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# Examination of the relationship between specific classes of social skill behaviors and academic competence on the social skills improvement system rating-scales

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EXAMINATION OF THE RELATIONSHIP BETWEEN SPECIFIC CLASSES OF SOCIAL  
SKILL BEHAVIORS AND ACADEMIC COMPETENCE ON THE SOCIAL SKILLS  
IMPROVEMENT SYSTEM RATING-SCALES

A Dissertation

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
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Doctor of Philosophy

in

The Department of Psychology

by  
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May 2012

## DEDICATION

I would like to dedicate this document, and all of the hours of preparation associated with it, to my wife Kim Pippin Vance. Without your love and support I would not have been able to keep grounded on this journey and I will be forever indebted to you for that.

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## ABSTRACT

An individual's social competencies and interpersonal relationships have been repeatedly linked to a number of behaviors not typically directly associated with social skills including depression (Hokanson & Rupert, 1991) and aggressive behavior (McColloch & Gilbert, 1991). In addition to these more social behaviors, social skills have also been shown to be predictive of both risk and protective factors related to academic functioning (Newcomb, Bukowski, & Pattee, 1993; Parker & Asher, 1987). The current study aims to add to the literature by examining the relationship between teacher, parent, and self-ratings of specific classes of social skill behaviors and teacher ratings of externalizing behavior and academic competence in the classroom as rated on the Social Skills Improvement System-Rating- Scales (Gresham & Elliott, 2008a). Results suggest that teacher, parent, and student ratings of Social Skills related to Responsibility, Communication, and Cooperation, can be used to create a model with reasonable fit that adequately predicts academic achievement as rated by Teachers on the SSRS-IS when taking teacher ratings of externalizing problem behaviors into account. This adds to the literature by suggesting a starting place for targeted social skills interventions for students with academic difficulties.

## INTRODUCTION

An individual's social competencies and interpersonal relationships have been repeatedly linked to a number of behaviors not typically directly associated with social skills including depression (Hokanson & Rupert, 1991) and aggressive behavior (McColloch & Gilbert, 1991). In addition to these more social behaviors, social skills have also been shown to be predictive of both risk and protective factors related to academic functioning (Newcomb, Bukowski, & Pattee, 1993; Parker & Asher, 1987). Despite copious research detailing these relationships, there are still questions about exactly how these variables are interrelated, particularly the relationship between social skills and academic competence.

### Social Skills and Social Competence

Social Skills. A variety of definitions of social skills exist within the literature. Gresham and Elliott (1984) combined similar definitions and classified them into three distinct types including: a peer acceptance definition, a behavioral definition, and a social validity definition.

A peer acceptance definition of social skills is operationalized as a sociometric assessment of peer acceptance or popularity. In other words, within a peer acceptance definition, an individual who is regarded by their peers as being accepted or popular is considered to be socially skilled (Gresham, 1986). Although seemingly an objective definition that is measureable through sociometric assessment, a peer acceptance definition does not describe any specific behaviors that could lead to an individual being "socially skilled." As such, this definition is does not lend itself to designing interventions to improve an individual's deficient

social skills. In a peer acceptance definition of social skills, intervention design is difficult, since no particular behaviors are specified.

In a behavioral definition of social skills, social skills are described as situation specific behaviors that lead to social reinforcement while decreasing the probability of social punishment (Gresham, 1986). Unlike the peer acceptance definition, the behavioral definition allows for focusing on specific target behaviors that can be observed within the context of antecedents and consequences. This specificity allows for more detailed observation within naturalistic or role play situations and could provide useful information for intervention. Although the behavioral definition focuses on specific behaviors that contingently lead to a specific outcome, it does not necessarily suggest that these are essential socially significant behaviors with every individual, in all settings, and in every social interaction. For example, an individual who engages in appropriate conversational skills on the playground may not be seen as socially competent when continuing the same conversational skills during instruction after being repeatedly asked to stop. Specific behaviors that lead to reinforcement in one setting may not necessarily be reinforced in other settings. In this case, increasing the frequency of a targeted social behavior (appropriate conversation skills) may not lead to positive outcomes in all settings (Gresham, 1986).

Within a social validity definition, Gresham (1986) describes a definition that consists of a hybrid of the social acceptance and behavioral definitions. Social validity definitions are ones that describe specific behaviors used within specific situations that predict a variety of important social outcomes for individuals. These important social outcomes include: (a) peer acceptance or popularity, (b) significant others' judgments of social skill (e.g., teachers or parents), and/or (c) other social behaviors known to consistently correlate with (a) and (b) above. Like the behavioral definition, Gresham (1986) describes the social validity definition as one not only details specific

behaviors; but also goes further to discuss appropriate performances of these behaviors in particular settings and situations that lead to acceptance, similar to the peer acceptance definition.

Social Competence. Social validity definitions of social skills are closely linked to social competence. Unlike social skills, which are thought of as explicitly defined behaviors for use in accessing the social environment effectively social competence is an evaluative term based on external judgments of whether or not an individual has successfully completed a social task (Gresham, 1998; McFall, 1982). Unlike social skills, social competence consists of judgments about whether or not a given social behavioral performance was competent. Gresham, Sugai, & Horner (2001) suggested that social competence judgments can be based on a number of criteria including: the opinions of significant others (e.g., parents, teachers, and peers), comparisons to explicit criteria (e.g. rate of social behaviors performed as compared to a predetermined criteria), comparisons to a normative sample (e.g. standardized measures of social skills), or outcomes of social performance (e.g. peer acceptance, popularity, etc.).

Given the influence and pervasive use social validity definitions of social skills in relevant research (Caldarella & Merrell, 1997; Gresham, 1986), the following definition will be used throughout this paper: Social skills are a class of socially acceptable learned behaviors that an individual performs while successfully engaging in a social task (Gresham, 1998). Social skills can include a wide variety of behaviors such 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. Social tasks could include a number of situations where these skills could be utilized such as entering a group, sustaining a conversation, playing a game with peers, etc. When used appropriately in social tasks, social skills promote positive interactions, discourage negative

relations, and allow for an individual to be considered as socially competent (Gresham & Elliott, 2008a).

Common Social Skill Dimensions. Caldarella and Merrell used a behavioral dimensions approach to create an empirically based taxonomy of childhood and adolescent social skills by analyzing 21 studies of social skills conducted between 1974 and 1994 that used factor analyses to determine common social skills dimensions (Caldarella & Merrell, 1997). Caldarella and Merrell (1997) found that the five most common social skill dimensions contained behaviors that were seen as related to peer relations (e.g., stands up for rights of peers, initiates conversations, is sensitive to feelings of peers, makes friends easily), self-management (e.g., remains calm when problems arise, compromises when appropriate), academic (e.g., completes individual seatwork, uses free time appropriately, asks for assistance as needed, ignores distractions), compliance (e.g., following directions, responds appropriately to criticism), and assertion (e.g., questions unfair rules, introduces self to new people, expresses' feelings when wrong). Although this list is not exhaustive and several of the dimensions seem to overlap, it does provide a common taxonomy regarding the breadth of dimensions and behaviors that can be involved when conceptualizing social skills.

### Social Skill Deficits

When individuals are judged as being socially incompetent, it is judgment based on social skill deficits in performing important social tasks. Despite being behaviorally similar, social skill deficits can be distinguished as either acquisition deficits or performance deficits. This distinction is an important conceptual feature that can inform both assessment methodology and choices of intervention strategies.

Acquisition Deficits. When an individual is seen as having an acquisition deficit, they do not perform a specific social skill due to a lack of knowledge of how to perform the given skill. Even under optimal conditions with little competing reinforcers an individual with an acquisition deficit would not perform a target behavior because of a lack of knowledge or ability to complete the behavior appropriately (Gresham, 2002). Acquisition deficits are typically seen as “can’t do” deficits because the individual cannot perform a particular social skill under the most optimal conditions of motivation.

Assessment for acquisition deficits requires knowledge around whether or not an individual has ever actually engaged in a targeted behavior (appropriately or inappropriately). Ideally, the clinician would be able to directly observe this lack of performance of a targeted skill, but there are problems with relying on observations alone. While observational measures could show that an individual does not engage in a particular behavior in a particular situation, this lack of behavior does not necessarily indicate an acquisition deficit. An observed student may not raise his hand appropriately to ask for help in one classroom during an observation, but this does not necessarily suggest an acquisition deficit. The student could be preoccupied with other reinforced behaviors in that particular setting and could appropriately ask for help in other classrooms. Due to the broad nature of acquisition deficits, measures such as interviews and rating scales that indicate behavioral frequency are more aptly equipped to determine acquisition deficits (Gresham & Elliott, 2008b). An example of a rating scale that assesses behavioral frequency is the Social Skills Improvement System- Rating Scales (SSIS-RS; Gresham & Elliott, 2008a). In measuring social skills, the SSIS-RS operationalized acquisition deficits as items that were rated with frequency ratings of 0 (Never) and importance ratings of 1 (Important) or 2 (Critical).

Performance Deficits. When an individual is seen as having a social skill performance deficit, he or she does not perform a specific social skill at an appropriate frequency deemed acceptable even though the skill is present in the student's repertoire and the student has previously performed the targeted social skill in other situations (Gresham, 2002). Skill performance deficits are evident when individuals either do not employ appropriate social skills in given situations or at a frequency that is not acceptable or appropriate given a specific time or setting. Performance deficits could result from other existing difficulties related to social withdrawal, the existence of competing reinforcers for non-compatible alternative behaviors, or any other condition that results a lack of appropriate reinforcement for performing the skill. These deficits, typically referred to as "won't do" deficits, should be viewed primarily as motivational issues rather than acquisition issues. Using the same behavior mentioned above, a student with a performance deficit may only sometimes raise his hand to ask a question when other reinforcers are not present (performance deficit), but also could not be engaging in the same behavior because he has never been taught to appropriately ask for help (acquisition deficit). Gresham and Elliott (2008b) specify that social skill performance deficits using the SSIS-RS are social skills that receive a frequency rating of 1 (Seldom) and an importance rating of 2 (Critical).

Interventions for Social Skill Deficits. As previously mentioned, appropriate assessment of social skills can lead to differentiated interventions specific to the types of deficits presented.

Interventions for students with acquisition deficits require components of active teaching of how to perform the skill and should include direct instruction strategies such as coaching, modeling, behavioral rehearsal, and specific performance feedback (Elliott & Gresham, 2008). In the asking for help example, this deficit would be shown by a lack of engaging in appropriate



hand raising behavior in any class, under any circumstance. Interventions for this kind of deficit would include explicitly teaching the student to ask for help when realizing that he or she is having difficulty, and then reinforcing approximate attempts until the behavior occurs at a satisfactory level. Interventions for performance deficits should focus less on how to perform a particular social skill but instead on how to overcome competing reinforcers that may limit appropriate social skill use (Elliott & Gresham, 2008). For example, using an asking for help situation, a student who has a performance deficit would have been shown to engage in asking for help in other situations, but is not currently doing so appropriately. Interventions for this kind of performance deficit could include pre-correction techniques such as reminding students to ask for help when having difficulties, behavioral rehearsal, and consistent teacher responses that are reinforcing (possibly extra points for asking questions in class). These strategies are more closely linked to performance deficits than re-teaching how to appropriately ask for help. Interventions for performance deficits could also include self-control strategies, self-talk, and skill practice paired with getting contingent reinforcement for the successful completion of a social task (Elliott & Gresham, 2008).

Base Rates for Social Skill Deficits. Preliminary research examining the base rates of acquisition and performance deficits of social skills was conducted by Gresham, Elliott and Kettler in 2010 using the national normative sample of the Social Skills Improvement System-Rating Scales (SSIS-RS; Gresham & Elliott, 2008a). The authors examined over 4000 children and adolescents between the ages of 3 and 18 who were rated by a parent, teacher, or themselves on a general measure of social skills that were organized under the subdomains of communication, cooperation, assertion, empathy, responsibility, engagement and self-control. Raters determined whether target students engaged in the behaviors on a four-point scale of

never, seldom, often, and almost always. Additionally, raters determined whether the target behavior was important for the student's development or classroom success on a three-point scale of not important, important, and critical. Social skills performance deficits were defined as any behavior that was rated as seldom occurring but was critical to development of classroom success. Social skill acquisition deficits were defined as any skill that was both rated as never occurring and was rated as important or critical for classroom success. The researchers found that based on the normative sample less than 1% of all social skill deficits were acquisition deficits. This finding was replicated across raters and age groups (Gresham et al., 2010).

These data would suggest that improving social competence should focus less on teaching appropriate social skills, but instead providing appropriate situations where the individual can practice gaining access to reinforcement for appropriately using a social skill to complete a social task. Additionally, it would suggest teaching self-control and self-management behaviors to reduce the frequency of problematic incompatible alternative behavior that may be providing access to other reinforcement.

#### Importance of Social Skill Behaviors and Social Competence

Children and youth that have been judged as lacking social skills and/or social competence have repeatedly been shown to be at risk for a number of detrimental outcomes including school failure, school dropout, alcohol and substance abuse, delinquency, social rejection, victimization, and violence (Walker & Severson, 2002). Difficulties in interpersonal relationships have been shown to be characteristic of individuals with a wide array disabilities including attention deficit/hyperactivity disorder (Hinshaw & Blachman, 2005; Smith, Barkley, & Shapiro, 2007), emotional and behavioral disorders (Gresham, Cook, Crews, & Kern, 2004;

Maag, 2005; Walker & Gresham, 2003), mild mental retardation (Gresham , Reschly, & Carey 1987; MacMillan, Siperstein, & Gresham, 1996), and specific learning disabilities (Gresham, 1992; Gresham, MacMillan, Bocian, Ward, & Forness, 1998; Kavale & Forness, 1996). Outside of being related to disorders, deficits in social competencies are also part of the specific diagnostic criteria for an emotional disturbance under the Individuals with Disabilities Education Improvement Act (2004) and for a number classifications under the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV TR, American Psychiatric Association, 2000) including Autistic Disorder, Asperger's Disorder, Conduct Disorder, Oppositional Defiant Disorder, and Selective Mutism.

Relationship between Externalizing Behaviors and Academic Competence.

Hinshaw (1992) conducted a literature review as a means of exploring the relationship between two major problems of childhood that have been repeatedly shown to predict later maladjustment: externalizing behaviors and academic underachievement. Hinshaw 1992 described externalizing behaviors as ones that were evidenced by defiance, impulsivity, disruptiveness, aggression, antisocial behaviors, and overactivity. Within the scope of academic underachievement, Hinshaw (1992) focused primarily on reading at a level below what would be expected by the students IQ. He suggested that these two domains of externalizing behaviors and academic competence were related to a number of deficits including self esteem, difficulties with interpersonal relationships, and conduct problems, all of which contribute to major societal concerns (Hinshaw, 1992). After reviewing a number of epidemiological investigations, Hinshaw concluded that there were data to support a link between antisocial behaviors and IQ-discrepant reading deficits, but that these results were inconsistent across all reports. He suggested that there was a possibility that this was because some studies treated all antisocial

behaviors as similar rather than separating antisocial behaviors and hyperactivity. Hinshaw cited research suggesting that inattention and hyperactivity are more consistent correlates of underachievement than antisocial behaviors within grade-school children.

Similar to data from epidemiological investigations, after reviewing a number of clinical reports Hinshaw concluded that there was data to support that externalizing behavior was related to achievement related difficulties. He clarified this result suggesting that externalizing problem behaviors were more closely related to achievement difficulties that are not specifically underachievement but instead correlates such as retention or school suspension. For underachievement, as described by IQ-Achievement discrepancies, Hinshaw reported that hyperactivity and inattention were the most predictive externalizing behaviors.

Meltzer 1984 examined a sample of 53 early adolescents who averaged 15 years and had been sentenced to detention centers and compared them to a group of 51 junior high school students who averaged 14 years six months. The students were evaluated on a battery of educational assessments that included reading, writing, and spelling evaluations aimed at determining traditional grade-equivalents. Initial analyses showed that there were significant differences across the groups in areas of reading accuracy, reading comprehension, spelling and mathematics. In each, the delinquent group was on average multiple years behind the comparison group.

In addition to more traditional measures of academic achievement, Meltzer et al. (1984) also assessed the occurrence of early educational failure through parental questionnaires. Parental reports suggested that by second grade, 45% of delinquent children were reportedly delayed more than a year in reading, 38% were delayed more than a year delayed in spelling, and

36% were delayed more than a year in handwriting as opposed to only 14% of the comparison group being a year or more delayed. The authors additionally found that as much as one third of the delinquent students had been retained by third grade.

Though parental reports and unstandardized measures of academic competence are not necessarily rigorous enough to make any definitive comments regarding the relationship between academic competence and externalizing problem behaviors, data collected by Meltzer et al. (1984) suggests that there is a relationship between problem behaviors and long term academic achievement.

Richards, Symons, Greene and Szuskiewicz (1995) examined the relationship between externalizing behavior problems and academic achievement with students who were classified as having learning disabilities. The parents and teachers of 43 students who were receiving services within a private residential school for students with learning disabilities were asked to complete parent ratings of the Children's Attention and Adjustment Survey (CAAS; Lambert, Hartsough, & Sandoval, 1990) and the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1986) to examine what the authors hypothesized was as a bidirectional relationship between academic achievement and externalizing behaviors. The sample was made up of two cohorts, one who was in their first year at the residential school and one who was in their second year. Academic achievement measures were based on scores on reading, spelling and arithmetic subscales of the Wide Range Achievement Test-Revised (WRAT-R; Jastak & Wilkinson, 1984) and were collected once for the first cohort and twice for the second cohort. After data collection Richards et al. (1995) conducted hierarchical regression analyses to predict behavior problems based on achievement scores controlling for background variables (i.e. IQ, Age, gender, race, SES). The data suggested that when taking into account background variables externalizing behaviors as

rated by teachers and parents did not significantly predict academic achievement, but when looked across multiple years changes in academic achievement as rated by the subscales of the WRAT-R (Jastak & Wilkinson, 1984), externalizing behaviors did predict changes in academic achievement when all background variables were taken into account. Teacher reports of externalizing behaviors in year one were associated with 39% of variance of reading achievement in year two as measured by reading subscales of the WRAT-R (Jastak & Wilkinson, 1984)

Nelson, Benner, Lane, and Smith (2004) conducted a cross-sectional study to examine the relationship between academic achievement and emotional/behavioral disorders (EBD) using a sample of 155 students between kindergarten and 12<sup>th</sup> grade who were receiving special education services under the exceptionality of emotional disturbance. The researchers examined dependent measures that included social adjustment as rated by the Child Behavior Checklist: Teacher Report Form (TRF; Achenbach, 1991 ), Academic Achievement as rated by the Broad Reading, Broad Math, Math Calculation Skills, Written Language, and Written Expression clusters of the Woodcock Johnson III (WJ-III; Woodcock et al., 2001), and student records that included information on hours of special education services, and mean IQ scores as measured by the Wechsler Intelligence Scale for Children, Third Edition (WISC-III; Wechsler, 1991).

In regards to academic achievement as rated by the WJ-III cluster and subtest scores the researchers created effect size deficits for the total, broad reading, broad math, and broad written language clusters. Nelson et al. (2004) showed that group membership had an effect size discrepancy of roughly .94 on all of the WJ-III clusters when compared to the normative sample. These data suggest that the sample's average score in all of the WJ-III clusters was almost a full standard deviation below peers in the normative sample. Additionally their data suggests that as

many as 83% of the sample students scored below the mean of the norm group across the content areas.

In a series of regression analyses, Nelson et al. (2004) examined the relationship between externalizing behavior (TRF delinquent behaviors, aggressive behaviors, and attention problems bands), internalizing behavior (TRF withdrawn, somatic complaints, anxious/depressed, social problems, and thought problem bands), and the WJ-III scales related to broad reading, broad math, and broad written expression cluster scores. The authors found that TRF aggression, delinquent, and attention problems significantly contributed to the prediction of reading ( $r^2 = .14$ ,  $p < .000$ ), written language ( $r^2 = .14$ ,  $p < .000$ ) and mathematics achievement ( $r^2 = .14$ ,  $p < .000$ ) when entered both in the final position in the regression. The researchers report that this would suggest that students who are already labeled as E/BD who exhibit externalizing problem behaviors were more likely to experience achievement problems than those who exhibit primarily internalizing problems as rated by the TRF. Though this research was conducted only with students who had been previously labeled as requiring services for an Emotional/Behavioral Disorder, it does show that, for this population, academic achievement is related to constructs of externalizing behaviors (attention, aggression, and delinquency) while not as directly related to internalizing problems.

Nelson, Benner, and Neill (2006) used structural equation modeling to test the interrelationships between externalizing behavior, academic fluency and academic skills. The authors examined externalizing behavior as measured by the delinquent behavior, aggressive behavior and attention problem narrow bands of the Child Behavior Checklist: Teacher Report Form (TRF; Achenbach, 1991). The authors measured academic fluency utilizing the Math Fluency, Reading Fluency, and Writing Fluency (WJ-III Academic Fluency cluster) subtests of

the Woodcock Johnson-III tests of Achievement (WJ-III; Woodcock et al., 2001). They measured overall academic skills utilizing the Woodcock Johnson Academic Skills cluster on the WJ-III. Nelson et al. (2006) examined these factors for 126 students between Kindergarten and 12 grade who were receiving special education services for an Emotional Disturbance. The model demonstrated that language skills were significantly related to academic skills. Additionally, their results showed suggested academic processing speed was negatively related to externalizing behavior, which did not have an initial direct effect on academic skills and mediated its effects on academic skills. Additionally the results showed that academic processing speed was positively related to academic skills and mediated its effects on academic skills.

Benner, Nelson, and Allor (2008) examined the relationship between externalizing behavior and academic skills for students with a labeled emotional disturbance, after language skills and academic fluency were taken into account. The researchers examined 166 students who were between kindergarten and 12<sup>th</sup> grade and who were receiving services for an emotional disturbance. Data was collected on externalizing behavior as measured by the CBCL Teacher Report Form (Achenbach, 1991), Academic Processing Speed as measured by the Woodcock Johnson III Tests of Achievement (Math Fluency, Reading Fluency, and Writing Fluency; Woodcock et al., 2001), Academic Skills as measured by the Calculation, letter word identification and spelling subtests of the WJ-III, and language ability as measured by the Clinical Evaluation of Language Fundamentals, Third Edition (CELF-III; Semel, Wiig, & Secord, 1995) and receptive and expressive language as measured by the WISC-III (Wechsler, 1991). Regression analyses were run and found that there was a statistically significant ( $p < .05$ ) relationship between externalizing behavior and academic processing speed but the relationship



between externalizing behavior and academic skills was not statistically significant ( $p > .05$ ). Benner et al. (2008) suggest that this lack of a direct effect on academic skills is related to a mediating effect brought on by processing speed.

While all the aforementioned studies did show that there was a relationship between teacher ratings of externalizing behavior and academic competence there is some question as to what the relationship is when other factors such as processing speed, attention span, and hyperactivity is taken to account. As Hinshaw (1992) proposed, several of the results suggest that there are factors such as hyperactivity that are similarly related to both externalizing behaviors and academic competence that may be mediating the relationship between the two (Benner et al. 2008; Nelson et al., 2006). Another concern with these studies is the primary use of students who have already been identified as having an emotional disturbance. This restriction of range reduces the ability to make comments about how these behaviors (that both students with and without labels) engage in relates to academic competence.

#### Relationship between Social Behaviors and Academic Competence

Research has repeatedly demonstrated the relationship between social skills and academic functioning (Kupersmidt, Coie, & Dodge, 1990; Parker & Asher, 1987; Wentzel, 1993) but the directionality and boundaries of this relationship are still questioned.

Coie and Krehbiel (1984) examined the effects of several interventions including academic tutoring, social skills training, and a combination of the two with 40 third grade students who were low-achieving and socially rejected. The authors discovered that academic skills training was effective in improving academic achievement as measured by a statewide standardized achievement test. Additionally, academic skills training was related to the amount

of time spent working on task and with reductions in amount of time spent off task. Students in the academic skills only training group did not change in the amount of time engaged in social interactions, but their scores on sociometric ratings increased from socially rejected status to mirroring children of average status. At post test all three groups had significantly higher reading comprehension than the control group. Students in the social skills training only group had marginally higher ( $p < .06$ ) reading comprehension scores than students who had not received any intervention at a one year follow up. Additionally, the two groups who received academic intervention maintained the same social status achieved at the end of the intervention at a year follow up as compared to those in the control group. Coie and Krehbiel (1984) hypothesized the following two possible relationships between academic functioning and social skills. The first was that academic functioning leads to greater participation in class and increases positive attention both from teachers and peers which in turn leads to self-esteem, making students more pleasant in general to be around. The second hypothesis was improved classroom behavior leads to a more appropriate social status which in turn leads to less time spent off task, allowing for more time to appropriately engage in their work (Coie & Krehbiel, 1984).

In addition to examinations of Coie and Krehbiel's (1984) two possible relationships, research has also examined the possibility of a reciprocal model (e.g. Chen, Rubin, & Li, 1997; Welsh, Parke, Widaman, & O'Neil, 2001).

Wentzel (1991) reviewed the literature to examine the relationship between "social responsibility" and academic achievement. Wentzel defined classroom based social responsibility as an adherence to social rules and role expectations and suggested that it could be seen in behaviors related to cooperation, respect for others, participation in activities and

responsibility following rules and norms for student roles. Though she spoke of social responsibility as an implicit goal for education, she reviewed the literature and suggested that “social responsibility” was critical factor in learning and academic performance. A student’s ability to cooperate and collaborate in a learning environment, she suggested, was associated with an increase in intellectual development and improvement in academic competence.

Based on her review in 1991, Wetzel (1993) examined the relationship between prosocial behaviors in the classroom and academic achievement. The study looked at correlational findings between prosocial and antisocial behavior and academic behavior for 423 students who were in either the 6<sup>th</sup> and 7<sup>th</sup> grade. Wentzel aimed at examining several hypotheses about why social behavior could be related to academic outcomes: (a) Social behaviors could be related to academically relevant behavior that contribute to learning, (b) Classroom behavior can influence teacher preferences and impact the quality of teaching, (c) Behaving responsibly could make a direct contributing to academic achievement. Wentzel collected data related to GPA, teacher and peer sociometrics, teacher ratings of related to academically relevant behaviors (i.e. how often does this student work independently?), teacher preference ratings, Stanford Test of Basic Skills (STBS: Stanford 7 Plus Form; Harcourt, Brace, 1987) and demographic data. Results from multiple regression analyses suggested that both prosocial and antisocial behaviors were predictors of GPA and also that pro-social behaviors were a statistically significant ( $p < .05$ ) predictor of STBS scores even when academic behavior, teacher preference of students, IQ, and days absent from school were taken into account.

Social Skills as Academic Enablers. One possibility that could explain the relationship between academic and social competence is that social skills are one of a series of Academic Enablers. DiPerna and Elliott (2002) described academic enablers as “attitudes and behaviors

that allow a student to participate in, and ultimately benefit from academic instruction in the classroom” (DiPerna & Elliott, 2002 pp. 294). The authors hypothesized that these enablers include broad factors such as motivation, interpersonal skills, engagement, and study skills. These enablers can influence the academic behaviors that are typically viewed as primary educational outcomes. While behaviors such as reading, mathematics, and critical thinking skills are typically the main focus of instruction, an appreciation of academic enablers’ leads to questions of whether or not they should consistently be the sole focus of intervention.

Welsh, Parke, Widaman, and O’Neil, 2001, examined a longitudinal set of data that included sociometric and academic information for 163 children across three years. These researchers examined data related to positive social behaviors (summed teacher and peer ratings how much a child was liked, summed teacher and peer ratings of prosocial behavior, and overall measure of social acceptance), negative social behaviors (summed teacher and peer ratings of how much a child was disliked, summed ratings of aggressive behaviors), and academic competence (language report cards, math report cards, and a teacher completed measure regarding work habits). The findings showed that academic competence continuously influences social competence over time and that a significant path relationship between social competence and academic competence exists for some grades but not others.

DiPerna, Volpe, and Elliott (2001), examined one theoretical model for describing this relationship with teacher ratings of 394 students from primary and intermediate grades. Within their model they included two exogenous latent variables (prior reading achievement, and interpersonal skills) and four endogenous latent variables (motivation, study skills, engagement, and current reading achievement). All indicators were constructed as single measure items completed by teachers using two different subscales of the Academic Competence Evaluation

Scales (DiPerna & Elliott, 2000). The model was tested both for primary students (n=192) and for intermediate students (n = 202) and was shown to have a reasonable fit for both samples. Their model showed that prior reading achievement and engagement had the greatest direct effects and that study skills had a more significant role in promoting achievement in the intermediate group.

Ray and Elliott (2002) examined the relationship between social support, as measured by self-concept, social skills, and perceived social support, and performance on academic achievement tests with 77 fourth and eighth grade students. A latent variable labeled Social Adjustment was made up by three variables based on students' scores on the Child and Adolescent Social Support Scale (Malecki, Demaray, & Elliott, 2001), the Student Self-Concept Scale (Gresham, Elliott, & Evans-Fernandez, 1993) and teacher ratings on the SSRS-Teacher Form (Gresham & Elliott, 1990). A latent variable measuring Academic Achievement was created using scores on a series of standardized achievement tests (Wisconsin Knowledge and Concepts Examinations; Wilson Department of Public Instruction, 2005). Teacher ratings of academic competence were seen as an endogenous variable with paths both academic achievement and social adjustment. The original model did not have an adequate fit and was replaced with a new model that did not include perceived social support. The new model had provided a better fit, but even after the student rating of self-concept had been removed, teacher ratings of social skills had a higher path coefficient than the student to social adjustment.

## ASSESSMENT OF SOCIAL COMPETENCE AND MEASUREMENT OF SOCIAL SKILLS

Due to the long-ranging effects of adequate social competence (both as a predictor of long term outcomes and as a means of gaining access to appropriate interventions and services), the ability to accurately measure both social skills and social competence is necessary. Additionally, if skill or competence deficits are apparent, the timely and accurate assessments of hypothesized reasons for those social deficits is imperative so that appropriate, timely interventions can be implemented. Given the range of possible social competence judgments suggested by Gresham, Sugai, and Horner (2001) including opinions of significant others, comparisons to explicit criteria, comparisons to normative samples, or outcomes of social performance, there are a number of methods employed in which one can assess social skills.

A position statement from the National Association of School Psychologists (NASP) suggests that school psychologists be able conduct assessments so that they can aid in: 1. Routine classroom decisions, 2. Screening decisions, 3. Problem identification and certification, 4. Problem analysis for instruction/intervention planning, 5. Program evaluation and accountability, and 6. diagnostic and eligibility decisions (NASP, 2009). Given this variety of functions behind assessment, NASP advises that school psychologists are highly qualified to perform a variety of assessments so that the information can contribute to data based decision making and enhance child outcomes (NASP, 2009).

Broadly, there are two separate types of assessments: direct and indirect. Within direct assessment, the assessor observes a target behavior as it occurs. These direct observations typically deal with behavioral constructs that are easily quantifiable such as number of digits

correct, frequency of behavior, or latency between behavioral events. These types of assessments convey a large amount of information about a limited space in time.

Indirect assessments include observations and ratings that are not necessarily completed in the same temporal space as the behaviors occurrence. Though indirect assessments don't necessarily convey the same depth of information as direct observations, they can provide a broader overview of the behavior outside of a small space in time. For example if direct observations miss the occurrence of a particular problem behavior, teacher and parent ratings could give a more accurate representation of how frequently the target behavior happens.

#### Direct Methods

Naturalistic/Descriptive Observation. Within naturalistic/ descriptive observation, the observer enters a situation and observes a target student. During these observations, the observer records of any behavior of note, with no pre-specified expectations. The most common method for recording behaviors is from anecdotal reports where the observer provides a detailed description of what behaviors the target student engaged in as well as any context related to the behavior. In a report on Assessment Training and Practice using a survey of over 1000 school psychology practitioners, Wilson and Reschly (1996) reported that anecdotal observations was the 5<sup>th</sup> most frequently used assessment instrument in a survey of over 1000 school psychology practitioners (Wilson & Reschly, 1996).

Systematic Direct Observation (SDO). Systematic Direct Observation involves operationally defining a target behavior and observing/measuring that behavior using standardized procedures as it occurs in a predetermined setting and then summarizing data in a manner that doesn't change with multiple observers (Salvia & Ysseldyke, 2004). In the

previously mentioned survey, Wilson and Reschly 1996 found that structured observations were the most frequently used assessment instrument in a survey of over 1000 school psychology practitioners. Using SDOs, social behaviors can be measured on a number of behavioral dimensions, including frequency (e.g. how often a student approaches a conversation), duration (e.g. how long a student can engage in positive conversation), latency (e.g. how long does a student wait before asking a question) and intensity (e.g. how loudly a student talks to a peer in close proximity). Given the direct nature of observation, measurement can only take during a definable period of time where the observer can monitor the target behavior. Whether data are collected using duration, event recording, whole interval, partial interval or time sampling methods systematic direct observations can give the most accurate measure of a target behavior as it occurs. Despite the accuracy of direct observations when observers are reliable and detailed in defining and recording target behaviors SDO is not necessarily the most socially valid method of assessment.

Hintze and Matthews (2004) conducted a generalizability study of systematic direct observations across both settings and time with data collected on 14 fifth grade students. Using a momentary time-sampling method, data was collected on each student for 15 minutes twice a day for ten consecutive instructional days. At each 15 second interval, the rater noted whether the target student was on-task or off-task. Hintze and Matthews (2004) found that even after two weeks of data collection, adequate levels of reliability could not be achieved, and for most students there was not a stable state of responding. The authors suggested that this was probably due to a combination of internal states and environmental variability that existed during every observation. Results showed that traditional methods of reliability can be difficult to achieve



with SDO even with straightforward definitions of target behaviors and a large number of observations.

In addition to a lack of traditional reliability, systematic direct observations do not take into account any historical use of behaviors. A student performing a target behavior infrequently within a direct observation session does not necessarily suggest that the student is unable to perform a particular target behavior or even does not typically perform the target behavior in the same setting only that the behavior did not occur during the specified observation period.

Lastly, because SDO requires that the behaviors must take place in the student's natural environment, SDO of social behaviors require the observation of social tasks in which the student has an opportunity to engage in specific social skill behaviors. For example, if measuring appropriate entry into conversation, the opportunity to enter a new conversation has to occur. If a student is engaged in conversation for the entire observation period, they may be engaged in appropriate social skills but never have the opportunity to engage in the target behavior.

Specifically in relation to using SDOs to ascertain social competence, it is the case that though some individuals may engage in what may be considered appropriate social behaviors (behaviors targeted for observation), and these may not account for all of the variance of how a judgment about social competence is made. Ability to perform and routinely engaging in appropriate social skills doesn't necessarily make a person socially competent. For example, a person may be judged poorly on socially valid measures such as sociometric data and parent, peer, and self-ratings (Gresham, 1983) despite performing appropriately performing a target behavior.

## Indirect Methods

Interviewing. Interviews are an indirect measurement of behavior that can be used with the target student, or with the student's peers, teachers, or parents. Though this method can range in format from structured to unstructured, which can lead to limited reliability, the interviewer may gain a sense of not only the interviewees opinion of a target individuals social competence but also develop some hypotheses about why an individual engages in or refrains from performing particular social skills. Therefore, interviews may be an appropriate first step when deciding upon a target behavior as a means to understand what an invested party feels is the most important aspect of a behavior as well as what are some possible solutions /replacement behaviors.

Peer Referenced Assessments: Sociometric Ratings/ Peer Assessment. Sociometric ratings and peer assessments are indirect measures of social competence where a group of concerned parties (teachers, peers) rate or nominate other individuals based on fit to a particular question that is typically related to social status (e.g. Who would you most like to be friends with, Who is the least liked person in the class, etc.). Regardless of the existence of peer ratings on items such as, "Who has the fewest friends in your class or who talks the least?" sociometric measures generally do not directly relate to specific behavioral criteria, but instead are meant to gauge a group of rater's general attitudes and preferences in other people. When used with an entire classroom, sociometric measures can provide an authentic measure of a student's general social status based on the opinions of those who they most frequently interact with (Asher & Hymel, 1981; Gresham & Elliott, 1990). In addition to being an authentic measure of how a student is viewed by significant others, some research suggests that sociometric ratings can be

stable measures and may be predictive of long-term social outcomes (Coie, Dodge, & Coppotelli, 1982; Coie & Dodge, 1983; McConnell & Odom, 1986).

Despite being an accurate measure of how an individual is currently perceived by other people and possibly a fair measure of social competence, research has shown that individuals who are accepted and rejected are not necessarily on opposite ends of the social skills spectrum (Gresham & Elliott, 1984). Therefore, there could possibly be multiple dimensions of sociometric status.

Gresham and Stuart (1992) examined the stability of sociometric status classification for 137 children enrolled in grades K-4. Children were nominated as liked most/ liked least and z-scores were created to get an overall social preference and social impact score. The results showed that sociometric status classification had moderate stability over a one year interval with stability coefficients ranging between .45 and .6. Reclassification of students rated as neglected was shown to be as high as 30% and rejected as high as 17.6% of their sample of 137. Although long-term instability is present in sociometric data, the sociometric ratings may not be an accurate measure of how a person is able to perform specific social skill behaviors, and is thus not an appropriate measure for creating targeted interventions. Since sociometric status may or may not be a measure of how person is able to perform specific skills, it is entirely possible that a person who is able to appropriately socially interact is still disliked; or contrarily, a student who engages in inappropriate social behaviors could be well liked. Therefore, sociometric ratings are not utilized as the primary means by which researchers and practitioners measure social skills using a social validity type definition.

Normative Ratings of Social Skill Behaviors. Unlike naturalistic observations, behavior ratings are indirect measures of specific behaviors that require the rater to rate the occurrence of behavior outside of the original setting. Similar to sociometric ratings, composite ratings on these scales can take into account a number of behaviors. Unlike sociometrics and SDO, these ratings are normative in nature and take into account specific behaviors rather than general impressions about an individual.

McConaughy & Ritter (2002) suggested a number of advantages of using normative data when describing best practices in the assessment of emotional and behavioral disorders that can apply to ratings examining social skill use and broader social competency including that the following. First information is quantifiable (reliability/validity analyses). Second they allow assessment of a broad range of behaviors (multiple social skills, academic skills, problem behaviors). Third, the information is organized in systematic way. Fourth, empirically based syndromes cluster problems. Fifth normative data provide standard for judging behaviors across a large sample of individuals both with and without concerns. Sixth, (6) rating scales can typically be completed and scored quickly. Seventh sets of related scales can be used to compare similar data/types of data across multiple informants.

Interviewing can assess social competence by evaluating the opinions of significant others, systematic direct observations can investigate social competence in relation to explicit criteria, behavior rating scales can assess social competence through comparisons of an individual to normative data, and sociometric ratings could be an authentic outcome related to an individual's social performance. While each method may provide useful information when assessing social skills and an individual's social competence, there are unique advantages and disadvantages for each.

## ASSESSMENT OF ACADEMIC COMPETENCE

Similar to measures of problem behaviors and social skills, academic competence can be assessed using both direct and indirect methods. Levels of academic functioning can be determined by using direct measurement of academic skills such as oral reading fluency, reading comprehension, and measures of math fluency such as digits correct per minute. These direct measurements of specific behaviors learned in the classroom are assessed to gain a better understanding of a student's academic functioning on specific skills. In addition to direct assessments that target specific skills, direct assessments around academic competence can also include broader measures of academic competence such as criterion based tests and standardized and norm referenced measures such as achievement tests. While these direct measures don't necessarily give as precise an explanation of what skills a student does or does not have they can be used as a way to gauge how a student is doing broadly on a number of skills related to expected academic achievement.

In indirect measures of academic skills can be ascertained by collecting reports from significant informants such as teachers, parents, and peers. Though these reports don't necessarily provide the same information as direct measures, they have been shown to be an easy and predictive way to get a broad measure of how a student is performing in a classroom. In addition to being economical and easily administrable research suggests that teacher judgments around academic competence can be good predictors of more direct measures of academic functioning.

Hoge and Coladarci (1989) reviewed 16 published studies conducted between 1971 and 1988 where teacher judgment of academic performance and student test data were both collected

concurrently. Across the 16 studies Hoge and Coladarci found that there were moderate to strong associations between student achievement and teacher judgments. Nine of the studies included indirect evaluations of student performance such as teacher ratings of ranking of achievement levels to standardized achievement scores. The range of correlations for these indirect went from  $r = .28$  to  $r = .86$ , with a median correlation of  $r = .62$ . Seven of the reviewed studies included direct evaluations of student performance. These studies asked teachers to judge their student's performance specifically on the achievement test that was being given concurrently. Unlike the studies including indirect evaluations the direct evaluation studies included teacher judgments that were overtly linked to a criterion (achievement score). Direct measures showed a range of correlations from  $r = .48$  to  $r = .92$  with a median of  $r = .69$ . They noted that correlations were higher for those that were more direct, but suggested the differences between direct and indirect were not dramatic with the overall median correlation for the 16 studies being  $r = .66$ .

Gresham, Reschly, and Carey (1987) examined 100 students who had never been referred for consideration of special education services and 100 individuals who had been classified as learning disabled under state educational guidelines in Iowa. Teachers of these 200 students rated each on the Teacher Rating of Academic Performance (TRAP; Reschly, Gresham, & Graham-Clay, 1984) a five item teacher rating scale where teachers rate a student's overall academic performance, and more specifically with 4 questions dealing with reading and mathematics performance relative to the child's classroom and to grade level expectations on a five point scale. In addition to teacher ratings the students were given the Wechsler Intelligence Scale for Children (WISC-R; Wechsler, 1974) and the Peabody Individual Achievement Test (PIAT; Dunn & Markwardt, 1970). The study showed that the TRAP had high correlations with

measures on the WISC-R. VIQ correlated with the TRAP total correlated with VIQ ( $r = .61$ ), PIQ ( $r = .52$ ), and FSIQ ( $r = .61$ ). Additionally the TRAP total score correlated with the total on the PIAT at  $r = .71$ . Surprisingly Gresham et al. 1987 found that teacher ratings on the TRAP correctly classified 86% of the non-handicapped students and 96% of the Learning Disabled groups a level higher than both the WISC-R and the PIAT. These results suggest not only that teachers judgments around student performance have a moderate to strong correlation with standardized measures of academic achievement, but in some cases could be more predictive of real world classifications than standardized measures. Within the discussion, the authors suggest a number of concerns and possible alternate explanations for the results including that teacher judgments could just be confirmation of the accuracy of the original teacher referral or that teachers were good at judging who was LD because they knew who was learning disabled and non-handicapped.

In a follow up to Gresham et al. 1987, Gresham MacMillan, and Bocian (1997) aimed to evaluate the discriminant validity of teacher judgments in differentiating between groups of students who were at risk for learning difficulties while controlling for the bias associated with the Gresham et al. 1987 study. Unlike Gresham et al., 1987 which only included students who had already been labeled as disabled or who had never been referred for consideration of special education services, Gresham et al. 1997 included a group of 150 students who were referred to school study teams but had not yet been previously evaluated for special education services and a group of 90 students who had never been referred to the school study teams. Gresham et al. (1997) used the Academic Competence scale of the Social Skills Rating System (Gresham & Elliott, 1990) as a means of evaluating the discriminant validity of teacher judgments.

Students were placed into who had been referred to the school study teams were placed into one of three groups based on score combinations derived from the Wechsler Intelligence Scale for Children-III (WISC-III; Wechsler, 1991) and the Wide Range Achievement Test-Revised (WRAT-R; Jastak & Wilkinson, 1984). Students were included in the Low IQ based of having a significantly sub average intellectual functioning as defined by obtaining a Full Scale IQ of 75 or less on the WISC-III. Students were included in the LD group based on having a WISC-III full scale IQ of 82 or higher and a discrepancy between that score and any of the achievement areas on the WRAT-R of 22 points or greater. Students were included in the low achievement group based on having a WISC-III Full Scale IQ of 76 or higher and no discrepancy between Full Scale IQ and any of the WRAT-R that was greater than 22 points. The 90 students who had never been referred to the school study teams for special education consideration were placed into the control group.

The academic competence scale of the SSRS is of comprised of nine items that are rated by teachers on a five point scale. This scale is comprised of items related to reading and mathematics performance, parental support, general cognitive functioning, classroom behavior, and motivation. Using discriminant function analyses for teacher judgments based on the SSRS-AC each of the three groups were compared to ratings of students who were in the control group. Within the analyses teacher ratings correctly classified 91% of learning disabled students as compared to 90% of controls, 100 % of low IQ students as compared to 93% of controls, and 95% of the low achieving students as compared to 83% of controls. When all three groups labeled as at risk were examined, teacher ratings correctly classified 97% of the at risk group as compared to 90% of the control group, an overall classification accuracy of 94%. This study



adds additional support to the accuracy of teacher judgments in classifying student achievement using student ratings.

Begeny, Eckert, Monterello, and Storie (2008) examined the relationship between teacher judgment accuracy across a number of assessment methods direct methods including rating scales, interviews, and class rankings as they relate to curriculum based assessments related to oral reading fluency performance. Ten teachers of 87 first second and third grade students participated in the study. Students completed ten reading of roughly 120 words and were placed in groups of mastery, instructional, and frustrational reading levels based on Shapiro 2004 standards. Teachers then completed a rating scale where they responded to nine items related to performance across reading skills including decoding, accuracy, fluency, comprehension, completion of reading work, application of skills to other subjects, and overall performance on a five point scale. Teachers were asked to complete an interview and data sheet where they estimated their students instructional level (mastery, instructional or frustrational), estimating their students words read correctly per minute, and words read incorrectly per minute on grade level passages and questions regarding general information about the grade level student was currently receiving. Lastly teachers were asked to rank their students as compared to other students in the same class on a five point scale (much worse, somewhat worse, about the same, somewhat better, much better) on both reading fluency and reading accuracy. Teachers correctly identified reading level for 93.3% of mastery level students, 44.5% of students in the instructional, and 41.7% of students when using the teacher judgments of instructional level. Correlations between direct measures and teacher judgments were more accurate for words read correctly per minute  $r = .68$  than for words read incorrectly per minute  $r = .53$ . Teacher estimates on the five point rating scales correlated at  $r = .79$  for students with a frustrational

reading level,  $r = .74$  for students in the instructional reading level, and  $r = .68$  for students in the mastery reading level. The results suggested that teacher judgments were generally moderately to highly correlated with direct measures of reading fluency. Interestingly, despite these correlations, the results of this study also suggest that teacher judgments were more accurate for student's ability to read at mastery level, but less so for those who were reading at the instructional and frustrational levels.

Kenny and Chekaluk (1993) investigated the concurrent validity and utility of two teacher based judgments of academic competence and an extensive battery of tests including the Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981), The Lindamood Auditory Conceptualization Test (Lindamood & Lindamood, 1979) and the Word Identification and Word Attack subtests of the Woodcock Reading Mastery Tests- Revised (Woodcock, 1987). The first teacher based measure of teacher judgment was a 15 item teacher rating scale where teachers were asked to rate students on a 3 point scale on number of topics related to cognitive ability, attention/behavior performance, and academic performance. For the second teacher judgment measure, teachers were asked to rate their students into one of three categories related to reading: advanced, average, or poor readers. They conducted this study with 312 students in metropolitan Sydney in the first three years of schooling. Overall they found that correlations between group predicted by the one question rating and the 15 item measure were  $r = .64$  for Kindergarten,  $r = .72$  for first grade, and  $r = .8$  for second grade. Overall the correlation between the two teacher judgment measures were  $r = .69$ . For kindergarteners, scores on the Lindamood Auditory Conceptualization Test (Lindamood & Lindamood, 1979) correlated highly with both teacher questionnaire  $r = .56$  and teacher category assignment  $r = .45$ . For first graders scores on the Woodcock Word Identification subtest correlated highly with teacher judgments on the

teacher questionnaire  $r = .61$  and teacher category assignment  $r = .73$ . Additionally scores on the word identification subtest of the Woodcock Johnson correlated highly for second year students scores on the teacher questionnaire  $r = .60$  and the teacher category  $r = .70$  and word attack  $r = .60$  teacher questionnaire and  $r = .74$  for teacher category while for year 2 word identification and word attack showed the highest correlations with teacher judgments. These high correlations in combination with high levels of positive concurrent validity coefficients between teacher judgments and test assessments  $r = .70$  for kindergarten,  $r = .78$  for year 1 and,  $r = .87$  for year 2 add additional support for teachers being good judges of academic student achievement both through detailed questionnaires and on more general categorization of students by risk.

Demaray and Elliott (1998) examined the relationship between teacher judgments of student achievement as measured on the Academic Competence Scale from the SSRS (Gresham & Elliott, 1990) and student performance on the Kaufman Test of Educational Achievement Brief form (K-TEA; Kaufman & Kaufman, 1985) for 47 students. Additionally teachers were asked to rate items from the K-TEA as items they predicted that their students would get correct and incorrect. Similar to prior research (Gresham et. al., 1997) the Academic Competence Scale from the SSRS had a moderately high correlation ( $r = .70$ ) with a direct measure of Academic Achievement, in this case the K-TEA. The Academic Competence Scale was also correlated with the K-TEA subtests with  $r = .51$  for the Math subscale,  $r = .67$  for the Spelling subtest and  $r = .67$  for the reading subtest. When examining item level performance/judgment agreement for data common to both teacher ratings and student completion of the K-TEA the relationship was moderately high  $M = 79\%$  agreement with a Kappa-coefficient of 67%. When examining teacher predicted standard scores and student's actual standard scores the overall correlation was  $r = .84$ . Similar to Begeny et al. (2008) this study showed that teacher's predictions were more

accurate for higher achieving students (77% agreement) than for lower achieving students (80% agreement). In combination these data would suggest not only that teacher ratings of academic competence were moderately correlated with student's actual academic achievement, but also that teacher judgments of how students would perform on items on measures of academic competence were highly related to student's actual performance. Malecki and Elliott 2002 examined the relationship between academic competence, problem behaviors, social skills, and academic achievement for 139 third and fourth grade students. Data was collected at two points during the year so that the authors could investigate the predictive power of these variables over time. The results showed that social skills are related to current level problem behaviors are negatively related to academic achievement but only social skills are predictive of future academic functioning. Data was collected on student's social skills, problem behaviors, and academic competence as measured by the SSRS (Gresham & Elliott, 1990), students self rating of social skills as measured by the SSRS, and also on academic achievement as measured by the Iowa Test of Basic Skills- Survey Battery (ITBS; Hoover, Hieronymus, Frisbie, & Dunbar, 1993). Correlation analyses were run to examine the relationship between the variables collected concurrently and regression analyses were used to examine the predictive relationship between variables across time. Results suggested that the teacher ratings of academic competence and academic achievement as measured by the ITBS were strongly correlated (.54,  $p < .01$ ). Additionally there was a moderate correlation between overall social skill scores as and teacher ratings of academic competence on the SSRS (.50,  $p < .001$ ). Regression analyses showed teacher ratings of social skills and teacher ratings of problem behaviors, as measured by the SSRS (Gresham & Elliott, 1990) could account for 30% of the variance associated with ITBS scores collected concurrently. When looking at significant predictions over time fall scores

related to teacher ratings of social skills and problem behaviors and student ratings of social skills accounted for 17% of the variance of ITBS scores, but none of the social and behavioral predictors were significant at the  $p < .05$  level. Results also showed that academic competence ratings on the SSRS were significant predictors of future academic achievement as measured by scores on the ITBS. Fall measures of academic competence ( $\beta = .47, p < .001$ ) and in combination with all of the variables collected in the fall could be a part of a model that accounted for 33% of the variance in ITBS scores collected in the spring.

## USING MULTIPLE ASSEMENTS TO MAKE DATA BASED DECISIONS

Despite the NASP 2009 position suggesting that school psychologists should be able to conduct a number of assessment methods across multiple informants and situations to appropriately examine specific target behaviors in targeted settings, currently there is no “gold standard” for how to synthesize the results from multiple sources of data (Gresham, 2011). Given the number of inference risks associated with each measurement tactic described, it is difficult to say which is the most appropriate measure when making a diagnosis or building an intervention. Common practice would suggest taking a multi-source approach to accurately pinpoint the “true nature” of the targeted behavior or skill, but as of yet there is no consensus around how to do this as a best practice. Gresham (2011) describes this problem and suggests that there are a number of difficulties in coming up with a particular conclusion based on multi source data:

1. “Multiple sources of information are often used to assess students’ social behavior without guidance as to which source of information to trust or weight most heavily.
2. Use of a single source of information will necessarily restrict the conclusions and recommendations to be drawn.
3. The use of single sources of information in research studies often significantly changes the conclusions that might be drawn about an individual (Gresham, 2011).”

One area where this discrepancy across raters is clearly seen is in the literature regarding the use of behavioral rating scales (e.g. Achenbach, McConaughy, & Howell, 1987; De Los Reyes & Kazdin, 2004; 2005; De Los Reyes, Youngstrom, Rabon, Youngstrom, Feeny, & Findling, 2011; Kraemer, Measelle, Ablow, Essex, Boyce, & Kupfer, 2003). In a meta analysis

reviewing 119 studies with 269 participant samples, Achenbach, McConaughy and Howell (1987) examined the uniformity of informant reports of behavioral problems of subjects between a year and a half and 19 years old. Achenbach et al. (1987) showed that across the 119 studies the average Pearson  $r$  among pairs of similar informants was .60, .28 between different types of informants, and .22 between subjects and other informants (Achenbach et al., 1987). While all of these correlations were statistically significant the modest correlations suggest that inconsistency across raters is the norm. Data collected since the 1987 finding have consistently suggested low cross informant agreement across multiple domains including: adaptive behavior (Harrison & Oakland, 2003; Sparrow, Cichetti, & Balla, 2005), psychopathology (Kraemer et al., 2003; Offord et al., 1996; Reynolds & Kamphaus, 2004; Youngstrom, Loeber, & Stouthamer-Loeber, 2000) and social behavior (Gresham & Elliott, 1990; Renk & Phares, 2004; Gresham, Elliott, Cook, Vance, Kettler, 2010). This finding is consistent even when the instruments used have been shown to be technically adequate and have included specific instructional procedures and detailed operational definitions of rated behaviors.

One possible explanation for the lack of consistency amongst dissimilar raters proposed by Achenbach et al. 1987 was that differences were linked to differences in the social environment that leads to differences in behavioral performance. More broadly, this point of view would suggest that the reason that ratings are different is primarily because behavior is situationally specific.

Murray, Ruble, Willis, and Molloy (2009) examined the relationship between parent and teacher perceptions of specific social behaviors of 45 children who were between the ages of five and 14 and had been diagnosed as having an Autism Spectrum Disorder. Ratings on the TRIAD Social Skills Assessment (TSSA; Stone, Ruble, Coonrod, Hepburn, & Pennington, 2003) were

completed by parents and teachers of students with Autism. The measure includes specific questionnaires divided up into four areas of social development including understanding affect, initiation, maintaining interactions, and responding. Although the measure includes specific questions about whether a student does a particular behavior on a four point scale from not very well to very well parents and teachers had low to moderate levels of agreement ( $r = .34; p < .05$ ). The data also showed that the differences occurred in predictable patterns with parents typically rating items dealing with initiating interactions higher and teachers rating items related to responding and maintaining interactions as higher. These data would suggest that these social behaviors may be situationally specific and thus multiple ratings of the behavior could lead to a more comprehensive view of a particular skill. It is entirely possible that the set of social skills required to function successfully at home are different than those at school. Additionally the frequency of engaging in particular social skills should be, given the prior findings regarding performance and acquisition deficits (Gresham, Elliott, & Kettler, 2010), dependent upon rate of reinforcement in a particular setting.

Kraemer et al. (2003) as a prelude to describing their own conceptual method of integrating multiple sources of measurement so that they can triangulate “trait” behavior across multiple dimensions describe three commonly used methods of coming to a conclusion when taking multiple raters into account: the optimal informant, using data from all informants separately, and aggregation.

Within the optimal informant method, Kraemer et al. (2003) describe a process of choosing one informant, and basing all of the final judgments regarding assessment on their report. Though this method makes conceptual sense as in theory one reporter could have a greater knowledge about a particular behavior, Kraemer et al. (2003) suggest that when done



arbitrarily, this method could lead to questioning of the results. In intervention studies, this could be of great concern as one non-optimal rater could report gains when the optimal one did not. Within research applications, Kraemer et al. (2003) describe a second possibility of dealing with informant discrepancy is using data from all sources separately and simultaneously. For example if any informant expressed the existence of a particular behavior, it would be considered to be occurring. Within this method, the authors suggest that you increase the likelihood of false positives. When trying to curb false positives through an adjustment procedure, the likelihood of false negatives would occur. The results of these kinds of studies would lead thus to ambiguous interpretation. The last possibility that Kraemer et al. (2003) suggest is aggregation of information across raters. This method they suggest is stronger than the other two, but requires a priori decisions about the way that data will be aggregated.

Regardless of the interrater discrepancies, it is difficult to suggest that multiple ratings of a target behavior would not be instructive. Given the widely accepted lack of interrater agreements, across rating forms and limited reliability in finding a true rate of behavior using more direct measures such as direct observation the question remains when determining a means of intervention who are there optimal informants and how do you take their information into account.

## RATIONALE AND CURRENT STUDY

There is a general consensus in the literature that social skills broadly are related to academic competence (DiPerna & Elliott, 2002; DiPerna, Volpe, & Elliott, 2002; 2005; Coie & Krehbiel, 1984; Kupersmidt, Coie, & Dodge, 1990; Parker & Asher, 1987, Ray & Elliott, 2002; Welsh, Parke, Widaman, & O'Neil, 2001; Wentzel 1991,1993) and that externalizing behaviors are negatively related to academic competence (Benner, Nelson, & Allor, 2008; Hinshaw, 2992; Meltzer, 1984; Nelson, Benner, Neill, 2006; Nelson, Benner, Lane, & Smith, 2004; Richards, Symons, Greene, & Szuskiewicz, 1995). Similar to Malecki and Elliott (2002) the current study aims to see how these three variables (social skills, externalizing behaviors, and academic competence) are interrelated through the use of structural equation modeling.

The current project aims to add to the current literature base by examining the effects of a specific subset of social skills across raters (parent, teacher, student), rather than a broader overview as is typically represented in the literature. Additionally, it adds to the existing literature by using one measure across three separate raters (parent, teacher, student), rather than multiple scales that may be measuring differing constructs, to see if a variety of raters can more accurately measure latent variables than have previously been found to predict teacher ratings of academic competence. In addition to providing more data regarding how externalizing behavior, social skills, and academic competence are related, the specificity around social skills could provide some instruction as to how to best target social behaviors that could be directly related to academic competence.

Data, in the form of parent, teacher, and student ratings, were obtained on measures of social skills, academic competence, and externalizing problem behaviors (SSIS-RS subscale

composite scores) from the SSIS-RS standardization sample (Gresham & Elliott, 2008a). The sample was reduced to include only individuals that were rated across all three raters. It was hypothesized, as in previous research and in the non-included portion of the standardization sample, that some subscales of social skill behaviors would be correlated significantly with teacher ratings of academic competence. It was also hypothesized that externalizing behavior problems would be significantly correlated with a measure of academic competence.

The study aimed to build on that information by testing a series of structural models examining the relationship between social skill composites, externalizing behaviors, and teacher ratings of academic competence. Additionally, the current project examined the incremental validity added by testing models that included multiple raters of the same social skill behaviors. It was hypothesized that multiple raters would increase model fit after a significant model was created.

## METHODS

### Participants

Participant data was taken from the standardization sample of the Social Skills Improvement System-Rating Scales (Gresham & Elliott, 2008a) with permission from the authors and the publication company. The initial sample included 4,700 individuals across 36 states in over 100 sites, who were representative of the U.S. population on demographics related to race, sex, socioeconomic status, and geographic region (Gresham & Elliott, 2008b). Participants included all of the normative sample that had completed self, parent, and teacher ratings. Out of the initial sample of there were 162 individuals who met these criteria. The sample included 62 females (37.3%) and 104 males (62.7%). Since the two student scales are only intended for students between the ages of 8 and 12 and 13 and 18, the sample was limited to students between these ages with an average age of 12 (Table 1). There was a range of students from grades 3 to 12 (Table 1).

Instrumentation: Social Skills Improvement System- Rating Scales.

The Social Skills Improvement System Rating Scales (SSIS-RS; Gresham & Elliott, 2008a) are a series of rating scales where teachers, parents, and students can assess a student's social skills and problem behaviors. The SSIS-RS are a revision of the Social Skills Rating System (SSRS; Gresham & Elliott, 1990) and include updated norms, four additional subscales, and a direct link to intervention. The SSIS-RS were selected for this investigation because it is the most widely used multirater measure of children's and adolescents' social skills in the world (F.M. Gresham (personal communication, March, 2012).

Table 1

## Demographic Characteristics of Sample

Variable	Frequency	Percent
Gender		
Male	104	62.7
Female	62	37.3
Grade		
3	28	17.3
4	14	8.6
5	27	16.7
6	27	16.7
7	22	13.6
8	12	7.4
9	4	2.5
10	3	1.9
11	12	7.4
12	13	8.0
Total	162	100.0

The SSIS-RS contains a single form for both parents and teachers and two forms for students (ages 6-12 and ages 13-18). The teacher and parent forms have been normed for three subgroups for ages 3 to 5, 5 to 12, and 13 to 18. The original scale, the SSRS (Gresham & Elliott, 1990), has been a widely used measure of children's social behaviors since it was normed in the United States in 1989. In more recent years (2003-2008) it has been utilized in over 127 published studies and 53 doctoral dissertations as a measure of child and adolescent social skills and problem behaviors in an array of fields including education, psychiatry, developmental psychology, school psychology, mental health, and nursing (Elliott, 2008). It has been used in all 50 states and in a number of foreign countries including Argentina, Brazil, Canada, England, France, Germany, Greece, Ireland, Korea, Netherlands, Norway, Portugal, Russia, and Spain. Additionally, it has been employed worldwide and been translated into 9 foreign languages

including Spanish, French, Dutch, Greek, German, Korean, Norwegian, Portuguese, and Russian (Elliott, 2008).

In 2008 the SSRS was revised and rereleased as part of the Social Skills Improvement System (Gresham & Elliott, 2008a), a body of work that includes not only rating scales (SSIS-RS) but also a screening tool (SSIS-Performance Screening Guide; Elliott & Gresham, 2007) and two intervention guides focusing both on whole classroom instruction of social skills (SSIS-Classwide Intervention Program; Elliott & Gresham, 2007b) and small group, targeted, interventions (SSIS-Intervention Guide; Elliott & Gresham, 2008). The SSIS-RS were developed with research utilizing the SSRS in mind and added social assessments related to autism spectrum disorders and bullying behaviors. In response to continued research identifying social skills as academic enablers (e.g. Capara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Elliott, DiPerna, Mroch, & Lang, 2004; DiPerna, 2006; DiPerna, Volpe, & Elliott, 2001; Wentzel & Watkins, 2002) two new subscales related to communication and engagement behaviors were included with the original five SSRS social behavior domains.

When compared, the SSRS and the SSIS-RS have been shown to measure similar constructs, but reliability estimates for the SSIS-RS were superior when compared to the SSRS' internal consistency (Gresham, Elliott, Vance, & Cook, 2011). This statistic, coupled with the ability to use the new measure to directly link assessment to intervention, suggests that the SSIS-RS goes beyond what was available in the original scale.

All forms of the SSIS-RS include 46 items that assess social skills on sub domains related to communication, cooperation, assertion, responsibility, empathy, engagement, and self-control. In addition to social skill behaviors, all four forms of the SSIS-RS also include items related to

the frequency of problem behavior on subscales related to externalizing, bullying, hyperactivity/inattention, internalizing, and autism spectrum behaviors.

For both social skill and problem behavior questions, parents and teachers are directed to decide how often the student displays target behavior on a four point scale of *never*, *seldom*, *often*, and *almost always*. Students, regardless of age, are instructed to rate themselves on how true each item is about them on a scale four point scale of *not true*, *a little true*, *a lot true*, and *very true*. Additionally parent, teacher, and student raters between 13 and 18 are asked to specify how important they think the indicated behavior is for the student's development/success in the classroom on a 3 point scale of *not important*, *important*, and *critical*.

Teacher scales also include a 7-item measure related to academic competence. In addition to questions assessing student performance in reading and math both from the perspective of grade level expectations and comparatively with other students, there were questions related to overall motivation to succeed and perceived intellectual functioning. For these ratings teacher's rate on a 5 point scale related to how the student rates to comparative peers/grade level expectations: lowest 10%, next lowest 20%, middle 40%, next highest 20%, and highest 10%.

SSIS-RS Normative Sample. As previously noted, the parent and teacher forms have norms for ages 3 to 5, 5 to 12, and 13 to 18 while student forms have norms related to the two separate forms for ages 8 to 12 and 13 to 18. The normative scores available were determined based off a standardization sample of 4,700 students in the United States aged between 3 and 18 years who were representative of the U.S. population according to sex, race, socioeconomic status and geographic region (Gresham & Elliott, 2008b). Students were assessed in over 100

sites across 36 states in a number of schools, school districts, mental health facilities, and child care centers.

Reliability of Scales. When looking at the total standardization sample the SSIS-RS student's total scores had a test retest reliability of .82 for teachers, .84 for parents, and .81 for students across a span of between 42 and 66 days. Total problem behavior scores had a test retest reliability of .92 for teachers, .86 for parents, and .77 for students. Individual subscales ranged from and had a median stability coefficient of .84 (Gresham & Elliott, 2008b).

Consistency Across Raters. Within the social skills scale of the SSIS-RS (Gresham & Elliott, 2008a) there is large proportion of common items across forms with parent and teacher forms having roughly 80% of items in common and with the student form sharing roughly 66% of its items with the parent and teacher forms. On the problem behavior scale there is 91% overlap between the parent and teacher scale and roughly 55% of shared items with the student forms (Gresham & Elliott, 2008b).

To examine cross informant agreement of social skill and behavior ratings across raters on the SSIS-RS, Gresham, Elliott, Cook, Vance, and Kettler (2010) examined the records of 168 students who were rated by all three informants. On measures of social skills, convergent correlations for parent and teacher ratings ranged from a minimum of .15 to a maximum of .38 with the highest correlations seen for responsibility ( $r = .38, p < .01$ ) and the lowest for assertion ( $r = .15, p > .05$ ). Ratings on problem behavior subscales ranged from a minimum of .18 to a maximum of .39 on for parent-teacher ratings with the highest agreement occurring for externalizing and hyperactivity subscales ( $r = .39, p < .05$ ) and the lowest for the internalizing subscale ( $r = .18, p < .01$ ).



On measures of social skills, convergent correlations for parent and student ratings ranged from .02 to a maximum of .34 with the highest correlations seen for Cooperation ( $r = .34$ ,  $p < .01$ ) and the lowest being for assertion ( $r = .02$ ,  $p > .05$ ). For problem behaviors the convergent validity estimates between parent and student ratings ranged from .21 to .36 with the highest being hyperactivity ( $r = .36$ ,  $p < .01$ ) and the lowest being internalizing ( $r = .21$ ,  $p < .01$ ).

Correlations on ratings of social skills subscales as rated by students and teachers ranged from .12 to .26 with responsibility being the highest ( $r = .26$ ,  $p < .01$ ) and the subscales relating to communication and empathy being the lowest ( $r = .12$ ,  $p > .05$ ). On measures of problem behaviors, convergent correlations for student and teacher ratings ranged from .14 to .40 with bullying being the highest ( $r = .40$ ,  $p < .01$ ) and internalizing being the lowest ( $r = .14$ ,  $p < .01$ ).

Results of this study suggest that despite the high level of consistency across the scale items, cross informant agreement for ratings of social skills and problem behaviors on the SSIS-RS is low to moderate. This is consistent with the literature (Achenbach et al, 1987) and suggests that it is probable that these social behaviors occur differently across settings making multi rater reports a necessity for planning intervention.

## Procedures

Composite scores were created for each of the subscales across raters by averaging all of the items on particular subscales. These parceled values, though less descriptive than the individual items allow for a broad view of how students were rated on particular subscales of social skills, externalizing problem behaviors, and internalizing problem behaviors. Means and standard deviations were calculated for each of the subscales.

Correlations between each subscale composite scores and teacher ratings of academic competence were run. After teacher correlations were created, initial models were created with all of the social skills subscales entered as observed variables of a greater social skills construct. Multiple models were examined and observed subscales that did not add to predictive model fit were extracted.

#### Analysis/Structural Equation Modeling

SPSS Amos 19 was used to explore multiple SEM models relating social skills, problem behavior, and ratings of academic competence on the SSIS-RS (Gresham & Elliott, 2008a). Raw data was used rather than information from the created correlation matrix. All cases included ratings on every variable, therefore means and estimations for missing variables were not necessary. In each model, maximum likelihood estimation was used to estimate means and intercepts of free parameters. Standardized estimates were specified as the primary output type.

For all observed variables, correlations between social skills subsets, externalizing problem behavior, and academic competence were run across raters. In models where multiple ratings of social skills were included (parent, teacher, and self) each was considered an observed variable of a particular raters construct of social skills and then related to a second order latent construct representing social skill. This second order latent construct was entered as the primary predictor of academic competence, individual ratings of social skills, and problem behaviors.

The first model explored (Figure 1) was made up of each of the social skill subscales on the SSIS-RS related to an unobserved variable labeled Social Skills. A direct path was drawn between the construct of social skills and an observed variable of academic competence. When an appropriate model of social skills as related to academic competence was created, composite

scores of externalizing behavior were added to the existing model. After an appropriate model was created for teacher only measures, models were created with parent and student ratings of social skills behaviors on the same subscales from the original model. These were then added to the initial model to see if additional observations would lead to a more predictive model of teacher ratings of academic competence.

Goodness of fit indices were tested using the generalized likelihood ratio, comparative fit index, and root mean square error of approximation (RMSEA). As suggested by Kline, 2005, good fit will be demonstrated with a non-significant chi square, a comparative fit index above .90, and a RMSEA <.8.

Testing Combination Model(s). After a model had been created using teacher only data, secondary models were created using the same social skills subscales for students and parents. After fit was assessed on these two models, a third model was created using information from all three raters first looking at social skills relationship to academic competence(Figure 5) and then looking at social skills relationships to externalizing problem behavior (Figure 7). Lastly, a model including all three raters measures of social skills, teacher ratings of academic competence, and teacher ratings of externalizing problem behaviors. Goodness of fit indices were tested using the generalized likelihood ratio, comparative fit index, and root mean square error of approximation (RMSEA). Goodness of fit will be demonstrated using the same statistics as used while testing the teacher only model.

## RESULTS

### Means and Standard Deviations of Subscale Scores.

Means and standard deviations were calculated for the samples subscale composite scores and are included in Table 2.

Table 2  
Means and Standard Deviations of SSIS-RS subscales for 162 included students

Subscale	Parent	Teacher	Student
Academic Competence	—	3.54 (.99)	—
Assertion	2.11 (.48)	1.73 (.51)	1.99 (.54)
Communication	2.31 (.41)	2.26 (.49)	2.28 (.51)
Cooperation	2.21 (.46)	2.13 (.55)	2.18 (.51)
Empathy	2.26 (.53)	1.98 (.59)	2.17 (.60)
Engagement	2.2 (.50)	2.05 (.47)	2.21 (.54)
Responsibility	2.23 (.53)	2.22 (.57)	2.12 (.50)
Self-Control	1.79 (.51)	2.04 (.59)	1.82 (.62)
Problem Behavior Externalizing	0.49 (.46)	0.39 (.45)	0.83 (.58)
Problem Behavior Internalizing	0.49 (.48)	0.45 (.48)	0.6 (.52)

### Problem Behaviors Correlations with Academic Competence.

Correlations were run to examine the relationship between parent, teacher, and student rating of externalizing problem behavior composites as found on the SSIS-RS and teacher ratings of academic competence (Gresham & Elliott, 2008a). Correlations are found in table 3.

Significant correlations with teacher ratings of academic competence included parent ratings of externalizing behaviors ( $r = -.171, p < .029$ ) and teacher ratings of externalizing behaviors ( $r = -$

.310,  $p < .001$ ). Student ratings of externalizing behaviors were not significantly correlated with teacher ratings of academic competence ( $r = -.142, p > .07$ )

Table 3

Correlations between ratings of externalizing problem behaviors and teacher ratings of academic competence

Rater of externalizing behavior	Correlations with Externalizing Behavior and Academic Competence
Parent	-.171*
Teacher	-.310*
Student	-.142

\* $p < .05$

#### Social Skill Correlations with Academic Competence.

Correlations were run to examine the relationship between parent, teacher, and student rating of social skills composites as found on the SSIS-RS and teacher ratings of academic competence (Gresham & Elliott, 2008a). Correlations are found in Table 4. Significant correlations with academic competence included parent ratings of cooperation ( $r = .205, p < .009$ ), responsibility ( $r = .204, p < .009$ ), and self-control ( $r = .228, p < .004$ ). For teacher ratings, all social skill subscale composites were significantly correlated to teacher ratings of academic competence. Correlations ranged from .18 to .551. Significant teacher ratings included assertion ( $r = .195, p < .013$ ), communication ( $r = .407, p < .001$ ), cooperation ( $r = .551, p < .001$ ), empathy ( $r = .180, p < .022$ ), engagement ( $r = .321, p < .001$ ), responsibility ( $r = .451, p < .001$ ), and self control ( $r = .290, p < .001$ ). Significant correlations with teacher ratings of academic competence

included student ratings of cooperation ( $r = .251, p < .001$ ), empathy ( $r = .180, p < .022$ ), and responsibility ( $r = .291, p < .001$ ).

Table 4

Correlations between teacher ratings of academic competence and specific social skills subscales for 162 participants

Correlations between Teacher Ratings of Academic Competence and Social Skills	Assertion	Communication	Cooperation	Empathy	Engagement	Responsibility	Self Control
Parent Ratings	-.046	.133	.205*	-.006	-.019	.204*	.228*
Teacher Ratings	.195*	.407*	.551*	.180*	.321*	.451*	.290*
Student	.102	.131	.251*	.180*	.138	.291*	.136

\* $p < .05$

### Model Testing

The first model created included all teacher subtest scores serving as observed variables linked to a latent variable called Social Skills. This latent variable was then used as a predictor variable of academic competence which was an observed variable comprised of the composite scores related to academic competence. After the initial model was tested (Table 5, 6, Figure 1) results showed that the model did not demonstrate adequate fit based on the pre-specified standards presented earlier ( $\chi^2 = 162.406, p = .000, RMSEA = .210$  (Table 7), CFI = .837 (Table 8)). Based on the subscales for with the highest intercorrelations with academic data in the normative sample. Responsibility, Communication and Cooperation were chosen as the three social skills subscales to be explored in their relationship to measures of academic competence.

The responsibility subscale of the SSIS-RS includes factors related to making moral or rational decisions on one's own and being able to be accountable for one's own behavior. Across raters it includes items such as being well-behaved when unsupervised. Taking responsibility for one's own actions, taking care of other people's things, and taking responsibility for a group activity.

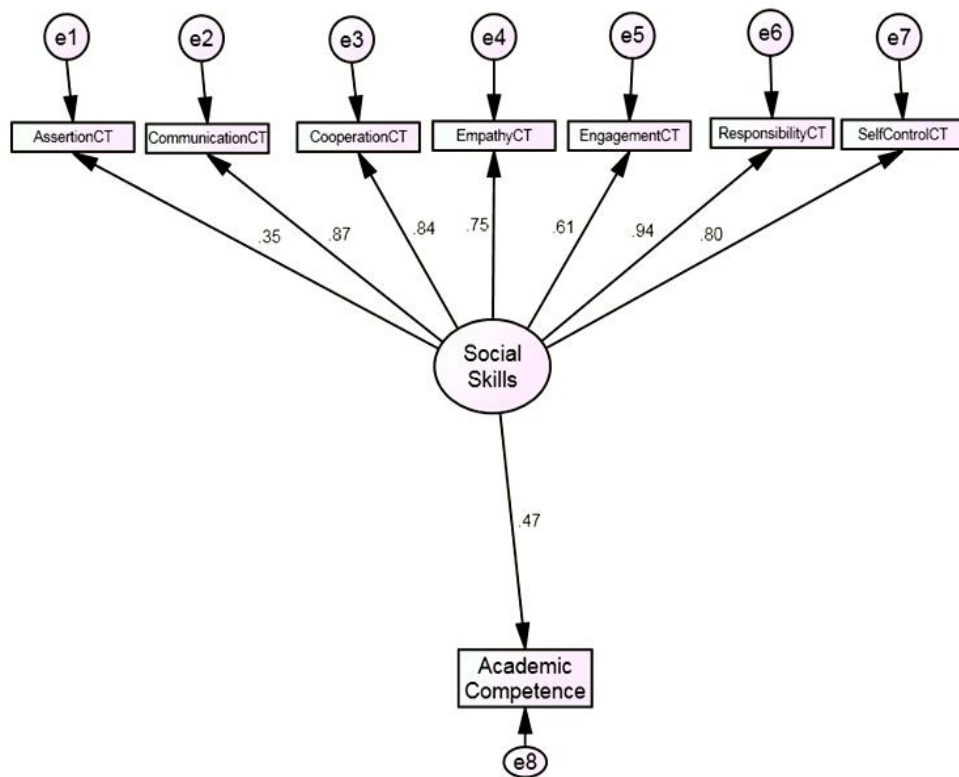


Figure 1. Model 1.

Table 5

Model 1 Regression Weights

			Estimate	S.E.	C.R.	P
AssertionCT	<---	Social_Skills	1.000			
CommunicationCT	<---	Social_Skills	2.395	.536	4.465	***
CooperationCT	<---	Social_Skills	2.607	.588	4.434	***
EmpathyCT	<---	Social_Skills	2.453	.567	4.330	***
EngagementCT	<---	Social_Skills	1.611	.392	4.110	***
ResponsibilityCT	<---	Social_Skills	3.012	.667	4.514	***
SelfControlCT	<---	Social_Skills	2.665	.606	4.394	***
ACT	<---	Social_Skills	2.637	.701	3.761	***

\*\*\* p<.001



Table 6

Model 1 Standardized Regression Weights: (Group number 1 - Default mode)l

			Estimate
AssertionCT	<---	Social_Skills	.347
CommunicationCT	<---	Social_Skills	.873
CooperationCT	<---	Social_Skills	.840
EmpathyCT	<---	Social_Skills	.746
EngagementCT	<---	Social_Skills	.610
ResponsibilityCT	<---	Social_Skills	.939
SelfControlCT	<---	Social_Skills	.800
ACT	<---	Social_Skills	.475

Table 7

Model 1 RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.210	.181	.241	.000
Independence model	.440	.416	.465	.000

Table 8

Model 1 Baseline Comparisons Comparative Fit Index

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	.820	.748	.838	.772	.837
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

The communication subscale of the SSIS-RS includes factors related to acting or imparting thoughts, opinions, or information through written, oral, and non-verbal communication techniques. Across raters it includes items such as saying please, responding when others start a conversation, making eye contact when talking, and using gestures to appropriately communicate with others.

The cooperation subscale of the SSIS-RS includes factors related to being able to work with others for a common purpose. Across raters the cooperation subscale includes items related to following directions, participating in group activities, completing tasks without bothering others, and paying attention to instructions.

After the initial model was run, several models were run sequentially eliminating all paths with regression weights less than .8. A three subscale model was created looking at responsibility, communication, and cooperation. Results showed (Table 9,10, Figure 2) that the model did not have adequate fit based on the pre-specified standards presented earlier ( $\chi^2 = 19.161$   $p = .000$ , RMSEA = .210 (Table 12)) despite meeting qualifications for acceptable fit on a

comparative fit index (CFI=.837 (Table 11)). Given this models fit on one of the indices, extensions of this model were used for future models across raters.

Table 9

Model 2 Regression Weights: (8-12 - Default model)

			Estimate	S.E.	C.R.	P
CommunicationCT	<---	Teacher_Social	1.000			
CooperationCT	<---	Teacher_Social	1.177	.087	13.592	***
ResponsibilityCT	<---	Teacher_Social	1.372	.090	15.331	***
ACT	<---	Teacher_Social	1.205	.185	6.526	***

\*\*\* p<.001

Table 10

Model 2 Standardized Regression Weights: (8-12 - Default model)

			Estimate
CommunicationCT	<---	Teacher_Social	.826
CooperationCT	<---	Teacher_Social	.859
ResponsibilityCT	<---	Teacher_Social	.970
ACT	<---	Teacher_Social	.492

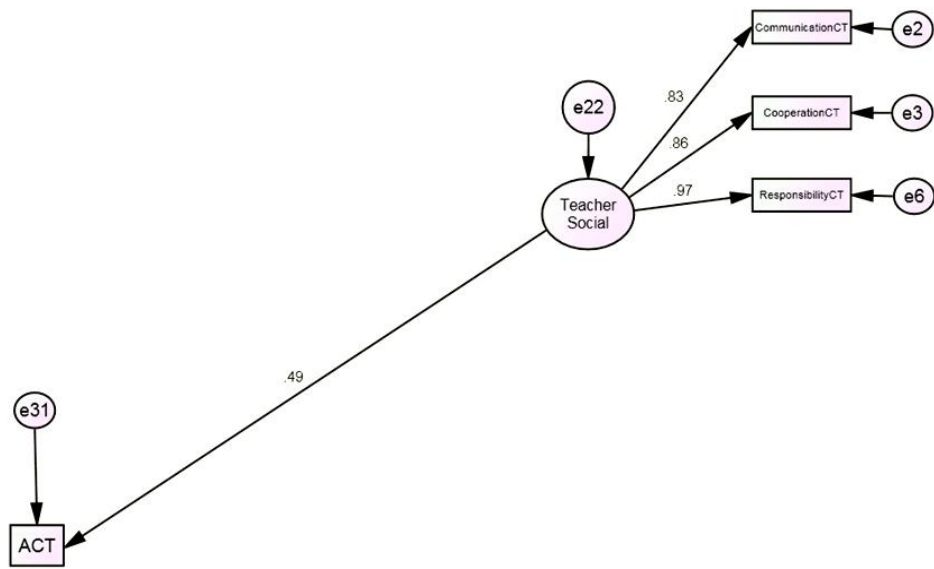


Figure 2. Model 2

Once the teacher based three factor model showed some fit it, similar models made up of the same three subscales were tested with students and parents. Results of the parent only model (table 13, 14, Figure 3) showed adequate fit on two indices ( $\chi^2 = .659$   $p = .719$ , CFI = 1.0 (Table 15)) and inadequate fit on the other (RMSEA = 0 (Table 16)).

Table 11

## Model 2 Comparative Fit Index

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.954	.863	.959	.876	.959
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 12

## RMSEA model 2

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.231	.144	.330	.001
Independence model	.655	.602	.709	.000

Table 13

Regression Weights Model 3: (8-12 - Default model)

			Estimate	S.E.	C.R.	P
CooperationCP	<---	Parent_Social	1.000			
ResponsibilityCP	<---	Parent_Social	.999	.075	13.380	***
CommunicationCP	<---	Parent_Social	.703	.061	11.511	***
ACT	<---	Parent_Social	.481	.180	2.677	.007

\*\*\* p<.001

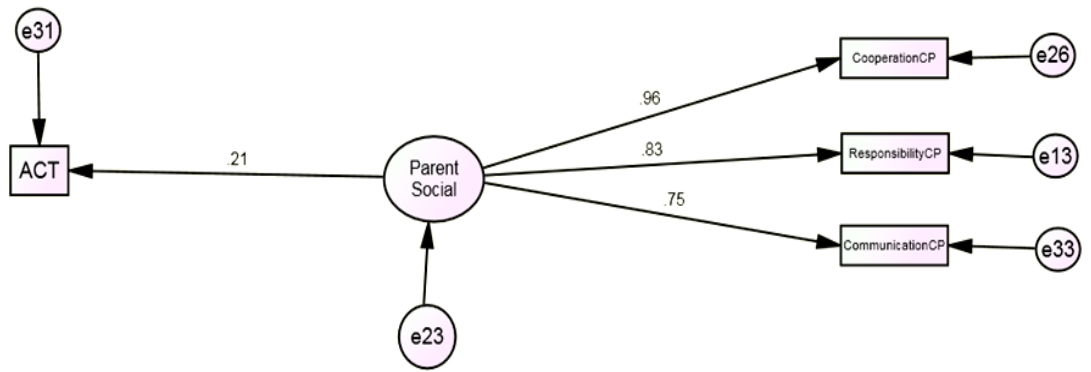


Figure 3.Model 3

Table 14

Standardized Regression Weights Model 3: (8-12 - Default model)

			Estimate
CooperationCP	<---	Parent_Social	.964
ResponsibilityCP	<---	Parent_Social	.833
CommunicationCP	<---	Parent_Social	.750
ACT	<---	Parent_Social	.214

Table 15

Model 3 Comparative Fit Index

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	.998	.993	1.005	1.014	1.000
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 16

Model 3 RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.000	.000	.112	.800
Independence model	.548	.495	.602	.000

Results of the student only model (Table 17, 18 Figure 4) also showed adequate fit on two indices ( $\chi^2 = 5.369$   $p = .068$ , CFI = .986 (Table 19)). The student only model showed inadequate on the other (RMSEA = .102 (Table 20)).

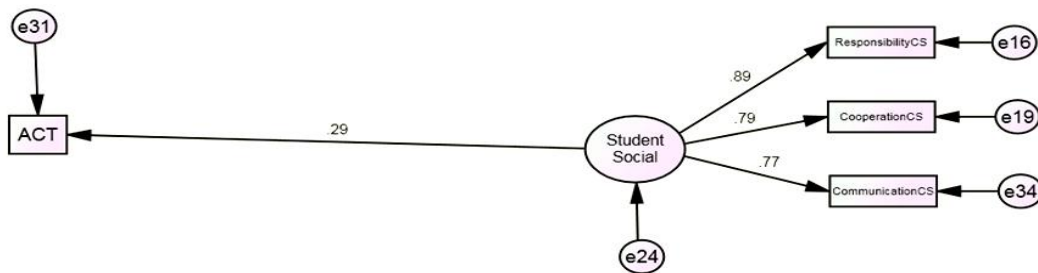


Figure 4. Model 4



Table 17

Regression Weights Model 4: (8-12 - Default model)

			Estimate	S.E.	C.R.	P
ResponsibilityCS	<---	Student_Social	1.097	.103	10.629	***
CooperationCS	<---	Student_Social	1.000			
CommunicationCS	<---	Student_Social	.972	.097	10.000	***
ACT	<---	Student_Social	.710	.204	3.488	***

\*\*\* p<.001

Table 18

Standardized Regression Weights Model 4: (8-12 - Default model)

			Estimate
ResponsibilityCS	<---	Student_Social	.887
CooperationCS	<---	Student_Social	.789
CommunicationCS	<---	Student_Social	.775
ACT	<---	Student_Social	.291

Table 19

## Comparative Fit Index Model 4

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	.978	.933	.986	.957	.986
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 20

## RMSEA Model 4

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.102	.000	.211	.146
Independence model	.491	.439	.546	.000

Table 21

## Regression Weights Model 5: (8-12 - Default model)

			Estimate	S.E.	C.R.	P
Teacher_Social	<---	Social	1.890	.442	4.277	***
Parent_Social	<---	Social	1.155	.316	3.654	***
Student_Social	<---	Social	1.000			
CommunicationCT	<---	Teacher_Social	1.000			
CooperationCT	<---	Teacher_Social	1.179	.088	13.448	***
ResponsibilityCT	<---	Teacher_Social	1.390	.088	15.732	***
CooperationCP	<---	Parent_Social	1.000			
ResponsibilityCP	<---	Parent_Social	1.033	.074	14.007	***
ResponsibilityCS	<---	Student_Social	1.070	.099	10.832	***
CooperationCS	<---	Student_Social	1.000			
CommunicationCP	<---	Parent_Social	.720	.061	11.814	***
CommunicationCS	<---	Student_Social	.961	.095	10.113	***
PBXext_T	<---	Social	-2.116	.482	-4.391	***

\*\*\* p&lt;.001

Table 22

Standardized Regression Model 5 Weights: (8-12 - Default model)

			Estimate
Teacher_Social	<---	Social	.827
Parent_Social	<---	Social	.468
Student_Social	<---	Social	.428
CommunicationCT	<---	Teacher_Social	.821
CooperationCT	<---	Teacher_Social	.855
ResponsibilityCT	<---	Teacher_Social	.976
CooperationCP	<---	Parent_Social	.949
ResponsibilityCP	<---	Parent_Social	.848
ResponsibilityCS	<---	Student_Social	.876
CooperationCS	<---	Student_Social	.800
CommunicationCP	<---	Parent_Social	.756
CommunicationCS	<---	Student_Social	.776
PBXext_T	<---	Social	-.833

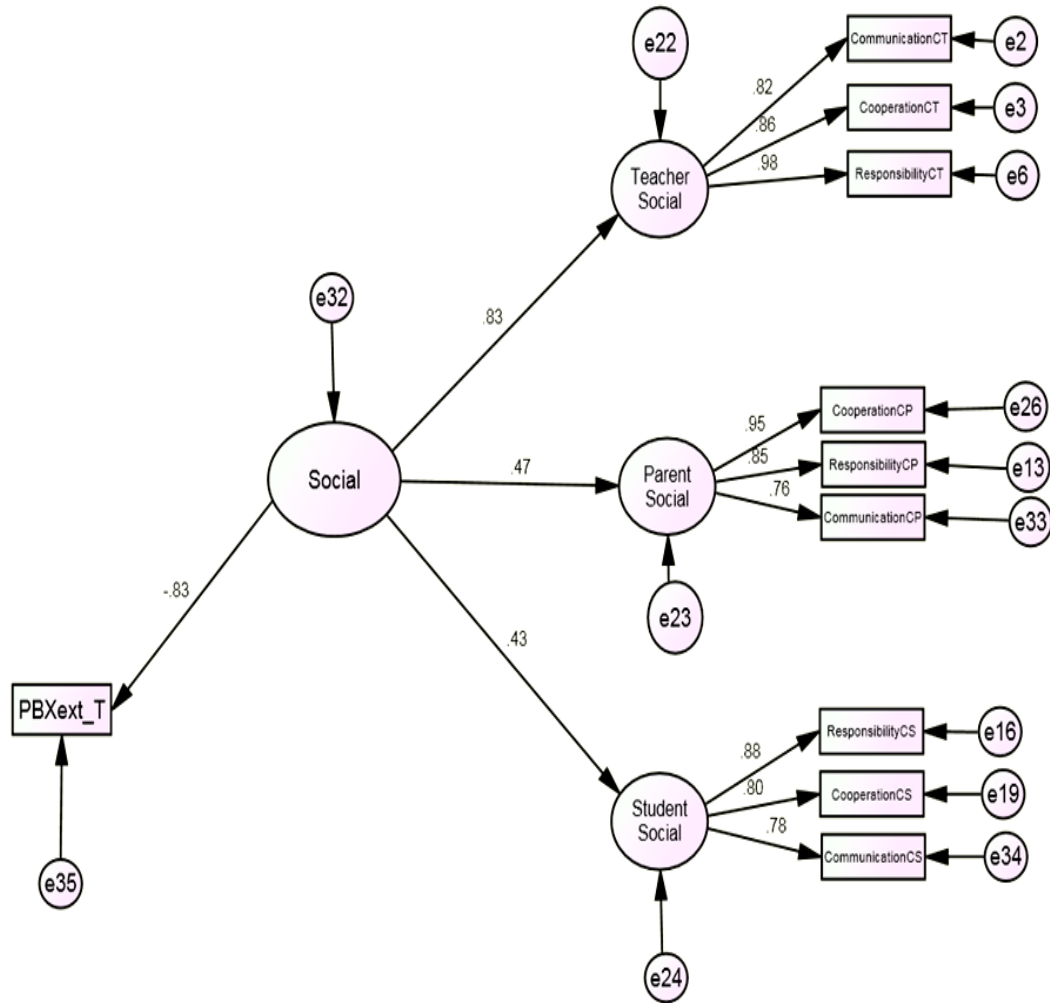


Figure 5. Model 5

After the teacher only, parent only, and student only models showed some fit across multiple indices a model was created examining the three of them with teacher ratings of externalizing problem behavior. This model (Table 21, 22, Figure 5) showed adequate fit on two indices (CFI= .982 (Table 23), RMSEA = .60 (Table 24)) but inadequate fit on the third ( $\chi^2 = 50.841 p = .018$ ).

Table 23

## Comparative Fit Index Model 5

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	.952	.933	.982	.974	.982
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 24

## RMSEA Model 5

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.060	.025	.091	.272
Independence model	.376	.357	.396	.000

A model was also created using all three raters as related to teacher ratings of academic competence. This model (Table 25, 26, Figure 6) showed adequate fit across two indices (CFI=.974(Table 27), RMSEA = .70 (Table 28)) and inadequate fit on the third ( $\chi^2= 57.553$   $p= .004$ ).

Table 25

## Regression Weights Model 6: (8-12 - Default model)

			Estimate	S.E.	C.R.	P
Teacher_Social	<---	Social	1.812	.489	3.704	***
Parent_Social	<---	Social	1.122	.322	3.478	***
Student_Social	<---	Social	1.000			
CommunicationCT	<---	Teacher_Social	1.000			
CooperationCT	<---	Teacher_Social	1.175	.087	13.561	***
ResponsibilityCT	<---	Teacher_Social	1.376	.089	15.486	***
CooperationCP	<---	Parent_Social	1.000			
ResponsibilityCP	<---	Parent_Social	1.020	.074	13.861	***
ResponsibilityCS	<---	Student_Social	1.082	.100	10.778	***
CooperationCS	<---	Student_Social	1.000			
ACT	<---	Social	3.227	.827	3.900	***
CommunicationCP	<---	Parent_Social	.715	.061	11.768	***
CommunicationCS	<---	Student_Social	.967	.096	10.073	***

\*\*\* p&lt;.001

Table 26

Standardized Regression Weights Model 6: (8-12 - Default model)

			Estimate
Teacher_Social	<---	Social	.814
Parent_Social	<---	Social	.466
Student_Social	<---	Social	.444
CommunicationCT	<---	Teacher_Social	.826
CooperationCT	<---	Teacher_Social	.857
ResponsibilityCT	<---	Teacher_Social	.972
CooperationCP	<---	Parent_Social	.954
ResponsibilityCP	<---	Parent_Social	.842
ResponsibilityCS	<---	Student_Social	.881
CooperationCS	<---	Student_Social	.795
ACT	<---	Social	.591
CommunicationCP	<---	Parent_Social	.754
CommunicationCS	<---	Student_Social	.776



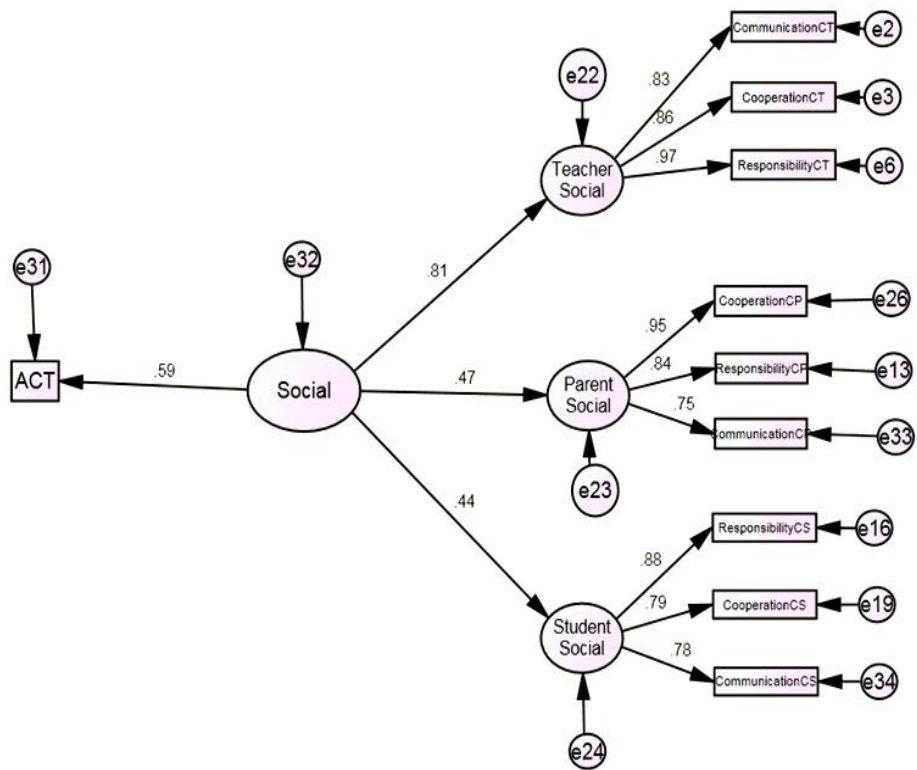


Figure 6. Model

Table 27

Comparative Fit Index Model 6

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	.943	.920	.974	.963	.974
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 28

## RMSEA Model 6

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.070	.040	.099	.123
Independence model	.365	.346	.385	.000

A final model was created combining the three rating scales, teacher ratings of academic competence, and teacher ratings of externalizing behavior. This model (Table 29,30, Figure 7) showed adequate fit across two indices (CFI= .968(Table 27), RMSEA = .74 (Table 28)) and inadequate fit on the third( $\chi^2 = 74.828, p = .001$ ). Outside of the academic only model (Figure 6) with three raters of social skills, this model showed the best fit of the models explored. Additionally it had stronger regression weights than previously run models (Table 29,30). Given the number of predictors included in this final model, the sample size of 162 fulfills suggested requirements of having 5-10 cases per parameter estimate (Bentler & Chou, 1987).

Table 29

Regression Weights Model 7: (8-12 - Default model)

			Estimate	S.E.	C.R.	P
Teacher_Social	<---	Social	1.886	.408	4.625	***
Parent_Social	<---	Social	1.067	.285	3.739	***
Student_Social	<---	Social	1.000			
PBXext_T	<---	Social	-2.055	.448	-4.589	***
CommunicationCT	<---	Teacher_Social	1.000			
CooperationCT	<---	Teacher_Social	1.202	.087	13.762	***
ResponsibilityCT	<---	Teacher_Social	1.363	.088	15.514	***
CooperationCP	<---	Parent_Social	1.000			
ResponsibilityCP	<---	Parent_Social	1.029	.074	13.965	***
ResponsibilityCS	<---	Student_Social	1.076	.099	10.870	***
CooperationCS	<---	Student_Social	1.000			
ACT	<---	Social	5.913	2.222	2.661	.008
CommunicationCP	<---	Parent_Social	.718	.061	11.794	***
CommunicationCS	<---	Student_Social	.957	.095	10.078	***
ACT	<---	PBXext_T	1.300	.708	1.837	.066

\*\*\* p<.001

Table 30

Standardized Regression Weights Model 7: (8-12 - Default model)

			Estimate
Teacher_Social	<---	Social	.847
Parent_Social	<---	Social	.444
Student_Social	<---	Social	.440
PBText_T	<---	Social	-.831
CommunicationCT	<---	Teacher_Social	.822
CooperationCT	<---	Teacher_Social	.873
ResponsibilityCT	<---	Teacher_Social	.959
CooperationCP	<---	Parent_Social	.951
ResponsibilityCP	<---	Parent_Social	.846
ResponsibilityCS	<---	Student_Social	.880
CooperationCS	<---	Student_Social	.799
ACT	<---	Social	1.078
CommunicationCP	<---	Parent_Social	.755
CommunicationCS	<---	Student_Social	.772
ACT	<---	PBText_T	.586

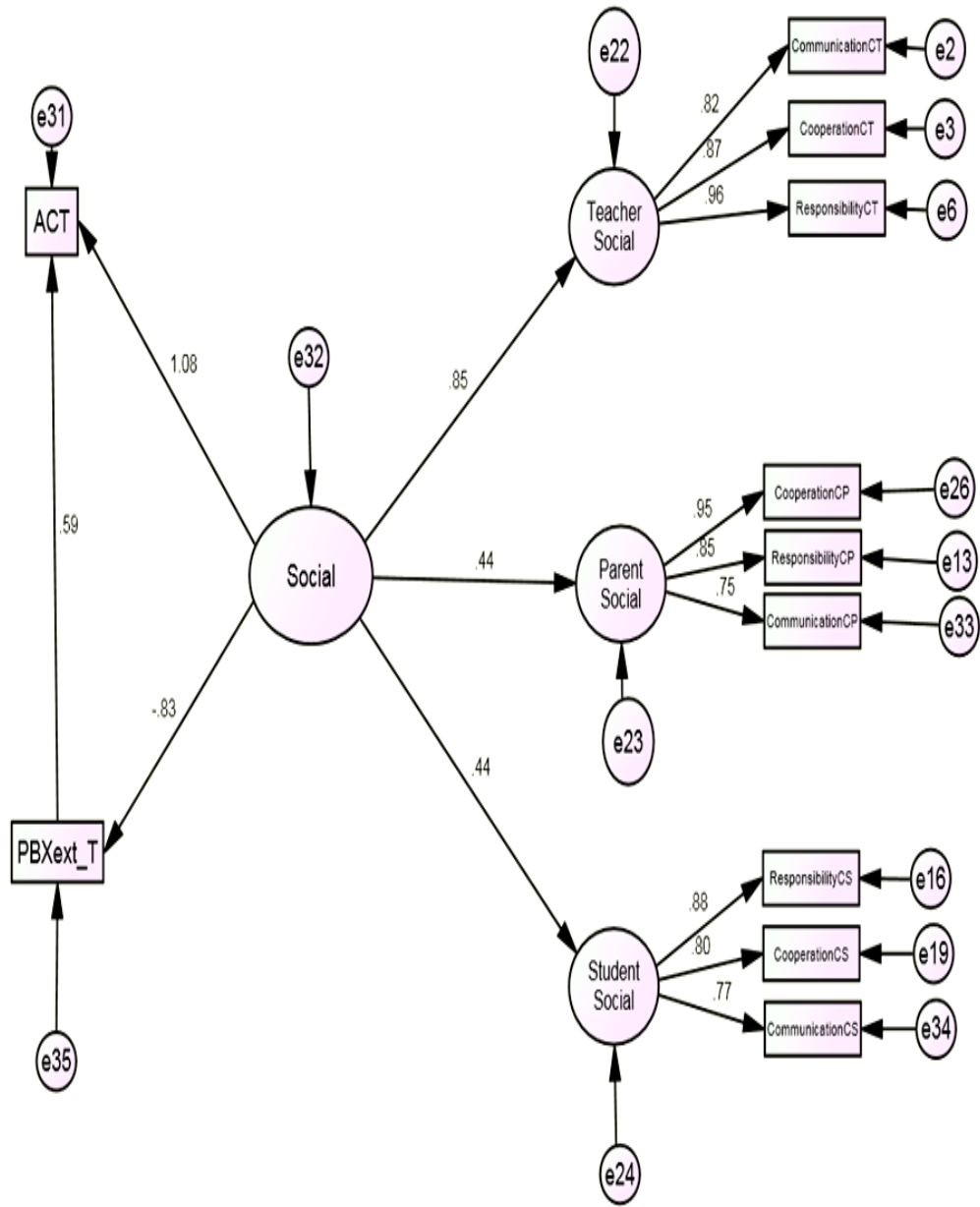


Figure 7. Model 7

Table 31

## Comparative Fit Index Model 7

Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	.934	.910	.968	.956	.968
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Table 32

## RMSEA Model 7

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.074	.047	.099	.069
Independence model	.350	.332	.368	.000

## DISCUSSION

Research has shown that broad measures of social skills are generally related to academic functioning (Coie & Krehbiel, 1984; DiPerna & Elliott, 2002; Parker & Asher, 1987; Ray & Elliott, 2002; Welsh et al., 2001; Wentzel, 1993). Additionally research suggests that externalizing problem behaviors are negatively related to academic functioning (Meltzer et al., 1994; Nelson et al., 1994; Richards et al., 1995) though there is some question as to whether the relationship is determined by externalizing problem behaviors or by sources related to externalizing behavior like suspension (Hinshaw, 1992), hyperactivity (Hinshaw, 1992), or limited processing speed (Benner et al., 2008).

Research has repeatedly shown that across multiple domains there is frequently levels of discrepancy across raters of behavior (Achenbach et al., 1987; De Los Reyes & Kazdin, 2004; 2005; De Los Reyes et al., 2011; Kraemer et al., 2003). One suggestion proposed by Kraemer et al. (2003) is to aggregate data when there is no known optimal informant.

The current study aimed to further examine the relationship between externalizing problem behaviors within a classroom, specific social skill clusters, and academic competence as rated by teachers. Additionally it aimed to address some of the concerns of mono-source bias by creating a model that included multiple raters of specific social skills that are highly correlated with academic competence as rated by teachers. The current study adds to the literature by specifying a specific cluster of social skills that are related to teacher ratings of academic competence on the SSIS-RS (Gresham & Elliott, 2008a) rather than a broad theoretical construct of social skills assumed to be related to academic competence.

The final model presented in the current study took observed variables from parent, teacher, and student ratings of social skill composites related to responsibility, communication, and cooperation and related them to both problem behavior and academic competence. It was further hypothesized that problem behavior also had a direct effect on academic competence. The results showed that the model had reasonable fit across multiple indices while taking into account a variety of raters that have been previously shown to be discrepant when broadly measuring social behaviors (Murray et al., 2009). Addition of multiple raters of social skills did provide some incremental validity (Sechrest, 1963) with better models being created with the addition of multiple raters even though they were looking at primarily the same items. The inclusion of multiple raters improved the fit on two of three examined indices over the initial teacher only model. This suggests that the addition of teacher and parent reports can be valuable in the prediction of academic competence as rated by a teacher.

The inclusion of multiple ratings of specific social skills to a model built directly off of the relationship between problem behavior and social skills reduced the significant negative relationship between academic competence and problem behaviors to a non-significant positive relationship. Though this finding would require additional research across multiple methods of assessment, it does question whether problem behaviors impact on teacher ratings of academic competence is mediated by social skills (specifically those related to responsibility, cooperation, and communication). In addition to having the highest correlations with academic competence as shown in correlations between parceled scores on these subscales and academic competence previous research that has shown that teacher ratings of cooperation and communication have been good predictors of teacher ratings of academic competence (Del Prette, Del Prette, Oliveira, Gresham, & Vance, in press)



Data from this study would suggest the exploration of interventions specifically tied to social skill behaviors targeted in the responsibility, communication, and cooperation subscales of the SSIS-RS (Gresham & Elliott, 2008a) as a means of improving academic performance in the classroom. Specific behaviors like saying please and thank you, taking turn in conversations, making eye contact when talking, ignoring classroom distractions, taking responsibility for own actions, and respecting others things could be targeted for interventions for students who are having academic difficulties. Though these behaviors theoretically wouldn't increase academic competence on their own, this study could add to the literature on social skills as academic enablers (DiPerna & Elliott, 2002; Ray & Elliott, 2002) allowing for students to benefit from an existing classroom setting.

Additionally this study could add further support to using the SSIS-RS (Gresham & Elliott, 2008a) as a normative measure related to social skills deficits as well as an empirically supported intervention planning tool.

## LIMITATIONS AND FUTURE DIRECTIONS

One limitation of the current project is the reliance on scales from the SSIS-RS for measures of academic competence, social skills, and externalizing problem behaviors. While this mono measure exploration did allow for a specific view of how these three variables were related, there is limited generalizability to other measures of the same theoretical constructs. For example, while it is hypothesized that direct observations of the behaviors linked to the responsibility subscale would be similarly related to measures of academic achievement such as high stakes tests (as was tested in Malecki & Elliott, 2002), this is not necessarily the case and needs to be explored in the future.

Additional concerns can be brought up related to how these measures of social skill, externalizing, and academic behaviors are actually related to the occurrence of these behaviors they aim to represent in a natural setting. While it has been shown that academic competence as rated by the academic subscale of the SSRS is correlated with academic achievement on more performance based measures (Demaray & Elliott, 1998), the relationship between actual social skill behaviors as measured by the SSIS-RS and direct measures of academic achievement needs to be more adequately explored. Given this current model, future research could use more direct ratings of externalizing behaviors, rates of specific social skills across settings, and direct measures of academic achievement in a manner similar to Begeny et al. (2008).

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## VITA

Michael Vance graduated *cum laude* with Bachelor of Science degrees in psychology and political science from Syracuse University in 2005. During his years at Syracuse he worked on a series of school based intervention projects with under Dr. Tanya Eckert and Dr. Laura Lee McIntyre. While at LSU he worked under Dr. Frank Gresham on a number of projects examining the effects of social skill interventions in the general education classroom. He earned his Master of Arts in May, 2005. After completing coursework at LSU, he went on internship at Louisiana School Psychology Internship Consortium where he worked in the Recovery School District. He is currently working in the Recovery School District in New Orleans Louisiana as a School Psychologist. His main focus of research and practice is evidenced based interventions and data based decision making in alternative school settings. He hopes to continue working in the Recovery School District implementing a broader range of services in traditional settings.