFI = .97$, $RMSEA = .06$. *p < .05, **p < .01

Figure 7. Final Cascade Model from Initial Task Avoidance to Math Achievement to Peer Acceptance.



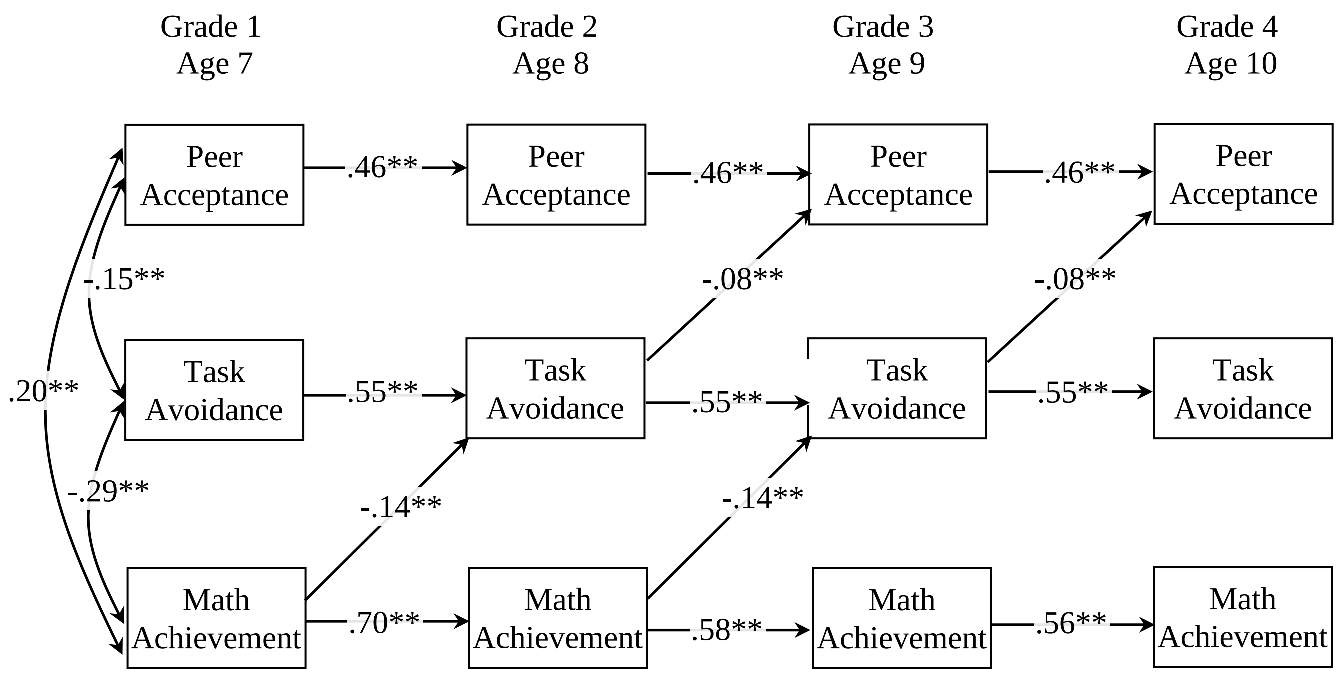
Note. *n*=545. Concurrent correlations are not depicted. The model fit the data, $\chi^2(44, N = 545) = 127.87$, $p < .01$, *CFI* = .97, *RMSEA* = .06. *p < .05, **p < .01

Figure 8. Final Cascade Model from Initial Reading Achievement to Task Avoidance to Peer Acceptance



Note. *n*=545. Concurrent correlations are not depicted. The model fit the data, $\chi^2(44, N = 545) = 147.22$, $p < .01$, $CFI = .96$, $RMSEA = .07$. *p < .05, **p < .01

Figure 9. Final Cascade Model from Initial Math Achievement to Task Avoidance to Peer Acceptance.



Note. n=545. Concurrent correlations are not depicted. The model fit the data, $\chi^2(44, N = 545) = 155.74, p < .01, CFI = .96$, $RMSEA = .07$. *p < .05, **p < .01

REFERENCES

Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: critique and reformulation. *Journal of Abnormal Psychology*, *87*(1), 49-74. doi: 10.1037/0021-843X.87.1.49

Ainley, M. D. (1993). Styles of engagement with learning: Multidimensional assessment of their relationship with strategy use and school achievement. *Journal of Educational Psychology*, *85*(3), 395-405.

Asher, S.R., Parkhurst, J.T., Hymel, S., & Williams, G.A. (1990). Peer rejection and loneliness in childhood. In Asher, S.R., Coie, J.D. (Eds.). *Peer rejection in childhood*. Cambridge University Press.

Aunola, K., Nurmi, J. E., Parrila, R., & Onatsu-Arvilommi, T. (2000). Behavioural strategy rating scale II–BSR-II. *Unpublished test*.

Aunola, K., & Räsänen, P. (2007). The 3-minutes basic arithmetic test. *Unpublished test material. Jyväskylä, Finland*.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173-1182.

Blandon, A.Y., Calkins, S.D., Grimm, K.J., Keane, S.P., & O'Brien, M. (2010). Testing a developmental cascade model of emotional and social competence and early peer acceptance. *Development and Psychopathology*, 22, 737-748. DOI: 10.1017/S0954579410000428.

Burt, K. B., & Roisman, G. I. (2010). Competence and psychopathology: Cascade effects in the NICHD study of early child care and youth development. *Development and Psychopathology*, *22*(03), 557-567. doi: 10.1017/S0954579410000271

Chen, X., Rubin, K. H., & Li, D. (1997). Relation between academic achievement and social adjustment: Evidence from Chinese children. *Developmental psychology*, *33*(3), 518-525.

Cialdini, R. B., Borden, R. J., Thorne, A., Walker, M. R., Freeman, S., & Sloan, L. R. (1976). Basking in reflected glory: Three (football) field studies. *Journal of Personality and Social Psychology*, *34*(3), 366.

Coie, J.D., Dodge, K.A., & Kupersmidt, J.B. (1990). Peer group behavior and social status. In S.R. Asher & J.D. Cole (Eds.), *Peer rejection in childhood* (pp. 17–59). New York: Cambridge University Press.

Coie, J. D., & Krehbiel, G. (1984). Effects of academic tutoring on the social status of low-achieving, socially rejected children. *Child Development*, 1465-1478. doi:

DuPaul, G. J., & Weyandt, L. L. (2006). School-based intervention for children with attention deficit hyperactivity disorder: Effects on academic, social, and behavioural functioning. *International Journal of Disability, Development and Education*, *53*(2), 161-176.

Eccles, J. S. (1999). The development of children ages 6 to 14. *The Future of Children*, *9*(2), 30-44.

Fantuzzo, J., Tighe, E., & Childs, S. (2000). Family Involvement Questionnaire: A multivariate assessment of family participation in early childhood education.

Journal of Education Psychology, 92(2), 367-376. Doi: 10.1037/0022-0663.92.2.367.

Gest, S. D., Domitrovich, C. E., & Welsh, J. A. (2005). Peer academic reputation in elementary school: Associations with changes in self-concept and academic skills. *Journal of Educational Psychology, 97,* 337–346.

Goodman, R. (1997). The strength and Difficulties Questionnaire: A research note. Journal of Child Psychology and Psychiatry, 38, 581–586.

Groteluschen, A., Borkowski, J., & Hale, C. (1990). Strategy instruction is often insufficient: Addressing the interdependency of executive and attributional processes. In T. E. Scruggs & B. Y. L. Wong (Eds.), *Intervention research in learning disabilities* (pp. 81-101). New York: Springer-Verlag.

Henricsson, L. and Rydell, A.-M. (2006). Children with behaviour problems: the influence of social competence and social relations on problem stability, school achievement and peer acceptance across the first six years of school. *Infant and Child Development*, 15(4), 347–366. doi: 10.1002/icd.44

Hughes, J. N., & Kwok, O. M. (2006). Classroom engagement mediates the effect of teacher–student support on elementary students' peer acceptance: A prospective analysis. *Journal of School Psychology*, *43*(6), 465-480. doi: 10.1016/j.jsp.2005.10.001

Hughes, J.N., Luo, W., Kwok, O., Loyd, L. K. (2008). Teacher-student support, effortful engagement, and achievement: A 3-year longitudinal study. Journal of Educational Psychology, 100(1), 1-14. doi: 10.1037/0022-0663.100.1.1

Jiang, X. L., & Cillessen, A. H. (2005). Stability of continuous measures of sociometric status: A meta-analysis. *Developmental Review*, *25*(1), 1-25. doi:10.1016/j.dr.2004.08.008

Juvonen, J. (1991). Deviance, perceived responsibility, and negative peer reactions. *Developmental Psychology, 27*(4), 672-681. doi: 10.1037/0012-1649.27.4.672

Kandel, D. B. (1978a). Homophily, selection, and socialization in adolescent friendships. *The American Journal of Sociology, 84*(2) 427-436. doi:10.1086/226792

Kiuru, N., Aunola, K., Lerkkanen, M-K., Pakarinen, E., Poskiparta, E., Ahonen, T., Poikkeus, A-M., & Nurmi, J-E. (under review). Positive teacher and peer relations combine to predict primary school students academic performance.

Ladd, G. W. (1990). Having friends, keeping friends, making friends, and being liked by peers in the classroom: Predictors of students's early school adjustment? *Child Development*, *61*(4), 1081-1100. DOI: 10.1111/j.1467-8624.1990.tb02843.x

Ladd, G. W., Birch, S. H., & Buhs, E. (1999). Students's social and scholastic lives in kindergarten: Related spheres of influence? Child Development , 70 , 1373 − 1400.

Lansford, J. E., Malone, P. S., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2010). Developmental cascades of peer rejection, social information processing biases, and aggression during middle childhood. *Development and Psychopathology*, *22*(03), 593-602. doi: 10.1017/S0954579410000301

Laursen, B., Bukowski, W.M., Aunola, K., & Nurmi, J.-E. (2007). Friendship moderates prospective associations between social isolation and adjustment problems in young students. *Child Development, 78,* 1395-1404.

Lerkkanen, M. K., Niemi, P., Poikkeus, A. M., Poskiparta, E., Siekkinen, M., & Nurmi, J. E. (2006). The first steps study (Alkuportaat). *Unpublished data. University of Jyväskylä, Finland*.

Lindeman, J. (1998). Ala-asteen lukutesti [Comprehensive school reading test]. *Jyväskylä: University of Turku, Centre for Learning Research*.

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*(404), 1198-1202. doi: 10.1080/01621459.1988.10478722

Little, T. D. (2013). *The Oxford handbook of quantitative methods, volume 1: Foundations*. New York: Oxford University Press.

Martin, M. J., Conger, R. D., Schofield, T. J., Dogan, S. J., Widaman, K. F., Donnellan, M. B., & Neppl, T. K. (2010). Evaluation of the interactionist model of socioeconomic status and problem behavior: A developmental cascade across generations. *Development and Psychopathology*, *22*(03), 695-713. doi: 10.1017/S0954579410000374

Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology*, *22*(03), 491-495. doi: 10.1017/S0954579410000222

Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradovic, J., Riley, J. R., et al. (2005). Developmental cascades: Linking academic achievement, externalizing and internalizing symptoms over 20 years. Developmental Psychology, 41, 733–746.

McClain, D. B., Wolchik, S. A., Winslow, E., Tein, J. Y., Sandler, I. N., & Millsap, R. E. (2010). Developmental cascade effects of the New Beginnings Program on adolescent adaptation outcomes. *Development and psychopathology*, *22*(04), 771-784.

Mostow, A. J., Izard, C. E., Fine, S., & Trentacosta, C. J. (2002). Modeling emotional, cognitive, and behavioral predictors of peer acceptance. *Child Development*, *73*(6), 1775-1787.

Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.

Nurmi, J.-E. (2012). Students' characteristics and teacher–child relationships in instruction: A meta-analysis. *Educational Research Review, 7,* 177–197.

Nurmi, J. E., Aunola, K., Salmela-Aro, K., & Lindroos, M. (2003). The role of success expectation and task-avoidance in academic performance and satisfaction: Three studies on antecedents, consequences and correlates. *Contemporary Educational Psychology*, *28*(1), 59-90.

Nyberg, L., Henricsson, L. & Rydell, A-M. (2008), Low social inclusion in childhood: adjustment and early predictors. *Infant and Child Development, 17*(6), 639–656. doi: 10.1002/icd.590

Obradović, J., Burt, K. B., & Masten, A. S. (2009). Testing a dual cascade model linking competence and symptoms over 20 years from childhood to adulthood. *Journal of Clinical Child & Adolescent Psychology*, *39*(1), 90-102.

Onatsu-Arvilommi, T., & Nurmi, J. E. (2000). The role of task-avoidant and task-focused behaviors in the development of reading and mathematical skills during the first school year: A cross-lagged longitudinal study. *Journal of Educational Psychology*, *92*(3), 478. doi: 10.1037/0022-0663.92.3.478

Pajares, F., & Schunk, D. H. (2001). Self-beliefs and school success: Self-efficacy, self-concept, and school achievement. *Perception*, *11*, 239-266.

Poikkeus, A.M. (2008). *Kaverisuhteet luokassa* [Peer relationships in the classroom] [Unpublished test material]. University of Jyväskylä, Finland.

Prinstein, M. J., Rancourt, D., Guerry, J. D., & Browne, C. B. (2011). Peer reputations and psychological adjustment. In Rubin, K. H., Bukowski, W. M., & Laursen, B. (Eds.). *Handbook of peer interactions, relationships, and groups*. Guilford Press.

Raftery, A. E. (1995). Bayesian model selection in social research. *Sociological Methodology*, *25*, 111-164.

Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relationship processes: potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin*, *132*(1), 98-131. doi: 10.1037/0033-2909.132.1.98

Vannatta, K., Gartstein, M. A., Zeller, M., & Noll, R. B. (2009). Peer acceptance and social behavior during childhood and adolescence: How important are appearance, athleticism, and academic competence?. *International Journal of Behavioral Development*, *33*(4), 303-311. doi: 10.1177/0165025408101275

Velásquez, A.M., Bukowksi, W.M., & Saldarriaga, L.M. (2013). Adjusting for group size effects in peer nomination data. *Social Development, 22*(4). 845-863. doi: 10.1111/sode.12029.

Véronneau, M. H., Vitaro, F., Brendgen, M., Dishion, T. J., & Tremblay, R. E. (2010). Transactional analysis of the reciprocal links between peer experiences and academic achievement from middle childhood to early adolescence. *Developmental Psychology*, *46*(4), 773. DOI: 0.1037/a0019816

Welsh, M., Parke, R. D., Widaman, K., & O'Neil, R. (2001). Linkages between children's social and academic competence: A longitudinal analysis. *Journal of School Psychology*, *39*(6), 463-482. doi: 10.1016/S0022-4405(01)00084-X

Wentzel, K. R. (2005). Peer relationships, motivation, and academic performance at school. In A. Elliot & C. Dweck (Eds.). *Handbook of competence and motivation* (pp. 279-296). New York: Guilford.

Wentzel, K. R., & Caldwell, K. (1997). Friendships, peer acceptance, and group membership: Realtions to academic achievement in middle school. *Child Development*, *68*(6), 1198-1209.

Youniss, J., & Smollar, J. (1985). *Adolescent relations with mothers, fathers, and friends*. Chicago, IL: University of Chicago Press.

Zhang, X., Koponen, T., Räsänen, P., Aunola, K., Lerkkanen, M.-K. and Nurmi, J.-E. (2014), Linguistic and spatial skills predict early arithmetic development via counting sequence knowledge. *Child Development, 85*(3), 1091–1107. doi: 10.1111/cdev.12173