Does Social Competence in Preschoolers Predict Psychopathology Symptoms in Childhood and Adolescence?

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Abstract

A large body of research has examined if early psychopathology symptoms predict continued social difficulties into adolescence; however, few studies have examined whether early social competence predict which children will develop and maintain psychopathology symptoms across childhood and adolescence. Utilizing the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development dataset, this study included a multi-method assessment of social competence in preschoolers and examined whether these social competency measures predicted internalizing and externalizing psychopathology symptom trajectories throughout childhood and adolescence. Additionally, it examined whether social competency measures predicted narrowband measures of attention-deficit/hyperactivity disorder, oppositional defiant disorder, depression, and psychopathy in 3rd - 9th grade. Exploratory factory analyses could not identify underlying factors among the social competency measures; as such, these were examined individually. Two to four classes were identified using Growth Mixture Modeling for parent- and teacher-reported internalizing and externalizing trajectories. Generally, children who had worse preschool social competence were more likely to be in the various moderate and high psychopathology symptom trajectory classes. Some measures of social competency were predictive of parent and teacher-reported ADHD and ODD and self-reported psychopathy, with differing relations for males and females; no measures were predictive of self-reported depression. This study has important implications with regard to early identification of and intervention for at-risk youth. Identifying these youth during the preschool years can result in improved developmental trajectories and significantly decreased societal costs.

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General Audience Abstract

A large amount of research has looked to see if early atypical mental or behavioral symptoms (known as psychopathology symptoms) predict continued social difficulties into adolescence; however, only a few studies have looked at whether early social skills and performance (social competence) predict which children will develop and continue to show psychopathology symptoms across childhood and adolescence. Using the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development dataset, this study included multiple ways to assess social competence in preschoolers and wanted to see if these measures predicted psychopathology symptoms over time as the child grows up. Additionally, it looked to see whether social competency measures predicted symptoms of attention-deficit/hyperactivity disorder, oppositional defiant disorder, depression, and psychopathy in 3rd - 9th grade. Generally, after running analyses on the data, children who had worse preschool social competence were more likely to have moderate and high psychopathology symptoms over time. Some measures of social competency were shown to be related to parent and teacher-reported ADHD and ODD and self-reported psychopathy, with different connections for males and females; no measures were connected to self-reported depression. This study has important possibilities when looking at early recognition of and treatment for at-risk youth. Finding these youth during the preschool years can lead to better paths over time.

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Introduction

Social competence is critical for youth to be successful (Meier et al., 2006; Pahl & Barrett, 2007) and have direct relations to psychopathology (Burt et al., 2008; Semrud-Clikeman, 2007). Despite these well-established associations, few studies have longitudinally examined whether early social competence can be used to identify children at-risk for developing and maintaining psychopathology symptoms in childhood and adolescence (see Parker et al., 2006). Although some preschoolers may "outgrow" emotional or behavioral difficulties over time, a large portion of them do not (e.g., Campbell et al., 1986; Lavigne et al., 1998). As such, understanding the role of early social competence in predicting which youth display problematic emotional and behavioral difficulties and/or disorder-specific psychopathology symptomatology in childhood and adolescence is an important area of investigation. In particular, more research is needed examining the relation between social competence and psychopathology using a multi-method approach to assessing social functioning and psychopathology symptoms, and examining the development of psychopathology symptoms from early childhood through adolescence. Early identification and prevention work with preschoolers significantly reduce societal costs and improve developmental trajectories for these children (Brooks-Gunn, 2003; Reynolds & Temple, 2008). As such, the current study sought to address these gaps in the literature by investigating whether preschool social competence is predictive of broadband and narrowband psychopathology symptoms from early childhood through adolescence.

Social Competence

Development of social competence is an important challenge faced by preschoolers (Huber et al., 2019), as this is the first time many young children are interacting with their same-aged peers and adults other than family members regularly (Pahl & Barrett, 2007; Semrud-

Clikeman, 2007). Social competence is dependent on many skills that are emerging and developing during the preschool years. These skills include: (1) language acquisition that enables children to have a conversation, (2) basic executive functioning skills such as processing information and modifying behavior to fit the context of a given situation, (3) managing emotions during social interactions, and (4) social understanding and awareness (e.g., recognizing how others are responding to themselves) that develop through conversations and interactions with others (Crick & Dodge, 1994; Cassidy et al., 2003; Damasio, 2001; Denham, 2004; Fabes et al., 1999; Garfield et al., 2001). Some of the main components of social competence that develop during the preschool years include complying with rules; following directions; and prosocial behaviors such as sharing, co-operating, turn-taking, and helping (Rose-Krasnor & Denham, 2009; Stefan et al., 2009).

Theories of Social Competence

Because social competence has many definitions and consists of many components (Dodge, 1985), several theories have been developed on how to best capture and characterize social competence. Two commonly used comprehensive theories are Cavell's tri-component model of social competence (Cavell, 1990; Cavell et al., 2003) and Rose-Krasnor's social competence prism (Rose-Krasnor, 1997). Both of these models involve three components or levels of social competency, highlighting the need to examine various social abilities. These models also overlap in terms of what they label as social competency, both highlighting social skills and acknowledge that certain social competences are dependent on the social context. However, Rose-Krasnor's model also makes a distinction between internal and external priorities for social connection and social motivation, whereas Cavell's model largely focuses on external behaviors and abilities. From a clinical perspective, having more quantifiable and easily

identifiable measures of social competence can help with identification of at-risk youth. As such, it is critical for research examining the role of social competence in identifying at-risk youth to consider how various aspects of social competence may fit with these theories.

Cavell's tri-component model consists of three main aspects of social competency: social adjustment, social performance, and social skills (Cavell, 1990; Cavell et al., 2003). Social adjustment is an individual's ability to achieve society's pre-set and appropriate goals, social performance is determined by an individual's ability to respond in a socially acceptable way, and social skills are the different abilities an individual may have that allow them to adapt and react competently in social situations. A handful of studies have examined social competence among preschoolers using Cavell's tri-component model (Bohlin & Hagekull, 2009; Bost et al., 1998; Mendez et al., 2002; Proekt et al., 2017; Risan, 2014; Sebanc et al., 2003; Spritz et al., 2010). These studies examined preschooler social profiles and how these profiles interact with and are related to various aspects of demographics (i.e., race, gender) and specific systems such as Head Start (Bohlin & Hagekull, 2009; Bost et al., 1998; Mendez et al., 2002; Proekt et al., 2017; Sebanc, et al., 2003; Spritz et al., 2010). Only one unpublished master's thesis has investigated how social competence and psychopathology symptoms relate, with the thesis examining how social competence at age 6 related to aggression 2 years later (Risan, 2014).

Rose-Krasnor's (1997) social competence prism consists of a theoretical, index, and skills level. The theoretical level is an individual's effectiveness during an interaction and defines social competence based on the social context, the individual's goals, and the individual's interactions with others. The index level contains two domains of social competence, the Self and Other, within various social contexts. The Self domain consists of situations where the individual's needs take the top priority, and the Other domain includes

situations where an interpersonal connection is the top priority. The skills level is the base upon which the theoretical and index levels are built, which consists of the social, emotional and cognitive abilities that make up social competence. These are individual specific and are not context dependent. This model has been used extensively in studying social competency of preschoolers (e.g., Denham, 2006; Denham et al., 2001; Han & Thomas, 2010; Joy, 2016). These studies examined preschool social profiles and how they interacted with teachers' and other adults' view of the child and how that intersects within different cultural viewpoints (Denham, 2006; Denham et al., 2001; Han & Thomas, 2010). However, no research to date has investigated how social competence and psychopathology symptoms relate under the context of Rose-Krasnor's model.

Measures of Social Competence

Given this multi-faceted nature of social competence, a multi-method, multi-informant approach is critical (Kraemer et al., 2003). Common assessment measures of social competence include: rating scales, socio-metric/peer nominations, and behavioral observations (Dirks et al., 2007). Behavioral rating scales can be used to identify behaviors that may be related to social functioning such as assessing shyness, difficulty with initiating conversations, or interacting with peers (e.g., Achenbach & Rescorla, 2001; Gresham & Elliot, 1990; Matson et al., 1983). Socio-metric/peer nominations are when children rate each other by how much they like or dislike certain classmates and then ratings are combined giving an accurate portrayal of social ranking within peer groups (e.g., Masten et al., 1985). These can also be done as parent or teacher socio-metrics, which is when informants rate children's social ranking among their peers, and is often done when access to peers is limited or unavailable (e.g., Crick et al., 1997; Wu et al., 2001). Observational measurement typically involves trained observers using a coding system to

capture child behaviors in a natural or laboratory environment (e.g., Holbein et al., 2014). Measures of standardized performance assess a child's social skills or ability to respond relevantly in social situations using standardized measures that have been normed based on a large, representative sample. All of these measurements have their individual strengths and weaknesses, and each capture different aspects of social competence.

Psychopathology in Children and Adolescents

Many psychopathology symptoms, including attention-deficit/hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD) first emerge during the preschool years (see McDonnell & Glod, 2003), with rates of these disorders increasing throughout childhood (e.g., Copeland et al., 2013; Costello et al., 2003). Other psychopathology symptoms, like depression become much more prevalent during adolescence (Costello et al., 2003). In fact, approximately 15-20% of adolescents experience some form of psychopathology (e.g., Costello et al., 2003; Merikangas et al., 2010). Early identification of psychopathology can significantly impact developmental trajectories and reduce the risk for future psychopathology (Brooks-Gunn, 2003; Reynolds & Temple, 2008).

Many studies have examined psychopathology symptoms across one developmental period (e.g., Harvey et al., 2015; Hu et al., 2008) or across preschool and childhood (e.g., Galéra et al., 2011; Shaw et al., 2003) or childhood and adolescence (e.g., Castelao & Kröner-Herwig, 2013; Lahey et al., 2002). A handful of large, longitudinal studies exist that follow psychopathology symptoms across preschool through adolescence (e.g., Ashford et al., 2008; Bornstein et al., 2010; Bosquet & Egeland, 2006; Davis et al., 2015; Karevold et al., 2009; Leve et al., 2005; Luby et al., 2014; Mesman & Koot, 2001; Van Lier et al., 2007). The majority of these studies have focused on one disorder (e.g., Bosquet & Egeland, 2006; Luby et al., 2014) or

one category of disorders (e.g., internalizing disorders; Ashford et al., 2008; Groeben, et al., 2011; Karevold et al., 2009). Only a couple studies have examined both internalizing and externalizing symptoms from preschool through adolescence (Bornstein et al., 2010; Leve et al., 2005; Mesman & Koot, 2001). The National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (NICHD SECCYD) examined a range of psychopathology symptoms using both broadband (internalizing and externalizing symptoms) and narrowband (depression, ADHD, ODD, psychopathy) measures from preschool through middle adolescence (United States Department of Health and Human Services, 2018). Because these data assessed both internalizing and externalizing symptomatology, as well as disorder specific measures, they can provide a highly unique assessment of psychopathology symptoms across development.

Social Competence and Psychopathology

For several decades, theory and research have explored the link between social competence and psychopathology (see Semrud-Clikeman, 2007). In particular, theorists have long emphasized the role of social interactions in the development of children (e.g., Vygotsky, 1978). In particular both the developmental psychopathology perspective and resilience theory (see Masten et al., 2006; Parker et al., 2006) highlight the importance of examining the interplay between social-emotional competences and psychopathology. The developmental psychopathology perspective takes a life course perspective and examines how psychopathology can be understood by examining how normative development goes awry (Drabick & Kendall, 2010). Resilience theory focuses on the social, contextual, and individual factors that may interfere with an individual's ability to adapt and overcome poor outcomes (e.g., psychopathology, problematic behaviors; Van Breda, 2001). Overall, there is growing awareness

that examining social competence, something that is shaped by one's environment and social opportunities, is not only important for understanding the etiology of psychopathology, but also for helping promote competence and prevent or ameliorate psychopathology symptoms throughout development (Burt et al., 2008; Masten et al., 2006; Rutter et al., 2006).

Research supports these theoretical foundations, and suggests that youth with poorer overall social competence display higher levels of externalizing and internalizing symptoms (see Huber et al., 2019 for a review). The preschool developmental period is a vital time for social skills to develop and friendships to be made; these early experiences continue to shape emotional and behavioral functioning throughout life (e.g., Howes & Phillipsen, 1998; Parker et al., 2006). Specifically, peer rejection and negative social behaviors predict continued externalizing behaviors such as ADHD and ODD and even involvement in juvenile or adult criminal behavior (e.g., Ollendick et al., 1992; Woodward & Ferguson, 2000). Prosocial behavior is strongly associated with less externalizing symptoms, whereas prosocial behavior displays mixed relations with internalizing symptoms (i.e., some studies found a negative association, but others found a positive association; Huber et al., 2019). Children with poor peer relationships and social skills often experience anxiety and low self-esteem (e.g., Rubin & Burgess, 2001; Rubin et al., 2003). Internalizing symptoms are related with peer rejection, poor social support, and social initiative however, such that youth with high levels of peer rejection and low levels of social initiative displayed higher levels of internalizing symptoms (e.g., Burks et al., 1995; Hoza et al., 1995; Kistner et al., 1999; Windle, 1992). These differential results highlight the importance of capturing different aspects of social competence, consistent with theoretical models of social competence.

Prior research examining associations between social competence and psychopathology

symptoms have had three major limitations. First, the majority of prior research has relied on a single informant and/or a single measure of social competence and psychopathology symptoms (see Huber et al., 2019 for a review). Specifically, a recent review found that the majority (*n* = 12) of the existing 21 studies used a single assessment method and nine used a single reporter to determine social competency (Huber et al., 2019). Similarly, psychopathology symptoms were assessed using a single informant in eight of the studies and using a single assessment method in 14 of the studies. Thus, the majority of research has been limited by shared method variance and informant biases (Huber et al., 2019). Second, these prior studies primarily included a single disorder or either externalizing symptoms or internalizing symptoms, not both. In fact, only seven studies examined both internalizing and externalizing symptoms. Third, of the 21 reviewed studies, only 13 were longitudinal in nature, with seven studies having only two time points, five having three time points, and only one having four time points, limiting the ability to examine non-linear change in psychopathology symptoms over time. Based on this review, future research should be sure to include multi-method assessment of both internalizing and externalizing psychopathology symptoms and social competence, and include at least four time points of data to enable examination of linear as well as non-linear trajectories (e.g., quadratic, piecewise).

Of the seven longitudinal studies reviewed by Huber and colleagues (2019), only two examined both internalizing and externalizing symptoms and their relation to social competences across preschool through adolescence (Bornstein et al., 2010; Perren et al., 2012). The Bornstein study followed 117 children at ages 4, 10, and 14, and found age 4 parent and self-reported social competences (i.e., social acceptance, friendship understanding, socialization) to predict mother and teacher-reported externalizing and internalizing symptoms at age 10 years and mother- and

self-reported externalizing symptoms at age 14 years. The Perren study followed 428 children at kindergarten age (4-7 years old) and again 6 years later, when the children were 10-13 years old. This study found that kindergarten teacher-reported social competence (i.e., cooperation and prosocial behavior) was associated with early adolescent self-reported depressive symptoms and conduct problems; however, they did not have a measure of kindergarten psychopathology symptoms to control for in analyses. One other study that was not included in the Huber review as it did not include preschool social competence, examined trajectories of parent-reported internalizing and externalizing symptoms from preschool through adolescence, and the relation of these trajectories to parent and self-reported middle childhood and adolescent social competence (Korhonen et al., 2014). However, it is critical to determine whether preschool social competence may be useful in identifying which youth go on to display high levels of psychopathology across childhood and adolescence. Such early identification can improve developmental trajectories and significantly decrease societal costs. Overall, these studies provide a foundation for examining relations between social competency and psychopathology symptoms using multi-informant report. Additional longitudinal research is needed that examines whether preschool social competence is predictive of both broadband and narrowband measures of psychopathology, using multi-informant, multi-assessment data from preschool to adolescence.

Sex Differences in Social Competence and Psychopathology Symptoms

A large body of research has documented sex differences in both social competency and psychopathology. Specifically, girls generally perform higher on measures of social skills than boys (cooperation, self-control, responsibility, assertion and overall social skills; Abdi, 2010). In particular, girls are found to be more prosocial, whereas boys are reported as having significantly

more externalizing and aggressive behaviors. (e.g., Diener & Kim, 2004; Huaqing & Kaiser, 2003; Keane & Calkins, 2004; Loeber & Hay, 1997; Margetts, 2005). There is also some evidence that specific social abilities (e.g., solitary play, prosocial behavior) have been linked to social acceptance for girls but not for boys (Cillessen & Bellmore, 2004; Hart et al., 2004). Consistent with this, standardized assessments of social skills in children are normed differently based on sex, with the standards for girls being higher on social skills and the standards for boys being higher on problem behaviors (Gresham & Elliot, 1990).

Similarly, sex differences in psychopathology are well documented. Specifically, boys are consistently rated as higher on externalizing symptoms and having higher rates of externalizing disorders like ADHD and ODD (e.g., Abdi, 2010; Nolen-Hoeksema, 2012). In contrast, girls are consistently rated higher on internalizing symptoms, particularly post-puberty, and have higher rates of internalizing disorders like depression (Nolen-Hoeksema, 2012). These well-established sex differences in both social competence and psychopathology underscore the importance of exploring whether social competence differentially predicts psychopathology symptoms in childhood and adolescence for boys versus girls. Unfortunately, the recent Huber et al. (2019) article excluded studies where gender/sex differences was the main focus, and the connection between social competence and psychopathology was a secondary question. As such, they were unable to consider sex differences in the relation between social competence and psychopathology in their review.

Present Study

Given this backdrop, the current study investigated whether preschool social competence predicted broadband and narrowband psychopathology symptoms from preschool through middle adolescence. Although many studies have examined the relation between social

competence and psychopathology symptoms (see Huber et al., 2019 for a review), few studies have utilized a multi-method assessment of social competency and psychopathology (Blandon et al., 2010; Bornstein et al., 2010; Hay & Pawlby, 2003; Julvez et al., 2011; Kouros et al., 2010; Perren & Alsaker, 2009; Perren et al., 2012), and only one study has examined the predictive role of social competence in trajectories of psychopathology from preschool through adolescence (Bornstein et al., 2010), with this study utilizing three time points and informant report measures only. As such, this study adds to and extend this literature by utilizing the NICHD SECCYD sample which involved a multi-method assessment of social competence and psychopathology symptoms and followed youth from birth to 15 years, with social competence and psychopathology symptoms first being assessed at 54 months and including five time points of parent-reported psychopathology symptoms. The current master's thesis aims were to address the following research questions:

1) ***Which Social Competence Measures Are More Related and What Underlying Social Competence Factors Exist?***

An exploratory factor analysis (EFA) was run to determine whether underlying social competence factors were present among the various social competence measures used in the NICHD SECCYD study. Given that multiple models of social competence exist (e.g., Cavell, 1990; Cavell et al., 2003; Rose-Krasnor, 1997) and that past research has captured social competence in numerous ways, an exploratory approach was warranted. Labels for identified factors were determined based on existing theoretical models and past research.

2) ***Is Preschool Social Competence a Predictor of Internalizing and Externalizing Symptoms Trajectories from Preschool through Adolescence?***

It was predicted that each preschool social competency factor would be a significant

predictor of membership in parent-reported internalizing and externalizing symptom trajectories from 54 months to 15 years (9th grade) and teacher-reported internalizing and externalizing symptoms from 54 months through 5th grade. Based on prior research examining trajectories of internalizing and externalizing symptoms from preschool through adolescence (Korhonen et al., 2014) a four-group model for both internalizing and externalizing symptoms was anticipated.

3) ***Does Preschool Social Competence Predict Disorder-Specific Psychopathology Symptoms in Childhood and Adolescence, Controlling for Preschool Internalizing and Externalizing Symptoms?***

It was predicted that each preschool social competency component would be predictive of parent- and self-reported childhood (ADHD, ODD, depression) and adolescent (depression, psychopathy) disorder-specific symptomatology. It was hypothesized that preschool social competences would be stronger predictors of childhood than adolescent disorder-specific symptomatology. Specific predictions regarding which components are unique predictors of which psychopathology symptoms were not made as these analyses were exploratory in nature given no prior research on the Cavell or Rose-Krasnor models of social competence and psychopathology other than aggressive behavior (Risan, 2014). Additionally, multi-group path models exploring whether the relations between social competency and psychopathology symptoms differed for boys versus girls were conducted.

Method

Participants

Participants were from the NICHD SECCYD, a longitudinal study of children born in the United States in 1991. Parents were recruited through hospital visits, and 1,364 participants with healthy newborns were enrolled in the study (for details see United States Department of Health and Human Services, 2018). Participants were selected via random sampling to reflect the diversity of the demographics of the sites where data collection took place. Exclusionary data included: (a) mothers under 18 at time of the child's birth, (b) children with obvious disabilities at birth or who remained in the hospital for at least a week, (c) mothers who could not converse in English, and (d) families who intended to leave the area in less than three years. As part of the larger study, data was collected via multi-informants (parents, teachers, children) as well as multi-methods (interviews, questionnaires, direct assessments, observations). The SECCYD research protocol was approved by each of the 10 participating university's ethical review boards, with universities located in: Little Rock, AR; Orange County, CA; Lawrence, KS; Boston, MA; Morganton, NC; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Seattle, WA; and Madison, WI. All participating parents provided written informed consent at the start of the study.

The current study included data collected at five times points, split across three phases of study (Phase II-IV). During the second phase (54 months-1st grade) 1,226 participants (90% of the original Phase I sample collected during birth to 3 years) participated. The third phase (2nd grade- 6th grade) included 1,061 participants (78% of the original sample). During the final phase (7th grade- 9th grade) 1,009 participants (74% of the original sample) completed data. Of the children included in the present study, 705 participants were male and 659 were female; 80.4% identified as White, 12.9% as Black, and 6.7% as another race, and 6.1% identified as Latinx.

Mothers had a mean age of 28.11 years (*SD* = 5.63) and 82.6% identified as White, 12.8% as Black and 4.6% as another race. At the time of entry into the study, mean family income was $37,781 (*SD* = $33,880), and 35.3% of the mothers had a bachelor's degree or higher, 33.4% had an associate's degree or had completed some college, 21.1% were high school graduates, and 10.2% did not complete high school. The majority of mothers (76.7%) were married and living with their partner.

Measures

Friendship Observation Task

The Friendship Observation Task examined interactions between the participant children and the child's friend at their child care provider. Children and their friends were videotaped while interacting during three structured sessions, while trained observers coded social behaviors. The first play session involved a Mickey Mouse pop-up game, the second session included a View-Master, and the third session included a Fisher-Price doctor kit with an accompanying doll. During each session the observer coded child aggression, negative interactions, negative mood, prosocial behavior, positive interactions, and positive mood. All ratings except for the prosocial behavior code were rated on a five-point Likert scale ranging from 1 (low) to 5 (high). Prosocial behavior was coded on a three-point scale from 1 (none) to 3 (high). All negative variables were re-coded to a three-point scale prior to forming the composite. At the end of the three sessions, the observer coded one dyadic rating for the global child–friend relationship during the session which was used during analyses (Iluz et al., 2016).

Social Skills Rating System (SSRS; Gresham & Elliot, 1990)

The SSRS is an informant-report measure of a broad range of socially validated behaviors in children and adolescents. The SSRS was used to assess parent-report of children's social skills at 54 months; in the present study, the total social competence scale was used. The

SSRS included items on cooperation, assertion, responsibility and self-control, which make up the total social skills composite used in the current study. Cronbach's alpha for mother report on the SSRS at 54 months in the present sample was .88. The SSRS has good internal reliability (αs =.84-.91). The SSRS also has demonstrated content, criterion, and construct validity (Boyer & Nelson, 2015).

California Preschool Social Competency Scale (CPSCS; Levine, Elzey, & Lewis, 1969)

The CPSCS is an informant-report measure of social competence and responsibility in preschool children. The CPSCS was used to assess teacher-report of children's social competence at 54 months using the total social competency score. The CPSCS evaluated a child's ability to interact with peers, persevere on tasks, follow instructions, communicate effectively and respond confidently in unfamiliar situations. The CPSCS has been shown to provide a valid assessment of a preschooler's social functioning (Pianta & Stuhlman, 2004). Inter-rater reliability is good (αs = .75-.86) as is split-half reliability (α ≥.90; Lee et al., 1990).

Social Problem-Solving Test: Revised (SPST-R; Rubin, 1988)

The SPST-R is a standardized measure of social problem-solving abilities in children and adolescents. The SPST-R consists of providing children with narratives via stimulus cards and asking how they would respond in that situation do reach the desired goal (e.g., What do you think Rick could do or say to play on the swing?) The SPST-R was used to assess children's social-problem solving skills at 54 months by using the total composite score. The SPST-R has excellent inter-rater reliability for categories (e.g., conversation starters, sharing of information, indirect and direct attempts at friendship; αs = .91), relevancy of the answers to the question being asked (αs = .88) and flexibility of answers in unknown situations (αs = .83-.88; Walker & Henderson, 2012).

Sociometric Status: Teacher Ratings

The Sociometric Status: Teacher Ratings measured how teachers assessed the children's acceptance or rejection by peers. Informants answered using a 7-point Likert scale, responding to statements about how the children interacted with others and how others viewed the children. Teacher ratings were used to indicate how liked the children are by their peers (Buhs et al., 2015). Overall social classification agreement across teachers was kappa equals .30 (Cilessen et al., 1992).

Achenbach System of Empirically Based Assessment (ASEBA; Achenbach & Edelbrock, 1991) - Child Behavior Checklist (CBCL) and Teacher Report Form (TRF)

The ASEBA is a broadband measure of adaptive and maladaptive behavior in children and adolescents, with parent, teacher, and self-report (ages 11+) forms. In the proposed study, the internalizing and externalizing symptom composites from the CBCL and TRF were used to assess children's broadband psychopathology symptoms across childhood and adolescents. Parent ratings are available at all time points; teacher ratings are available in 54 months through 5th grade time points. The ASEBA has good test-retest reliability (r = .85 average, for CBCL; r = .81, average for TRF), including for internalizing problems (r = .90 for CBCL; r = .77 for TRF) and externalizing problems (r = .87 for CBCL; r = .89 for TRF; Achenbach & Rescorla, 2000).

Disruptive Behavior Disorder Rating Scale (DBDRS; Pelham et al., 1992; Pelham et al., 2005)

The DBDRS is a measure of externalizing behaviors as rated by parents and teachers in children and adolescents. The DBDRS has subscales that assess symptoms related to ADHD inattentive symptoms, ADHD hyperactive/impulsive symptoms, and ODD symptoms. The DBDRS was used to assess children's narrowband externalizing behaviors in 3rd and 5th grade with both parent and teacher report at both time points. The DBDRS has good internal

consistency for ADHD (α = .95), ODD (α = .95; Admin, 2018). Excellent reliability was found across timepoints for mother- and teacher-reported ADHD (α = .92-.95). Similarly, good to excellent reliability was found for ODD symptoms across time points for mother- and teacher-report (α = .85-.93).

Children's Depression Inventory, Short Form (CDI-S; Carlson & Cantwell, 1979)

The CDI-S is a measure of self-reported depressive symptoms in children and adolescents. The CDI-S was used to assess children's depressive symptoms in 5th grade and 9th grade. The CDI-S has shown good reliability (α = .80) and is significantly correlated with the long form version of the measure (*r* = .89; Martin-Storey & Crosnoe, 2012; Martin-Storey & Crosnoe, 2015). Reliability was .73 and .81 at 5th and 9th grade respectively.

Youth Psychopathic Traits Inventory (YPI; Andershed et al., 2002)

The YPI is a self-report measure of psychopathic personality traits. The YPI was used to assess psychopathy symptoms in 9th grade. The YPI overall has good internal consistency for the three subscales: Grandiose-Manipulative (αs = .73-.83), Callous-Unemotional (αs = .61-.63), and Impulsive-Irresponsible (α = .78), as well as for the overall YPI (αs = .61-.65; Andershed et al., 2007). In the present study, the overall YPI measure was used.

Analytic Plan

To address Aim 1, an EFA in Mplus Version 8 (Muthén & Muthén, 1998-2017) was conducted. Missing data was accounted for using full information maximum likelihood estimation, which allowed all data to be utilized without excluding participants who did not have all measures of social competence at 54 months. Model fit was assessed using Root Mean Square Error of Approximation (less than .06), Confirmatory Fit Index and Tucker-Lewis Index (greater than or equal to .95), and χ^2 value and its corresponding *p*-value (Hooper et al., 2008; Hu & Bentler, 1999).

To address Aim 2, growth mixture modeling (GMM) was run to examine the differential trajectories of parent-reported and teacher-reported internalizing and externalizing symptoms across childhood and adolescence, with 54-month social competences included as predictors in each model. Instead of assuming that there is one underlying population with a single change pattern over time, GMM allows for examining multiple unobserved (latent) subpopulations that differ in model parameters (intercepts and slopes) and class-specific variations around these parameters (Jung & Wickrama, 2008; Lubke & Muthén, 2007; Ram & Grimm, 2009). GMM does not assume that "growth" or increase in symptomatology occurs over time; that is, subpopulations may exhibit positive slopes, negative slopes, or no change over time. A visual inspection of individual trajectories was first conducted to examine variability between individuals, and if the trajectories appeared to display linear or nonlinear trajectories. In line with recommendations (e.g., Muthén & Muthén, 2000; Tein et al., 2013), model fit was determined using Akaike Information Criteria (AIC), Bayesian Information Criterion (BIC), bootstrapped parametric likelihood ratio test (BLRT), classification probabilities (greater than .70), and signs of model instability (e.g., few repetitions for seeds for log likelihoods, class membership of less than 5%). In particular, the AIC and BIC decreasing, the BLRT remaining significant, and class sizes remaining greater than 5% of the total sample were used as indicators of better model fit. The model with the majority of model fit indicators in its favor was determined to have the better fit. Classification probabilities were used as an indication of how distinct each class is from the other group(s). Coefficients for social competence (either latent variables or individual measures, based on findings for Aim 1) and their associated *p*-values were used to determine which social competences are significant predictors of internalizing and externalizing trajectories.

Finally, a series of multigroup regression analyses (Byrne, 2013) were conducted in Mplus version 8 (Muthén and Muthén 1998–2017) with biological sex being used as the grouping variable. These analyses evaluated which social competence variables predicted narrowband psychopathology symptoms at 3rd through 9th grade, controlling for preschool parent-reported internalizing and externalizing symptoms, and if such relations varied for males and females. All social competence and psychopathology variables were entered into a single path model (see Figure 1 for a conceptual model). Model fit statistics comparing the final trimmed model with paths free to vary across biological sex (i.e., examining differential relations between social competence variables and psychopathology symptoms across males and females) versus fixed to be equal across biological sex was examined (i.e., assuming these relations to be the same for males and females); a non-significant chi-square statistic would indicate that the fixed model should be retained in favor of parsimony. Full information maximum likelihood was used to address missing data, which uses all observed information to estimate parameters. This model did not have an acceptable fit, so the model was trimmed by dropping the least significant path for each predictor one at a time, until a significant chi-square difference indicated that the model had been over trimmed or all remaining pathways exhibited p values $\leq .20$. Model fit was assessed using root mean square error of approximation (RMSEA; Steiger, 1990; Steiger & Lind, 1980), comparative fit index (CFI; Bentler, 1990), and standardized root mean square residual (SRMR; Hu & Bentler, 1999). RMSEA values of $< .08$, CFI values $\geq .95$, and SRMR values $< .08$ indicating acceptable model–data fit. Standardized coefficients are reported; standardized coefficients are used to gauge relative importance of paths and interpreted as r-values (Durlak, 2009) with values greater than .10 indicating a small effect, values greater than .30 indicating a medium effect, and values greater than .50 indicating a large effect (Cohen, 1988).

Results

Preliminary Analyses

Descriptive statistics including means and standard deviations, and bivariate correlations between all study variables can be found in Tables 1-3.

Aim 1: EFA for Social Competence Measures

Correlation between social competence measures were first examined to determine the type of rotation for the EFA. Oblique rotations require correlations of .32 or higher (Tabachnick & Fidell, 2007); as the only significant bivariate correlation found was between the CPSCS and the teacher rated sociometrics, orthogonal rotation was used when running these analyses. The eigenvalues for the correlation matrix were greater than one for both a 1-factor and 2-factor model. Unfortunately, upon exploring both the 1-factor and 2-factor model, neither was able to adequately capture all five indices of social competence (loadings for the stronger indicated factor in the 2-factor model ranged from 0.15 – 1.05, loadings for the 1-factor model ranged from 0.04 – 1.06), with two of the five indices not loading in either model (Friendship Observation Task and SPST-R). Both promax and varimax rotations were examined without success. Since the EFA did not have an acceptable fit or factors loadings, the five individual measures of social competency were used as predictors in Aims 2 and 3.

Aim 2: Examining Social Competence as Predictors of Trajectories of Internalizing and Externalizing Symptoms

Trajectories of Internalizing Symptoms

A three-class linear model was the best fitting model for parent-reported child internalizing symptoms trajectories (see Figure 2a), with strong model fit indices for all indicators and acceptable discrimination of classes as indicated by the classification probabilities

(Table 4). The first trajectory had very low levels of internalizing symptoms at all time points (*M* = 37.25, *SE* = 0.44), with symptoms decreasing over time (Low Decreasing; 7.9% of participants; significant slope: *b* = -0.45, *SE* = 0.07, *p* < .001). The second trajectory had a high level of internalizing symptomatology, but still within normal limits [WNL] at all time points (*M* = 54.07, *SE* = 1.46; Steady High WNL; 32.4% of participants; non-significant slope: *b* = 0.02, *SE* = 0.11, *p* = .882). The third trajectory had moderate levels of internalizing symptoms at all time points (*M* = 45.54, *SE* = 0.56; Stable Moderate WNL; 59.7% of participants; non-significant slope: *b* = -0.11, *SE* = 0.08, *p* = .149).

A two-class linear model was the best fitting model for teacher-reported child internalizing symptoms trajectories (see Figure 3a), with acceptable discrimination of classes as indicated by the classification probabilities (Table 5). The first trajectory had moderate levels of internalizing symptoms at all time points (*M* = 49.02, *SE* = 0.26; Stable Moderate WNL; 93.3% of participants; non-significant slope: *b* = -0.06, *SE* = 0.04, *p* = .094). The second trajectory had very low levels of internalizing symptoms at all time points (*M* = 37.34, *SE* = 0.49), with symptoms decreasing over time (Low Decreasing; 6.7% of participants; significant slope: *b* = -0.48, *SE* = 0.08, *p* < .001).

Trajectories of Externalizing Symptoms

A three-class linear model was the best fitting model for parent-reported child externalizing symptoms trajectories (see Figure 2b), with strong model fit indices for all indicators and acceptable discrimination of classes as indicated by the classification probabilities (Table 4). The first trajectory had a high level of externalizing symptomatology, still WNL at all time points (*M* = 54.26, *SE* = 0.60), with symptoms decreasing over time (Decreasing High WNL; 57.4% of participants; significant slope: *b* = -0.53, *SE* = 0.07, *p* < .001). The second

trajectory had a moderate level of externalizing symptomatology (M = 45.21, SE = 0.64) with these symptoms decreasing over time (Decreasing Moderate WNL; 36.0% of participants; significant slope: b = -0.80, SE = 0.08, $p < .001$). The third trajectory had low levels of internalizing symptoms at all time points (M = 36.16, SE = 0.69), with symptoms decreasing over time (Low Decreasing; 6.6% of participants; significant slope: b = -0.48, SE = 0.09, $p < .001$). Figure 2b displays the three parent-reported externalizing trajectories.

A four-class linear model was the best fitting model for teacher-reported child externalizing symptoms trajectories (see Figure 3b), with acceptable model fit of classes as indicated by the classification probabilities except for BIC (Table 5). Although both the three- and four-class models had reasonable model fit, the four-class model was chosen over the three-class model due to the fact that a meaningful and distinct group of participants approaching the clinical range for externalizing symptoms was found in this model. The first trajectory had a low level of externalizing symptomatology, still WNL at all time points (M = 40.00, SE = 0.27) with symptoms increasing over time (Increasing Low WNL; 7.86% of participants; significant slope: b = 0.30, SE = 0.06, $p < .001$). The second trajectory had a high level of externalizing symptomatology (M = 58.03, SE = 1.55) with these increasing over time (Increasing High; 12.28% of participants; significant slope: b = 1.01, SE = 0.39, p = .010). The third trajectory had low levels of externalizing symptoms at all time points (M = 46.16, SE = 0.86; Steady Low; 30.04% of participants; non-significant slope: b = -0.32, SE = 0.25, p = .199). The fourth trajectory had moderate levels of externalizing symptoms at all time points (M = 52.05, SE = 0.93; Steady Moderate WNL; 49.82% of participants; non-significant slope: b = 0.10, SE = 0.19, p = .586).

Preschool Social Competence Predictors of Latent Class Membership

Parent-Reported Internalizing Symptoms. The CPSCS significantly predicted membership in the three identified latent class trajectories for parent-reported internalizing symptoms, $F = 4.03$, $p = .018$. Specifically, members of the Low Decreasing class had significantly higher scores on the CPSCS ($M = 31.28$, $SD = 4.27$) indicating better social competence than members of the Stable High WNL class ($M = 29.6$, $SD = 4.88$), $p = .027$. The SSRS also significantly predicted membership in latent class trajectories for parent-reported internalizing symptoms, $F = 14.73$, $p < .001$. Specifically, members of the Low Decreasing class had significantly higher scores on the SSRS ($M = 103.15$, $SD = 11.98$) indicating better social competence than members of the Stable High WNL class ($M = 95.40$, $SD = 13.43$), $p < .001$. Additionally, members of the Low Decreasing class had significantly higher scores on the SSRS than members of the Stable Moderate class ($M = 99.17$, $SD = 13.48$), $p < .001$. The Stable Moderate class also displayed better social competence on the SSRS than the Stable High WNL, $p < .001$. The three latent class trajectories did not significantly differ on the Friendship Observation Task, the SPST-R, nor teacher sociometric ratings, ps $> .053$.

Parent-Reported Externalizing Symptoms. The CPSCS significantly predicted membership in the three identified latent class trajectories for parent-reported externalizing symptoms, $F = 15.41$, $p < .001$. Specifically, members of the Decreasing High WNL class had significantly lower scores on the CPSCS ($M = 29.51$, $SD = 4.95$) indicating poorer social competence than members of the Decreasing Moderate class ($M = 31.03$, $SD = 4.18$) and Decreasing Low class ($M = 32.27$, $SD = 4.59$), ps $< .001$. Similarly, the SSRS significantly predicted membership in the latent class trajectories for parent-reported externalizing symptoms, $F = 15.41$, $p < .001$. Specifically, members of the Decreasing High WNL class had significantly lower scores on the SSRS ($M = 95.33$, $SD = 12.99$) indicating poorer social competence than

members of the Decreasing Moderate class (*M* = 101.62, *SD* =13.02) and Decreasing Low class (*M* = 105.97, *SD* = 13.85), *p*s < .001. Additionally, the Decreasing Moderate group had significantly lower scores on the SSRS than members of the Decreasing Low class, *p* = .031. Further, teacher sociometric ratings significantly predicted membership in the three identified latent class trajectories for parent-reported externalizing symptoms, *F* = 6.99, *p* = .001. Specifically, members of the Decreasing High WNL class had significantly poorer teacher rated sociometric ratings (*M* = 16.42, *SD* = 3.02) than the Decreasing Moderate group (*M* = 17.19, *SD* = 2.44), *p* = .001. The three latent class trajectories did not significantly differ on the Friendship Observation Task nor the SPST-R, *p*s > .372

Teacher-Reported Internalizing Symptoms. All five social competence measures significantly predicted membership in the two identified latent class trajectories for teacher-reported internalizing symptoms. For the CPSCS specifically, members of the Stable Moderate class had significantly worse social competence scores (*M* = 29.51, *SD* = 4.81) than members of the Decreasing Low class (*M* = 31.93, *SD* = 4.20), *F* = 47.71, *p* <.001. For the SSRS, members of the Stable Moderate class also had significantly worse social competence scores (*M* = 97.37, *SD* = 13.86) than members of the Decreasing Low class (*M* = 100.11, *SD* = 12.44), *F* = 8.93, *p* = .003. For the teacher sociometric ratings, members of the Stable Moderate class had significantly lower ratings (*M* = 16.30, *SD* = 2.98) than members of the Decreasing Low class (*M* = 17.76, *SD* = 2.17), *F* = 46.22, *p* <.001. For the SPST-R, members of the Stable Moderate class had significantly worse social competence (*M* = -0.18, *SD* = 2.46) than members of the Decreasing Low class (*M* = 0.40, *SD* = 2.16), *F* = 12.45, *p* <.001. Finally, for the Friendship Observation task, members of the Stable Moderate class had significantly worse social competence (*M* =

3.18, *SD* = 0.65) than members of the Decreasing Low group (*M* = 3.32, *SD* = 0.64), *F* = 7.20, *p* = .007.

Teacher-Reported Externalizing Symptoms. The CPSCS significantly predicted membership in the four identified latent class trajectories for teacher-reported externalizing symptoms, *F* = 35.03, *p* < .001. Specifically, members of the Increasing High class had significantly lower scores on the CPSCS (*M* = 26.82, *SD* = 5.82) than members of the Increasing Low (*M* = 33.17, *SD* = 3.79) Stable Low (*M* = 31.56, *SD* = 3.65), and Stable Moderate WNL (*M* = 29.71, *SD* = 4.73) classes, *p*s < .001. Additionally, the Stable Moderate WNL class was significantly below the Increasing Low and Stable Low groups, *p*s < .001. Similarly, the SSRS significantly predicted membership in the four latent class trajectories for teacher-reported externalizing symptoms, *F* = 6.22, *p* < .001. Specifically, members of the Increasing High class had significantly lower scores on the SSRS (*M* = 94.15, *SD* = 13.32) than members of the Stable Low class (*M* = 100.23, *SD* = 13.34), *p* < .001 and the Stable Moderate WNL class (*M* = 97.75, *SD* =13.53), *p* = .045. Additionally, the Stable Moderate group had significantly lower scores on the SSRS than members of the Stable Low group, *p* = .047. Further, teacher sociometric ratings significantly predicted membership in the four classes for teacher-reported externalizing symptoms, *F* = 13.14, *p* < .001. Specifically, members of the Increasing High class had significantly lower sociometric ratings (*M* = 15.31, *SD* = 3.38) than members of the Increasing Low (*M* = 17.72, *SD* = 1.88) Stable Low (*M* = 17.26, *SD* = 2.64), and Stable Moderate WNL (*M* = 16.57, *SD* = 2.83) classes, *p*s < .001. Additionally, the Stable Moderate WNL group was significantly below the Increasing Low group, *p* < .001 and Stable Low groups, *p* = .015. The four latent class trajectories did not significantly differ on the Friendship Observation Task, *p* = .481 or the SPST-R, *p* = .080.

Aim 3: Examining Preschool Social Competence as Predictors of Disorder-Specific Psychopathology Symptoms in Childhood and Adolescence

Finally, for the multi-group path models examining if preschool social competence measures predicted narrowband measures of psychopathology in childhood and adolescence, model fit statistics confirmed that allowing paths to be free across biological sex resulted in significantly better fit than fixing these paths across groups ($\Delta\chi$ (156) = 291.19, $p < .001$). This suggests that as hypothesized there are differences in the relations between preschool social competence measures and psychopathology symptoms for females versus males. This model had a marginally acceptable fit (RMSEA = .09, CFI = .95, SRMR = .09).

Females

For females, the CPSCS and Friendship Observation Task emerged as significant predictors of some narrowband psychopathology symptoms (see Figure 4 for retained and significant paths). Specifically, teacher-reported ADHD symptoms in grade 3 was significantly predicted by the CPSCS (β= -.22, $p < .001$), controlling for preschool internalizing and externalizing symptoms. Additionally, teacher-reported ADHD symptoms in grade 5 was significantly predicted by the CPSCS (β= .17, $p = .002$) and Friendship Observation Task (β= -.18, $p < .001$), controlling for preschool internalizing and externalizing symptoms and grade 3 ADHD symptoms. Teacher-reported ODD symptoms in grade 3 was significantly predicted by performance during the Friendship Observation Task (β= -.12, $p = .025$), controlling for preschool internalizing and externalizing symptoms; however, teacher-reported ODD symptoms in grade 5 was not significantly predicted by any of the social competency measures. Finally, self-reported psychopathy traits in grade 9 was significantly predicted by performance on the Friendship Observation Task (β= -.12, $p = .036$), controlling for preschool internalizing and

externalizing symptoms. In contrast, parent-reported ADHD and ODD symptoms in grade 3 and 5 were not significantly predicted by any of the social competency measures. Additionally, self-reported depression symptoms in grade 5 and 9 were not significantly predicted by any of the social competency measures.

Males

For males, the CPSCS, SSRS, Friendship Observation Task, and teacher sociometric ratings emerged as predictors of some narrowband psychopathology symptoms (see Figure 5 for retained and significant paths). Specifically, parent-reported ADHD symptoms in grade 3 was significantly predicted by the SSRS (β= -.16, p = .008), controlling for preschool internalizing and externalizing symptoms. Similarly, parent-reported ADHD symptoms in grade 5 was significantly predicted by teacher sociometric ratings (β= -.17, p = .010), controlling for preschool internalizing and externalizing symptoms and grade 3 ADHD symptoms. Teacher-reported ADHD symptoms in grade 3 was not predicted by any of the social competency measures; however, teacher-reported ADHD symptoms in grade 5 was significantly predicted by performance during the Friendship Observation Task (β= -.14, p = .006), controlling for preschool internalizing and externalizing symptoms and grade 3 ADHD symptoms. Parent-reported ODD symptoms in grade 3 was significantly predicted by the CPSCS (β= .18, p = .013), controlling for preschool internalizing and externalizing symptoms, whereas parent-reported ODD symptoms in grade 5 was significantly predicted by the SSRS (β= -.13, p = .019) and teacher sociometric ratings (β= -.13 p = .038), controlling for preschool internalizing and externalizing symptoms and grade 3 ODD symptoms. Teacher-reported ODD symptoms in grade 3 was not predicted by any of the social competency measures, but teacher-reported ODD symptoms in grade 5 was significantly predicted by the CPSCS (β= -.17, p = .007) controlling

for preschool internalizing and externalizing symptoms and grade 3 ODD symptoms. Finally, self-reported psychopathy traits in grade 9 was significantly predicted by the CPSCS (β= -.15, *p* = .027), controlling for preschool internalizing and externalizing symptoms. In contrast, self-reported depression symptoms in grade 5 and 9 were not significantly predicted by any of the social competency measures.

Discussion

This study's primary goal was to examine the relation between preschool social competence and broadband and narrowband psychopathology symptoms from early childhood through adolescence. The results of the current study provide support for the ability of measures of social competency in preschoolers for predicting psychopathology outcomes into adolescence (i.e., grade 9). Trajectory analyses suggest that preschool social competence measures can even disentangle non-clinical levels of symptomatology trajectories. Path model analyses with narrowband measures found that social competency measures were more strongly associated with externalizing disorders (i.e., ADHD, ODD, and psychopathy) than they were with internalizing disorders (i.e., depression). Taken together, findings of the present study highlight the opportunity to assess and identify at-risk young children through easy to collect social competence measures. These results and their clinical implications are discussed further below.

Social Competence Measures and Social Theories

The ability of various social competency measures to be mapped onto the overarching theoretical structures of two commonly used models were investigated in the present study using an EFA. Although both Rose-Krasnor and Cavell's theoretical models have been well researched regarding the main components of social competence, results from our EFA suggest that existing commonly used measures of social competence do not map onto their various theorized underlying components as predicted. Surprisingly, the EFA suggested that a 1- or 2-factor model was indicated; however, neither of these models had adequate loadings for the five individual social competence measures. The findings of the current study are somewhat in contrast to several prior studies that have run an EFA or a confirmatory factor analysis (CFA) when examining measures of social competence, and their ability to fit onto Cavell or Rose-Krasnor's

theoretical models (Bost et al., 1998; Joy, 2016; Proekt et al., 2017). Proekt at al. (2017) and Joy (2016) both were able to find factor loadings or significant pathways that they believed matched well with Cavell and Rose-Krasnor's models, respectively. However, they both only used a single informant for social-competence and Proekt et al. (2017) was only a single measure. In contrast, Bost et al. (1998) used a CFA and found minimally adequate fit, with identified factors being limitedly consistent with Cavell's theoretical model. This study utilized 3 different reporters for each child, however all of them were unrelated individuals (i.e., observers not parents or teachers) who were just observing the child's behavior. The observers who watched the children and rated them using two different questionnaires and a sociometric instrument. Although this study utilized several different informants and measures of social competency, they were all completed based on observations. As such, it is believed that when a multi-method and multi-informant approach to measuring social competency is used, these constructs do not fit as well into existing theoretical models, despite the fact that they may better capture social competence in daily life.

Preschool Social Competency Predictors of Adolescent Psychopathology Symptoms

A main aim of this study was to examine different trajectories of psychopathology symptoms throughout early childhood and adolescence, and whether measures of preschool social competency could predict membership in the identified trajectories. Surprisingly, only the teacher-reported externalizing symptom trajectories included a class that reached clinical symptomatology levels. This finding likely resulted from the NICHD SECCYD dataset being a community sample identified at birth. However, prevalence rates of externalizing (i.e., ADHD approximately 8-9%; ODD approximately 12-13%; Merikangas et al., 2010) and internalizing (i.e., mood disorders, approximately 14-15%; anxiety disorders, approximately 31-32%;

Merikangas et al., 2010) symptoms in the general population would indicate that at least a small sample of this large community population would have elevated rates of externalizing and internalizing symptoms. Externalizing symptoms such as hyperactivity/impulsivity, oppositionality, defiance, and aggression traditionally are assessed by parent and teacher report (American Academy of Pediatrics, 2011); as such, it makes sense that this was the symptomatology where we identified clinical (teacher) and sub-clinical (parent) populations identified. In contrast, internalizing symptoms are more often assessed via self-report, particularly in adolescence, given that these symptoms are not as apparent to observers (i.e., they involve thoughts and feelings rather than specific behaviors; Chorpita et al., 2000). Unfortunately, the ASEBA system youth self-report measure is only validated for children ages 11 years and older, and thus was only collected during the grade 9 time point of the NICHD SECCYD study, preventing the examination of self-report trajectories in childhood and adolescence. It will be important for future work to examine internalizing symptom trajectories using self-reported broadband measures that can be collected from younger children, such as the Behavior Assessment System for Children, Third Edition (Reynolds et al., 2015), which has self-report measures for children as young as age 6 and continues through college age young-adult self-report.

Utilizing GMM, we identified two to four latent class groups, with linear slopes, for both parent- and teacher-reported internalizing and externalizing symptoms, with some classes increasing, others decreasing, and others remaining stable from early childhood (54 months) to adolescence (grade 9/age 15). Despite these differential trajectories, clear distinction between trajectories was obtained for all models, with no overlap in symptoms across trajectories at any time point. Further, even though only one class was identified across the four models that

displayed clinical symptoms, results consistently suggested that preschool social competence measures were robust predictors of class membership. Specifically, results generally suggested that preschool social competence measures could distinguish children with low levels of internalizing and externalizing psychopathology from children with high and even sometimes moderate symptomatology. These findings were true regardless of if the trajectories were stable across time points or displayed changes over time. These are important findings, as they suggest that even variance WNL of psychopathology symptoms can be significantly predicted by preschool social competence. Such insight could help teachers and families identify at-risk youth, and provide early intervention support these children during the preschool and early elementary school years to hopefully result in improved trajectories across childhood and adolescence.

Previously, two studies examined psychopathology symptom trajectories, similar to the current study, however neither of these studies had preschool social competence as predictors which limits their ability to be compared to the current study. Nantel-Vivier et al. (2014) found 3 trajectories for prosocial and physical aggression development and 4 trajectories for anxiety and depression development and ran analyses to discover what overlap existed between psychopathology trajectories and social competence trajectories. Their primary findings were findings of the most common trajectories in combination (i.e., joint trajectories), the largest being children who displayed moderate prosocial behavior and moderate physical aggression. Korhonen et al. (2014) also focused on internalizing and externalizing trajectories and if they were significantly related to the maternal- and self-reported social competency, but only during middle childhood and adolescence. Their study found 4 trajectories for both internalizing and externalizing problems, during which the highest internalizing trajectory was above the

subclinical/clinical threshold at all time points and the highest externalizing trajectory started subclinical but was above the clinical cutoff by the final timepoint. Korhonen et al. (2014) also found a significant association between maternal-reported social competence and internalizing symptoms in middle childhood and adolescence and externalizing symptoms in adolescence. The self-reported social competence was significantly related to internalizing symptoms at adolescence.

To date, only one prior study has examined preschool social competency as a predictor of psychopathology symptoms in adolescents. Bornstein et al. (2010) found that social competence at 4-years-old was predictive of internalizing and externalizing symptoms at 10-years-old. The lower social competence abilities a 4-year-old had, the more internalizing and externalizing symptoms were reported at 10 and more externalizing at 14-years-old. However, this study only had 3 time points where they collected data (4 years old, 10 years old, 14 years old) and the informants and measures were limited in their scope, particularly when assessing early social competence. The findings of the present study were largely consistent with this prior study in that it found social competence to be significantly predictive of both internalizing and externalizing symptoms. It also extended upon these prior studies by examining this by using more informants and measures as well as utilizing 5 time points that spanned preschool through adolescence (i.e., high school), compared to the 3 utilized previously time points.

Preschool Social Competence Predicting Disorder-Specific Psychopathology Symptoms

The final aim of this study was to explore the possibility of preschool social competence as a predictor of narrowband, disorder-specific psychopathology symptoms (ADHD, ODD, depression, psychopathy). Multi-group path models revealed that these relations were different for females and males, and that a majority of the captured variance was explained by the

psychopathology symptoms from earlier time points, rather than social competency measures specifically. Additionally, a poor model fit was present for the full model, resulting in the use of model trimming procedures. Even after model trimming, the model fit was still marginally acceptable, perhaps suggesting that examination of disorders independently rather than in a single model may be warranted.

Despite these concerns, our findings that some social competency measures were predictive of externalizing, disorder-specific psychopathology fit with previous research (Bornstein et al., 2010; Perren et al., 2012). Specifically, prior research suggests that multiple reporters of early social competence (i.e., parent, teacher, self) are likely to be predictive of later psychopathology symptoms. However, this research has been limited by small sample sizes and use of only one or two reporters/measures. Interestingly, in the present study, preschool social competency measures were more significantly predictive of teacher-reported-psychopathology in elementary school (i.e., grades 3 and 5) in females than in males, with social competency only being linked to teacher-reported ODD in grade 5. In contrast, preschool social competency measures were more strongly associated with parent-reported psychopathology in males (i.e., parent-reported ADHD symptoms in grade 3 and parent-reported ODD symptoms in grade 3 and 5). Overall, preschool social competency measures were a more robust predictor of male psychopathology symptoms (7 significant paths) than females (5 significant paths). Impressively, in both males and females, preschool social competency (Friendship Observation Task for females and CPSCS for males) was predictive of self-reported psychopathy traits (i.e., cold and uncaring affect; grandiose and impulsive behavior; a charming, manipulative, and exploitative nature; lack of remorse; Hare & Neumann, 2008) in 9th grade. Given the serious negative consequences of psychopathy (e.g., violent acts, arrest, incarceration, recidivism ; Brandt et al.,

1997; Hemphill et al., 1998; Salekin et al., 1996; Walters, 2003), this finding underscores the potential utility of identify at-risk youth during preschool to intervene and improve long-term outcomes. In contrast, and surprisingly, preschool social competency measures were not predictive of self-reported depression symptoms in 5th and 9th grade in males or females. This may be due to the fact that preschool social competence is less relevant to depression during middle childhood and adolescence, since these youth could be doing well socially and emotionally pre-puberty, but then later experience concurrent social difficulties due to their depression. Unfortunately, the NICHD SECCYD study did not have any other measures of disorder-specific internalizing symptoms, so it remains unclear if the lack of relations between preschool social competence and childhood/adolescent psychopathology extends to internalizing disorders broadly or to depression specifically. As far as we know, no research to date has looked at the longitudinal relations between preschool social competence and disorder-specific psychopathology symptoms, let alone distinguished by biological sex. As such, these findings expand on the existing developmental and clinical literatures supporting social competence difficulties among various clinical populations.

Limitations

Although this study provides important evidence for the predictive nature of preschool social competence for identifying later psychopathology symptoms in childhood and adolescence, these results should be considered within the context of several limitations. First, although the present study had a large sample size that sought to be representative of the United States, the data was collected from 1991-2006 and consisted of predominately non-Hispanic, White, married mothers, who were fluent in English. Given that the demographics of the United States have changed drastically over the past 30 years (e.g., large increase in Hispanic/Latinx

individuals, Bureau, 2020), it will be important for these findings to be replicated with a more diverse sample. Additionally, given that means of social interactions have changed during this time period (e.g., increased use of technology), which such social interactions beginning as early as the preschool years, future research should consider a broader range of social competence that may be relevant in a more digital world. Second, because this study utilized an existing dataset, these secondary analyses were limited to the measures collected as part of the larger study rather than being selected based on the targeted study questions. Specifically, as previously noted, examination of self-reported symptom trajectories was not possible given the use of the ASEBA Youth Self-Report which does not start until age 11, and we only had self-reported depression symptoms to represent narrowband internalizing disorders, rather than a range of internalizing (e.g., Generalized Anxiety Disorder, Social Anxiety Disorder). Additionally, the examined narrowband measures were not collected at all time points as would have been ideal to examine whether social competency measures were more strongly associated with psychopathology symptoms at different developmental periods. Particularly, given that ADHD and ODD symptoms typically onset during the preschool and early elementary school years (McDonnell & Glod, 2003), it would have been ideal to have these symptoms measured in 1st grade. Similarly, psychopathy can be reliable measured as early as preschool (Colins et al., 2018), so having measures of this at any time point prior to 9th grade would have been beneficial. Finally, given that this was a somewhat low-risk, community sample (i.e., largely two parent, non-Hispanic White families) low rates of clinical symptoms were identified in GMM trajectory analyses. Additional research is needed that utilizes at-risk or clinical samples to see if social competence measures may be more or less robust predictors of psychopathology symptoms that are in the clinical range.

Conclusion

The present study suggests that preschool social competency measures may be useful in identifying at-risk children who may need early interventions or resources to prevent negative long-term psychopathology outcomes in childhood and adolescence. This is particularly important given that these social competency measures could be easily utilized as screeners in preschools or Head Start programs, as they are easy to implement, with minimal time and resources. Such screeners could take place as part of an entrance to kindergarten assessment, and would provide additional insight above and beyond assessment of preschool psychopathology symptoms. The use of these measures will allow teachers, parents, and primary care doctors the ability to add in easy and affordable measures to help identify children who may be at-risk in the future. Additionally, results highlight that the risk for poor social competency may differ for male and female children, and underscore the importance of considering individual factors such as biological sex that may influence risk over time. If these findings are replicated, such research could be extremely useful in helping individualize early-intervention services to focus on the aspects of social competence that are most relevant for a particular child.

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Appendix A:

Tables

Table 1.

Descriptive Statistics for Social Competence Variables and Mother-Reported Child Behavior Checklist Variables Across Timepoints

Variable	*M (SD)*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Friendship Observation Task	3.23 (0.65)	--													
2. SSRS	98.27 (13.53)	.07	--												
3. CPSCS	30.25 (4.75)	.04	.18***	--											
4. SPST-R	0.00 (2.40)	.05	.14***	.08*	--										
5. Sociometric Status	16.74 (2.84)	-.03	.11**	.55***	-.01	--									
6. Ext 54 Months	51.69 (9.39)	.00	-.33***	-.19***	-.04	-.18***	--								
7. Int 54 Months	47.29 (8.88)	-.04	-.21***	-.12**	-.09**	-.10**	.59***	--							
8. Ext Grade 1	48.64 (9.79)	-.02	-.27***	-.22***	-.08*	-.15***	.69***	.40***	--						
9. Int Grade 1	48.27 (8.94)	-.03	-.17***	-.14***	-.08*	-.12**	.43***	.57***	.58***	--					
10. Ext Grade 3	47.40 (9.82)	-.03	-.23***	-.17***	-.06	-.13**	.60***	.35***	.74***	.40***	--				
11. Int Grade 3	48.43 (9.90)	-.04	-.14***	-.12**	-.06	-.12**	.39***	.51***	.43***	.63***	.56***	--			
12. Ext Grade 5	45.80 (10.09)	-.06	-.20***	-.21***	-.04	-.10*	.58***	.35***	.69***	.43***	.75***	.46**	--		
13. Int Grade 5	48.74 (9.78)	-.06	-.17***	-.15***	-.03	-.07	.42***	.48***	.44***	.63***	.44***	.67**	.61**	--	
14. Ext Grade 9	45.51 (10.46)	-.05	-.22***	-.15***	-.04	-.13**	.49***	.30***	.57***	.33***	.62***	.38**	.64**	.39**	--
15. Int Grade 9	46.64 (9.86)	.01	-.14***	-.11**	-.04	-.13**	.35***	.38***	.38***	.49***	.38***	.56**	.43**	.60**	.61**

Note. SSRS = Social Skills Rating System, CPSCS = California Preschool Social Competency Scale, SPST-R = Social Problem-Solving Test: Revised, Ext = Externalizing, Int = Internalizing. *p<.05, ** p <.01, *** p <.001

Table 2.

Descriptive Statistics for Social Competence Variables and Teacher Report Form Variables Across Timepoints

Variable	*M (SD)*	1	2	3	4	5	6	7	8	9	10	11	12
1. Friendship Observation Task	3.23 (0.65)	--											
2. SSRS	98.27 (13.53)	.07	--										
3. CPSCS	30.25 (4.75)	.04	.18***	--									
4. SPST-R	0.00 (2.40)	.05	.14***	.08*	--								
5. Sociometric Status	16.74 (2.84)	-.03	.11**	.55***	-.01	--							
6. Ext 54 Months	50.09 (9.61)	-.01	-.19***	-.59***	.02	-.40***	--						
7. Int 54 Months	50.51 (9.65)	-.05	-.17***	-.48***	-.08*	-.40***	.49***	--					
8. Ext Grade 1	50.68 (8.72)	-.06	-.10**	-.30***	-.04	-.14***	.48***	.09*	--				
9. Int Grade 1	49.21 (9.18)	-.05	-.03	-.14***	-.10**	-.12**	.11**	.13**	.30***	--			
10. Ext Grade 3	51.51 (9.36)	-.03	-.13***	-.20***	-.06	-.14***	.30***	.05	.54***	.06	--		
11. Int Grade 3	51.50 (9.60)	-.07	-.07*	-.11**	-.11**	-.18***	.12**	.13**	.09*	.16***	.37***	--	
12. Ext Grade 5	50.96 (9.15)	-.08*	-.09**	-.20***	-.04	-.14**	.29***	.07	.47***	.05	.52***	.04	--
13. Int Grade 5	50.46 (9.48)	-.12**	-.10**	-.09*	-.12***	-.15***	.11**	.14**	.09*	.17**	.12***	.25***	.37***

Note. SSRS = Social Skills Rating System, CPSCS = California Preschool Social Competency Scale, SPST-R = Social Problem-Solving Test: Revised, Ext = Externalizing, Int = Internalizing. *p<.05, ** p <.01, *** p <.001

Table 3.

Descriptive Statistics for Social Competence Variables and Parent, Teacher, and Self-Reported Narrowband Measures

Variable	*M (SD)*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Friendship Observation Task	3.23 (0.65)	--														
2. SSRS	98.27 (13.53)	.07	--													
3. CPSCS	30.25 (4.75)	.04	.18***	--												
4. SPST-R	0.00 (2.40)	.05	.14***	.08*	--											
5. Sociometric Status	16.74 (2.84)	-.03	.11**	.55**	-.01	--										
6. PR ADHD Grade 3	12.49 (8.81)	-.02	-.22***	-.22**	-.07*	-.17***	--									
7. PR ODD Grade 3	4.53 (3.51)	-.03	-.24***	-.17**	-.06	-.12**	.65***	--								
8. TR ADHD Grade 3	10.24 (11.18)	-.04	-.11**	-.25**	-.12***	-.17***	.54***	.27**	--							
9. TR ODD Grade 3	2.49 (4.22)	-.05	-.11**	-.22**	-.09*	-.13**	.34***	.31**	.67**	--						
10. PR ADHD Grade 5	13.09 (9.36)	-.05	-.16***	-.23**	-.02	-.16***	.75***	.51**	.44**	.29**	--					
11. PR ODD Grade 5	4.78 (3.78)	-.04	-.24***	-.19**	-.03	-.13**	.48***	.68**	.19**	.22**	.64**	--				
12. TR ADHD Grade 5	8.84 (10.28)	-.13**	-.08*	-.19**	-.12**	-.14***	.42***	.24**	.54**	.42**	.46**	.24**	--			

13. TR ODD Grade 5	2.51 (4.30)	-.08	-.12**	-.18**	-.06	-.11**	.27***	.22**	.36**	.49**	.30**	.27**	.73***			
14. SR Dep Grade 5	1.28 (1.95)	-.05	-.10**	-.12**	-.02	-.07	.16***	.15**	.08*	.07*	.16**	.18**	.05	-.05		
15. SR Dep Grade 9	2.01 (2.64)	-.03	-.06	-.02	.01	-.06	.07*	.12**	-.00	.02	.06	.16**	-.07	-.03	.25**	--
16. SR Psychopathy Grade 9	29.35 (7.04)	-.09*	-.02	-.12**	-.18***	-.02	.13***	.08*	.26**	.22**	.15**	.09*	.23***	.17***	.04	-.06

Note. SSRS = Social Skills Rating System, CPSCS = California Preschool Social Competency Scale, SPST-R = Social Problem-Solving Test: Revised, PR = parent-report, TR = teacher-reported, SR = self-reported, ADHD = attention-deficit/hyperactivity disorder, ODD = oppositional defiant disorder, Dep = Depression. *p<.05, ** p <.01, *** p <.001

Table 4.
Model Fit Statistics for Parent-Reported Symptom Trajectories

Model	AIC	BIC	BLRT	*p*	Classification Probability	Class Size
			Internalizing Symptoms			
1 Class	37391.75	37443.93	--	--	--	1157
2 Class	35320.87	35396.67	-17713.20	<.001	.99, .80	1079, 78
3 Class	**35264.86**	**35381.09**	**-17679.04**	**<.001**	**.83, .82, .78**	**91, 375, 691**
4 Class	35248.19	35389.69	-17649.53	<.001	.84, .82, .67, .74	102, 261, 180, 614
5 Class	35191.45	35378.43	-17572.71	.062	.58, .91, .82, .75, .81	321, 16, 363, 385, 72
			Externalizing Symptoms			
1 Class	37229.05	37281.23	--	--	--	1157
2 Class	35127.20	35203.00	-17631.85	<.001	.78, .97	118, 1039
3 Class	**35051.31**	**35172.60**	**-17548.60**	**<.001**	**.71, .80, .88**	**417, 76, 664**
4 Class	35023.59	35190.36	-17501.66	<.001	.71, .80, .64, .69	237, 75, 384, 461
5 Class	34961.66	35173.91	-17461.73	<.001	.76, .68, .99, .65, .71	81, 459, 9, 369, 239

Note. Bolded row represents the best fitting growth mixture model. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; BLRT = bootstrapped parametric likelihood ratio test.

Table 5.
Model Fit Statistics for Teacher-Reported Symptom Trajectories

	Internalizing Symptoms					
Model	AIC	BIC	BLRT	*p*	Classification Probability	Class Size
1 Class	28494.12	28546.30	--	--	--	1132
2 Class	**26503.08**	**26578.56**	**-13264.39**	**<.001**	**.87, .70**	**796, 336**
3 Class	26477.33	26588.03	-13236.85	<.001	.79, .70, .88	11, 319, 802
4 Class	26464.48	26610.40	-13219.58	.031	.68, .65, .70, .79	16, 472, 126, 518
5 Class	--	--	--	--	--	--
	Externalizing Symptoms					
1 Class	27578.96	27631.14	--	--	--	1132
2 Class	25370.04	25445.52	-12806.81	<.001	.99, .93	1046, 86
3 Class	25220.87	25331.57	-12685.17	<.001	.86, .85, .82	88, 451, 593
4 Class	**25193.21**	**25339.13**	**-12601.43**	**<.001**	**.85, .84, .74, .74**	**89, 139, 340, 564**
5 Class	25168.31	25349.45	-12579.71	<.001	81, 72, 82, 81, 75	89, 180, 14, 211, 638

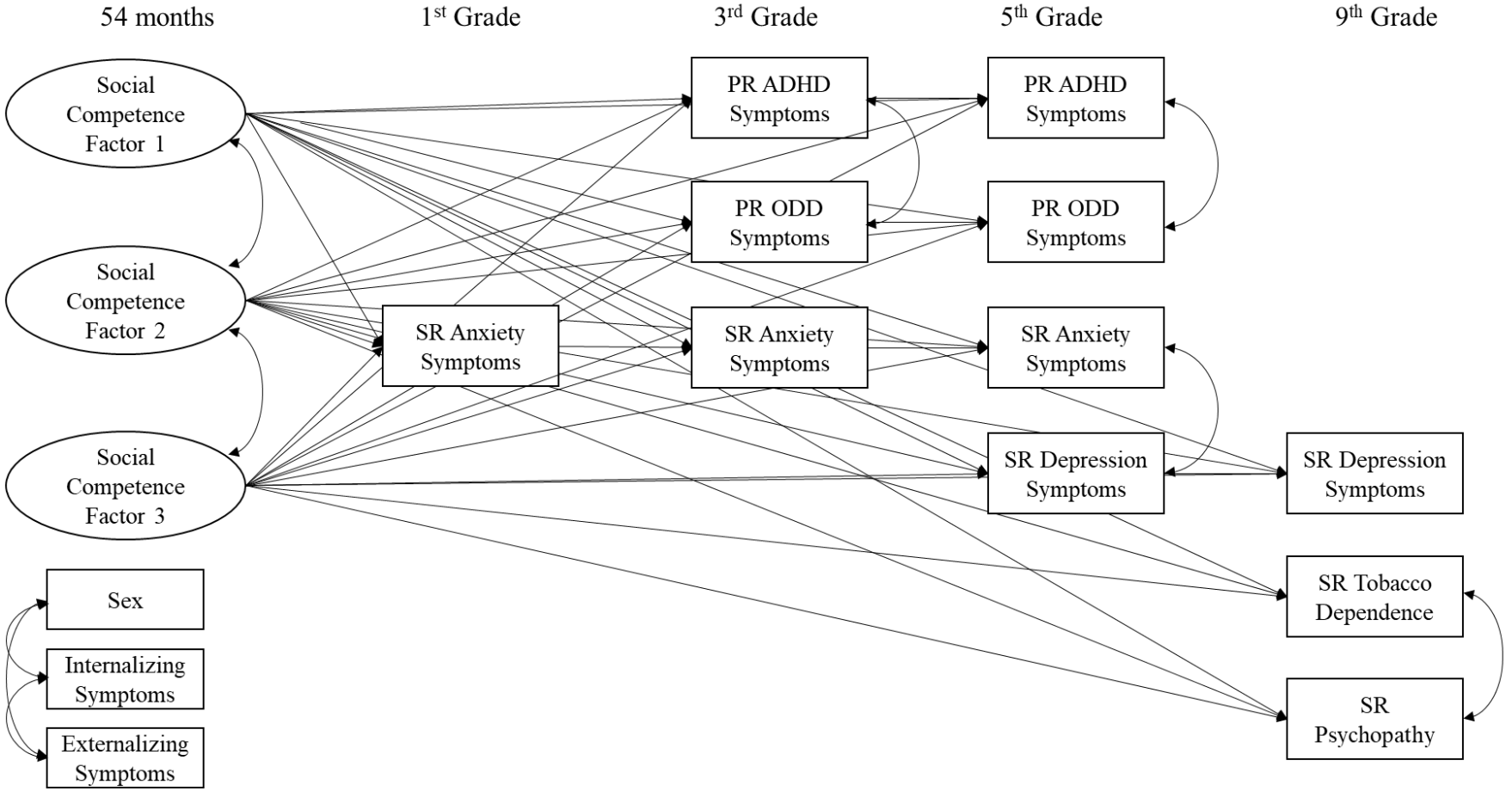
Note. Bolded row represents the best fitting growth mixture model. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; BLRT = bootstrapped parametric likelihood ratio test.

Appendix B:

Figures

Figure 1.

Path Model for Aim 3 Examining Whether Preschool Social Competencies Predict Disorder-Specific Psychopathology Symptoms in Childhood and Adolescence

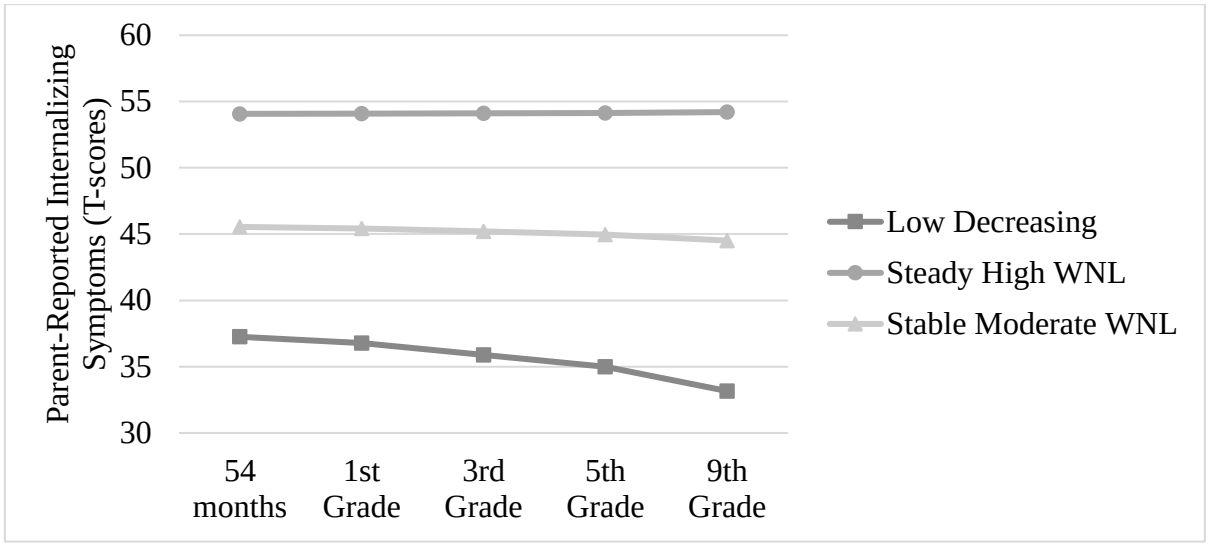


Note. Controls for preschool parent-reported internalizing and externalizing symptoms and sex. PR = parent-reported, TR = Teacher-reported, SR = self-reported.

Figure 2.

Parent-Reported a) Internalizing and b) Externalizing Symptom Trajectories

a)



b)

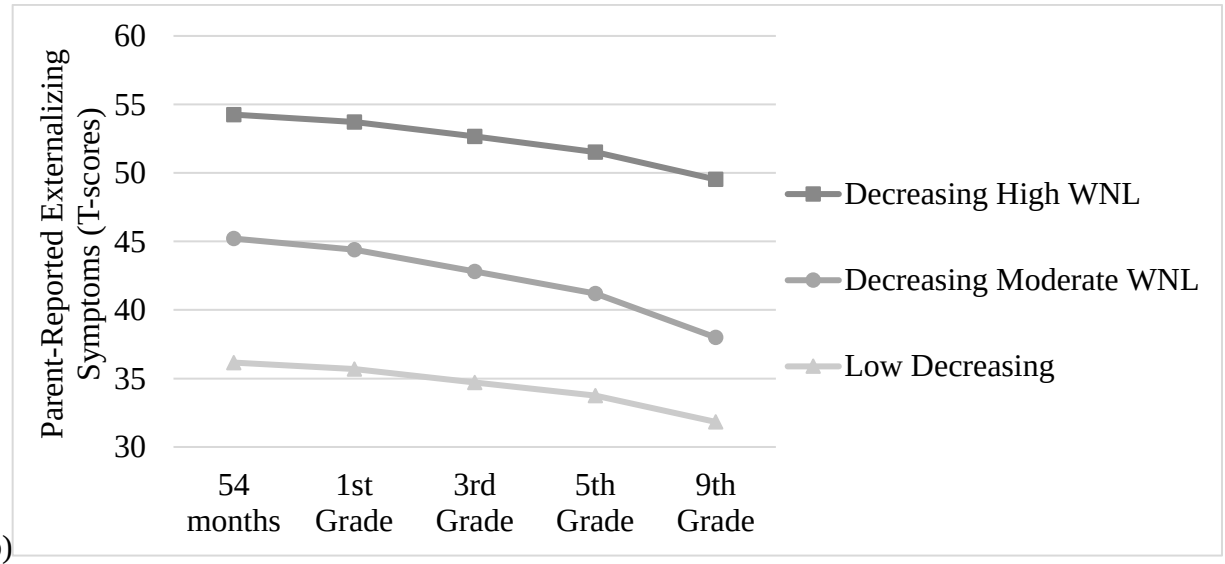
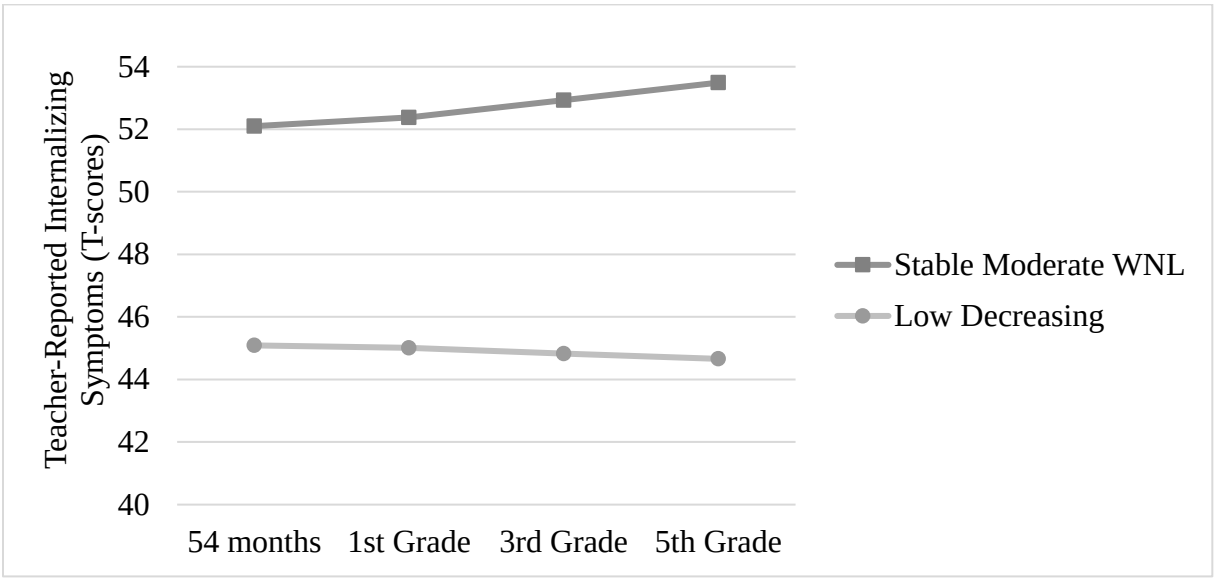


Figure 3.

Teacher-Reported a) Internalizing and b) Externalizing Symptom Trajectories

a)



b)

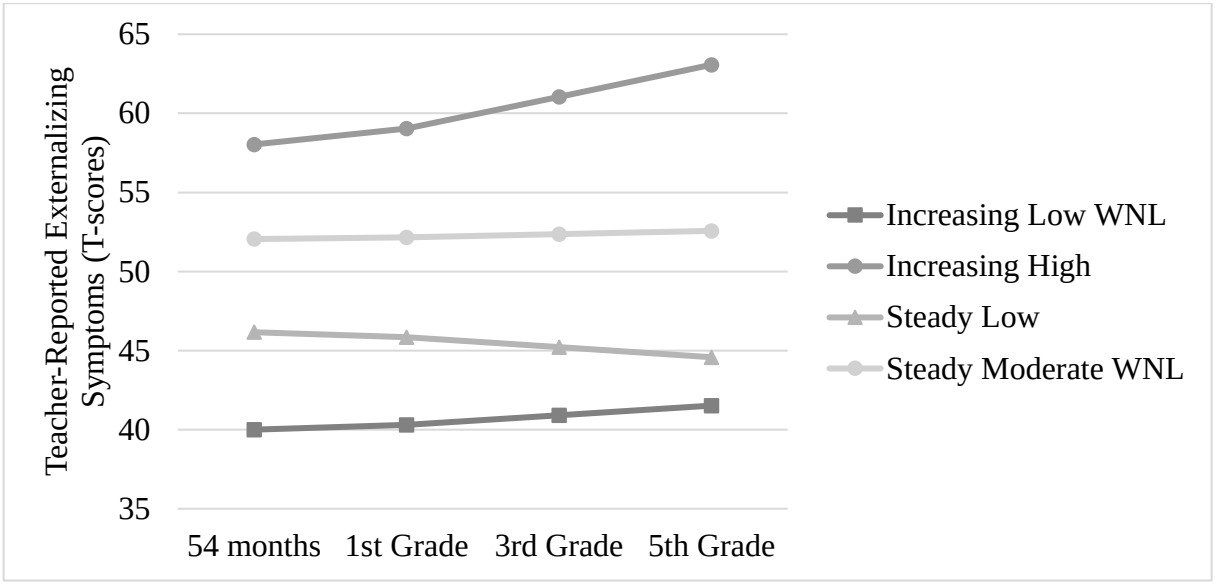
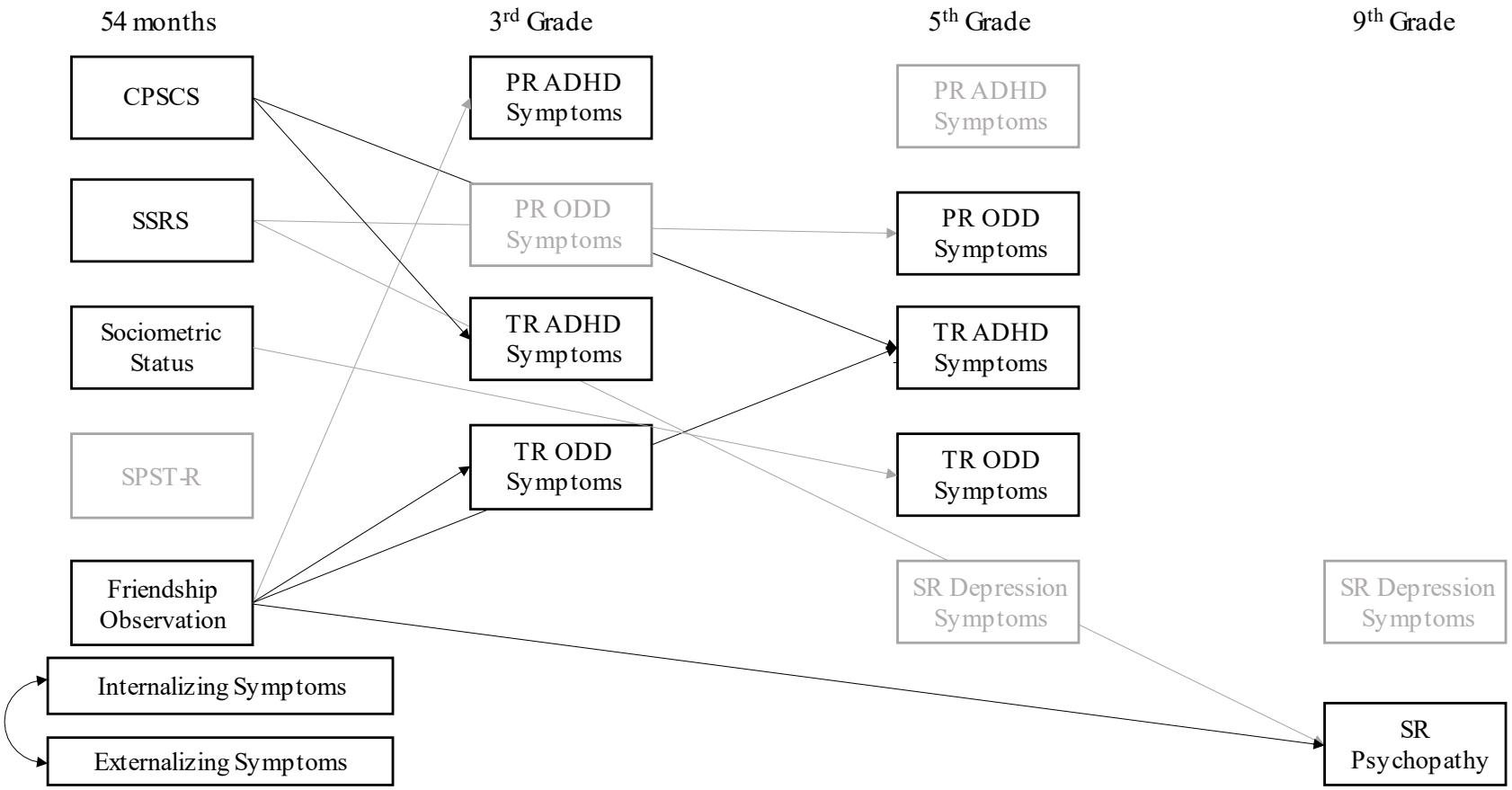


Figure 4.

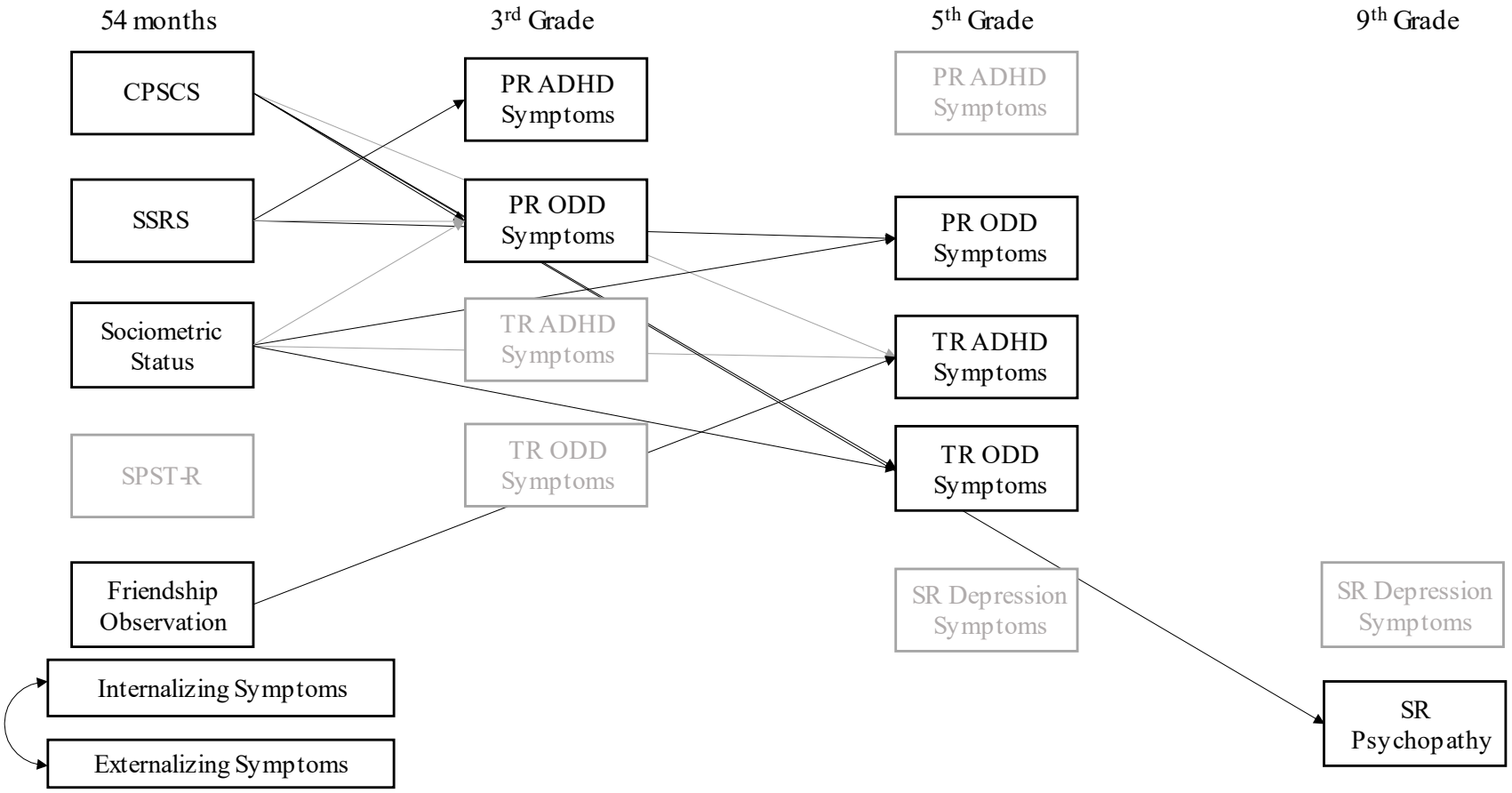
Social Competency Measures as Predictors of Narrow-Band Psychopathology Symptoms in Females



Note. Grayed out paths were retained in the final model, but were non-significant (*p*s > .050), whereas paths that are black represent significant relations (coefficients and *p*-values reported in text).

Figure 5.

Social Competency Measures as Predictors of Narrow-Band Psychopathology Symptoms in Males



Note. Grayed out paths were retained in the final model, but were non-significant (*p*s > .050), whereas paths that are black represent significant relations (coefficients and *p*-values reported in text).