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Social Skill Development and Academic Competence in Children With and Without Intellectual Disability

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Dedication

I dedicate this work to my family, particularly my parents. You have instilled in me a love of learning and new experiences, and I could not have completed my degree without your constant support and encouragement. To Nick, my brother and best friend: thank you for the countless pep talks, and thank you for becoming a "real" doctor. To Matt: you have always supported me steadfastly and reminded me of the importance of balance. I love you all.

ABSTRACT OF THE DISSERTATION

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by

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Social skills and academic competence are key factors influencing children's development and functioning across early childhood and through adolescence. There is a great need to understand the longitudinal patterns of growth in social and academic skills in order to further inform intervention, particularly for at-risk groups such as individuals with intellectual disability (ID). Using a sample of 204 children with (N = 84) and without (N = 120) intellectual disability, the present study utilized structural equation modeling techniques to examine the longitudinal development of social skills from age 6 to age 13. Latent growth curve analysis was used to model intraindividual and interindividual changes in social skills over time. The best fitting growth model specified a linear slope, or rate of change in social skills across time, which was greater for children placed in special education at age 6. Other covariates indicating risk-status at age 6 (ID status, special education placement, elevated externalizing behavior problems, and elevated internalizing behavior problems) significantly influenced children's initial social skills scores at age 6, accounting for additional variance in the growth model. In addition,

the data were fit to a cross-lagged panel to model the relationship of social skills with academic competence over time. The academic competence-driven model fit the data better than the fully transactional and the social skills-driven models, supporting the importance of earlier academic competence to future social skills and academic competence. Furthermore, the predictive validity of parent and teacher ratings of age six social and academic competence was examined via multivariate regression analyses in relation to youth self-reports of competence at age 15. Teacher-rated age 6 academic competence, but not parent- and teacher-rated age 6 social skills, significantly predicted youth-reported competence at age 15. However, the mean of parent- and teacher-rated age 6 social skills did significantly predict youth-reported competence at age 15.

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Social Skill Development and Academic Competence in Children With and Without Intellectual Disability

Social competence and academic success are key outcomes by which to benchmark child and adolescent development. Although traditionally considered separate entities, there is growing consensus that children's social and academic competencies are inextricably related (e.g., DiPerna & Elliott, 1999; Oberle, Schonert-Reichl, Hertzman, & Zumbo, 2014). Children's levels of social skills, which enable the broader construct of social competence, may vary based on disability status, the presence of behavior problems, gender, and socioeconomic status (e.g., Bandura, 1997; Welsh, Parke, Widaman, & O'Neil, 2001). Social skills are critical to children's development from a young age and particularly during formal schooling; intervention programs have successfully improved these skills in school-aged children (e.g., Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). There is a great need to understand the longitudinal patterns of growth in social and academic skills in order to further inform intervention, particularly in at-risk groups including individuals with intellectual disability.

The goal of the present study was to identify the social skills trajectories from ages 6 to 13 of children with intellectual disability (ID) or typical development (TD). Disability status, gender, socioeconomic status, special education placement, and externalizing and internalizing behavior problems were examined as possible predictors of these trajectories. In addition, this study proposes an examination of the transactional relationship between social skills and academic competence over time in the same sample

at the same time points. This hypothesized transactional relationship reflects the notion that there are interdependent effects between the child and the environment. Particularly in research beyond infancy and early childhood, the centrality of the parent-child relationship is found to wane while other transactions such as that between the child and school or peers become more important to development (Sameroff, 2009).

Social Skills

Social skills are a class of socially acceptable learned behaviors that an individual performs while successfully engaging in a social task (Gresham & Elliott, 1990). This definition is widely used in the literature and was created by the authors of the Social Skills Ratings System (SSRS), one measure used in this study. Social skills help individuals to navigate and interpret social information to inform their goal-directed actions, and support positive interpersonal relationships and peer acceptance. These behaviors are the building blocks of social competence, which is defined by Gresham, Sugai and Horner (2001) as "the degree to which students are able to establish and maintain satisfactory interpersonal relationships, gain peer acceptance, establish and maintain friendships, and terminate negative or pernicious interpersonal relationships" (p. 331). Social skills may include such behaviors as listening to others, asking for help, getting along with others, staying calm with others, taking turns while talking, and doing nice things for others. The effective use of social skills should enable positive interactions and social competence while discouraging negative or harmful interactions (Gresham & Elliott, 1990).

Dimensions of social skills. Caldarella and Merrell (1997) created an empirical taxonomy of child and adolescent social skills, based on the findings of 21 factor analytic studies of social skills conducted between 1974 and 1994. The five most commonly represented dimensions were related to peer relational skills, self-management skills, academic skills, compliance skills, and assertion skills. Accordingly, measures of social skills tend to assess the presence or absence of behaviors in these areas. Base rate information about social skills is important in the development of measurement tools for this construct.

Gresham, Elliott, and Kettler (2010) gathered data on base rates of social skills acquisition deficits (i.e., when a child lacks the skills needed to perform the desired behavior) and performance deficits (i.e., when a child has the requisite skills but does not perform the behavior at desired levels), social skills strengths, and problem behaviors in a nationally representative sample of children ages 3-18 years. They measured these using the Social Skills Improvement System – Rating Scales (SSIS-RS; Gresham & Elliott, 2008), the updated version of the SSRS (Gresham & Elliott, 1990) collected from three informants (teacher, parent, and student) across early and middle childhood and adolescence. Results indicated that base rates for social skills acquisition deficits and problem behaviors were quite low in the typical population, while base rates for social skills performance deficits and social skills strengths were significantly higher. These findings are generalizable to the general population and inform assessment in this group; however, they do not necessarily apply to clinical samples, which in this case are children with ID.

Measurement of social skills. As noted above, social skills measures tend to capture functioning in peer relational skills, self-management skills, academic skills, compliance skills, and assertion skills. Valid and reliable assessment of these skills is key to understanding deficits and implementing effective intervention to ameliorate these difficulties. Practitioners may use direct and/or indirect approaches to assess social skills.

Using direct assessment, the assessor observes the target behavior in the setting in which it occurs and counts or codes aspects of the behavior to derive an indicator of the subject's skills. Indirect assessments consist of observations and ratings that typically reflect a broader range of behaviors than those quantified via direct assessment. Indirect methods include interviews, peer referenced assessments such as sociometric ratings, and normative rating scales of social skill behaviors. Rating scales ask the informant to rate the occurrence of the target behavior outside its original setting; ratings are often summed to form composite scores that indicate the subject's performance compared to the normative sample. There are several advantages to using normative scales in the assessment of emotional and behavioral functioning (McConaughy & Ritter, 2008): information is quantifiable, allowing for reliability and validity analyses; a broad range of behaviors can be assessed; the results are organized in a systematic way; the syndrome clusters are empirically based; normative data might consist of a large group of individuals with and without disorders; scales can be completed and scored relatively simply and quickly; it is easy to compare findings across settings and informants. Given these benefits, normative rating scales such as the SSRS, which was replaced by the

Social Skills Improvement System Rating Scales (SSIS-RS) in 2008, have been commonly used in empirical studies of social skill behaviors (Gresham & Elliott, 2008).

Differences by rater. The assessment of child behavior often differs between raters and across time points. Teachers are likely to compare a child's behavior to that of other students, while parents may know more details about their own children at home compared to school (van der Ende, Verhulst, & Tiemeier, 2012). Consistency tends to be higher for externalizing behavior problems because they were more easily observed, while parent reports and older youth self-reports are more accurate for internalizing problems such as anxiety or depression (Verhulst, Koot, & Ende, 1994). In spite of these discrepancies, however, a multi-informant approach to assessment is recommended in order to most accurately understand children's functioning across settings and raters (McConaughy & Ritter, 2008).

Importance of social skills. Many positive outcomes are associated with social competence, including academic achievement and strong relationships with teachers and peers. Children with higher levels of social skills tend to succeed in their relationships and in an academic setting (Wentzel, 1998), while children with deficient social skills may experience difficulties such as depression and school failure, school dropout, substance abuse, delinquency, and victimization (Gazelle & Rudolph, 2004; Walker & Severson, 2002).

The impact of social skills on adaptive development is consistent with the theories of Vygotsky and Bandura, who highlighted the influence that social behavior has on learning and cognitive development. Vygotsky (1978) proposed that social interaction

with both peers and adults was key to children's acquisition of new skills and ideas. Relatedly, Bandura (1997) theorized that children learn via social modeling simply by observing the behavior of others. What is more, they can also observe which behaviors are reinforced or punished, i.e., are socially acceptable, and incorporate this knowledge into their own actions. Experts have argued that learning is an inherently social process, where children's social skills guide interactions with peers and teachers that facilitate future learning (Pianta, 1999). Taking an ecobehavioral perspective, social skills are expected to change over time as children progress through school and encounter varied social environments including peers and teachers (Birch & Ladd, 1997). Therefore, it is essential to understand the longitudinal development of social skills in addition to their concurrent and prospective associations with other variables.

Social Skill Development Over Time

School entry. The entry into formal schooling is a major transition for children with and without disabilities as they face new social and cognitive challenges. Children must adapt to the structure, schedule, and demands of the classroom while navigating relationships with new adults and many other children (e.g., McIntyre, Blacher, & Baker, 2006). Teachers have reported that up to half their kindergarten class had problems specific to the transition to school; risk factors such as district poverty level were related to higher rates of problems (Rimm-Kaufman, Pianta, & Cox, 2000). Although much of the extant research has focused on academic performance during the transition to school, other researchers have indicated concern about young children's ability to work

independently and within their peer group, and generally demonstrate adaptive school behavior such as social skills (Stipek & Byler, 2001).

The transition to school seems to be especially difficult for children with disabilities such as ID, with characteristic deficits in cognitive and adaptive skills. The emerging social skills of six-year-old children with developmental delays have been found to be lower when rated by both parents and teachers (J. Baker, Fenning, Crnic, Baker, & Blacher, 2007), and these poorer behavioral and emotional skills may impede the school adjustment of children with ID (Eisenhower, Baker, & Blacher, 2007; McIntyre et al., 2006). McIntyre and colleagues (2006) examined the transition to school for 5- to 6-year-old children with and without intellectual disability, and found that children with ID had more problem behaviors, poorer student-teacher relationships, and poorer social skills and self-regulation than their typically developing peers. Of note, children's social skills significantly predicted the transition over and above the effects of IQ and adaptive behavior, thus highlighting the importance of social skills early on in children's schooling.

While much of the extant research has focused on social skill deficits in young children with disabilities, studies of children with typical development have found that their social skill development may be curvilinear during the early school years. In the first known investigation of intra-individual change in social skills over time, Chan, Ramey, Ramey, and Schmitt (2000) examined parent and teacher ratings of children's social skills each year from kindergarten to third grade using the SSRS (Gresham & Elliott, 1990). The longitudinal sample consisted of 378 elementary school children.

Growth curve analyses indicated positive growth of parent-reported social skills up until second grade, with a plateau into third grade. Interestingly, social skills as rated by teachers demonstrated a different trajectory: teacher-reported social skills actually decreased at a constant rate from kindergarten to third grade. These differences indicate that social skills growth may depend on the context and the reporter. In a later study, Berry and O'Connor (2010) examined social skills trajectories for elementary students using data from several phases of the NICHD Study of Early Child Care and Youth Development. Similar to Chan and colleagues (2000), Berry and O'Connor found that children made significant social skills growth around the time of school entry. They reasoned that even children at risk for behavioral disorders would experience more adaptive trajectories over time if they were provided with early and frequent opportunities to learn and to use positive social behaviors. Student-teacher relationships were particularly important in creating these opportunities (Berry & O'Connor, 2010).

Middle childhood. Middle childhood is another transition period in which key changes in social skill development are likely to occur. During the progression through the primary grades and particularly into third grade, school becomes more structured with higher academic and behavioral expectations for students. Research has found that the achievement trajectories established by the end of third grade tend to show continuity, highlighting this time period as an important benchmark for student success (Belsky & MacKinnon, 1994). The literature suggests that positive social skill growth continues during the later elementary school years but that it typically follows a curvilinear pattern. Berry and O'Connor (2010) analyzed social skills growth trajectories spanning the

elementary years from kindergarten to sixth grade and found an overall curvilinear pattern. There was acceleration in social skills between third and fifth grades, followed by a slight deceleration from fifth to sixth grade. Of note, Berry and O'Connor found that social skill development varied for individual youth based on moderator variables such as student-teacher relationship quality and internalizing behavior.

Henricsson and Rydell (2006) investigated social development over a similar timeframe by prospectively following 95 Swedish children from first grade to third grade, and then to sixth grade. Teachers rated behavior problems and social competence in the spring of first grade, the spring of third grade, and the spring of sixth grade; researchers also observed the children's behaviors towards peers in the natural classroom setting in the spring of second grade. Teachers additionally rated school achievement in sixth grade, and peer acceptance was assessed via peer nominations in sixth grade. The two groups with elevated internalizing or externalizing behavior problems in first grade showed poorer development of social competence, peer acceptance and achievement over time into sixth grade. These findings again highlight the influence of other behavioral dimensions on social skills.

In a recent study, Lamont and Van Horn (2013) analyzed systematic changes in parent-rated social skills for 6964 children, from kindergarten to third grade. The authors employed latent growth mixture modeling to assess any substantive differences in typical social skill trajectories for these children. This methodological approach estimates class-specific parameters defining the mean growth and variability within each latent class, helping to better understand the variability in social skills development. Lamont and Van

Horn modeled trajectories for each of the four components of social skills: self-control, cooperation, responsibility, and assertion, in addition to the social skills composite score (Gresham & Elliott, 1990). Results of the one-class latent growth model indicated significant changes from kindergarten to third grade in each social skills component except cooperation. The mixture modeling analyses also identified three groups following distinct developmental trends: 85-90 percent of youth that had mostly stable skill development; a small group that had a sharp acceleration of skill development around first or second grade; and a small group that showed a significant decline in skills during first or second grade. The authors cautioned that although the majority of children demonstrated stability in their skills, practitioners could not always identify problematic development based solely on skill level assessed during kindergarten. It may be necessary to conduct repeated assessments of social skills in order to reliably inform the need for early intervention.

Adolescence. During the transition to middle school, many adolescents face new social and educational demands increasing risk for problem behaviors and mental health issues (Eccles et al., 1993). The onset of puberty typically takes place during middle school, when students no longer have one teacher and classroom, but instead they move through multiple classrooms each day. They experience more complex social interactions and peer relationships, and often have multiple teachers, resulting in a less personal and protective climate than was likely experienced in elementary school (Kasen, Johnson, & Cohen, 1990). Youth often must establish increased independence from adults while more deeply cultivating their relationships with peers to foster identity growth. Social and

emotional skills thus become more important, as youth begin to interact with and maintain more relationships with others (Oberle et al., 2014). Although social skills are critical during this time, less is known about their development in older children.

A thorough search of the literature revealed that little is known about the trajectories of social skills during adolescence. It may be assumed that these skills are relatively stable by this point in development; however, this is not necessarily the case, particularly for populations that are underserved or have special needs. One group of researchers noticed this gap and examined the long-term developmental trajectories of social withdrawal, a construct related to social competence (Oh et al., 2008). Oh and colleagues measured friendship quality and social withdrawal in a diverse sample of 392 students as they moved through middle school. The authors' latent growth trajectory class analyses indicated that there were three distinct pathways of social withdrawal from fifth grade, across sixth grade and into eighth grade. While the majority of the community sample showed a generally stable trajectory of withdrawal, 8% of children demonstrated a decreasing trajectory, suggesting that some previously withdrawn children lose their risk status. On the other hand, 7% of children demonstrated an increasing trajectory over this time period, indicating that they were newly at risk as adolescents. Positive and negative peer group experiences predicted decreasing and increasing trajectories of social withdrawal, respectively, underscoring the centrality of peer relationships at this time of transition.

Adolescence is clearly a time of physical, emotional, and environmental changes, putting many typically developing youth at risk for behavior problems or mental health

concerns; for example, internalizing problems, including depressive symptoms and self-esteem deficits, tend to increase as children move into adolescence (McCauley et al., 1993). Although they may be behind their typically developing peers in terms of cognitive, social, and physical development, adolescents with disabilities such as ID face many of the same challenges as TD youth. During adolescence, family, friends, teachers, and strangers begin to expect more from children as they begin to resemble adults (Kuperminc et al., 2001). The onset of puberty may add to youth's adjustment difficulties if there is a mismatch between their physical maturity and social or cognitive maturity. What is more, youth with ID are more likely to develop mental health and behavior problems. These compounded risk factors may make the transition to adolescence even more difficult for youth with ID, yet no studies to date have examined this specific area.

Social Skills and Academic Competence

Academic competence. Academic competence, or school competence, has been defined and measured in many ways in the literature. Academic competence is often used interchangeably with terms such as academic performance and academic ability, and few standardized assessments have established measures which generate specific and valid data for this construct (DiPerna & Elliott, 1999). DiPerna and Elliott set out to clarify and establish measurement of academic competence, proposing that it is made up of academic skills, study skills, academic motivation, interpersonal skills, and academic self-concept. The teacher rating scale developed in this study consisted of 95 items tapping into these different domains. Results of this study, consistent with Gresham and Elliott (1990), showed significant positive relationships between teacher-rated academic competence

and students' social skills (DiPerna & Elliott, 1999). Of note and not surprising, students with a disability (which was self-reported and the category was not specified) scored significantly lower on the domains of the academic competence scale. This is consistent with the lower cognitive and achievement skills typically observed in individuals with a developmental or neurological disability (American Psychiatric Association, 2013).

Other researchers have taken both direct and indirect approaches to assess academic competence. One approach is to directly measure academic skills such as reading fluency, reading comprehension, and math computation. In addition to these discrete skill-based measures, standardized norm-referenced achievement tests help to indicate broader academic skills. Finally, indirect measures of academic performance may be obtained in the form of checklists or rating scales completed by teachers, parents, or students. For example, the Teacher Report Form (TRF), the parent-reported Child Behavior Checklist (CBCL/6-18), and the Youth Self Report (YSR), part of the Achenbach System of Empirically Based Assessment (Achenbach & Rescorla, 2001), include school competence scales. The SSRS teacher form (Gresham & Elliott, 1990) also includes an academic competence scale made up of nine items, rated on a five-point scale. These items are related to reading and mathematics achievement, parental support, cognitive functioning, classroom behavior, and motivation. Gresham, MacMillan and Bocian (1997) evaluated the discriminant validity of these teacher judgments on the SSRS and found that indirect teacher ratings were accurate indicators of student achievement.

Student-teacher relationship. The student-teacher relationship is another factor that can significantly influence academic and social outcomes; it likely affects the

valence of teacher ratings of their students, as well. Hamre and Pianta (2001) studied the longitudinal relationship between teachers' perceptions of their relationships with their students and student outcomes. Kindergarten teachers completed the Student-Teacher Relationship Scale (STRS; Pianta, 2001), in addition to a measure of children's classroom behavior, for 179 students who remained in the district through eighth grade. Hierarchical regression analyses indicated that a composite of STR Conflict and Dependency explained unique variance in eighth grade behavioral outcomes, including positive work habits and the number of disciplinary infractions. The predictive power of the teacher-rated STR was stronger for behavioral outcomes than for academic outcomes, particularly for students already at risk for behavior problems, suggesting that even after eight years, teacher perceptions of their relationship with their students have important implications for adolescent outcomes. Therefore, this key relationship might affect teacher ratings of academic competence as well as social skills.

The nature of the student-teacher relationship may differ by disability status. Children with ID were found to have poorer relationships with their teachers compared to their TD peers in one study, with less closeness and more conflict and dependency (Blacher, Baker, & Eisenhower, 2009; Eisenhower et al., 2007). McIntyre and colleagues (2006) found that children with ID transitioning to kindergarten had more behavior problems, poorer student-teacher relationships, fewer social skills, and fewer self-regulation skills than typically developing children based on reports collected from their teachers. The poorer early school experiences of children with ID may continue to impact future transitions in the school environment, such as the switch from middle to high

school. The student-teacher relationship often remains a significant part of students' middle and high school experiences. Ryan and Patrick (2001) proposed that teacher support is an important component of the classroom social environment, and that non-parental adults, including teachers, are particularly influential as sources of support during adolescence. Although teachers are typically considered sources of information and evaluation, the relational connection they provide may be just as important for student outcomes.

Social competence predicting academic competence. Social skills are critical to children's school readiness and adjustment to school at a young age; children with more social skills have better peer interactions and stronger academic skills during the elementary years (Birch & Ladd, 1997). These skills continue to be integral to children's school success throughout their development and into adolescence. For example, teacher-reported social competence for a group of sixth graders significantly predicted higher math and reading scores in seventh grade (Oberle et al., 2014). Social skills have been implicated in the development of academic competence, meaning that students with more developed social skills are more successful in the classroom (e.g., spend more time on task, participate in discussion, engage with others; DiPerna & Elliott, 1999). Early childhood social competence has been found to predict important outcomes up to two decades later, including high school and college graduation, stable employment, crime, substance abuse, and mental health (Jones, Greenberg, & Crowley, 2015).

There is a growing body of literature investigating the impact of social adjustment on academic adjustment. DeRosier and Lloyd (2010) were primarily interested in this

phenomenon during middle childhood; they examined whether social variables were predictive of academic outcomes over the course of the third grade year. They focused on two measures of social adjustment: social acceptance, or the degree to which a child is liked by his or her peers at school; and aggressive behavior with peers. These two indices are related, as aggressive children are more likely to be rejected by peers. However, the presence of one does not negate the other. The authors hypothesized that they would find support for a causal relationship between these two measures and spring outcomes including GPA in reading and math, school absenteeism, classroom disruptive behavior, help-seeking behavior for academic problems, and academic self-esteem, controlling for academic functioning in the fall. They administered measures to 1,255 students and their teachers to generate composite scores of social adjustment, which were entered into regression models predicting the academic outcomes of interest. In support of the hypothesized causal model, each type of social adjustment was a significant predictor of each academic outcome, even controlling for previous academic functioning. Although DeRosier and Lloyd only examined this relationship in one direction, they proposed that there is likely a transactional relationship between social and academic adjustment and called for longitudinal studies of these interrelations.

Malecki and Elliott (2002) set out to determine the predictive path from social skills, problem behavior, and academic competence, to academic achievement. They used student- and teacher-reported social skills, academic competence, and problem behaviors on the Social Skills Rating System (SSRS; Gresham & Elliott, 1990) and measured academic achievement using the Iowa Test of Basic Skills (ITBS; Hoover, Hieronymus,

Frisbie, & Dunbar, 1993). All variables were collected for 139 third- and fourth-graders in the fall and spring of one school year; most of these students qualified for free or reduced lunch, and 25% were identified with disabilities. Correlational analyses indicated moderate relationships among social skills, academic competence, and academic achievement via both student and teacher reports. In addition, regression analyses showed that teacher-rated social skills, but not problem behaviors, accounted for significant variance in achievement scores in the fall; earlier social skills ratings also predicted spring academic competence, which in turn significantly predicted spring reading, math, and language scores on the ITBS. The findings of this exploratory study, which highlighted social skills as academic enablers, suggest the need for longitudinal investigations across longer time periods and greater age ranges, as well as studies examining the impact of social interventions on academic achievement.

Taking a more longitudinal perspective, Caprara, Barbaranelli, Pastorelli, Bandura, and Zimbardo (2000) investigated the contributions of children's early prosocial behavior to their trajectories in both the academic and social domains. The researchers measured the prosocial behavior (i.e., helpfulness, sharing, kindness, and cooperativeness) of 294 Italian third graders via varied methods and sources: children rated their own prosocialness on a 10-item scale; teachers rated child behavior using the same 10-item scale worded in the third person; and children completed sociometric ratings of their peers' prosocial behaviors. Results from these three assessments were used to form a latent variable. Similar multimethod, multisource procedures were used to create latent variables of physical and verbal aggression. Five years later, when the same

children were in eighth grade, Caprara and colleagues measured peer social preference via sociometrics as well as academic achievement ratings from six different teachers per student (the six ratings were averaged as a composite indicator of academic performance). Results of structural equation modeling analyses indicated that early prosocial behavior predicted later academic achievement, even when controlling for earlier academic achievement; higher prosocial behavior in third grade also predicted higher peer social preference in eighth grade. However, there was no significant effect of early aggression on later academic achievement or social preference. These findings underscore the significance of prosocial behaviors, implying that efforts to increase these should precede, or at least accompany, efforts to decrease aggression. Additionally, early prosocial behavior impacts not only later social success but also later academic success, suggesting that educational programs should foster social competence in addition to academics.

Oberle and colleagues (2014) examined the relation between social competence and academic outcomes in a sample of early adolescents. They measured fourth-grade academic achievement on standardized tests, student- and teacher-reported social and emotional skills at the end of sixth grade, and academic achievement in math and reading in seventh grade. Teacher-reported social emotional competence in sixth grade significantly predicted math and reading scores in seventh grade. In addition, later reading achievement was predicted by youth's perceptions of their own social responsibility goals. Oberle and colleagues concluded that both social goals in the classroom as well as social emotional competence impacted academic success, and that

these areas can be targeted in classroom programs to improve academic outcomes. The results of these studies support the concept that social skills enable academic competence by acting as motivation, interpersonal skills, engagement, and study skills (DiPerna & Elliott, 1999).

Academic competence predicting social competence. Conversely, there is also evidence that academic competence predicts social competence (Coie & Krehbiel, 1984). This has been attributed to the behavioral issues that may emerge in children with low academic skills, which lead to social difficulties and peer rejection; children may even be rejected due to the academic failure itself. Coie and Krehbiel (1984) studied this phenomenon experimentally by randomly assigning low achieving, socially rejected fourth graders to academic skills intervention, social skills intervention, combined academic and social skills intervention, or a control group. In third grade, fourth grade, and fifth grade, achievement was measured via the California Achievement Tests in reading or mathematics, and social rejection was obtained using social preference scores on sociometric ratings.

Analyses of covariance indicated the academic skills intervention resulted in significantly improved reading, math, and social preference scores at postintervention (fourth grade) and follow-up (fifth grade); students who received academic skills intervention also displayed less off-task behavior and more on-task behavior, in addition to more positive teacher attention. These positive behavioral effects likely led to higher sociometric ratings by peers. In contrast, students assigned to the social skills training group made slight improvements in reading comprehension and social preference scores

at post-intervention, but no significantly improved scores were maintained at the fifth grade follow-up. The authors posited that for children struggling with both academic and social deficits, the provision of academic intervention may produce more robust, long-term improvements than social skills training. It may be that these children's social deficits arose due to their academic difficulties, which thus should be targeted in intervention. However, the authors did note that the academic tutors spent considerably more time with students than did social skills trainers, and that their study may have failed to capture some changes in social behavior.

Transactional relationship: Social and academic competence. Several studies have modeled the transactional relationship between social and academic competence in order to address questions of directionality between these constructs. Welsh and colleagues (2001) conducted one of the first studies to examine the reciprocal relationships between social and academic competence, in addition to the two unidirectional models (i.e., social competence predicting later academic competence, and academic competence predicting later social competence). The authors collected ratings of social and behavioral competence from both peers and teachers of 165 students at grades one, two, and three; report cards and teacher ratings were used as indicators of academic competence. Using structural equation modeling, Welsh and colleagues specified a three-wave cross-lagged panel consisting of three latent variables (positive social competence, negative social competence, and academic competence) at each time point. Model fit indices supported the reciprocal model over nested unidirectional models: academic competence consistently predicted social competence over time, and a

bidirectional relationship between the two domains was apparent from second to third grade. The authors concluded that both academic and social variables should be examined as predictors of success in the school setting, and that additional work was needed to examine the reciprocal relationship of these domains beyond third grade.

Chen, Rubin and Li (1997) also tested the reciprocal nature of this relationship in a sample of elementary school students in Shanghai. They measured peer- and teacher-reported social competence as well as language and mathematics achievement, once when students were in fourth and sixth grade, and again two years later when they were in sixth and eighth grade. Using cross-lagged correlations and regressions, Chen and colleagues found that social and academic competence had a mutually predictive relationship from fourth to sixth grade. Specifically, achievement predicted social competence and peer acceptance, while social competence, aggression, leadership, and peer acceptance, predicted achievement. This study's findings were similar to those found in studies of Western societies, highlighting the universal importance of social competence at school across multiple cultures.

Miles and Stipek (2006) looked more specifically at the direction of effects among prosocial behavior, aggression, and literacy in a sample of low-income children, who have been found to enter school at a disadvantage with lower cognitive and early literacy skills as well as poorer social skills (Rimm-Kaufman et al., 2000). Data were obtained from The School Transitions Study on development in middle childhood; families enrolled in this study had incomes below the federal poverty line. Miles and Stipek examined teacher reports of aggressive and prosocial behavior at first, third, and

fifth grades as well as a standardized assessment of literacy achievement (subtests of the Woodcock Johnson such as letter-word identification and comprehension, dependent on the grade level). They conducted bivariate correlations, path analyses, and hierarchical linear regression analyses to determine the associations of social skills and literacy concurrently and over time. Results indicated that the association between aggression and literacy increased over time from first to fifth grade, with stronger literacy skills predicting lower levels of aggressive behaviors. However, the positive association between social skills and literacy decreased over this same time period. The path analyses revealed that earlier social skills predicted later literacy, but this relationship did not hold in the opposite direction. However, poor literacy predicted relatively high aggressive behavior later on. These findings support the hypothesis that problems in one domain can cross over to impact another domain of functioning at school.

In a recent study, Zucchetti, Candela, Sacconi, and Rabaglietti (2015) also applied cross-lagged panel analysis to three waves of data in order to examine the direction of influence between primary students' school achievement and friendship quality, a metric of social competence. The authors chose measures of friendship quality specifically because they argued this is more important than the quantity and level of peer acceptance; additionally, they utilized a sample of Italian children, thus contributing to the literature examining the development of youth in non-U.S. social and school climates. Results of model testing revealed that the reciprocal model fit the data better than the unidirectional friendship quality driven and school achievement models. School achievement, positive friendship quality, and negative friendship quality were stable over time; second grade

achievement predicted third grade positive friendship quality, which then predicted fourth grade school achievement. This shifting association suggests that achievement is most important in the early elementary school years, while friendship may have more of an impact on adjustment in middle childhood. It is important to note that in all of these studies, other variables such as demographics and child functioning were accounted for; these are important variables to discuss.

Child and Family Characteristics

Intellectual disability. ID involves impaired mental abilities that have an effect on adaptive functioning in the following areas: the conceptual domain, including skills in language, reading, writing, math, reasoning, knowledge, and memory; the social domain, including empathy, social judgment, interpersonal communication skills, and the ability to make friendships; and the practical domain, focusing on self-management of personal care, job responsibilities, money management, recreation, and organizing school and work (American Psychiatric Association, 2013). The DSM-5 considers ID to be about two standard deviations or more below the norm on IQ, a score of 70 or below. However, research has found that individuals with borderline intellectual functioning, i.e., with IQs ranging from 71 to 84, experience similar difficulties to those with a diagnosis of ID (American Psychiatric Association, 2013; Fenning, Baker, Baker, & Crnic, 2007). Therefore, these groups are sometimes combined to form the ID sample, as in the present study.

The core deficits associated with ID highlight a number of concerns regarding social and school functioning for children with this disorder. In particular, deficits in the

conceptual domain may interfere with academic learning, while social skills deficits are likely to impact relationships with both peers and teachers (Eisenhower et al., 2007). Children with ID tend to exhibit poorer social skills and less involvement with other children during play. This may be linked to the limited cognitive skills of these students, in addition to the environmental contexts of students' school days, i.e., the amount of time spent in special education, resource rooms or academic tutoring. However, these interactions might increase if schools take active steps to facilitate connections (e.g., implement a peer buddy system) between students with ID and their peers in general education (Carter, Hughes, Guth, & Copeland, 2005). Students with ID may also have difficulty with complex interactions requiring higher-order social cognition and information processing skills; still, social competence has been found to be crucial to the adaptive development and quality of life of individuals with ID (Leffert & Siperstein, 1996).

Youth with ID are also at significantly increased risk for developing behavior problems. Children with ID were found to be at about three times higher risk of developing behavioral problems, compared to their typically developing counterparts (B. L. Baker et al., 2003); a recent review of nine studies found that children and adolescents with ID faced 2.8 to 4.5 times the risk of behavioral or mental disorder compared to TD youth (Einfeld, Ellis, & Emerson, 2011). Students with disabilities tend to be nominated for problem behavior more often than their peers, and, in turn, they experience more peer rejection (Farmer, 2000). These heightened behavior problems couple with social skills

deficits to put children with ID at particular risk, highlighting the need to study these processes longitudinally in this population.

Socioeconomic status. The impact of socioeconomic status (SES) reaches across multiple domains and is likely to affect the development of social and academic competence in children. Rimm-Kaufman and colleagues (2000) found that children from low- income families entered kindergarten at a disadvantage due to lower cognitive and early literacy skills; they also had poorer social skills. Children attending school in low-income areas tend to demonstrate lower academic achievement as well as poorer social skill development (Malecki & Demaray, 2006), however, there is some evidence that higher levels of social emotional competence and social support act as protective factors that positively influence academic success (Elias & Haynes, 2008).

Gender. Previous research has indicated that girls tend to score higher than boys on measures of social skills and social emotional competence (Oberle et al., 2014). There is a complex relationship between gender and social skills throughout development, as girls appear to engage in more socially constructive play from a young age; there is some evidence for biological influences, but more so for the influence of parents, other adults and peers via social learning (Merrell & Gimpel, 2014). Throughout childhood, males may be more likely to engage in aggressive behaviors as these are seen as more normative for boys than for girls. Particularly during sensitive periods of transitions such as adolescence, girls may be at higher risk for developing internalizing problems in their reactions to major changes in their social and physical identities (Simmons, Burgeson, & Carlton-Ford, 1987). Gender differences in behaviors and social skills may also impact

the development of academic skills; DeRosier and Lloyd (2010) found that social acceptance and aggression differentially predicted academic outcomes based on gender. Further, time-varying conditional latent growth curve models analyzed separately by gender indicated that social skills differentially predicted growth in reading and math achievement between boys and girls (Konold, Jamison, Stanton-Chapman, & Rimm-Kaufman, 2010). These findings are consistent with previous studies (e.g., Welsh et al., 2001) that justified decisions to control for gender when investigating longitudinal relationships and growth in social skills and academics.

Behavior problems. Social skills consist of a set of behaviors, but the social skills domain is distinct from externalizing and internalizing behavior problems. Many children with behavior problems, particularly in the externalizing domain, are also rated by parents and teachers as having fewer social skills (Gresham & Elliott, 1990). However, children with behavior problems may also have prosocial skills in their repertoire that enable positive interactions with peers and adults (e.g., Vitaro, Gagnon, & Tremblay, 1990), while other children may display an absence of problem behaviors accompanied by social skills deficits.

Although they are distinct areas of functioning, there is overlap between behavior problems and social skills deficits. The presence of behavior problems at an early age, particularly given their relative stability and negative impact, may act as a risk factor that significantly affects the development of social skills over time (Henricsson & Rydell, 2006). Children with internalizing problems including depression, anxiety, and social withdrawal are at increased risk for peer rejection and other social problems (Gazelle &

Rudolph, 2004). Externalizing problems, such as aggression and hyperactivity, also affect children's social competencies with peers and teachers (Eisenhower et al., 2007). An extensive literature review also indicated that externalizing behavior was related to achievement difficulties, particularly in the area of reading as indicated by a discrepancy between IQ and achievement (Hinshaw, 1992). Hyperactivity and inattention were the behaviors that were most predictive of academic problems. The cited studies indicated that a lack of positive social interactions, exacerbated by either social withdrawal or maladaptive social activity, is likely to inhibit growth in social and/or academic skills over time. In turn, the negatively impacted social skills can lead to further behavior problems, in an example of a child-by-environment interaction model wherein there is a theorized reciprocal relationship between children and their environments over time.

In an example of this, Bornstein, Hahn, and Haynes (2010) modeled developmental cascades in children from ages 4 to 14 to capture intrapersonal, longitudinal relations across psychological characteristics. Bornstein and colleagues hypothesized that social competence and externalizing and internalizing behavioral adjustment would influence one another in lasting ways; specifically, they posited based on previous theory that social competence would predict later behavioral adjustment in the externalizing and internalizing domains. The researchers measured child social competence and externalizing and internalizing behavior problems at ages 4, 10, and 14 in a sample of 118 children and their mothers. Using structural equation modeling, they found that lower social competence at age 4 predicted more externalizing and internalizing behaviors at both age 10 and age 14. Children with more internalizing

behaviors at age 4 demonstrated more internalizing behaviors at age 10, and more externalizing behaviors at age 14. These results support the notion that functioning in one domain of behavior impacts other domains throughout a child's development; specifically, it appeared that social competence predicted behavioral adjustment, but this effect did not hold in the opposite direction. Bornstein and colleagues noted that although this finding may be surprising, it is consistent with previous studies, and the strong methodology of their study supported the temporal precedence of social competence.

Gaps in the Literature

While there is agreement that social skills are important assets, few studies have investigated the development of social skills over time, particularly during the transition from early to middle childhood and into adolescence. Those that have examined longitudinal trends have used only two or three time points. In addition, no studies have specifically examined social development over key transition points in children with intellectual disability. Little research has modeled intra-individual social skill trajectories and predictors of these trajectories for children and adolescents (Berry & O'Connor, 2010). In addition, few studies have examined the bidirectional relationship between social skills and academic competence, with most investigating the impact of social skills on later academic achievement across only a few time points (e.g., Caprara et al., 2000; Oberle et al., 2014). Therefore, the field is in need of longitudinal research that encompasses a longer period of time with more time points and shorter intervals between each measurement.

Caemmerer and Keith (2015) recently proposed a more thorough examination of these reciprocal effects to understand whether they vary at different grade levels. They analyzed data from the Early Childhood Longitudinal Study (ECLS-K) program, a longitudinal dataset spanning from kindergarten to eighth grade. Teacher-rated social skills and standardized math and reading achievement of 7802 students were measured four and five times, respectively. Caemmerer and Keith analyzed a latent variable longitudinal panel model to determine the transactional relations between achievement and social skills, controlling for gender, SES, and verbal ability at wave one. Results supported a reciprocal model with achievement consistently influencing later social skills, and social skills affecting achievement from kindergarten to first grade and from fifth to eighth grade. The authors found it interesting that achievement was a stronger predictor of later social skills, while social skills had a weaker impact on later achievement. This finding was similar, however, to other longitudinal studies examining the same variables over time (Miles & Stipek, 2006; Welsh et al., 2001). It may be that social skills are most important at key transition points, i.e., school entry (kindergarten to first grade) and adolescence (fifth grade to eighth grade).

In recent child development literature, there has been a shift toward a more strengths-based approach (often referred to as positive psychology; Seligman & Csikszentmihalyi, 2000) with movement away from the traditional focus on within-child deficits (Jimerson, Sharkey, Nyborg, & Furlong, 2004). Caldarella and Merrell (1997) similarly emphasized the notion that behaviors should be considered on a spectrum with competence on one end, and deficits or incompetence on the other. The present study

extends the focus on resilience as opposed to risk or deficit models, which have been particularly prevalent in the study of children with disabilities. It also underscores the significance of social competence, thus supporting the mission to educate students in academics as well as in how to be socially responsible, caring members of society (e.g., Greenberg et al., 2003). This study's unique sample of participants and measurements at multiple time points create a strong framework for furthering the study of social skills and disability over time.

Present Study

The present study investigated the longitudinal development of social skills in children with and without intellectual disability, as well as longitudinal relationships of social skills with academic competence over time. Additionally, this study examined the predictive impact of earlier social skills and academic competence on important school-related outcomes via youth report at age 15. This study addressed the following research questions: (1a) To what extent do mother-reported social skills change over five time points (child ages 6, 7, 8, 9, and 13) for children with and without ID? (1b) To what extent do levels of child externalizing and internalizing behavior problems predict longitudinal change in social skills, controlling for the effect of child disability status? (2a) To what extent are youth social skills and academic competence related across the five time points? (2b) Controlling for disability status and behavior problems, what is the direction of effects over time? (3) To what extent do parent- and teacher-reported social and academic competence at age 6 predict youth-reported competence at age 15?

Method

Participants

Participants were recruited from a larger longitudinal study examining school and child influences on the development of behavior problems in children with and without disabilities. When the study began it was conducted at three universities across the country: two in Southern California, and one in Pennsylvania (Eunice Kennedy Shriver National Institute of Child Health and Human Development Grant # HD34879-1459). Children with and without disabilities began their participation in this study beginning at age 3 and continued through adolescence.

The children with intellectual disability (ID) were referred to the larger study predominantly by local service agencies, such as the Regional Centers, that assist families with developmental disabilities. Children with ID were classified according to the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition Revised (DSM-IV-TR; American Psychiatric Association, 2000). As part of study procedures, children met criteria for ID if they had an IQ in the clinical or borderline range, below 85 on the Stanford Binet-Fourth Edition (Thorndike, Hagen, & Sattler, 1986), and a standard score below 85 on the Vineland Adaptive Behavior Scales (VABS; Sparrow, Cicchetti, & Balla, 1984). Children with borderline intellectual functioning were included in the ID group because past literature suggests they experience similar challenges to those with clinical levels of impairment (Fenning et al., 2007).

The typically developing (TD) children were recruited for the larger study mainly through local schools and community programs. These children were included in the TD

group if they scored in the range of normal cognitive development (IQ > 85) at the time of recruitment. In addition, the children included in this group did not have any diagnosis of learning or developmental disability or record of special education.

The sample for the present study consisted of two groups, beginning at age 6: youth with ID (N = 84; mean IQ = 60.87) and TD (N = 120; mean IQ = 103.3). Table 1 shows demographics by status group (ID and TD) based on measures collected at ages 5 and 6. There were no statistically significant differences between the two groups on ethnicity or gender.

Procedure

Following approval by all appropriate IRBs, informed consent was obtained from mothers and, when appropriate at the later ages, youth. On-site assessments took place at child ages 5, 6, 7, 8, 9, 13 and 15. During the assessments, the researchers met with the youth and mother to complete study tasks and measures. Mothers completed measures of social skills, behavior problems, and family demographics. Furthermore, following the assessment, the child's elementary teacher was asked to fill out measures of social skills, behavior problems, and school-related variables. When the child began middle school, these measures were completed by the academic subject teacher closest to the youth.

Measures

Stanford-Binet Intelligence Scale, 4th Edition (SB-IV; Thorndike et al., 1986). The Stanford-Binet was administered at child age 5 to measure children's cognitive ability. The results were used to determine the child's intellectual status. This test is widely used and possesses strong psychometric properties; it provides a composite

standard IQ score with a mean of 100 and standard deviation of 15. For the present study, the eight subtests most appropriate for the children's developmental level at age 5 were used: Vocabulary, Comprehension, Absurdities, Pattern Analysis, Copying, Quantitative, Bead Memory, and Memory for Sentences). Evidence supporting reliability and validity is strong (Thorndike et al., 1986). The internal consistency of the SB-IV ranged from .95-.99 across ages, and test-retest reliability was $r = .91$ for five-year-olds. The technical properties of the SB-IV have also been established for use with populations with ID. Dacey, Nelson, and Stoeckel (1999) calculated significant test-retest reliability coefficients for administrations spaced five weeks apart in a sample with mild to moderate ID. They also observed moderate correlations between the SB-IV composite scores and the Vineland Adaptive Behavior Scales composite scores. Dacey and colleagues' findings supported the temporal reliability of the SB-IV as well as its concurrent and criterion-related validity in a sample with ID.

Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1984). The VABS was used to measure children's adaptive behavior via a semi-structured interview with mothers at child age 5. This measure assesses the adaptive skills of individuals with or without a disability. In this study, parents reported on behaviors currently in the child's repertoire. An Adaptive Behavior Composite score, with a mean of 100 and standard deviation of 15, was formed from the communication, daily living skills, and socialization skills subscales. This score was used along with child IQ to determine the presence of intellectual disability based on DSM-IV-TR criteria (American Psychiatric Association, 2000). The Vineland has a test-retest reliability of .75-.80 and

internal consistency of .93. In addition, studies have supported the clinical validity of the Vineland in typical and delayed samples. Sparrow and Cicchetti (1985), the developers of the Vineland, discussed evidence of the measure's diagnostic utility in several children with developmental delays. Another group of researchers examined the use of the interview in a large representative sample, (ages 4-18) including all levels of intellectual disability, and found evidence for both convergent and discriminant validity (de Bildt, Kraijer, Sytema, & Minderaa, 2005).

Family demographic variables. Demographics including household income, mother's education level, special education placement, child race, and child gender, were provided by mothers at child age 5. Those indicated as differing between TD and ID groups were included as covariates, when appropriate.

Achenbach Child Behavior Checklist and Youth Self Report (CBCL/6-18; YSR/11-18; Achenbach & Rescorla, 2001). The CBCL was used to measure children's behavior problems via mother report at child ages 6, 7, 8, 9, 13 and 15. The parent report form consists of a family information section, competence items, and open-ended items for describing the child's illnesses and disabilities, what concerns the respondent most about the child, and the best things about the child; in addition, parents complete 113 items regarding behavioral, emotional, and social problems of the child. The parent form has alpha coefficients ranging from .69 to .97 and test-retest reliability ranging from .82 to .94, as reported in the manual (Achenbach & Rescorla, 2001).

The parent rated youth levels of behavioral, emotional, and social problems based on the preceding six months as *0 = not true, 1 = somewhat or sometimes true,* and *2 =*

very true or often true. The present study utilized the T-scores for externalizing behavior problems and internalizing behavior problems based on parent ratings, which have a mean of 50 and a standard deviation of 10. T-scores under 65 are considered to be within the normal range; T-scores between 65 and 70 are within the borderline clinical range, while T-scores above 70 reflect clinical levels of child behavior problems.

The YSR was used as a self-report measure of youth competence at age 15. The Total Competence scale, used in the present study, was constructed to reflect child strengths in the areas of school, activities, and social functioning. The school competence score, or "Academic Performance" is based on a mean of youth self-ratings on their performance in academic subjects. The social competence score is based in youth self-ratings on items concerning group activities and social relationships. The authors of the measure constructed the competence scales based on previous literature and tested the discriminative power of the items; they found that non-referred children scored significantly higher than referred (for professional help with behavioral, emotional, and social problems) children on the competence items (Achenbach & Rescorla, 2001).

The alpha for the YSR Total Competence scale is .75, as reported in the ASEBA manual; this is moderately high, especially considering the component scales consist of few items. The authors utilized a normative sample to assign T-scores to the raw competence scores. They assigned a T-score of 55 to all raw scores at the 69th percentile and above. Raw scores at the 2nd percentile were assigned T-scores of 30, while raw scores falling within the 3rd to 7th percentiles were assigned T-scores of 31 to 35.

Social Skills Rating System (SSRS; Gresham & Elliott, 1990). The SSRS is a widely used questionnaire that provides scale scores reflecting child social skills and problem behaviors. The SSRS has been used in numerous studies as a measure of child and adolescent social skills and problem behaviors, and has been used in all U.S. states as well as internationally. It has been translated into nine languages including Spanish, French, Dutch, Greek, German, Korean, Norwegian, Portuguese, and Russian. A review by Demaray, Ruffalo, Carlson, & Busse (1995) found the SSRS to be the most comprehensive, psychometrically sound social skills measure compared to five other published rating scales. There is also evidence supporting the criterion-related validity and construct validity of the SSRS; it has discriminated between preschoolers at risk for disorders and typically developing preschoolers (Treuting & Elliott, 1997), and the SSRS classifications have been shown to be consistent with peer nominations (Maag, Vasa, Reid, & Torrey, 1995).

The SSRS parent form was used to measure children's social skills via mother report at ages 6, 7, 8, 9, and 13. The parent report form consists of 38 items for the social skills scale, including items such as "Speaks in an appropriate tone of voice at home" and "Receives criticism well", and 17 items for the Problem Behaviors Scale, including items such as "Acts sad or depressed" and "Acts impulsively". Mothers rated specific behaviors on a 3-point scale based on frequency: "*Never* (0)" "*Sometimes* (1)" and "*Very Often* (2)". The social skills scale score is based on items regarding the child's communication, cooperation, assertion, responsibility, empathy, engagement, and self-control. The raw score summed from these items is typically converted to a standard score based on

comparisons with the normative sample, with a mean of 100 and standard deviation of 15. The parent social skills scale has high internal consistency (r = .87) and test-retest reliability (r = .84; Gresham & Elliott, 1990).

The SSRS teacher form was also collected at ages 6, 7, 8, 9, and 13. The teacher form generates a social skills scale similar to the parent report, based on 30 items including "Invites others to join in activities" and "Responds appropriately when pushed or hit by other children." Like parents, teachers rate these specific behaviors on a 3-point scale based on frequency: "*Never* (0)" "*Sometimes* (1)" and "*Very Often* (2)". The academic competence scale from the teacher form was also utilized in the present study. This scale consists of teacher ratings of student performance in reading, math, motivation, parental support, and general cognitive functioning. The reliability of the academic competence scale is high, with an alpha coefficient of .95. Validity evidence is strong as well; Gresham et al. (1997) found indirect teacher judgments on the SSRS were accurate indicators of student achievement.

The academic competence scale includes nine items, such as "In reading, how does this child compare with other students?"; "This child's overall motivation to succeed academically is:"; and "Compared with other children in my classroom this child's overall classroom behavior is:". Teachers indicate the student's functioning in each area on the following scale: *lowest 10%, next lowest 20%, middle 40%, next highest 20%,* and *highest 10%.* Since the data were collected at one-year intervals, children changed grades and thus teachers; therefore, it is important to note that different teachers provided ratings of social skills and academic competence while a single parent rated the child's social

skills over time. Changes on the teacher form may thus reflect both changes in the child's behavior and varying teacher perspectives.

Social Emotional Assets Social Emotional Assets and Resilience Scales (SEARS; Merrell, 2011). The SEARS measures the social-emotional competencies of children and adolescents using a multi-rater assessment of self-regulation, social competence, empathy, and responsibility. These adaptive characteristics are considered to be important for success at school, with peers, and in the outside world. For the current study, youth completed the Adolescent Short Form (SEARS-A-SF), which consists of 12 items tapping into constructs measured by the full-length 35-item form; reliability estimates for the short form remain strong (r = .90; α = .82). These 12 items are rated on a 4-point scale: *"Never," "Sometimes," "Often," "Always".* Sample items include "I make friends easily," "I stay in control when I get angry," and "I make good decisions." Nese and colleagues (2012) reported high correlations with measures of social skills and life satisfaction, providing validity evidence.

Student-Teacher Relationship Scale (STRS; Pianta, 2001). The STRS is a teacher-report measure that assesses the quality of the student-teacher relationship. The child's teacher completed this measure about the child at ages 6, 7, 8, 9, and 13. The STRS yields a total score (α = .79), used in this study, as well as three subscales. The Conflict subscale (12 items, α = .89) measures the teacher's perceptions of negativity and conflict with the student (e.g., "This child and I always seem to be struggling with each other"). The Closeness subscale (11 items, α = .81) measures the teacher's perceptions of affection and open communication toward the student (e.g., "I share an affectionate,

warm relationship with this child"). The Dependency subscale (5 items, α = .64) measures the teacher's idea of whether the student is overly dependent (e.g., "This child asks for my help when he/she really does not need help").

Data Analytic Plan

The data were first screened for outliers and to determine whether assumptions of normality were met. As part of preliminary data analyses, correlations were run between social skills ratings and academic competence scores at all time points and the data were examined for group differences between the ID and TD subgroups. In addition, the outcome variables were correlated with demographic variables to determine the need to control for covariates. Then, the research questions were examined via structural equation modeling (SEM). SEM is advantageous in that it tests paths of influence between multiple variables at multiple time points to extend previous work; additionally, it allows us to explicitly model measurement error of repeated measures variables and to assess model fit (Kline, 2011). Although this methodology cannot establish causality to the same extent as experimentally designed studies (Welsh et al., 2001), SEM is nonetheless well suited to address theoretically driven quasi-experimental research questions (Little, 2013).

There are typically six steps of model building in SEM (Kline, 2011): 1) model specification, in which hypotheses are represented by symbols describing parameters of the structural equation model; 2) evaluation of whether the model is identified, meaning whether the model is theoretically possible; 3) selection of measures and collection of the data; 4) estimation of the model, which involves the evaluation of model fit, the

interpretation of parameter estimates, and the consideration of equivalent or near-equivalent models. Finally, the fifth step is presentation of the results, which are interpreted in order to guide any necessary re-specification of the model; 6) final results are reported once necessary re-specification is complete. The following sections describe the statistical adjustments that were applied as part of the analytic plan, followed by descriptions of the models that were specified and fit to the data.

Missing data. In longitudinal research, missing data are to be expected and may be related to attrition (e.g., participants who move away) or to nonresponse (e.g., if part of the protocol at one time point is not completed; Little, 2013). There are multiple modern approaches to handling missing data. The full-information maximum likelihood (FIML) estimation method is known as a model-based approach. Using FIML, the parameters of a statistical model are estimated with missing data present, and all information is then utilized to inform the values and standard errors of the parameters (Little, 2013). This approach can be used if there is no indication that missingness was related to unobserved outcomes such as the variables of interest, social skills and academic competence. The present study utilized FIML to address missing data across time points that may have otherwise led to biased analyses.

Predictors and covariates. Covariates are used as statistical controls to account for their influence on the outcome variables, so that we can better estimate the influence of the variables of interest. Covariates may have confounding influences that could inflate or conceal a hypothesized relationship; these variables can be controlled to remove their influence from both the independent and dependent variables, in the case of more

complex longitudinal models (Little, 2013). These variables may be time-invariant or time-varying covariates, depending on whether they change across measurement occasions. In the present study binary variables were included as covariates when necessary: Disability status (0 = TD, 1 = ID); gender (0 = female, 1 = male); annual family income (0 = $50,000 and up, 1 = under $50,000); externalizing and internalizing behavior problems (0 = normal range, 1 = borderline/clinical range). Furthermore, preliminary analyses indicated significant differences in ratings of social skills based on classroom placement for children with ID at age 6; children who spent the majority of their day in regular education settings had more highly rated skills than those in more restrictive settings. Therefore, a covariate for special education placement (0 = regular education classroom most of the time, 1 = special education classroom most of the time) was also created.

Model fit. Model fit indices are utilized to assess the relative fit of nested models in both the latent growth curve and the cross-lagged panel analyses. The chi-square difference test is used to compare model fit, and tests the null hypothesis that the model fits the observed data. It should be noted that the chi-square test might be overly sensitive, i.e., when sample size is large, and it is a test of exact fit, which is not necessarily feasible; therefore, researchers have developed alternative measures of model fit (Little, 2013). These consist of absolute fit indices, which compare the hypothesized model to the saturated model and relative fit indices, which in turn compare the hypothesized model to the null model. Measures of absolute fit include the root mean square error of approximation (RMSEA), an index of the amount of misfit per degree of

freedom in the model; and the standardized root mean square residual (SRMR), which averages the squared residuals and then takes the square root to assess typical model misfit. The following guidelines are proposed to interpret the RMSEA and SRMR indices: >.10 = poor fit; .10-.08 = mediocre fit; .08-.05 = acceptable fit; .05-.02 = good fit; <.01 = excellent fit (Little, 2013). Measures of relative fit include the comparative fit index (CFI), the ratio of misfit of the tested model; and the Tucker-Lewis Index (TLI), which contains the ratio of the chi-square per degree of freedom for the null and the tested models. The following guidelines are proposed to interpret the CFI and TLI indices: <.85 = poor fit; .85-.90 = mediocre fit; .90-.95 = acceptable fit; .95-.99 = good fit; >.99 = excellent fit (Little, 2013).

Latent growth curve modeling. For the first set of research questions examining the development of social skills over time, latent growth curve modeling (LGCM) was utilized. This type of analysis is commonly applied to longitudinal repeated measures data to study how the construct of interest changes over time, how the level of the construct is related to the rate of change, and whether there are interindividual differences in these patterns. LGCM is quite useful for understanding longitudinal growth and enables the estimation of both group and individual variation (Meredith & Tisak, 1990). It does so by estimating linear or non-linear slopes, which indicate the rate of change across time; it estimates mean intercept values (the group average at initial status) and mean slope values (the average rate of growth across individuals); it also estimates individual variation in intercepts and slopes, as well as the correlation between the intercept and the slope (Konold et el., 2010). These unconditional LGCMs can then

become conditional models via the addition of exogenous variables, i.e., predictors or covariates, which are hypothesized to account for some growth in the model.

Kline (2011) outlined the requirements of latent growth curve modeling in SEM: 1) A continuous dependent variable is measured on at least three different occasions; 2) Scores have the same units across time and are considered to measure the same construct at each time point; 3) Data are time structured, such that cases are all tested at the same intervals (which need not be equal). The present study's data set meets these requirements, as it includes five waves of data; in addition, social skills have been shown to change over time in previous literature, and a reliable and valid assessment tool (i.e., the SSRS) was consistently used to measure the construct across time. The data were also collected from participants at specific time points, i.e. child ages 6, 7, 8, 9, and 13. The third point raises the question of missing data, an inevitable reality in longitudinal research, which was addressed using full implementation maximum likelihood (FIML; described above).

The following latent growth curve models were specified to examine the second set of research questions: a no growth/intercept only model, a linear growth model, and a latent basis growth model. In these models, the intercept corresponds to the initial status of children's social skills, i.e., the value of the variable at age 6. The latent intercept factor is a constant for any individual over time, so the factor loadings on the repeated measures variables will be fixed to 1. The intercept factor reflects information about the mean and variance of the intercepts within each individual's growth curve. Meanwhile, the slope corresponds to the rate of change in social skills over time from age 6 to age 13.

The latent slope factor reflects information about the mean and variance of the slopes within each individual's growth curve. In order to identify the model, at least two of the slope factor loadings must be fixed to different values.

Figure 1 shows the hypothesized latent growth model to be fit to the data. The intercept and slope factors are allowed to covary freely. For the intercept only model, just the intercept factor is included in the model which accounts for initial status and not for any change in the data. For the linear growth model, the intercept loading will be fixed to 1, and the slope factor loadings of the five social skills variables will be fixed to values representing their measurement intervals: 0, 1, 2, 3, and 7 (corresponding to ages 6, 7, 8, 9, and 13). For the latent basis model, the intercept metric will be scaled to 1; the first and last slope factor loadings will be fixed while the middle metrics will be freely estimated. This allows the modeling of unspecified trajectories where the shape is determined by the data.

Using Mplus® version 7 (Muthén & Muthén, 1998-2012), each model was estimated and their fit statistics were compared in order to determine the best fitting and most parsimonious model. The mean and variance of the intercept and slope parameters for this model were interpreted. In the present study first unconditional models will be specified, and then the following time-invariant covariates will be added to the best fitting unconditional model to form a conditional model: disability status, gender, family income, special education placement, externalizing and internalizing behavior problems.

Cross-lagged panel analysis. For the second set of research questions, cross-lagged panel analysis was used to address questions of directionality in the relationship

between youth levels of social skills and academic competence. Cross-lagged panel analysis allows for the simultaneous examination of the pathways of interest while estimating temporal precedence; this type of design goes beyond correlational analyses by establishing the nature and direction of predictive relationships between variables at multiple time points (Little, 2013).

In the present study, a series models were fit to the data in order to determine directionality in the relationships among the variables of interest. The hypothesized full cross-lagged model for social skills and academic competence is shown in Figure 2; this is a two-variable, five-wave cross-lagged model with disability status, gender, family income, and special education placement as time-invariant covariates which have been indicated as such in the literature.

The fully transactional model specified all stability, covariance, and cross paths. The following stability paths were tested using Mplus® version 7 (Muthén & Muthén, 1998-2012): social skills at age 6 predicting social skills at age 7; social skills at age 7 predicting social skills at age 8; social skills at age 8 predicting social skills at age 9; social skills at age 9 predicting social skills at age 13; academic competence at age 6 predicting academic competence at age 7; academic competence at age 7 predicting academic competence at age 8; academic competence at age 8 predicting academic competence at age 9; and academic competence at age 9 predicting academic competence at age 13. In addition, the cross-sectional relationships between social skills and academic competence at each time point were tested. The following cross paths were tested: social skills at age 6 predicting academic competence at age 7; social skills at age 7 predicting

academic competence at age 8; social skills at age 8 predicting academic competence at age 9; social skills at age 9 predicting academic competence at age 13; academic competence at age 6 predicting social skills at age 7; academic competence at age 7 predicting social skills at age 8; academic competence at age 8 predicting social skills at age 9; and academic competence at age 9 predicting social skills at age 13.

The autoregressive paths between the same variables at different time points, and the cross-lagged effects between different variables at different time points, are predictive effects where prior estimates of the effect are controlled (Little, 2013). Meanwhile, two-way arrows indicate associations between the two different variables at one time point; these would be estimated if social skills and academic competence were significantly correlated.

In addition to the fully reciprocal model shown in Figure 2, a series of nested models were tested as well. These include: (1) A social skills-driven model specifying stability effects and unidirectional relationships between social skills and academic competence; (2) An academic competence-driven model specifying stability effects and unidirectional relationships between academic competence and social skills; and (3) A model including only stability effects. The goal of testing these successive models is to identify the most parsimonious, theoretically meaningful model that fits the data, as opposed to the fully saturated model (i.e., the model that estimates all possible directed regression paths; Little, 2013). Once this model was identified, the role of predictor variables was examined by adding covariates including ID status, gender, family income, special education placement, and behavior problems.

Quasi-simplex model. In specifying the cross-lagged panel model described here, latent variables were formed indicating social skills and academic competence (see Figure 2). These single-indicator latent variables were specified by fixing to one the factor loading of the manifest indicators (i.e., observed score; Hayduk & Littvay, 2012). Jöreskog (1970) proposed a quasi-simplex model, an adaptation of the simplex model in which the single indicators load onto latent variables which are modeled over time, and the residual variances of the manifest indicators are constrained to equality over time. As can be seen in Figure 2, latent variables are represented by circles, while manifest variables, represented by squares, load onto the latent variables via single-headed arrows. Particularly in cross-lagged path models, the presence of measurement error may attenuate the relations among variables; latent variable models aim to estimate measurement error and remove its confounding effects.

Multivariate multiple regressions. Multivariate multiple regression analyses were conducted to examine the third set of research questions regarding the relationship of earlier parent and teacher ratings to later youth self-report. Regression, which models the relationship of the dependent variable to independent variables or factors of interest, is commonly utilized to determine the predictive utility and validity of multi-informant ratings (Cohen, Cohen, West, & Aiken, 2003). One can use this methodology to determine how well a group of independent variables together estimate the outcome, as well as how much individual variables account for the outcome when all other variables are held constant. An advantage of the multivariate approach is that by estimating the regression equations as a unified model, one can test coefficients simultaneously across

outcome variables. Within univariate regression, the beta coefficients must be evaluated separately for each dependent variable.

Multiple regression comes with a set of assumptions, and the data set was examined prior to analyses to determine whether any violations are present and to inform the need for any statistical adjustments. The first assumption is that the form of the relationship between the independent variables and the dependent variable is properly specified (e.g., linearity). Another assumption holds that independent variables are correctly specified and are measured without error. Regression also requires homoscedasticity, meaning that the variance of the residuals for predicted values is constant across values of *X* in the population. Additionally, the residuals of observations should be independent of one another, and the residuals should have a normal distribution around the regression line. Violations of assumptions may lead to biased estimates of regression coefficients or their standard errors; therefore, it is critical to explore the data to determine the extent of deviations from these properties. The process of checking for assumptions can also guide important insight into patterns and complexities in the data set (Cohen et al., 2003).

In the present study, parent and teacher ratings were added as predictors to two multivariate regression models within a structural equation framework. The first model examined the association of parent- and teacher-reported social skills and teacher-reported academic competence on the SSRS at child age 6, with the youth-reported total competence score on the YSR at age 15 and the youth-reported total score on the SEARS, indicating social-emotional resilience, at age 15. The second model examined the

association of mean and difference scores for parent- and teacher-reported social skills, and teacher-reported academic competence on the SSRS at child age 6, with the youth-reported total competence score on the YSR at age 15 and the youth-reported total score on the SEARS at age 15. The second model was specified in order to examine the presence of rater discrepancies: one predictor consisted of the average of parent and teacher social skills ratings, and one predictor consisted of the difference between the two ratings. In addition, given the importance of the student teacher relationship, particularly in understanding teacher perspectives of their students, the STRS total score from age 6 will be added as a predictor in each model. The results of these models were interpreted based on overall R^2 (proportion of variance accounted for in the outcome) as well as incremental changes in model fit with the addition of each predictor variable. Covariates including disability status, gender, family income, and special education placement were also considered in these models.

Results

This study addressed three research questions, all examining longitudinal data collected over time for a sample of children from ages 6 to 15. Sample characteristics are displayed in Table 1 and were discussed in the method section. Descriptive statistics, including means and standard deviations, for the variables explored in research questions 1 and 2 are presented in Table 2. These variables consist of scores collected at child ages 6, 7, 8, 9, and 13. Table 3 presents means and standard deviations for research question 3, including scores collected at child age 6 and 15. It is evident from these mean values and the accompanying t-tests that children with ID had significantly lower levels of social

skills and academic competence across time points. In addition, self-reported competence at age 15 was significantly lower for children with ID.

Tables 4, 5, and 6 present correlations for the variables explored in research questions 1, 2, and 3, respectively. As Tables 4 and 5 show, there were significant correlations among social skills, academic competence, and externalizing and internalizing behavior problems at all time points. Table 6 shows significant correlations among age 6 mother- and teacher-reported social skills, academic competence, student-teacher relationship, and youth-reported total competence on the YSR at age 15. The youth-reported SEARS correlated only with the mean of parent- and teacher-reported social skills and with the YSR. In general, the mean of parent- and teacher-reported social skills correlated more strongly with other variables than did the difference of parent- and teacher-reported social skills.

Research Question 1: Change in Social Skills Over Time

The first research question utilized latent growth curve modeling to examine the change in mother-reported social skills over five time points (child ages 6, 7, 8, 9, and 13) for children with and without ID. Further, it examined the extent to which levels of child externalizing and internalizing behavior problems predicted any longitudinal change in social skills, controlling for the effect of child disability status, gender, family income, and special education placement.

As previously discussed, the model building process includes model specification, identification, and estimation. These steps are described in the method section and the hypothesized structural equation model can be seen in Figure 1. Mplus® statistical

software, version 7 (Muthén & Muthén, 1998-2012) was used to fit the model to the data using maximum likelihood estimation. Model fit indices including chi-square value, RMSEA, CFI, and TLI were used to evaluate how well the specified models fit the existing data. The parameter estimates of the best-fitting model were then interpreted.

Unconditional model building. In order to fit a model to the growth in social skills over time, a multi-step model building approach was taken. Results of this process can be seen in Table 7. First, a no-growth, intercept-only model was built which assumed that there was no growth in social skills. This model resulted in a poor fit to the data: the chi-square value was significant, χ^2 (13) = 97.81, $p < .001$. Other indices demonstrated poor fit as well, with an RMSEA of .18 (C.I. = .15-.22), SRMR = .40, CFI = .88, and TLI = .91.

A linear growth model was then fit to the data to determine whether this led to an improvement in fit indices. In this model, the intercept loadings were fixed to 1, and the slope factor loadings of the five social skills variables were fixed to values representing their measurement intervals: 0, 1, 2, 3, and 7 (corresponding to ages 6, 7, 8, 9, and 13). The linear growth model produced improved fit indices, although it still had a significant chi-square value, χ^2 (10) = 19.36, $p = .04$. The linear model had an RMSEA of .07 (C.I. = .02-.11), SRMR = .09, CFI = .99, and TLI = .99, all of which indicated adequate model fit.

Subsequently, the latent basis model was estimated, allowing the three middle metrics to vary freely while the first and last slope factor loadings were fixed to 0 and 7 (corresponding to ages 6 and 13). As shown in Table 7, this latent basis model had a

significant chi-square value, χ^2 (7) = 15.80, p = .03. The RMSEA was .08 (C.I. = .03-.13), SRMR = .08, CFI = .99, and TLI = .98. It appeared that the modeling of unspecified trajectories did not produce a significantly improved fit to the data, as compared to the linear constraints model; the fit of the latent basis model was worse than that of the linear model. Additionally, in the linear model, the intercept was significantly negatively correlated with the slope, β = -.61, p < .001. This means that a lower initial status (intercept value) related to greater growth in social skills (slope value). This pattern is consistent with linear growth, providing more support for the retention of the linear model. Therefore, the linear model was retained as the best-fitting unconditional model and covariates were added to examine the change in fit for conditional models.

Addition of covariates. Significant residual variances remained for intercept and slope parameters following estimation of the unconditional linear model for social skills. This suggested that the addition of covariates into the model would be appropriate, in order to examine whether they accounted for some of this interindividual variation from mean values for initial status and growth. First, a conditional linear model was specified controlling for ID status (0 = TD, 1 = ID), gender (0 = female, 1 = male), family income (0 = $50,000 or more per year, 1 = under $50,000 per year), and special education (0 = majority of time spent in regular education, 1 = majority of time spent in special education). These variables were all dichotomously coded so that a score of "1" indicated increased risk status as dictated by theory (i.e., increased risk for poorer outcomes has been associated with the presence of ID, being male, family income under $50,000 per year, special education placement). These variables were incorporated into the model by

estimating paths from each covariate to both the intercept and the slope latent factors, as illustrated in Figure 1.

The addition of the covariates resulted in a slightly better fitting model than the unconditional specification, indicating that at least some of the residual variance was accounted for. The chi-square value was nonsignificant, χ^2 (22) = 31.31, p = .09. There was a small improvement in fit based on one other index, with RMSEA = .05 (C.I. = .00-.08). Other fit indices remained the same: CFI = .99 and TLI = .99, and SRMR = .06. There was a significant path from ID status to intercept, β = -.34, p < .001, and from special education status to intercept, β = -.24, p < .01. The only significant covariate path on rate of change was from special education status to slope, with β = .53, p < .001. This indicated that children who spent most of their time in special education classes at age 6 demonstrated greater growth in social skills over time from age 6 to age 13. In this conditional model, the intercept and slope factors remained negatively correlated, β = -.54, p < .001.

Model with externalizing and internalizing problems. The next steps in model building involved the addition of predictor variables of interest, namely the levels of externalizing and internalizing behavior problems at age 6. The externalizing variable was dichotomously coded to represent risk status, with 0 = normal externalizing T-scores and 1 = borderline or clinical externalizing T-scores. The internalizing variable was dichotomously coded to represent risk status, with 0 = normal internalizing T-scores and 1 = borderline or clinical internalizing T-scores. These covariates were added to the previously specified conditional model. This conditional model fit the data significantly

better than the previous conditional model. The chi-square value was nonsignificant, χ^2 (28) = 33.42, p = .22. There was also improvement in fit based on other fit indices, with RMSEA = .03 (C.I. = .00-.07). CFI = .99, TLI = .99, and SRMR = .06.

In an effort to fit a more parsimonious model with improved fit indices, this model was respecified by fixing the nonsignificant covariate paths to zero. This is a method for model reduction and increased parsimony that has precedent in the literature (Burkholder & Harlow, 2003; Hays, Marshall, Wang, & Sherbourne, 1994). Paths from gender and family income to the intercept factor were fixed to zero, and paths from gender, family income, and ID status to the slope factor were fixed to zero. The respecified model resulted in slightly better fit, as seen in Table 8: the chi-square value remained nonsignificant, χ^2 (35) = 39.72, p = .27. Other fit indices remained the same, with RMSEA = .03 (C.I. = .00-.06). CFI = .99, TLI = .99, and SRMR = .06.

Results of the final model estimating the impact of externalizing and internalizing problems on social skill development are shown in Table 9, and are structurally displayed in Figure 3. There was a negative significant effect of ID status on the intercept factor, with β = -.35, p < .001, a negative significant effect of special education placement on the intercept factor, with β = -.18, p < .05, a negative significant effect of externalizing problems on the intercept, with β = -.22, p < .001, and a negative significant effect of internalizing problems on the intercept, with β = -.12, p < .05. Children with ID, children placed in special education at age 6, and children with clinical levels of externalizing and internalizing problems, demonstrated lower initial social skills scores. In addition, there was a positive significant effect of special education placement on the slope factor, with β

= .50, $p < .001$. This finding was retained from the previous linear model, showing that children with ID who spent most of their time in special education classes at age 6 demonstrated greater growth in social skills over time from age 6 to age 13. The intercept and slope factors remained negatively correlated, $\beta = -.55$, $p < .001$. Special education status was significantly positively correlated with ID status, gender, family income, and externalizing problems; ID status and family income remained significantly correlated in the same direction. Externalizing problems significantly correlated with ID status and special education. These results signify that externalizing and internalizing behavior problems are important influences of children's initial social skills scores as rated by mothers at the age of 6; however, behavior problems did not influence the rate of change after that point.

The analyses for the first research question indicated that the model specifying linear social skills growth from age 6 to 13 was supported in the present data set over the intercept-only and latent-basis models. Social skills developed at a constant rate over time. Further, children with ID, placed in special education, and/or with elevated externalizing or internalizing behavior problems began with poorer social skills at age 6. In addition, children placed in special education exhibited a greater rate of growth in social skills over time from age 6 to 13.

Research Question 2: Relation of Social Skills to Academic Competence Over Time

The second research question utilized cross-lagged panel analysis to examine the extent to which youth social skills and academic competence were related across the five time points. Further, it examined the direction of effects over time, controlling for

disability status and other covariates. As previously discussed, a quasi-simplex model was specified by loading latent variables onto the manifest variable social skills scores for each time point. The quasi-simplex model (Jöreskog, 1970) uses latent variables to address potential measurement error by modeling residual variances (Newsom, 2015). In this type of model, only a single indicator is needed at each measurement point; simplex models have been shown to be particularly appropriate in mapping academic growth over time (Werts, Linn, & Jöreskog, 1977).

A series of cross-lagged models were fit to the data in order to estimate the direction of effects among the latent variables for social skills and academic competence. The hypothesized reciprocal cross-lagged model for social skills and academic competence is shown in Figure 2; this was fit to the data first as an unconditional reciprocal model. The reciprocal model was tested first, followed by models that were nested within the reciprocal model. Certain paths were removed and nested tests were used to investigate successive improvements in model fit that might warrant rejection of the initial model.

Unconditional model building. In the reciprocal model, the cross-sectional relations among the latent variables were estimated at each time point, and the stability of each variable across time points was assessed. In addition, the following social skills-driven cross paths were tested using Mplus® version 7 (Muthén & Muthén, 1998-2012): age 6 social skills predicting age 7 academic competence; age 7 social skills predicting age 8 academic competence; age 8 social skills predicting age 9 academic competence; and age 9 social skills predicting age 13 academic competence. The following academic

competence-driven cross paths were tested: age 6 academic competence predicting age 7 social skills; age 7 academic competence predicting age 8 social skills; age 8 academic competence predicting age 9 social skills; and age 9 academic competence predicting age 13 social skills.

Table 10 shows the model fit statistics for successive models tested using the nested comparison process. In Model A, the fully reciprocal model, all cross and lagged effects were tested. The fully reciprocal model did not converge, so constraints were imposed to specify the latent variable residual variances to equality. Constraints help to increase precision of the model estimates and fulfill the homogeneity of variance assumption, as well as increasing parsimony (Kline, 2011). Stability paths from age 6 to 7, age 7 to 8, and age 8 to 9 were also constrained to equality to support convergence of the model. Results of fitting the full model with these constraints indicated adequate fit, χ^2 (30) = 39.01, p = .13. Other fit indices were within acceptable limits, with RMSEA = .04 (C.I. = .00-.07), CFI = .99, TLI = .99, and SRMR = .05. The standardized estimates, reported in the Model A column of Table 12, indicate that social skills and academic competence showed high stability across time points, with all stability paths significant at the $p < .001$ level. There was a significant cross-sectional correlation between social skills and academic competence at age 6, $\beta = .45$, $p < .001$. There was a significant cross path effect of age 9 academic competence on age 13 social skills, $\beta = .18$, $p < .05$.

To test the social skills-driven model (Model B in Tables 10 and 12), the cross paths from earlier academic competence to later social skills were removed from the reciprocal model. The cross paths from earlier social skills to academic competence one

year later were therefore the focus of this model (age 6 social skills to age 7 academic competence; age 7 social skills to age 8 academic competence; age 8 social skills to age 9 academic competence; and age 9 social skills to age 13 academic competence). The constraints on the latent variable variances and the stability paths were retained. The social skills-driven model resulted in adequate fit to the data, similar to the reciprocal model, with χ^2 (34) = 43.84, p = .12. Other fit indices were within acceptable limits, with RMSEA = .04 (C.I. = .00-.07), CFI = .99, TLI = .99, and SRMR = .06. The standardized estimates, reported in the Model B column of Table 12, indicate that social skills and academic competence showed high stability across time points, and all stability paths remained significant at the $p < .001$ level. There were no significant cross path effects from earlier social skills to later academic competence.

To test the academic competence-driven model (Model C in Tables 10 and 12), the cross paths from earlier social skills to later academic competence were removed from the reciprocal model. The cross paths from earlier academic competence to social skills one year later were the focus of this model (age 6 academic competence to age 7 social skills; age 7 academic competence to age 8 social skills; age 8 academic competence to age 9 social skills; and age 9 academic competence to age 13 social skills). The constraints on the latent variable variances and the stability paths were retained. The academic competence-driven model resulted in better fit to the data than the reciprocal and social skills-driven model, with χ^2 (34) = 39.62, p = .23. Other fit indices remained the same or slightly improved to previous models, indicating strong fit, with RMSEA = .03 (C.I. = .00-.06), CFI = 1.0, TLI = .99, and SRMR = .06. The standardized estimates,

reported in the Model C column of Table 12, indicate that social skills and academic competence showed high stability across time points, and all stability paths remained significant at the $p < .001$ level. There was one significant cross path in this model from age 9 academic competence to age 13 social skills, $\beta = .18$, $p < .05$.

To test the stability effects model (Model D in Tables 10 and 12), the cross paths from earlier academic competence to later social skills *and* earlier social skills to later academic competence were removed from the reciprocal model. The stability paths between the same constructs measured at successive time points were the focus of this model, which represents a variable as the additive function of its previous measurement plus random variation. The stability effects model resulted in strong fit to the data, similar to the academic competence-driven model, with χ^2 (38) = 44.55, $p = .22$. Other fit indices remained nearly the same, also indicating strong fit, with RMSEA = .03 (C.I. = .00-.06), CFI = .99, TLI = .99, and SRMR = .06. The standardized estimates, reported in the Model D column of Table 12, indicate that social skills and academic competence showed high stability across time points, and all stability paths remained significant at the $p < .001$ level.

Addition of covariates. Following this comparison of nested models, it was determined that the academic competence-driven panel best fit the data based on theory and statistical tests. Subsequently, covariates of interest including ID, family income, gender, special education placement, externalizing behavior problems, and internalizing behavior problems were incorporated into this model. These variables were examined as time-invariant covariates loading onto age 6 social skills and age 6 academic competence.

A similar successive model testing approach to the first research question was taken, in which the academic competence-driven model with all covariates was tested first (Model E in Tables 11 and 13). All covariate paths were specified to load onto both age 6 social skills and age 6 academic competence, which then would mediate the relation of the covariates to later time points. The academic competence-driven model with all covariates produced a poorer yet adequate fit to the data with a nonsignificant chi-square value, χ^2 (82) = 100.88, p = .08. Other fit indices indicated good fit, with RMSEA = .03 (C.I. = .00-.05), CFI = .99, TLI = .98, and SRMR = .06.

Next, the model was respecified by fixing nonsignificant covariate paths to zero, in an effort to improve model fit and increase parsimony (Model F in Tables 11 and 13). The paths from family income and gender to social skills were fixed to zero, and the paths from gender, special education placement, and internalizing behavior problems to academic competence were fixed to zero. The resulting model produced similar, slightly improved fit to the data with a nonsignificant chi-square value, χ^2 (87) = 104.35, p = .10. Other indices indicated good fit, with RMSEA = .03 (C.I. = .00-.05). CFI = .99, TLI = .98, and SRMR = .06.

The model was respecified once more by also fixing nonsignificant cross paths to zero (Model G in Tables 11 and 13). The resulting model produced similar, slightly improved fit to the data with a nonsignificant chi-square value, χ^2 (94) = 106.44, p = .18. Other fit indices indicated good fit, with RMSEA = .03 (C.I. = .00-.05). CFI = .99, TLI = .99, and SRMR = .06. Figure 4 displays the final model with significant covariate, stability and cross effects, and the "Model G" column in Table 13 shows the final

parameter estimates. In the final model, all stability paths remained significant at the $p <$ .001 level, indicating that earlier ratings of social skills and academic competence were highly predictive of later ratings of social skills and academic competence, respectively. As detailed earlier in this section, the first three stability paths for each construct were fixed to equality in order for the model to converge; the fact that the resulting model fit was strong indicates that these constraints were appropriate for the data set. Additionally, in the final model there was one significant cross path from age 9 academic competence to age 13 social skills, $\beta = .18$, $p < .05$. This influence across the span of four years helps to support the academic competence-driven model over other explanations.

ID status had a significant negative effect on age 6 social skills, $\beta = -.35$, $p < .001$. This means that the social skills of children with intellectual disability in this sample were rated lower than their typically developing peers. In addition, special education placement ($\beta = -.17$, $p < .05$), externalizing behavior problems ($\beta = -.22$, $p < .01$), and internalizing behavior problems ($\beta = -.14$, $p < .05$) had significant negative effects on social skills at age 6. Children placed in special education classes were rated lower on social skills by their mothers at age 6. Further, children with borderline or clinical levels of externalizing and/or internalizing behavior problems had fewer social skills via mother report.

ID status also had a significant negative effect on age 6 academic competence, $\beta = -.63$, $p < .001$, an even stronger relationship than it had to social skills. Family income ($\beta = -.25$, $p < .001$) acted as another significant covariate, indicating that children of families making less than $50,000 per year were rated lower on academic competence by their

teachers. Externalizing behavior problems ($\beta = -.09$, $p < .10$) approached significance in their impact on age 6 academic competence.

The analyses for the second research question indicated that the academic competence-driven model best explained the relation between social skills and academic competence over time. Both domains demonstrated high stability across time, with one significant cross path from age 9 academic competence to age 13 social skills. Again, children with ID, placed in special education, and/or with elevated externalizing or internalizing behavior problems began with poorer social skills at age 6. Children with ID and/or from families making less than $50,000 per year began with poorer academic competence at age 6.

Research Question 3: Relation of Early Parent and Teacher Reports to Later Youth Reports

The third research question utilized multivariate multiple regression analysis to examine the extent to which parent- and teacher-reported social and academic competence at age 6 predicted youth-reported total competence and at age 15. Again, Mplus® statistical software, version 7 (Muthén & Muthén, 1998-2012) was used to fit the model to the data using maximum likelihood estimation. Multivariate multiple regression is used to estimate a model that includes more than one predictor variable as well as more than one outcome variable. It is beneficial to approach this analysis using structural equation modeling in order to account for measurement error and to address missing data via full information maximum likelihood (FIML; Little, 2013).

Model 1. The first model examined whether the original parent- and teacher-reported social skills and teacher-reported academic competence on the SSRS at child age 6, predicted the youth-reported total competence score on the YSR and the youth-reported total SEARS score at age 15. In the first step of model building, paths were specified from these three exogeneous variables to the two endogeneous variables, YSR total competence and SEARS total. This model was just identified, or saturated, meaning that all parameters were identified and there were zero degrees of freedom; therefore, it was not appropriate to calculate or interpret model fit indices (Kline, 2011). In the next step, the following covariates were added as exogeneous variables in the model: ID status, gender, family income, special education placement at age 6, and the student-teacher relationship scale (STRS) total score. The model with all covariate paths remained saturated and fit indices were not interpreted.

Subsequently, this model was respecified by fixing nonsignificant paths to zero. It appeared that neither mother- nor teacher-reported social skills at age 6 significantly predicted either youth-reported outcome. In the interest of increasing model parsimony, these paths were fixed to zero. The resulting model fit the data well, suggesting that these parent and teacher ratings were not important in explaining youth's perceptions of their well being nine years later. In addition, due to multicollinearity and lack of correlation to the outcome variables, the paths from ID status, gender, and STRS were fixed to zero. The fit indices of the resulting model (Model 1C), shown in Table 14, indicated good model fit, with a nonsignificant chi-square value, χ^2 (10) = 8.95, p = .54, RMSEA = .00 (C.I. = .00-.07). CFI = 1.0, TLI = 1.05, and SRMR = .04.

Model 1C was retained due to the strong fit indices, and final model parameters are shown in Table 16. Academic competence, rated by teachers at age 6, significantly predicted youth-reported total competence on the YSR at age 15 in the positive direction, $\beta = .26$, $p < .01$. Family income ($\beta = -.26$, $p < .01$) and special education placement ($\beta = -.20$, $p < .05$) significantly negatively predicted YSR total competence at age 15. The R-square value for YSR was significant, $R^2 = .30$, $p < .001$, indicating that 30% of the variance in the YSR total competence was accounted for by the model.

There was only one significant predictor of the SEARS total score in Model 1C: special education placement, $\beta = -.20$, $p < .05$. The R-square value for SEARS in Model 1C was not significant, indicating that the model did not account for significant variance in the SEARS total score.

Model 2. The second model examined whether the mean and difference scores between age 6 parent and teacher reports significantly predicted youth-reported competence at age 15. These scores were calculated using Statistical Package for the Social Sciences (SPSS; Version 24); the mean scores consisted of the mean of the parent-reported social skills score and the teacher-reported social skills score, while the difference score consisted of the absolute value of parent-reported social skills minus teacher-reported social skills. This was done in order to examine the role of rater agreement and discrepancies between parent and teacher reports.

To build the second model, paths were specified from the exogeneous variables (mean of parent- and teacher-reported social skills scores, difference of parent- and teacher-reported social skills scores, and teacher-reported academic competence) to the

two endogeneous variables, YSR total competence and SEARS total score. As with the first model, this model was just identified, or saturated, so fit indices were not calculated or interpreted. In the next step, the following covariates were added as exogeneous variables in the model: ID status, gender, family income, special education placement at age 6, and the student-teacher relationship scale (STRS) total score. The model with all covariate paths remained saturated and fit indices were not interpreted.

As with the first model, the second model was respecified by fixing nonsignificant paths to zero. Due to multicollinearity and lack of correlation to the outcome variables, the paths from ID status, gender, and STRS were fixed to zero. The fit indices of the resulting model (Model 2C), shown in Table 14, indicated strong fit of this model to the data, with a nonsignificant chi-square value, χ^2 (6) = 4.06, p = .67, RMSEA = .00 (C.I. = .00-.07). CFI = 1.0, TLI = 1.13, and SRMR = .02.

The final model parameters for Model 2C are shown in Table 16. The mean of parent- and teacher-reported social skills at age 6 approached significance as a predictor of YSR total competence, β = .20, p<.10. Academic competence, rated by teachers at age 6, also approached significance in its relation to youth-reported total competence on the YSR at age 15 in the positive direction, β = .18, p < .10. Family income (β = -.28, p < .01) significantly negatively predicted YSR total competence at age 15. The R-square value for YSR was significant, R^2 = .32, p < .001, indicating that 32% of the variance in the YSR total competence was accounted for by Model 2C.

There was one significant predictor of the SEARS total score in Model 2C: the mean of parent- and teacher-reported social skills at age 6, (β = .30, p < .05). In this

model, there were also two predictors that approached significance: academic competence at age 6 ($\beta = .21$, $p < .10$), and special education placement at age 6 ($\beta = -.20$, $p < .10$). The R-square value for SEARS in Model 2C was significant, $R^2 = .15$, $p < .05$, indicating that the model utilizing mean and difference social skills scores did account for significant variance in the SEARS total score, while the model utilizing the original social skills scores did not.

The analyses for the third research question indicated that the mean of parent- and teacher-reported social skills at age 6 was a significant predictor of youth-reported competence at age 15, while separate parent and teacher reports on social skills were not. Teacher-reported academic competence was a significant predictor of better youth-reported competence. Annual family income over $50,000 predicted improved YSR competence, while placement in regular education predicted improved SEARS competence.

Discussion

Social skills and academic competence are essential aspects of children's development across childhood and adolescence. The present study aimed to investigate the longitudinal patterns of growth in social and academic skills, particularly for at-risk groups such as individuals with ID. First, a latent growth curve model traced the social skills development from ages 6 to 13 of children with ID or TD. The best fitting growth model specified a linear slope, or rate of change in social skills across time, which was greater for children placed in special education at age 6. Other covariates indicated that risk status at age 6 (ID status, special education placement, elevated externalizing

behavior problems, and elevated internalizing behavior problems) significantly influenced children's initial social skills scores at age 6, accounting for additional variance in the growth model.

This study also used cross-lagged panel analysis to examine the transactional relationship between social skills and academic competence over time in the same sample. The academic competence-driven model fit the data better than the fully transactional and the social skills-driven models, supporting the importance of earlier academic competence to future social skills and academic competence. These relations Finally, multivariate regression models demonstrated that teacher-rated age 6 academic competence, but not parent- and teacher-rated age 6 social skills, significantly predicted youth-reported competence at age 15. However, the mean of parent- and teacher-rated age 6 social skills did significantly predict youth-reported competence at age 15. Covariates of interest including disability status, gender, family income, special education placement, and behavior problems were considered in these models.

Longitudinal Development of Social Skills

The findings reported in this study suggest that social skills grew at a steady rate over time. This finding is consistent with others in the literature. For example, Lamont and Van Horn (2013) found that 85 to 90 percent of their sample experienced stable growth in social skills from kindergarten to third grade. Chan and colleagues (2000) also found that there was positive growth in parent-reported social skills on the SSRS during early elementary years, and Berry and O'Connor (2010) came to similar conclusions when they examined social skills growth at the time of school entry. However, the

specific shape of the growth was curvilinear in these two studies, which tended to find acceleration in social skills in earlier elementary school, with a slight deceleration in later grades (Berry & O'Connor, 2010; Chan et al., 2000). This pattern was expected in the present study, but the lack of a curvilinear trend may be explained by the four-year gap between the age 9 and age 13 measurement points.

The addition of covariates helped to account for some of the unexplained variance observed in the unconditional linear model. Not unexpectedly, initial social skills scores were lower for ID than for TD children. This finding mirrors prior studies, which reported lower social skills at school entry for children with ID (e.g., J. Baker et al., 2007; McIntyre et al., 2006). It also matches the diagnostic profile for individuals with ID, who struggle in the social domain, including empathy, social judgment, interpersonal communication skills, and the ability to make friendships (APA, 2013).

One surprising finding was that when controlling for disability status, children placed in special education at age 6 experienced greater subsequent growth in social skills than children in regular placements at that age. In other words, placement in special education became less associated with poor social skills as children grow older. This was shown by the growth in social skills over time. Children who began with lower social skills at age 6, showed gains in these skills over time. Children in special education experienced both lower starting social skills and greater rates of growth over time.

Nonetheless, this impact of special education placement diverges from more recent thinking that general education placement fosters better social skill development for children with disabilities. This line of thought has been based on evidence

demonstrating positive social and emotional impact for children who are mainstreamed (Fisher & Meyer, 2002; Wiener, & Tardif, 2004). While children in more inclusive settings have more opportunities to interact with and learn from typically developing peers, they may receive less individualized support and structure in their early elementary years, which are full of rich and complex social interaction. Fuchs and Fuchs (1994) recommended against a "one size fits all" inclusion approach and encouraged educators to consider children's specific needs in individualizing their education plans.

There were no effects of gender or income. Although much of the literature has established gender differences in manifestations of behavior and social skills, this phenomenon did not hold in the present data. Other studies reported similar findings. As part of their evaluation of the psychometric properties of the SSRS in a sample of 4345 children from kindergarten through third grade, Van Horn, Atkins-Burnett, Karlin, Ramey, & Snyder (2007) did not find significant gender differences in ratings of social skills. With regard to income, however, this study diverges from others establishing a clear disadvantage in social competence for children from low-income backgrounds (e.g., Hoglund & Leadbeater, 2004; Rimm-Kaufman et al., 2000).However, the impact of SES may differ according to setting, as in one study where family income predicted social skills in the school setting, but not the home setting (Chan et al., 2000).

As hypothesized, initial social skills scores were significantly lower for children with borderline or clinical levels of externalizing and/or internalizing behavior problems. This is consistent with research that shows children with behavior problems also exhibit poorer social skills (Gresham & Elliott, 1990). Externalizing behaviors such as

aggression and hyperactivity often are perceived as incongruent with social skills and may cause children be rejected by others, while children who are prone to internalizing symptoms tend to engage in patterns of withdrawal and depression which inhibit their development of social competence (Eisenhower et al., 2007; Gazelle & Rudolph, 2004). Previous literature suggests that children with higher levels of externalizing and internalizing behavior problems may not experience the same social skills trajectories due to the impact behavior may have on social relationships and interactions (e.g., Henricsson & Rydell, 2006). Particularly around age 6, which coincides with school entry, elevated and internalizing behavior problems have negative impact on social skills. In the present study, however, behavior problems only influenced the initial level of social skills and did not impact the rate of change in social skills across time.

Longitudinal Relation of Social Skills to Academic Competence

Children spend much of their time in the school environment, and academic and social factors are key areas to investigate in the examination of youth well-being. Cross-lagged panel analysis is a tremendously useful method of examining the relations among these factors, defining the strength and direction of the associations at multiple time points and addressing issues of causality (Little, 2013). The second research question examined the longitudinal associations among social skills and academic competence, controlling for behavior problems and other covariates.

Stability of social skills and academic competence over time. Model results indicated that social skills and academic competence were highly stable across time points. This stability indicates that mothers were relatively consistent in their evaluation

of social skills which did increase over time, congruent with the extant research (e.g., Chan et al., 2000; Lamont & Van Horn, 2013). Academic competence had even stronger stability effects than did social skills, even from age 9 to 13. These high stability coefficients reflect the maintenance of academic competence over time even when rated by different teachers each year. Individuals may experience different growth from the sample as a whole, in which case the average covariance between time points would be impacted. The strength of the stability model highlights the importance of a strong foundation in social and academic skills beginning in early elementary school, a skill set often referred to as school readiness (La Paro & Pianta, 2000; Romano, Babchishin, Pagani, & Kohel, 2010).

Transactional relations among social and academic domains. The final cross-lagged model supported academic competence-driven effects in explaining the relations among variables. The only significant cross path to emerge in this model was from age 9 academic competence to age 13 social skills. This differed from the hypothesis that social skills and academic competence would demonstrate a transactional relationship over time. This lack of support for a social skills-driven model differs from much of the literature. Ray and Elliott (2006) found that perceived social support, self-concept, and social skills related to later achievement; the authors hypothesized that social adjustment would indirectly influence achievement via its effect on academic competence. One explanation for this is that difficult social relationships may create an environment that makes academic tasks and learning less enjoyable and more stressful (Pianta & Stuhlmann, 2004).

However, the academic competence-driven model is not unprecedented in the literature. Caemmerer and Keith (2015) found support for the impact of academic skills on later social skills using cross-lagged panel analysis. In a major examination of school readiness and later outcomes, Duncan and colleagues (2007) came to similar conclusions. The authors analyzed six longitudinal data sets to evaluate the influence of school readiness skills including abilities in cognition, attention, and socioemotional competence. They found that the strongest predictors of later achievement across all data sets were school-entry math, reading and attention skills. Social-emotional behaviors in the externalizing, internalizing, and social skills domains were not significant predictors of later academic success. Notably, there were no children with ID identified in that dataset.

Intervention studies have also supported the conclusions of the present study. Coie and Krehbiel (1984) found that provision of academic intervention led to significantly improved reading, math, and social preference scores both immediately following intervention and at a follow-up assessment. Students who received social skills training, on the other hand, did not maintain notably improved scores in any area at follow-up. Coie and Krehbiel hypothesized that children's social difficulties may have been rooted in academic problems, so that targeting academic skills ameliorated social issues. In another intervention study, an intensive social skills program did not lead to long term gains in academic skills, indicating that behavioral interventions may have little last impact on academic achievement (Tremblay, Pagani-Kurtz, Masse, Vitaro, & Pihl, 1995).

It is important to note that the only significant cross path from age 9 academic competence to age 13 social skills. This finding highlights the significance of academic competence during a time full of biological and social transitions. Pubertal and school transitions are often challenging, possibly disruptive periods for adolescents, and school transitions such as the move from elementary to middle school, and from middle to high school, have negatively impacted self-esteem and psychological functioning (Simmons et al., 1987). Perhaps high academic skills act as a protective factor for children as they navigate this complicated period (Eccles et al., 1993).

Additionally, some significant paths in the final cross-lagged model indicated that youth with ID had lower levels of social skills and academic competence at age 6, consistent with previous findings (Eisenhower et al., 2007; McIntyre et al., 2006). Of note, the level of family income impacted academic competence but not social skills. Conversely, for the ID sample, special education placement impacted social skills but not academic competence. Both externalizing and internalizing problems were significant predictors of social skills, while only externalizing problems approached significance in their impact on academic competence. Gender did not emerge as a significant covariate in any of the models explored in the present study. Duncan et al. (2007) also found that patterns of association among school readiness and later achievement did not differ by gender, which held true in the current analyses.

Predictive Value of Early Parent and Teacher Ratings

Another interest in this study was the predictive value of parent- and teacher-rated social skills and academic competence at age 6 in forecasting age 15 youth-reported

competence outcomes. In the first part of this question, the original parent- and teacher-rated social skills scores were the independent variables of interest, along with teacher-rated academic competence at age 6. However, the best-fitting model predicting age 15 youth-reported competence variables did not include any contribution by parent- or teacher-rated social skills. Higher teacher-rated academic competence did significantly relate to greater age 15 total competence on the YSR. Similar to the results of the second research question, better academic competence was a stronger indicator of later competence, even when rated by youth instead of mothers. Family income and classroom placement were also significant negative predictors of YSR total competence in this model, where annual family income over $50,000 and placement in a regular classroom predicted higher competence.

The second model examined associations among calculated mean and difference score variables, generated in order to look at the roles of rater congruence and noncongruence in the present sample. The mean of parent- and teacher-rated social skills was a significant predictor for both outcomes, with higher mean scores relating to higher youth-reported scores in YSR total competence and SEARS total. Academic competence approached significance as a predictor for both outcomes. In addition, family income above $50,000 related to higher YSR competence, a measure based on more concrete skills in school, activities, and social functioning. Meanwhile, classroom placement approached significance in its relation to SEARS, a measure of social emotional competence that taps into more abstract areas of self-concept. Children placed in regular education settings self-reported higher SEARS scores nine years later.

With regard to the relative merits of parent vs. teacher ratings, it seems meaningful that, in this study, the original parent- and teacher-reported social skills variables were not significant predictors of later youth-reported competence, but the mean of the two scores was. A multi-rater assessment approach may call for practitioners to aggregate scores in this fashion (McConaughy & Ritter, 2008; Verhulst et al., 1994). Furthermore, academic competence was an explanatory variable in both models, highlighting again its role early on as an indicator of broader competence and success.

Previously reported findings shed light on the parent-teacher discrepancies in reports of social skills. Fagan and Fantuzzo (1999) examined the relations among parent and teacher SSRS reports for urban Head Start children, and found that parent and teacher ratings were actually not significantly related. This lack of congruence between home and school sources has been observed elsewhere (van der Ende et al., 2012) and is important to note in practical applications. In terms of research, it may make it difficult to establish a unified social skills construct, but the information gained from these sources is valuable nonetheless. Fagan and colleagues suggested that the discrepancy between parent and teacher ratings may be due to factors such as culture and SES, since cultural backgrounds often result in differing perceptions and expectations of observed behavior. Additionally, parents and teachers observe children in different contexts. What is more, aspects of social competence like listening and cooperation are less obvious or outwardly manifested than target behaviors such as aggression, making it more difficult to accurately measure and rate these aspects.

Regarding this research question, it seems meaningful then that the original parent- and teacher-reported social skills variables were not significant predictors of later youth-reported competence, but the mean of the two scores was. A multi-rater assessment approach may call for practitioners to aggregate scores in this fashion. Furthermore, academic competence was an explanatory variable in both models, highlighting again its role early on as an indicator of broader competence and success.

Limitations

Several limitations of the present study should be discussed. One limitation was the fact that the starting sample size at age 6 was relatively small, with just over 200 participants. This meets the minimum recommendations for SEM analyses (Kline, 2011), but the sample size did decrease over time. The proportion of missing data increased with each subsequent time point, particularly at age 13 after a gap in measurement. Missing data are an unfortunate side effect of studies spanning many years; to address this, full information maximum likelihood was used to ensure that the results did not diverge greatly from what we would see if all data were present. Further, the data are longitudinal, not experimental, meaning that there may be variables important to the questions that were omitted.

Another limitation has to do with how constructs were measured. Reporting sources included mothers, teachers, and children, but not all variables were measured at each time point by each source. There may have been aspects of these domains that were not fully captured by these reports. For example, academic competence was based on a scale taken from the teacher SSRS, and did not involve any standardized academic

achievement scores, observations, or other classroom measures. It may be unclear whether this academic competence rating actually reflects social competence or teachers' perceptions of academic success. What is more, parent and teacher reports of behavior have been found to diverge particularly as children grow older (van der Ende et al., 2012).

Implications

Previous literature has examined the longitudinal development of social skills and academic competence, with some studies mapping the linked trajectories of these domains. However, few studies have specifically examined these trends in samples with a disability, especially spanning nearly a decade of the elementary and middle school years. Instead, researchers have tended to focus cross-sectionally or on a smaller window of time. There are many advantages of longitudinal modeling: it enables the discovery of patterns of covariation among variables by observing behaviors over time; it creates models that allow for the assessment of potential causality, since data are collected at multiple time points; and it estimates relative construct stability by evaluating subsequent measurements of a variable (Menard, 1991). Structural equation modeling allows for the testing of whole models as well as individual parameters. The exploration of conditional models that include covariates allowed explanation of some of the predictive influences underlying group and individual development.

The results of the present study are meaningful for educational practitioners including teachers and school psychologists. The linear trajectory of social skills emphasizes how the development of social skills occurs throughout elementary and

middle school and should be monitored and valued. Children with ID, externalizing or internalizing issues, or who are placed in special education may begin this development at a disadvantage, so should receive special attention in this regard.

A promising implication of the study is that early placement in special education may do a great deal to improve the rate of change in social skills over time, despite these children beginning with lower scores. This speaks to the importance of providing free and appropriate public education to all children, highlighting the role of teachers and peers in shaping youth outcomes (Fuchs & Fuchs, 1994; Hoglund & Leadbeater, 2004). Teacher and peer relationships alike are important in the school setting for students with and without disabilities; students with ID may face increased challenges with these relationships particularly during transition periods. Feeling a connection to others at school can influence youth social and academic adjustment because they may be more likely to feel comfortable and confident and thus build skills and competence in multiple areas (Murray & Greenberg, 2000).

Another implication of this study is that academic competence, which included teacher ratings of academic skills, academic motivation, and academic behavior, was a key indicator of future social competence as rated by both parents and children themselves. This highlights the utility of including measures of academic success in establishing school readiness (La Paro & Pianta, 2000; Romano et al., 2010). The findings of the present study suggest that academic competence is a core area in which to intervene, especially in the case of young children with ID, in order to foster both social and academic competence in the future.

Regarding the measurement of social skills, the present study suggested the value of integrating data from parent and teacher reports, since the mean of parent- and teacher-reported scores had improved predictive utility for youth reports of competence nine years later. This finding reflects guidelines for best practices in the field of school psychology, which call for assessment based on multiple raters and sources (McConaughy & Ritter, 2008). This finding also speaks to the consistency in strengths-based ratings across multiple time points and raters. Youth appear to provide valuable insight into their competencies at age 15 and should be key participants in their own assessment and intervention planning (Luiselli, McCarty, Coniglio, Zorilla-Ramirez, & Putnam, 2005).

Hoglund and Leadbeater (2004) proposed that schools can foster resilience for children not only by providing individualized intervention, but also by transforming elements of school and classroom environments which they found to influence social and behavioral competence. Schools are ideal sites within which to situate interventions targeting children's adjustment, particularly during times of multiple transitions that include academic, social, and physical changes (Malecki & Demaray, 2003). While the focus of school tends to be on academic skills and outcomes, educators can strengthen students' social skills by teaching them directly and integrating them into the classroom and school climate (Luiselli et al., 2005). In conclusion, a key takeaway of this study is that social development and academic development are inextricably related and a strengths-based perspective conceptualizes growth in one area as an asset to the other.

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Table 1

Sample Characteristics

Variable	**ID** ***(n=84)*** ***M (SD)***	**TD** ***(n=120)*** ***M (SD)***	χ^2 **or** ***t***
Children			
Child IQ (Age 5)	**60.87 (15.42)**	**103.30 (11.48)**	t = **23.85*****
VABS (Age 5)	**65.25 (13.57)**	**103.7 (15.72)**	t = **19.14*****
Gender (% Male)	61.9	55.0	χ^2 = 0.97
Race (% Caucasian)	56.0	63.3	χ^2 = 1.12
% African American	9.5	8.3	
% Asian	1.2	1.7	
% Hispanic	23.8	10.0	
% Other	9.5	16.7	
Classroom Placement (% Regular Education)	**45.2**	**100.0**	**χ^2 = 77.42*****
Mothers			
Marital Status (% Married)	79.5	85.8	χ^2 = 2.56
Family income (%>$50,000)	**48.2**	**67.8**	**χ^2 = 7.78****
Mother's Education (Highest Grade)	14.42 (2.01)	15.85 (2.35)	t = 2.70
Fathers			
Participation (% completed study measures)	**70.2**	**83.3**	**χ^2 = 4.93***

Note. *ID*: Intellectual Disability Sample; *TD*: Typically Developing Sample; *Child IQ:* Stanford-Binet Intelligence Scale – Fourth Edition (Thorndike et al., 1986); *VABS:* Vineland Adaptive Behavior Scales (Sparrow et al., 1984).
*p < .05, **p < .01, ***p < .001.

Table 2

Descriptive Statistics: Variables Used in Longitudinal Models

Variable	**ID** ***(n=84)*** ***M (SD)***	**TD** ***(n=120)*** ***M (SD)***	***T-test value***
Age 6 Social Skills Raw	41.88 (12.18)	53.55 (10.34)	$t = 7.18^{***}$
Age 6 Social Skills SS	82.94 (17.20)	100.62 (16.53)	$t = 7.20^{***}$
Age 6 Academic Competence	85.14 (10.11)	101.70 (10.74)	$t = 9.45^{***}$
Age 7 Social Skills Raw	43.20 (12.22)	54.62 (9.91)	$t = 6.99^{***}$
Age 7 Social Skills SS	84.88 (17.47)	101.96 (16.10)	$t = 6.84^{***}$
Age 7 Academic Competence	86.87 (10.63)	101.26 (10.75)	$t = 8.14^{***}$
Age 8 Social Skills Raw	43.27 (11.52)	54.94 (10.27)	$t = 6.80^{***}$
Age 8 Social Skills SS	84.42 (16.77)	102.59 (16.51)	$t = 6.86^{***}$
Age 8 Academic Competence	87.91 (10.53)	101.98 (11.05)	$t = 7.56^{***}$
Age 9 Social Skills Raw	46.60 (10.05)	55.67 (10.16)	$t = 5.62^{***}$
Age 9 Social Skills SS	88.70 (16.51)	103.97 (16.41)	$t = 5.83^{***}$
Age 9 Academic Competence	85.94 (9.56)	102.35 (10.19)	$t = 9.38^{***}$
Age 13 Social Skills Raw	50.42 (10.61)	57.31 (9.89)	$t = 3.25^{**}$
Age 13 Social Skills SS	93.28 (13.29)	102.85 (14.06)	$t = 3.44^{**}$
Age 13 Academic Competence	88.92 (12.47)	100.43 (10.11)	$t = 4.23^{***}$

Note. ID: Intellectual Disability Sample; TD: Typically Developing Sample; *M* = mean; *SD* = standard deviation;
$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 3

Descriptive Statistics: Variables Used in Multivariate Regression Models

Variable	**ID** ***(n=84)*** ***M (SD)***	**TD** ***(n=120)*** ***M (SD)***	***T-test value***
Mother Report			
Age 6 Social Skills	82.94 (17.20)	100.62 (16.53)	$t = 7.20^{***}$
Teacher Report			
Age 6 Social Skills	89.54 (14.35)	103.44 (13.06)	$t = 6.10^{***}$
Age 6 Academic Competence	85.14 (10.11)	101.70 (10.74)	$t = 9.45^{***}$
Age 6 STRS	113.15(13.22)	121.41 (11.84)	$t = 3.99^{***}$
Youth Report			
Age 15 YSR Total Competence	36.82 (10.39)	47.32 (11.11)	$t = 4.67^{***}$
Age 15 SEARS Total	23.13 (6.33)	25.08 (5.28)	$t = 1.76^{\dagger}$

Note. Social Skills = Social Skills Rating System standard score for social skills; academic competence = Social Skills Rating System standard score for academic competence; STRS = Student-Teacher Relationship Scale – Total Score; YSR = Youth Self Report total competence T-score; SEARS = Social Emotional Assets and Resiliency Scale total raw score.

$^{\dagger}p < .10$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 4

Correlations Among Variables: Latent Growth Curve Models

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. SSRS-SSM age 6	1.0														
2. SSRS-SSM age 7	.83**	1.0													
3. SSRS-SSM age 8	.79**	.86**	1.0												
4. SSRS-SSM age 9	.70**	.76**	.83**	1.0											
5. SSRS-SSM age 13	.45**	.56**	.61**	.66**	1.0										
6. CBCL Ext. age 6	-.48**	-.49**	-.51**	-.43**	-.24*	1.0									
7. CBCL Ext. age 7	-.38**	-.48**	-.51**	-.43**	-.30**	.74**	1.0								
8. CBCL Ext. age 8	-.47**	-.51**	-.58**	-.52**	-.46**	.77**	.83*	1.0							
9. CBCL Ext. age 9	-.38**	-.48**	-.53**	-.54**	-.45**	.73**	.80**	.84**	1.0						
10. CBCL Ext. age 13	-.29**	-.37**	-.41**	-.39**	-.52**	.62**	.70**	.71**	.80**	1.0					
11. CBCL Int. age 6	-.26**	-.32**	-.32**	-.26**	-.23*	.50**	.35**	.44**	.36**	.32**	1.0				
12. CBCL Int. age 7	-.17*	-.31**	-.32**	-.30**	-.39**	.41**	.50**	.49**	.44**	.43**	.67**	1.0			
13. CBCL Int. age 8	-.32**	-.33**	-.41**	-.40**	-.37**	.45**	.46**	.61**	.49**	.42**	.67**	.73**	1.0		
14. CBCL Int. age 9	-.25**	-.36**	-.37**	-.37**	-.33**	-.45**	.42**	.55**	.59**	.43**	.65**	.72**	.76**	1.0	
15. CBCL Int. age 13	-.19**	-.30**	-.35**	-.28**	-.46**	.45**	.45**	.50**	.51**	.63**	.60**	.67**	.61**	.69**	1.0

Note. SSRS-SSM = mother-reported SSRS Social Skills raw score; CBCL Ext. = mother-reported Child Behavior Checklist externalizing behavior problems T-score; CBCL Int. = mother-reported Child Behavior Checklist internalizing behavior problems T-score.

* $p < .05$, ** $p < .01$.

Table 5
Correlations Among Variables: Cross-lagged Panel Models

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. SSRS-SSM age 6	1.0									
2. SSRS-SSM age 7	.83**	1.0								
3. SSRS-SSM age 8	.79**	.85**	1.0							
4. SSRS-SSM age 9	.70**	.76**	.83**	1.0						
5. SSRS-SSM age 13	.43**	.53**	.60**	.65**	1.0					
6. SSRS-ACT age 6	.38**	.33**	.33**	.37**	.31**	1.0				
7. SSRS-ACT age 7	.35**	.29**	.29**	.30**	.34**	.68**	1.0			
8. SSRS-ACT age 8	.40**	.34**	.37**	.36**	.32**	.64**	.74**	1.0		
9. SSRS-ACT age 9	.41**	.41**	.38**	.39**	.38**	.68**	.77**	.81**	1.0	
10. SSRS-ACT age 13	.31**	.32**	.37**	.34**	.28**	.64**	.65**	.53**	.61**	1.0

Note. SSRS-SSM = mother-reported SSRS Social Skills standard score; SSRS-ACT = teacher-reported SSRS Academic Competence standard score.
* $p < .05$, ** $p < .01$.

Table 6

Correlations Among Variables: Multivariate Regression Models

	1.	2.	3.	4.	5.	6.	7.	8.
1. SSRS-SSM age 6	1.0							
2. SSRS-SST age 6	.66**	1.0						
3. SSRS M-T age 6 mean	.89**	.82**	1.0					
4. SSRS M-T age 6 difference	-.20*	-.05	-.16	1.0				
5. SSRS-ACT age 6	.38**	.63**	.57**	-.06	1.0			
6. STRS age 6	.30**	.68**	.53**	.02	.43**	1.0		
7. YSR competence age 15	.29**	.36**	.38**	.00	.43**	.34**	1.0	
8. SEARS age 15	.17	.16	.23*	.08	.01	.11	.27**	1.0

Note. SSRS-SSM = mother-reported SSRS Social Skills standard score; SSRS-SST = teacher-reported SSRS Social Skills standard score; SSRS M-T mean = mean of mother-reported Social Skills standard score and teacher-reported Social Skills standard score; SSRS M-T difference = difference of mother-reported Social Skills standard score and teacher-reported Social Skills standard score; SSRS-ACT = teacher-reported SSRS Academic Competence standard score; STRS = Student-Teacher Relationship Scale – Total Score; YSR competence = Youth Self Report total competence T-score; SEARS = Social Emotional Assets and Resiliency Scale total score.

* $p < .05$, ** $p < .01$.

Table 7

Model Fit: Unconditional Growth Curve Models for Social Skills

Model fit	**Model A Intercept Only**	**Model B Linear**	**Model C Latent Basis**
RMSEA (90% C.I.)	.18 (.15-.22)	.07 (.02-.11)	.08 (.03-.13)
SRMR	.40	.09	.08
CFI	.88	.99	.99
TLI	.91	.99	.98
χ^2 (df)	97.81 (13)	19.36 (10)	15.80 (7)
p value	.00	.04	.03
$\Delta \chi^2$/df	--	78.45/3	82.01/6

Note. RMSEA = root mean square error of approximation; C.I. = confidence interval; SRMR = standardized root mean square residual; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; df = degrees of freedom; $\Delta \chi^2$/df = change in chi-square value and degrees of freedom from initial model.

Table 8

Model Fit: Final Growth Curve Model for Social Skills

Goodness of Fit Index	Final Model
RMSEA (90% C.I.)	.03 (.00-.06)
SRMR	.06
CFI	.99
TLI	.99
χ^2 (df)	39.72 (35)
p value	.27

Note. RMSEA = root mean square error of approximation; C.I. = confidence interval; SRMR = standardized root mean square residual; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; df = degrees of freedom; $\Delta \chi^2$/df = change in chi-square value and degrees of freedom from initial model.

Table 9

Standardized Parameter Estimates: Final Growth Curve Model for Social Skills

		Estimate	S.E.	Est./S.E.	*p* Value
Intercept	SSRS Age 6	.91	.02	61.56	.00
	SSRS Age 7	1.00	.02	54.22	.00
	SSRS Age 8	1.05	.03	37.46	.00
	SSRS Age 9	1.07	.04	26.65	.00
	SSRS Age 13	1.09	.08	13.79	.00
Slope by	SSRS Age 6	0.00	0.00	-	-
Slope by	SSRS Age 7	.14	.01	9.73	.00
Slope by	SSRS Age 8	.29	.03	9.37	.00
Slope by	SSRS Age 9	.44	.05	9.12	.00
Slope by	SSRS Age 13	1.04	.11	9.12	.00
Intercept on ID		-.35	.06	-5.52	.00
Intercept on SPED		-.18	.07	-2.45	.01
Intercept on EXT		-.22	.06	-3.91	.00
Intercept on INT		-.12	.06	-2.14	.03
Slope on SPED		.50	.09	5.78	.00
Intercept with Slope		-.55	.07	-7.70	.00

Note. S.E. = standard error; Est. = estimate; SSRS = mother-reported SSRS social skills raw score; ID = intellectual disability status; SPED = special education placement, age 6; EXT = externalizing behavior problems, age 6; INT = internalizing behavior problems, age 6.

Table 10

Model Fit: Panel Analyses of Social Skills and Academic Competence

Model fit	**Model A: Reciprocal Model**	**Model B: Social Skills-Driven Model**	**Model C: Academic Competence-Driven Model**	**Model D: Stability Model**
RMSEA (90% C.I.)	.04 (.00-.07)	.04 (.00-.07)	.03 (.00-.06)	.03 (.00-.06)
SRMR	.05	.06	.06	.06
CFI	.99	.99	1.0	.99
TLI	.99	.99	.99	.99
χ^2 (df)	39.01 (30)	43.84 (34)	39.62 (34)	44.55 (38)
p value	.13	.12	.23	.22
$\Delta\chi^2$/df	--	4.83/4	.61/4	5.54/8

Note. Note. RMSEA = root mean square error of approximation; C.I. = confidence interval; SRMR = standardized root mean square residual; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; df = degrees of freedom; $\Delta\chi^2$/df = change in chi-square value and degrees of freedom from initial model.

Table 11

Model Fit: Panel Analyses of Social Skills and Academic Competence with Covariates

Model fit	**Model E: AC-Driven with Covariates**	**Model F: Respecified AC-Driven with Covariates**	**Model G: Final Model**
RMSEA (90% C.I.)	.03 (.00-.05)	.03 (.00-.05)	.03 (.00-.05)
SRMR	.06	.06	.06
CFI	.99	.99	.99
TLI	.98	.98	.99
χ^2 (df)	100.88 (82)	104.35 (87)	106.44 (94)
p value	.08	.10	.18
$\Delta \chi^2$/df	--	3.47/5	5.56/12

Note. AC = academic competence; RMSEA = root mean square error of approximation; C.I. = confidence interval; SRMR = standardized root mean square residual; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; df = degrees of freedom; $\Delta \chi^2$/df = change in chi-square value and degrees of freedom from initial model.

Table 12

Parameter Estimates: Panel Analyses of Social Skills and Academic Competence

Path	Time Points	Model A: Reciprocal Model β (S.E.)	Model B: SS-Driven Model β (S.E.)	Model C: AC-Driven Model β (S.E.)	Model D: Stability Model β (S.E.)
Stability effects					
Social skills	Age 6-7	.94 (.03)***	.92 (.02)***	.94 (.03)***	.92 (.02)***
	Age 7-8	.91 (.03)***	.92 (.02)***	.91 (.03)***	.92 (.02)***
	Age 8-9	.91 (.03)***	.92 (.02)***	.91 (.03)***	.92 (.02)***
	Age 9-13	.67 (.07)***	.75 (.06)***	.67 (.07)***	.75 (.06)***
Academic competence	Age 6-7	.96 (.05)***	.96 (.05)***	.97 (.02)***	.97 (.02)***
	Age 7-8	.95 (.04)***	.94 (.04)***	.97 (.02)***	.97 (.02)***
	Age 8-9	.96 (.04)***	.95 (.04)***	.97 (.02)***	.97 (.02)***
	Age 9-13	.84 (.10)***	.84 (.10)***	.84 (.08)***	.84 (.08)***
Cross effects					
Social skills → Academic competence	Age 6-7	-.00 (.08)	.01 (.08)	--	--
	Age 7-8	.04 (.07)	.04 (.07)	--	--
	Age 8-9	.02 (.08)	.02 (.08)	--	--
	Age 9-13	-.01 (.14)	-.02 (.14)	--	--
Academic competence → Social skills	Age 6-7	-.04 (.06)	--	-.04 (.06)	--
	Age 7-8	.02 (.05)	--	.02 (.05)	--
	Age 8-9	.02 (.06)	--	.02 (.05)	--
	Age 9-13	.18 (.09)*	--	.18 (.09)*	--

Note. SS = social skills; AC = academic competence; β = standardized coefficient; S.E. = standard error.

†$p<.10$, *$p<.05$, **$p<.01$, ***$p<.001$

Table 13

Parameter Estimates: Panel Analyses of Social Skills and Academic Competence with Covariates

Path	Time Points	Model E: AC-Driven Model with Covariates β (S.E.)	Model F: Respecified AC-Driven Model with Covariates β (S.E.)	Model G: Final Model β (S.E.)
Stability effects				
Social skills	Age 6-7	.92 (.03)***	.92 (.03)***	.93 (.02)***
	Age 7-8	.90 (.03)***	.91 (.03)***	.92 (.02)***
	Age 8-9	.91 (.03)***	.91 (.03)***	.92 (.02)***
	Age 9-13	.68 (.07)***	.68 (.07)***	.68 (.07)***
Academic competence	Age 6-7	.98 (.02)***	.98 (.02)***	.98 (.02)***
	Age 7-8	.98 (.02)***	.98 (.02)***	.98 (.02)***
	Age 8-9	.98 (.02)***	.98 (.02)***	.98 (.02)***
	Age 9-13	.86 (.07)***	.86 (.07)***	.85 (.07)***
Cross effects				
Academic competence → Social skills	Age 6-7	-.00 (.05)	-.00 (.05)	--
	Age 7-8	.04 (.05)	.04 (.05)	--
	Age 8-9	.01 (.05)	.01 (.06)	--
	Age 9-13	.18 (.09)*	.18 (.09)*	.18 (.09)*
Covariates (with SS)				
ID status	Age 6	-.36 (.08)***	-.35 (.07)***	-.35 (.07)***
Family income	Age 6	.03 (.06)	--	--
Gender	Age 6	.06 (.06)	--	--
Special Education	Age 6	-.17 (.08)*	-.17 (.08)*	-.17 (.08)*
Externalizing	Age 6	-.22 (.07)**	-.22 (.07)**	-.22 (.07)**
Internalizing	Age 6	-.15 (.07)*	-.14 (.06)*	-.14 (.06)*
Covariates (with AC)				
ID status	Age 6	-.66 (.06)***	-.63 (.05)***	-.63 (.05)***
Family income	Age 6	-.27 (.06)***	-.25 (.06)***	-.25 (.06)***
Gender	Age 6	.03 (.06)	--	--
Special Education	Age 6	.05 (.08)	--	--
Externalizing	Age 6	-.13 (.06)*	-.09 (.06)†	-.09 (.06)†
Internalizing	Age 6	.08 (.06)	--	--

Note. AC = academic competence; β = standardized coefficient; S.E. = standard error.
†$p<.10$, *$p<.05$, **$p<.01$, ***$p<.001$

Table 14

Model Fit: Multivariate Regression Models

Model fit	Original Scores			Mean & Difference Scores		
	Model 1A	**Model 1B Covariates**	**Model 1C Respecified**	**Model 2A**	**Model 2B Covariates**	**Model 2C Respecified**
RMSEA (90% C.I.)	.00 (.00-.00)	.00 (.00-.00)	.00 (.00-.07)	.00 (.00-.00)	.00 (.00-.00)	.00 (.00-.07)
SRMR	.00	.00	.04	.00	.00	.02
CFI	1.0	1.0	1.0	1.0	1.0	1.0
TLI	1.0	1.0	1.05	1.0	1.0	1.13
χ^2 (df)	.00 (0)	.00 (0)	8.95 (10)	.00	.00	4.06 (6)
p value	0	0	.54	0	0	.67

Note. RMSEA = root mean square error of approximation; C.I. = confidence interval; SRMR = standardized root mean square residual; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; df = degrees of freedom.

Table 15

Parameter Estimates: Multivariate Regression Model, Original Scores

Outcome Variable	**Predictor Variable**	***β* (S.E.)**	**R^2**
YSR on	SSM Age 6	.00	.30 (.08)***
	SST Age 6	.00	--
	ACT Age 6	.26 (.10)**	--
	ID Status	.00	--
	Gender	.00	--
	Family income	-.26 (.09)**	--
	SPED	-.20 (.10)*	--
	STRS	.00	--
SEARS on	SSM Age 6	.00	.08 (.06)
	SST Age 6	.00	--
	ACT Age 6	-.10 (.11)	--
	ID Status	.00	--
	Gender	.00	--
	Family income	-.07 (.10)	--
	SPED	-.20 (.10)*	--
	STRS	.00	--
YSR with	SEARS	.25 (.09)**	--

Note. SSM = mother-reported SSRS Social Skills standard score; SST = teacher-reported SSRS Social Skills standard score; ACT = teacher-reported SSRS Academic Competence standard score; ID Status = intellectual disability status; SPED = special education placement, age 6; STRS = Student-Teacher Relationship Scale – Total Score; YSR = Youth Self Report total competence T-score; SEARS = Social Emotional Assets and Resiliency Scale total score.

†$p<.10$, *$p<.05$, **$p<.01$, ***$p<.001$

Table 16

Parameter Estimates: Multivariate Regression Model, Mean and Difference Scores

Outcome Variable	Predictor Variable	β (S.E.)	R^2
YSR on	SSM-SST Age 6 mean	.20 (.12) †	.32 (.08)***
	SSM-SST Age 6 diff.	.04 (.08)	--
	ACT Age 6	.18 (.11) †	--
	ID Status	.00	--
	Gender	.00	--
	Family income	-.28 (.09)**	--
	SPED	-.14 (.11)	--
	STRS	.00	--
SEARS on	SSM-SST Age 6 mean	.30 (.13)*	.15 (.08)*
	SSM-SST Age 6 diff.	.12 (.09)	--
	ACT Age 6	-.21 (.12) †	--
	ID Status	.00	--
	Gender	.00	--
	Family income	-.09 (.10)	--
	SPED	-.20 (.12) †	--
	STRS	.00	--
YSR with	SEARS	.22 (.09)*	--

Note. SSM-SST mean = mean of mother-reported Social Skills standard score and teacher-reported Social Skills standard score; SSM-SST diff. = difference of mother-reported Social Skills standard score and teacher-reported Social Skills standard score; ACT = teacher-reported SSRS Academic Competence standard score; ID Status = intellectual disability status; SPED = special education placement, age 6; STRS = Student-Teacher Relationship Scale – Total Score; YSR = Youth Self Report total competence T-score; SEARS = Social Emotional Assets and Resiliency Scale total score.
†p<.10, *p<.05, **p<.01, ***p<.001

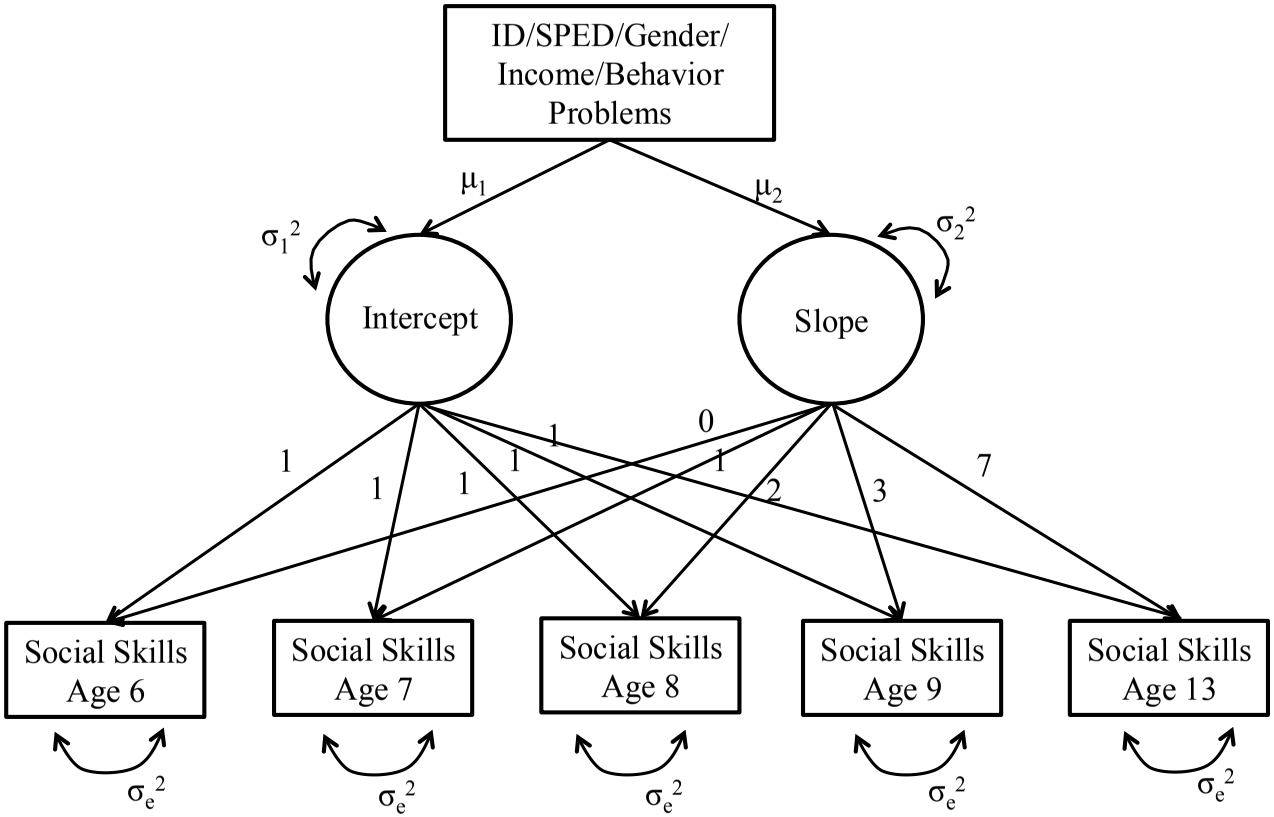

Figure 1. Proposed latent growth model of social skills over time.

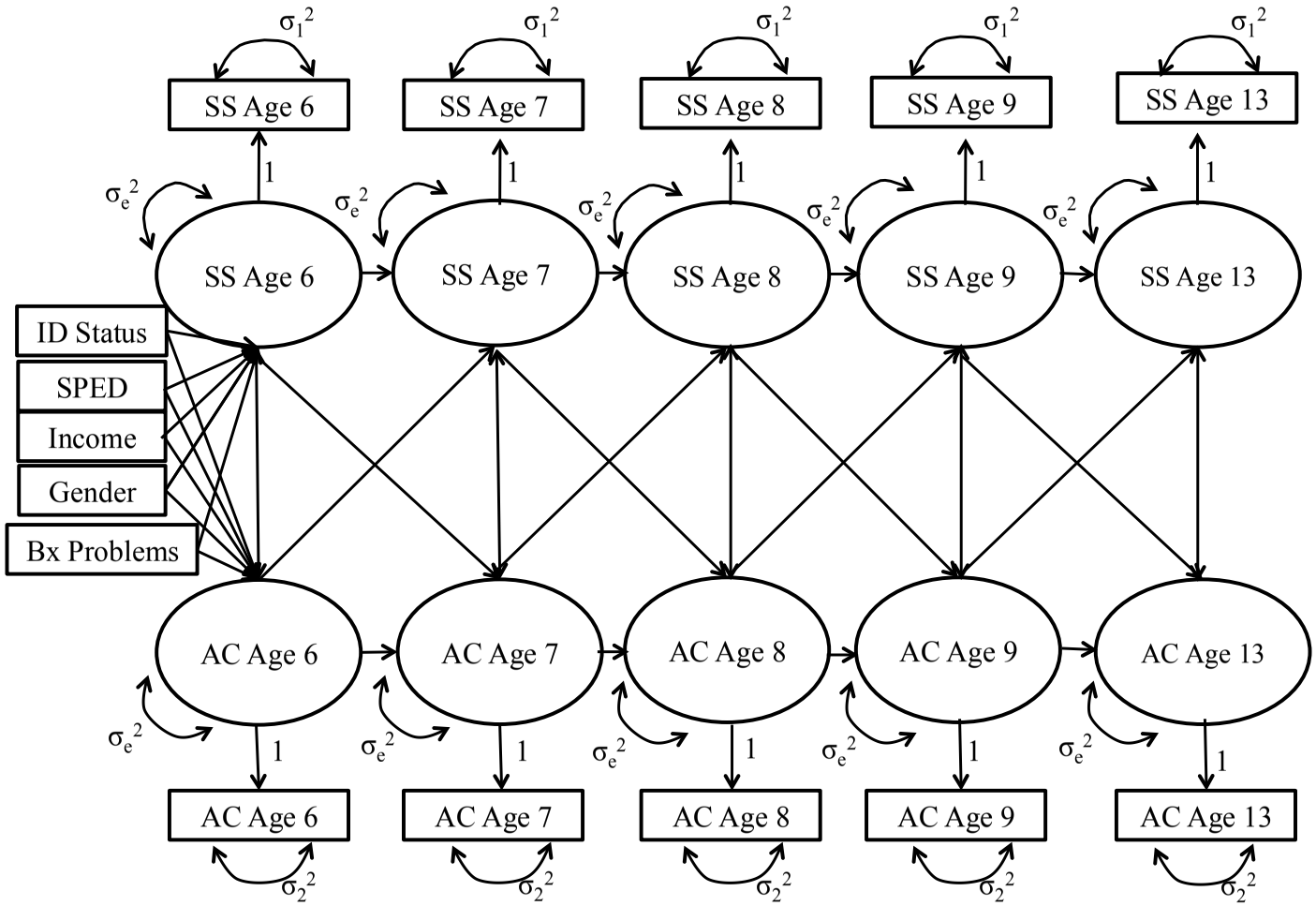

Figure 2. Proposed cross-lagged panel: Social skills and academic competence over time.
Note. SS: Social Skills; AC: Academic Competence.

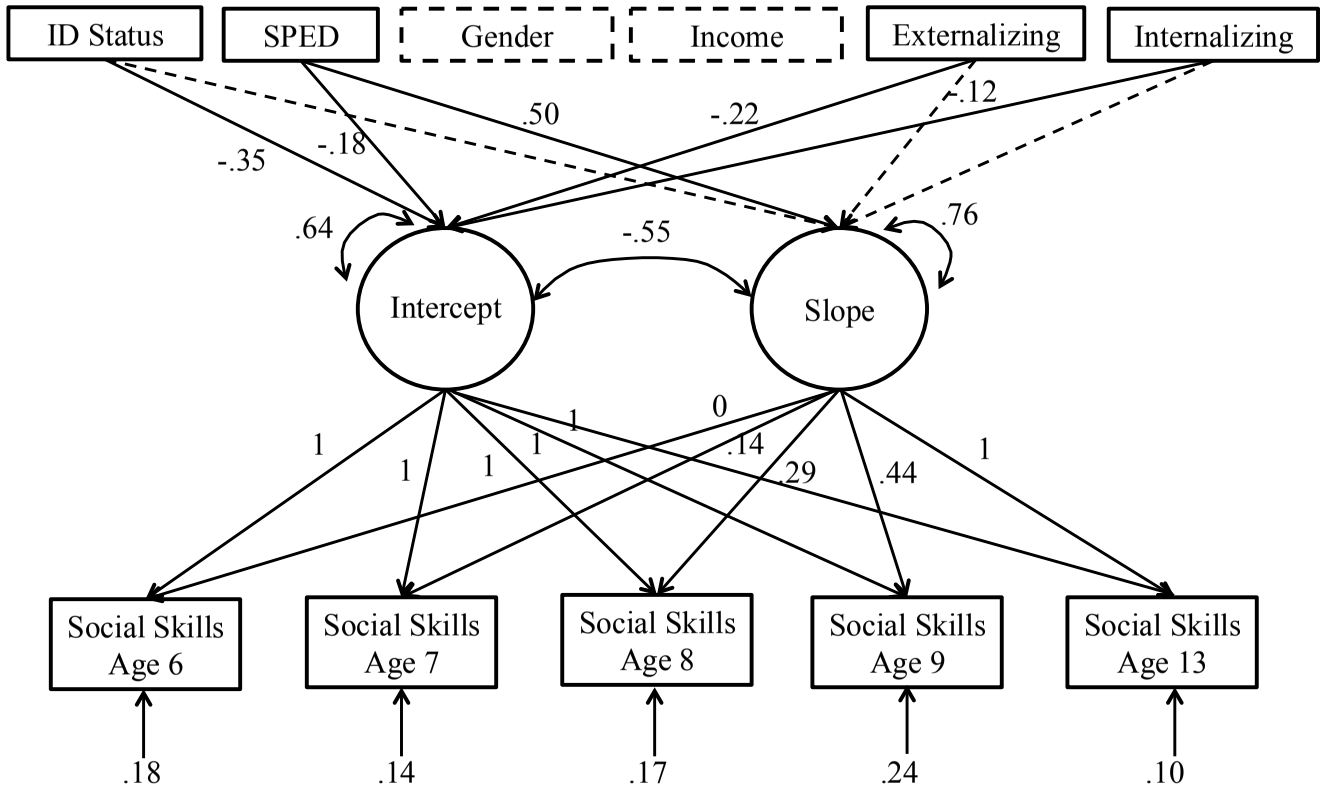

Figure 3. Final latent growth model of social skills over time.
Note. Dashed lines denote nonsignificant paths.

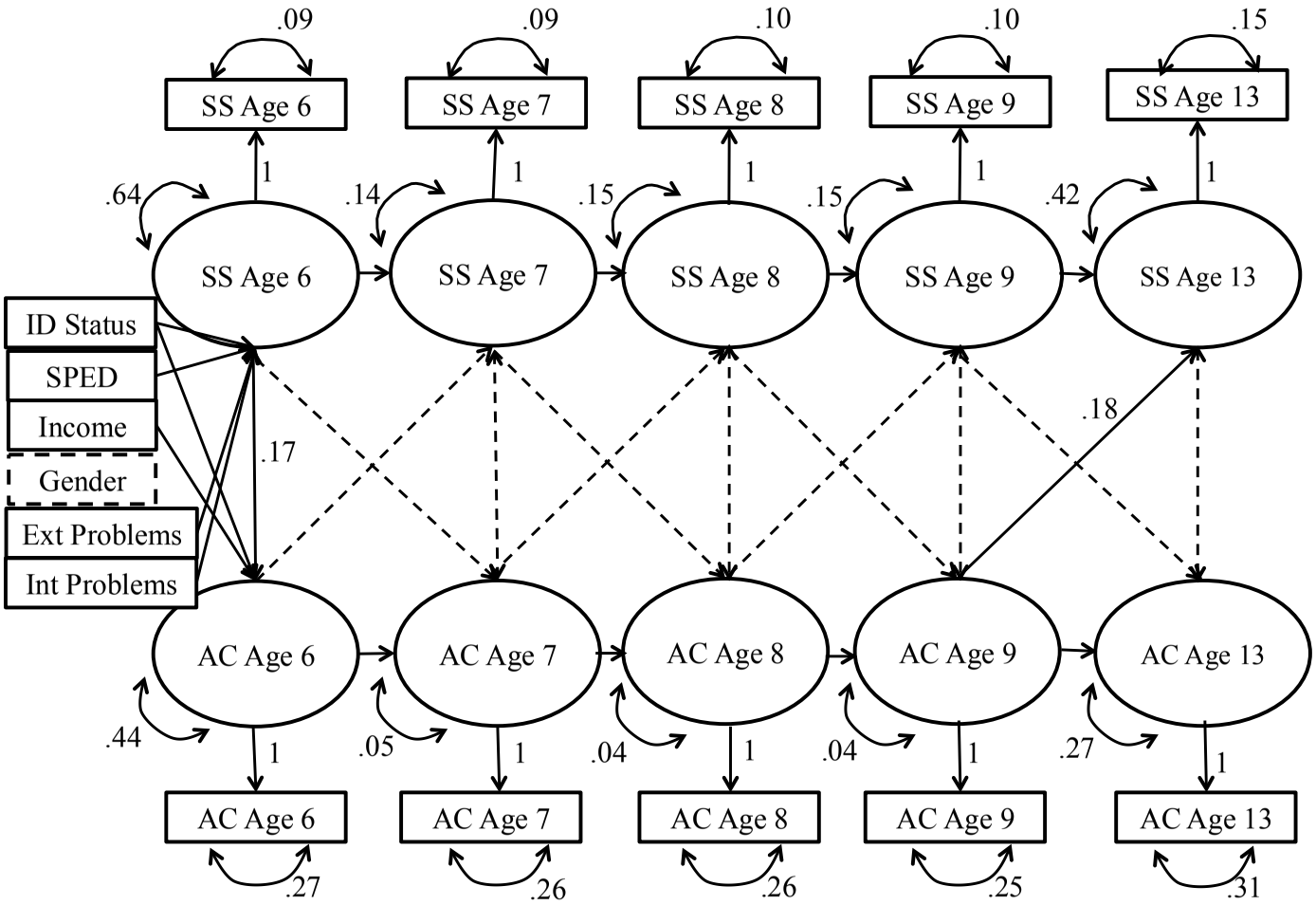

Figure 4. Final cross-lagged panel: Social skills and academic competence over time.
Note. Dashed lines denote nonsignificant paths. SS: Social Skills; AC: Academic Competence.