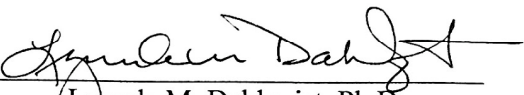


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Name of Candidate: Wendy Maria Pinder
Master of Arts, 2016

Thesis and Abstract Approved: 
Lynnnda M. Dahlquist, Ph.D.
Professor
Department of Psychology
Human Services Psychology Program

Date Approved: 1 | 6 | 16

NOTE: *The Approval Sheet with the original signature must accompany the
thesis or dissertation. No terminal punctuation is to be used.

ABSTRACT

Title of Document:

PEER RELATIONS AND SOCIAL COMPETENCE OF PRESCHOOL-AGE HEALTHY AND FOOD-ALLERGIC CHILDREN

Wendy Maria Pinder, M.A, 2016

Directed By:

Lynnda M. Dahlquist, Professor, Department of
Psychology, Human Services Psychology
Program

Peers provide children with a unique environment to develop social competence.

Previous research suggests that restricted peer contact is associated with poor social and emotional outcomes. Children with food allergy may experience heightened risk for restrictions in peer contact due to avoidance of allergens. This study examined the relations between children's access to peers outside of school and social competence in a sample of healthy and food-allergic children. Eighty-two mothers and teachers of children ages 3-6 participated. Thirty-two children had a food allergy diagnosis. Mothers reported their child's peer contact frequency, peer network size, and mothers and teachers reported children's social competence. Social competence was not statistically significantly related to children's peer contact frequency or peer network size outside of school. No significant differences were detected between food-allergic and healthy children. Further research should examine the longitudinal impact of peers both within and beyond school settings on social competence.

PEER RELATIONS AND SOCIAL COMPETENCE OF PRESCHOOL-AGE
HEALTHY AND FOOD-ALLERGIC CHILDREN

By

Wendy Maria Pinder

Thesis submitted to the Faculty of the Graduate School of the
University of Maryland, Baltimore County, in partial fulfillment
of the requirements for the degree of
Masters of Arts
2016

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Introduction

The ability to effectively navigate social interactions is important for mastery of many academic, occupational, and social tasks throughout the course of life (Frankel & Myatt, 1994; Parker & Asher, 1987). The development of competence in social contexts requires that individuals have opportunities to interact with others to learn appropriate social cues and skills. As such, the process of developing social competence begins at an early age, first as children engage in interactions with immediate family, and later as those interactions extend into various additional social environments. Consequently, early childhood is a critical period in this process as it is a time of rapid development and learning. Beginning in early childhood (i.e. preschool) children participate in interactions with peers; peers provide a unique and critical relationship owing to the reciprocal nature of the relationship (Dunn, 1983), which allows children to observe and practice age-appropriate skills (Langlois, Gottfried, Barnes, & Handricks, 1978). Therefore, interactions with peers provide a novel, and crucial, environment for developing social competence in early childhood.

The concept of competence necessarily involves a comparison of relative abilities between individuals. Thus for individuals who experience obstacles that are thought to restrict opportunities to interact with peers, it is expected that they will have lower levels of social competence than individuals that do not encounter those challenges. Chronic illness is one such challenge that can disrupt normal social development in childhood. Management of a chronic illness often demands adjustments to daily activities, which can reduce children's opportunities to interact with peers. Food allergy is a unique chronic illness that requires avoidance of foods, and situations in which children could experience

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an allergic reaction. Unlike most other chronic conditions, food allergy involves reactions that are rapid in onset and can escalate to severe levels within minutes. This characteristic of food allergy demands that children and caregivers be cautious about potential allergens in the environment, a requirement that can be particularly stressful when in unfamiliar locations. Therefore, the unique challenges of food allergy may reduce the frequency with which children interact with peers due to parental apprehension of potentially unsafe settings. For the same reasons, food allergy may contribute to a more limited number of peers in the child's social network. As a result of fewer social experiences with peers children with food allergy may have fewer opportunities to develop social competence relative to their healthy peers.

In the proposed study, I aim to explore the relation between access to peers and social competence. In addition, I aim to examine the differences between healthy children and children thought to have restricted opportunities for peer interaction due to food allergy.

Social competence

As children develop, they learn how to participate in social interactions. Much of this learning begins within the home with family members. Infants gain the ability to incorporate objects into their interactions with adults by 9-12 months of age, and progress to participating in more collaborative joint activities in early toddlerhood (Brownell & Kopp, 2007). Shortly thereafter, the network of people with whom the child interacts expands to babysitters, preschool teachers, peers, and others. In these settings children rapidly learn how to interact with others, using new forms of communication and play. Each experience builds upon the child's knowledge and competencies, stimulating

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cognitive and social development. This complex process of growth has been studied for decades, and continues to elicit interest from developmental and clinical researchers.

Social competence is a term broadly used to describe the degree to which an individual effectively interacts with others (Rose-Krasnor, 1997). A large body of theory and research emphasizes the importance of social competence for healthy functioning and development. Research suggests that social competence predicts various positive outcomes, such as lower rates of delinquency, substance abuse and school dropout (Frankel & Myatt, 1994; Parker & Asher, 1987). However, definitions of social competence vary throughout the literature. Some researchers propose that competence is evident when a specific social goal is obtained (Erdley & Asher, 1999). Others consider peer acceptance to be the gold standard of evaluating competence (Cavell, 1990). Some researchers use broader definitions; for example, LaFreniere and Dumas (1996) define competence as a combination of behaviors that show flexibility, emotional maturity, good adjustment and an overall prosocial pattern of interaction with others.

Approaches to evaluating social competence. In addition to the many definitions, various approaches are regularly used to evaluate social competence (Rose-Krasnor, 1997). One approach emphasizes the development and mastery of social skills, with the assumption that skills improve a person's ability to effectively navigate social situations. Some researchers assess popularity and peer status using sociometric assessments. Another line of research examines friendships and a person's ability to form and sustain positive relationships. Yet other researchers examine the functional aspects of social competence, looking at an individual's social goals, their outcomes, and the processes by which the individual obtains their goals (Rose-Krasnor, 1997). These

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approaches to defining and evaluating social competence overlap with one another to varying degrees. Although many of the approaches attempt to measure the same construct, evidence suggests that correlations are not strong between measured outcomes. For example, sociometric scores and observable behaviors are not as highly correlated as one might expect (Parker & Asher, 1987). For this reason, various researchers have proposed theoretical models that describe the complexity of the construct of social competence, and further explain that the approaches discussed above likely measure the different components of a broader construct of social competence.

Theoretical models of social competence. Cavell's (1990) Tri-Component Model defines the construct of social competence as a hierarchical framework composed of three parts: social adjustment, social performance and social skills. The model places social adjustment at the top of the hierarchy, representing a person's attainment of developmentally appropriate social goals. The second level consists of social performance, which represents the adequacy and social acceptability of a person's behaviors within various social contexts. Finally, social skills make up the bottom level of the hierarchy and refer to specific abilities that prepare a person to accomplish social tasks. The distinction between skills and performance is important in Cavell's model as it allows for the possibility of an individual possessing skills that are not applied to social contexts, thereby affecting actual social performance.

Rose-Krasnor's Social Competence Prism (1997) also defines the construct of social competence using three levels. The top level of the prism defines social competence at a theoretical level, as ways in which individuals effectively interact with others. The middle level divides competence behaviors into two parts, a person's

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effectiveness in terms of achieving a) personal goals, and b) the needs of others. The middle level shows the importance of balance between self- and other-oriented needs. The middle level is further segmented into slices that represent an individual's multiple social contexts, within which there is variation of competence across settings. This characteristic of the middle level contributes to the prismatic structure of the model. The bottom level of the prism represents the motivations and skills that are described throughout the social competence literature as definitions of the construct, including problem solving skills and effective communication. Overall, the prism creates an organizational framework that shows the complexity of the construct of social competence as context-dependent, performance-oriented and goal-specific (Rose-Krasnor, 1997). Most importantly, in her prism model, Rose-Krasnor (1997) highlights the importance of changes throughout the lifespan according to developmental changes, the relative importance of various relationships throughout life stages and a general increase in variety of contexts.

The current study is informed by decades of research from multiple perspectives and approaches of defining social competence, most notably those that define social competence broadly, as an overall effectiveness in interacting with others composed of multiple facets of behavior, including skills and dispositions. Both Rose-Krasnor's (1997) and Cavell's (1990) theoretical models guide this investigation of children's social competence, with the expectation that social competence is complex and composed of many facets.

Measurement of children's social competence. As social competence is defined in multiple ways, and changes throughout the stages of development, measuring the

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contributing pieces, and the construct as a whole, is challenging. Longitudinal studies in childhood frequently employ multiple scales at each time point, and vary measures across time points. Much of the complexity of measurement is attributable to the fluid nature of social competence throughout development. Items that capture the construct at one age often do not measure the same characteristics at another age. Therefore, social competence is commonly measured as a fluid construct across time, including sub-constructs such as peer acceptance, popularity, and the quality of close friendships. Sub-constructs thought to make up social competence, such as friendship, are similarly fluid during childhood and adolescence.

Measures developed to gauge social competence in older children are more widely used and validated than are measures for younger children (Vaughn et al., 2000). Thus, the extant research in social competence in early childhood often uses complicated methods of pooling data from various sources of sociometric ratings and friend nominations. Unfortunately, these methods can be time-intensive and introduce measurement error (Vaughn et al., 2000). One major issue in early childhood (i.e., preschool) social competence research is the inability to collect valid and reliable data from young children and their peers. Measurement of social competence is thought to be feasible beginning around the age of three (Bornstein, Hahn & Haynes, 2010), yet children under the age of six are thought to be unreliable reporters of their own behaviors or those of their peers (Cai, Kaiser, & Hancock, 2004).

As most social competence research focuses on school-age children (Vaughn et al., 2000) within the school context, in this study I aim to examine social competence in preschool-age children outside of the school context. Many researchers agree that

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fundamental components of social competence begin to develop early, but few studies examine the complexity of social interactions before, and outside of formal schooling. As such, there is a relative paucity of validated tools aimed at measuring social competence in early childhood outside of a formal school context.

The value of multiple informants. The developmental level of the child being assessed largely limits the informants that are appropriate reporters of the child's social behavior (Achenbach, 2011). Researchers interested in measuring social competence in preschool age children rely on parent and/or teacher reports due to age constraints of self- and peer- reports (Cai et al., 2004).

Research suggests that the environment interacts with a person's behaviors and motivations (Rose-Krasnor, 1997). Thus, social competence is expected to vary across contexts. As preschool-age children are rapidly learning how to behave in various environments, gathering information from a variety of contexts is particularly important during this period of development. Researchers frequently employ the use of multiple informants to collect data concerning children's behavior (Dirks, Treat & Weersing, 2007). It has been consistently found that parents and teachers reports of preschool children's social competence are not interchangeable, as their ratings of children's behaviors do not highly correlate with one another (Achenbach, McConaughy & Howell, 1987; Cai et al., 2004; Gray, Clancy & King, 1981). One such study compared parent and teacher ratings in a sample of 160 preschool children; the results showed parent-teacher agreement to be approximately .25 (Spearman's rho) (Korsch, & Petermann, 2013). In most studies that compare parent and teacher reports, parents tend to rate children as having more problem behaviors (Cai et al., 2004). Although the discrepancies are

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sometimes assumed to reflect that one type of informant is more valid than another, evidence instead suggests that discrepancies reflect more than measurement error (Achenbach, 2011). In all likelihood, there are various reasons for the discrepancies.

Teachers' and parents' expectations of appropriate behavior vary according to their own contexts (Mathieson & Banerjee, 2010). Parents may be most concerned about behaviors that constitute a problem at home, whereas teachers are more apt to recognize behaviors that influence the child's ability to effectively participate in classroom activities (Korsch, & Petermann, 2013). In addition, teachers are trained in social development, increasing their familiarity with developmentally appropriate behavior (Gray et al., 1981; Strickland, Hopkins, & Keenan, 2012). Problem behaviors may also naturally differ between the two environments, due to different demands on the child, resulting in unique perspectives from each observer. Thus, it is important to obtain reports from both types of respondents to assess children's social competence in each setting (Achenbach, 1987). The proposed study considers reports from parents and teachers, as both informants are thought to provide useful data to explore children's social competence across contexts.

The relation between social competence and behavior problems. The relation between social competence and behavior has received significant attention from researchers. Behavior problems from early childhood through adolescence are often described using two broadband factors: internalizing and externalizing behaviors. Internalizing behaviors include withdrawal, depression and anxiety. Externalizing behaviors include problems with aggression and self-regulation (Achenbach, 1985; Bornstein et al., 2010). Research consistently shows that internalizing and externalizing

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behaviors accompany poor social adjustment outcomes (Ladd, 2008); social problems are evident in many of the psychological disorders in the Diagnostic Statistical Manual (DSM-5), and symptoms of disorders often include internalizing and externalizing behavior problems (American Psychiatric Association, 2013).

Although researchers overwhelmingly agree that social competence predicts later behavior and adjustment, only recently has the direction of that assumption been explored. Results from several studies indicate that social competence in childhood predicts internalizing and externalizing behavior through young adulthood (Bornstein et al., 2010; Burt, Obradović, Long, & Masten, 2008). A sample of 205 children was followed from approximately 10 years of age until 30, with two intermediate time points at ages 17 and 20 (Burt et al., 2008). The results showed that social competence in childhood predicted internalizing symptoms in adolescence and that social competence in adolescence predicted internalizing symptoms in early adulthood. Externalizing problems did not follow the same longitudinal path, although the authors suggest that beginning data collection at age 10 may have missed an earlier, crucial, time point for assessing the relation.

In one study of social competence in preschool-age children, Bornstein and colleagues (2010) began longitudinal data collection with a sample of 117 children, and found that social competence in early childhood predicted internalizing and externalizing behaviors in adolescence. The researchers revealed an unexpected pattern of change; 4-year olds' social competence predicted internalizing behaviors at age 10, which in turn, predicted externalizing behaviors at age 14. This pattern implies that social competence

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in early childhood predicts externalizing behavior in adolescence, but is mediated by internalizing behaviors in middle childhood.

Short-term studies also support the expected causal direction. In a sample of 1,011 elementary school children tested at the beginning and end of a school year, social competence predicted changes in depressive symptoms. However, initial depressive symptoms did not predict changes in social competence (Cole, Martin, Powers, & Truglio, 1996). Together, these findings substantiate the oft-assumed direction of effects between social competence and problem behavior.

Peer relations in early childhood

Interaction with peers plays a vital role in fostering cognitive and emotional development, as well as practicing social skills and building social competence (Parker, Rubin, Price & DeRosier, 1995). During early childhood, interactions change from playing alongside peers, to increasingly interactive experiences; thus, this period is thought to be particularly important for setting the stage for more complex interactions and relationships later in childhood (Fabes, Martin, & Hanish, 2009).

The relation between cognitive and emotional development and peer relations, however, is complex, and bidirectional. Peers are thought to aid in the development of emotion-regulation skills, by providing negative feedback following inappropriate behaviors during interactions (Calkins & Mackler, 2011; Coplan & Arbeau, 2009). Yet, emotion-regulation skills are also linked to how much children are liked by peers in the reverse; children with low control over their emotions are more likely to be rated negatively by peers (Calkins & Mackler, 2011). A similar argument can be made for cognitive abilities, as early interactions can enhance multiple skills, such as divergent

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thinking and creativity; yet cognitive development and the skills that accompany it aid in later social success as well (Coplan & Arbeau, 2009). It is further evident from the literature that a significant relation exists between poor early peer relations and social difficulties, such as dropping out of school and criminality later in life (Parker & Asher, 1987). Ladd and Troop-Gordon (2003) found that in a sample of 399 children, followed from kindergarten to age 10, children's early aggressive and anxious behavior correlated with later maladjustment and that peer relations mediated that relation. Specifically, children with chronic peer difficulties had the poorest psychosocial adjustment outcomes.

Peer contact frequency. Solitary play in early childhood is both normal and essential for development of certain skills (Moore, Evertson, & Brophy, 1974). However, excessive time in solitary play after kindergarten becomes non-normative and reduces opportunities for children to learn and practice important social skills (Rubin, Daniels-Beirness, & Bream, 1984). Research suggests that high frequency of social play is associated with high levels of social competence in 3-5 year olds (Newton & Jenvey, 2011). Rubin et al. (1984) found that kindergarten children who interact with peers more frequently are better able to solve social problems, such as obtaining a desired object from another, or attempting to play with another child, than children who frequently play alone. The investigation included 55 kindergarten children who were observed during free play for 25 days. Analyses of the play behaviors showed that more sociable children were more likely to use effective strategies to solve social problems and attempt different strategies until they found one that was successful. Children who spent more time in isolated play were more likely to continue to use ineffective strategies to solve social problems, even after failing to solve the problem with the first attempt. The researchers

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found that 37 of the children, when assessed in first grade, performed similarly; the socially isolated children overall were at greater risk of social-cognitive problems. Similarly, a study by Howes and Matheson (1992) found that teachers rated children who engaged in more frequent cooperative social play at 30-35 months as more competent with their peers at 44-60 months, indicating that practice of skills in complex play contexts is beneficial during preschool years.

Much of the research to date on peer interaction in early childhood has been conducted in classrooms using behavioral observation. My search of the literature revealed no published studies that have examined access to peer contact outside of a school setting with a sample of preschool-age children. As such, much of the extant research is conducted with children who have daily interactions with peers in school settings. The aim of the current study was to explore children's access to peer contact outside of school settings, and to include children who may not have daily opportunities to interact with peers in order to bridge that gap in the literature. In light of this, I use the terms early childhood, preschool-age, and preschool children interchangeably to emphasize the point that children in this age range may or may not be enrolled in a formal or informal school setting.

Peer network size. A child's *social network* refers to the individuals with whom a child interacts on a regular basis (Ladd, Price, & Hart, 1990). A child's *peer network* is composed of children of a similar age with whom the child interacts on a regular basis. Research shows that larger peer networks tend to be associated with more positive adjustment in children (Kazak, 1992). Larger networks allow different peers to take on separate roles that a child needs to develop certain skills or to meet interpersonal needs;

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for example, children may find companionship in one peer, and intimacy in another (Parker et al., 2006). Unsurprisingly, the size of children's peer networks increases with age (Hartup, 2006) and with the transition between the ages of 3 and 6 from "home child" to "school child" (Feiring & Lewis, 1987).

Same-age peer. Some research suggests that older children are able to teach younger children important social skills (Vygotsky, 1978). However, there is agreement that something is different between same-age and mixed-age interactions (Bailey, Burchinal, & McWilliam, 1993). Research shows that changing the age composition of play dyads changes the behaviors that occur in the interactions (Langlois et al., 1978). Similarly, playing exclusively with younger children may have negative effects on older children's social development (Hartup & Lougee, 1975), as they do not learn new skills from their younger counterparts. The goal of the current study is to explore the unique impact of peers on the development of social competence. As such, it is most appropriate to examine the impact of interactions with children within a range of a targeted child's own age to maintain the reciprocal quality of the relationship that is present when developmental equality exists.

Further findings show that children of approximately 2 years of age begin to develop more complex forms of interaction that are often termed by researchers as "authentic peer interactions" (Eckerman & Stein, 1990). Children under the age of 2 show little interest in interacting with peers, and instead focus on objects in play (Eckerman & Stein, 1990). For the current study, children under the age of 2 are not considered to be peers, as their interactions are qualitatively different than those of older toddlers. Relatedly, as significantly older or younger peers change the dynamics of

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interaction in ways that alter the social benefits of such interactions, *peers* in this study refer to children within 2 years of age of the child in the study, one year older or younger.

Siblings. Just as peers provide a reciprocal context for interactions, siblings also provide experiences in which children learn and practice social skills (Berndt & Bulleit, 1985; Dunn, 1983). One study with 58 preschool-age children and their siblings found a sibling by friend interaction in which greater relationship quality with one buffers children from the negative effects of a poorer relationship with the other (McElwain & Volling, 2005), suggesting that having siblings may buffer the effects of restricted peer interaction for children for their development of social competence. Children with siblings in the same home, therefore, have consistent and frequent opportunities to interact. These interactions are likely to provide opportunities to learn and practice social skills and therefore may moderate the relation between peer relations and social competence. Just as findings with peers suggest, younger siblings do not often create opportunities for older siblings to learn new skills, however, older siblings may provide contexts for children to observe and practice novel skills that improve their social skills for later interactions.

A substantial body of literature has explored the impact of older siblings on children's cognitive skills development (Azmitia & Hesser, 1993), less is known about the degree to which siblings impact young children's peer relations and social competence. Therefore, this examination explored the impact of having an older sibling for children's development of social competence. I expect that the presence of a sibling will moderate the relation between peer relations and social competence. Specifically, I

predict that having an older sibling will attenuate the negative impact of having relatively low frequency of peer interaction and a small peer network.

Chronic Illness

Data from epidemiological studies estimate that approximately 15-30% of children have at least one chronic illness (Newacheck & Taylor, 1992; Weiland, Pless, & Roghmann, 1992). A chronic illness is defined as a physical condition that interferes with daily functioning for 3 or more months out of a year (Wallander, Thompson, & Alriksson-Schmidt, 2003).

Chronic illness and social competence. The association between chronic illness and psychological and social adjustment has been a topic of interest for decades (Quittner, 1992; Weiland et al., 1992). Several studies have shown that children with a chronic condition are at increased risk for psychological and social adjustment problems (Cadman, Boyle, Szatmari, & Offord, 1987). Two recent meta-analyses found that children with chronic illnesses in general had poorer social competence/social functioning than children without a chronic illness (Pinquart & Tuebert, 2012; Martinez, Carter, & Legato, 2011) with effect sizes of $g = -0.43$ and $d = -0.44$, respectively. These effects can be interpreted as small to moderate (Cohen, 1988). In a study that compared teacher's ratings of 24 children with cancer and a group of matched classroom control children, children with cancer were rated as more socially isolated, and less likely to show leadership (Noll, Bukowski, Rogosch, LeRoy, & Kulkarni, 1990). In contrast to studies that found deficits, a previous meta-analysis showed little to no differences between healthy children and children with chronic health problems (Spirito, DeLawyer,

& Stark, 1991). Thus there is competing evidence within the field regarding the impact of chronic illness on child outcomes.

Methodological concerns in chronic illness research. In much of the research to date in the chronic illness literature, researchers have combined diagnostically diverse samples. This is known as a “non-categorical approach”, through which researchers focus on commonalities among illnesses (Wallander & Varni, 1998). However, this approach has multiple drawbacks, including a possible reduced ability to detect differences, as the contextual experiences of children with chronic conditions vary substantially (Quittner, 1992). Various leaders in the field of pediatric psychology identify empirical and clinical challenges, using samples that are heterogeneous in terms of condition type, severity of symptoms, time course, specific treatment requirements and other characteristics (Noll & Bukowski, 2012).

Therefore, some of the discrepancy in extant research findings may be attributable to use of different inclusion criteria, or inconsistent definitions of chronic health conditions; some researchers exclude conditions that affect the child’s central nervous system (CNS), as research suggests that conditions that affect brain function may impact children differently. Various studies incorporate conditions that do not meet the definition of a disease, such as obesity (Martinez et al., 2011), but are included due to their impact on similar psychological and social outcomes. Yet others (Cadman et al., 1987) exclude conditions such as allergies, which were challenging to conclusively diagnose at the time of the study due to perceived limited medical technology and accuracy of tests. Such disparate findings in the literature demonstrate a need for further analysis of factors that may moderate the relation between illness type and adjustment outcomes.

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Many researchers do endeavor to explore the unique experiences and deficits of children with specific illnesses. This is often called the “categorical approach”, as it allows for researchers to examine the unique challenges of separate chronic health conditions. For example, children with obesity have been found to be at higher risk for peer bullying than children without a physically visible condition, resulting in unique social obstacles that may have effects on their social competence (Pinquart & Teubert, 2012; Martinez et al., 2011). Similarly, children with epilepsy experience cognitive impairments and heightened social stigma that may explain some of the deficits in their social competence (Deidrick, Grissom, & Farmer, 2009). Therefore, the distinctive characteristics of health conditions may be associated with the form and level of impairment in academic, physical or social functioning.

Children with illnesses that require frequent visits to medical facilities for treatment may experience more notable consequences in social functioning. Evidence suggests that the negative social effects of chronic illness accumulate as the child misses opportunities for peer interaction on a regular basis due to doctor’s appointments or hospitalizations (Pinquart & Teubert, 2012; Reiter-Purtill & Noll, 2003). Even in research with healthy children, children who are more frequently absent from school have fewer opportunities to interact with peers, and are found to have lower social breadth, which is a combined measure of peer network size and interaction frequency (Hanish, Martin, Fabes, & Barcelo, 2008).

In addition to direct obstacles to social interactions, a recent review of 325 empirical studies (Pinquart, 2013) showed that parents of children with chronic health conditions were more overprotective than parents of healthy children. Overprotective

parenting has been documented in samples of mothers of children with juvenile rheumatoid arthritis (Power, Dahlquist, Thompson, & Warren, 2003), type 1 diabetes, and asthma (Mullins et al., 2007). It is notable that each of these illness populations requires parental supervision of treatment, or includes children at risk of severe, and rather immediate, consequences if their health is inadequately monitored. The effects of overprotective parenting may be further amplified in younger children, as peer contacts are often initiated and monitored closely by their primary caregivers (Hartup, 2006). Excessive monitoring has been shown to interfere with the development of key social skills such as negotiation and elaborating play themes (Ladd & Golter, 1988).

In sum, research on the impact of chronic illness faces a weighty task of identifying factors that moderate the relation between illness characteristics and psychological and social problems. Rather than attempting to find cross-condition impacts, it is important to identify the unique challenges that children with specific illnesses face.

Food Allergy

Food allergy is defined as an adverse immunological response to food protein (Sicherer, 2011). The prevalence of food allergy in children under 18 years old is thought to be approximately 8% (Gupta et. al, 2011). Children typically develop food allergies early in life, often before the age of 2 (Wood, 2003). The age range with the highest prevalence of a diagnosed food allergy is children ages 3-5; 9% of children in that age range have one or more food allergies (Gupta et al., 2011). Many children outgrow their allergies, although some allergies persist into adulthood (Gupta et al. 2010).

The impact of food allergy on peer interactions. Food allergy can be a severe condition due to the potential lethality of allergic reactions, the most severe of which is anaphylaxis. Anaphylaxis involves exposure to an allergen, and is manifested as a multi-systemic reaction that occurs rapidly and can be fatal (Roberts, 2007). As would be expected, caregivers are frequently cautioned by physicians about avoiding potential allergens to keep their child from anaphylactic reactions. Oftentimes strategies to avoid allergic reactions, such as calling ahead to ensure that a restaurant is aware of a food allergy and is able to accommodate cross-contamination requirements, can be time-consuming and stressful for parents. Allergic reactions can occur despite taking the necessary precautions because allergens often go undetected. Thus, uncertainty regarding locations outside of the home can be anxiety provoking for caregivers and children.

Research shows that children with food allergy experience restrictions in peer activities due to the constant avoidance of allergens. Caregivers often choose to not allow their children to events and settings where their child may be exposed to allergens (LeBovidge, Strauch, Kalish, & Schneider, 2009). This may be especially true for younger children, as they are less able to adequately avoid potentially unsafe situations on their own. A study by Bollinger and colleagues (2006) found that approximately 10% of parents with a child with food allergy home-school their child due to uncertainty of the safety of school settings. As much as 68% of parents in the study reported that their child's participation in activities such as school parties was affected by the child's food allergy. Similarly, 59% said that their child's participation in field trips was affected by concern about exposure to food allergens. Older children with food allergy report that social isolation is the most difficult part of having the condition (LeBovidge et al., 2009).

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Similarly, the most frequently avoided activities are those in which the child is unsupervised by the parents, which limits the autonomous activities in which the child engages alone with peers. The impact of limited autonomous peer activities may involve failure to master developmental tasks such as making friends and practicing crucial social problem-solving skills (Bollinger et al., 2006). This is, again, particularly problematic during early childhood when autonomy is at the forefront of the developmental skills being learned by children.

In summary, the missed opportunities for peer interaction accumulate over time and reduce the total amount of time that children with food allergy have access to peer contacts and thus time to develop critical social skills at the same rate as their peers.

Current Study Aims

A review of the literature highlights the importance of peer relationships for developing social competence during early childhood. The unique quality of *peer* relationships allows children to practice skills that rely on the equitable and reciprocal nature of the relationship. Through experiences with peers, children develop competence in social situations, which is overwhelmingly agreed by researchers to be associated with later positive adjustment and behavioral outcomes. Thus, the first aim of this study is to explore the relations between access to and frequency of contact with peers, and social competence in early childhood.

The second aim of the current study is to examine whether reduced opportunities to interact with peers due to a chronic health condition, specifically food allergy, places children at risk for lower social competence. Children with food allergies may experience unique obstacles to access to peer contact due to concerns for their health and safety.

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Therefore I aim to examine the differences in peer contact frequency, social network size and social competence between a group of healthy children and a same-aged group of children with a diagnosed food allergy.

Hypotheses

Primary hypotheses. The following relations are expected to emerge in this examination:

- 1) Children with greater frequency of peer contact will be viewed by parents and teachers as more socially competent than children with fewer peer contacts.
- 2) Children with larger peer networks will be viewed by parents and teachers as more socially competent than children with smaller peer networks.
- 3) The presence of an older sibling will moderate the relation between peer contact frequency and social competence, such that the relations will be stronger for children without an older sibling.
- 4) The presence of an older sibling will moderate the relation between peer network size and social competence, according to parent reports, such that the relations will be stronger for children without an older sibling.

Secondary hypotheses. Various additional hypotheses are proposed due to the unique attributes of this sample such that it includes a group of food-allergic children and a comparison group of healthy children, as well as including reports of social competence from both parents and teachers.

- 5) Children with food allergy will engage in fewer peer contacts than children in the healthy group.

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- 6) Children with food allergy will have smaller peer networks than children in the healthy group.
- 7) Children with food allergy will have lower social competence scores, according to parent and teacher reports.
- 8) Parent and teacher reports of children's social competence will be moderately correlated with one another.

Method

Participants

Data were collected as a part of a larger study of 133 children and their mothers designed to assess parent-child interactions and autonomy development in food-allergic preschool children and healthy controls. Participants in this study are a subsample of 82 participants selected due to having complete parent-report data from the Social Competence and Behavior Evaluation Scale (SCBE). The SCBE was added to the questionnaire battery after the start of data collection and therefore a subset of children have complete data and were eligible for this examination. The sample for this study was 54% female, 76% Caucasian, and child age ranged from 36 to 83 years of age ($M = 56.85$, $SD = 14.50$). Thirty-two of the children had a diagnosed food allergy and 50 were healthy controls.

Procedure

Participants in the food allergy group were recruited from the University of Maryland Medical System's (UMMS) allergy clinics in Baltimore City and from food allergy support groups in the surrounding areas. Participants in the control sample were recruited from a pediatrician's office and local daycares. Some participants learned of the study from other participants, and were subsequently enrolled into the appropriate group based on whether or not the child had a food allergy.

The SCBE forms were mailed to parents prior to the research visit. Parents completed the SCBE prior to the visit, and all materials were collected during the visit. Parents were also mailed the teacher SCBE form and asked to deliver it to their child's teacher, along with an addressed and stamped envelope to be mailed directly to the researchers.

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Research visits were conducted by graduate students and undergraduate research assistants, either at the participant's home, or in an interview room at the University of Maryland, Baltimore County. The visits consisted of videotaped parent-child interactions, completion of a questionnaire packet, several direct child assessments and a parent interview. Following the interactive tasks and child assessments, a graduate student administered the Peer Interaction Record, preschool version (PIR-P) to mothers with the child in another room. Mothers were asked to recall their child's contacts with peers (with no specified age range) in the previous week, including the age and gender of the children. Parents were instructed to not include siblings in their report.

Mothers received a \$50 gift card, and children received a small toy for their participation at the conclusion of the research visit. All procedures met Institutional Review Board (IRB) standards and informed consent was obtained from all parents.

Measures

The Peer Interaction Record, preschool version (PIR-P). The PIR-P was used in this study to gather information about children's frequency of peer interaction and their peer network size. The PIR-P is administered in interview format and consists of 12 items; 10 items collect information as to whether or not the child engaged in specific activities with peers during the previous week. Each item also gathers the age and gender of the peers with whom the child interacted. The final two items request information about the child's structured group activities and a list of their friends (See Appendix A for a sample PIR-P).

The PIR was originally developed to examine the peer contacts of elementary school-aged children with Juvenile Rheumatoid Arthritis (Thompson, 1994). The items

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were formulated using a widely used measure, the Health and Daily Living Form (Moos, Cronkite, Billings & Finney, 1984). Thompson assessed the reliability of the PIR and the results showed internal consistency of .74 (Cronbach's alpha), as well as a 4-month test-retest reliability of .76 (Pearson correlations).

Thompson examined the construct validity of the PIR by first comparing children's scores to those received on the Child's Behavior Checklist (CBCL), social competence subscale, to assess the convergent validity of the PIR. The CBCL was expected to correlate with responses on the PIR, as both measures gather information about children's social behaviors. The results showed small to moderate correlations between the PIR and the CBCL social competence subscale (Thompson, 1994). This finding suggests that the CBCL and the PIR assess some overlapping aspects of social behavior.

Thompson further compared children's scores on the Asher Loneliness Scale (Asher et al., 1984) to establish discriminant validity. In Thompson's (1994) examination of the discriminant validity, results from child reports showed high divergence between the PIR and The Loneliness Scale (correlation coefficients of $-.18$ in peer activities, and $-.27$ for peer companions), although mother reports did not show equally significant levels of divergence.

Since its initial development, the PIR has been modified to assess preschool-age children's peer contacts. Items that were removed for the preschool version targeted peer activities common for older children and adolescents, but deemed inappropriate for preschool-age children, such as talking on the phone, or going to the mall with a friend. The PIR-P has not undergone the same extensive psychometric analysis as the adolescent

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version; however, one unpublished study (Gaultney, 2011) conducted by our research lab during data collection, with a sample of 120 children, showed that the PIR-P interaction frequency score correlated significantly ($r = .67$) with parent's prospective reports of their child's peer contacts during one week using the Ladd and Golter (1988) phone interview. Similarly, there was agreement between the PIR-P and the Ladd and Golter on peer network size ($r = .38$).

Scores from the PIR-P used in this study reflect the mother's report of: 1) the total number of peer activities outside of school in which the child engaged during that week, which corresponds to the child's *peer contact frequency*, and 2) the total number of unique peers with whom the child interacted in the span of one week, referred to in the analyses as the child's *peer network size*. Below I outline how each variable was extracted from the existing dataset.

Peer contact frequency. The PIR-P gathers information about the total number of children with whom the child had contact with in the previous week. As my focus in this examination is on peers, new variables were calculated to reflect my operationalization of peers as children 1 year older or younger than the participating child. The literature does not provide much guidance regarding an appropriate age range for peers. However, in studies of peer relations of school-age children researchers commonly examine samples within one academic grade level. Therefore the children are likely to be within 1 year of age of one another. In preschool samples researchers often examine classrooms of children that are within 12 months of age of one another due to the structure of preschool classrooms (Bailey, Burchinal, & McWilliam, 1993). Researchers often examine smaller age ranges with younger children, due to the rapid development of specific competencies

at this age; thus children of widely different ages have significantly different competencies, which have an impact on their interactions (Hartup, 1979). As children reach late childhood into adolescence, age ranges may grow larger as children are more variable in their competencies, and the discrepancies do not have such a large impact on interactions. The present study examined a range of one year older or younger than the age of the child in the study, as this strategy is most commonly used in the extant literature.

In addition to defining an age range within one year, children under the age of 2 were excluded altogether, as the literature suggests that children younger than 2 interact qualitatively differently in social interactions (Eckerman & Stein, 1990). For example, for a 30-month-old child in the present study, only children between 24 and 42 months of age would count as a peer; any child with whom the child interacted under the age of 2 was excluded from analyses. Items 1-7 on the PIR-P were utilized for this study. Items 8-11 were excluded because peer age was not gathered for those items in order to classify children as peers.

Peer network size. A continuous variable was calculated to reflect the number of unique peers with whom the child interacted in the previous week outside of a formal school setting from the PIR-P by counting each child only once, regardless of the number of times that they interacted with the child during the week. This provided an estimate of the child's social network size. This definition and measurement approach of peer network size is reflected in much of the research that examines network size across different ages and populations. Items 1-7 on the PIR-P were utilized for this variable.

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Items 8-11 were excluded because peer age and gender was not gathered for those items in order to determine if they classified as peers.

The Social Competence and Behavior Evaluation Scale (SCBE). The SCBE is a standardized measure designed to assess patterns of social competence, affective expression and adjustment difficulties in preschool children aged 30 months to 78 months (LaFreniere & Dumas, 1996). The instrument consists of 80 items, rated on a 6-point Likert scale, that assess the frequency of each specific behavior from (1) never occurs to (6) always occurs. The SCBE offers eight basic scales (Depressive-Joyful, Anxious-Secure, Angry, Isolated, Aggressive-Calm, Egotistical-Prosocial, Oppositional-Cooperational and Dependent-Autonomous) and four summary scales (Social Competence, Internalizing Problems, Externalizing problems, and General Adaptation). Each basic scale consists of 10 items, five of which describe adjustment difficulties and five of which describe positive aspects of adjustment. Similarly, two summary scales capture strengths, the Social Competence and General Adaptation scales, and the final two scales (Internalizing and Externalizing) capture weaknesses (see Appendix B for a sample copy of the SCBE). All scales provide a raw score and a t-score adjusted for child age. For the purposes of this study, the raw scores for the Social Competence summary scale were analyzed. The Social Competence summary scale summarizes the eight positive subscales to reflect a general ability to adapt to social contexts. Raw scores on the Social Competence summary scale range from 65 to 200. Higher scores indicate more social competence.

The SCBE has been demonstrated by several large studies to have adequate reliability and validity (LaFreniere & Dumas, 2003). One study with a sample of 979

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Canadian preschool children demonstrated that the scales had test-retest reliability between .74 and .87 (Pearson correlations). In another sample of 1,263 preschool children from Indiana and Colorado, the scales inter-rater reliability estimates ranged from .72 to .89 (Spearman-Brown coefficients). Similarly, the internal consistency (Cronbach's alpha) in each of the eight scales ranged from .80 to .89, suggesting that the items on each scale measure the same latent variable.

A subset of the larger Canadian sample was used to examine criterion validity using peer sociometrics. The results showed that children who were rejected by their peers were rated lower on the SCBE; although peer acceptance did not highly correlate with scores on the SCBE, the authors note that this is likely due to the unreliability to young children's self-reports, as most preschool children nominate nearly all same-sex peers in their classrooms as preferred partners.

Demographics. Parents completed a demographics questionnaire as part of the larger study. Various items, as described below, from the demographics form were used in this study.

Child age. The child's birthdate and the date of the research visit were used to calculate the child's age in months.

Child gender. The child's gender was gathered from an item on the demographics questionnaire. For purposes of interpretation of the results, gender was coded dichotomously, males were coded as 1, and females were coded as 2.

Older sibling status. Whether or not the child has an older sibling was gathered from an item on the demographics questionnaire that requested each family member's name, age, and their relationship with the participant. For purposes of interpretation of

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the results, sibling status was coded dichotomously, absence of siblings in the household was coded as 0, and presence of an older sibling was coded as 1.

Results

Power Analyses

To identify expected effect sizes, I reviewed the literature for studies with related research questions with a similar population. Two recent meta-analyses found overall effect sizes that indicated that children with chronic illnesses have lower levels of social functioning than their healthy peers. One of the meta-analyses included 501 studies, and found that chronic illness had an overall negative association with social functioning with an effect of $g = -0.43$, 95% CI $[-0.48, -0.41]$ (Pinquart & Teubert, 2012). This is considered a large effect, according to Cohen's (1988) specifications. Martinez and colleagues (2011) found a small to medium (Cohen, 1988) overall effect size of $d = -0.44$, 95% CI $[-0.52, -0.36]$, using a sample of 57 studies in a meta-analysis, also indicating lower social competence of children with chronic illnesses than healthy peers.

It is important to note that both meta-analyses included samples of children with various types of chronic illness, some of which experience severe forms of physical disability and/or pain, which is thought to have a larger impact on children's functioning than chronic conditions that do not involve physical disability and/or pain (Pinquart & Teubert, 2012). In addition, food allergy was not analyzed separately as a specific condition category in either study, and therefore no effect sizes were estimated for food allergy as a unique group, and food allergy may not have been represented in the studies analyzed. This limited the ability to estimate expected effect sizes for the current study. However, effects sizes were expected with this sample in comparison to other chronic conditions.

To examine the likelihood of detecting each expected effect I conducted power analyses using *G*Power 3* (Faul, Erdfelder, Lang, & Buchner, 2007). Post-hoc power analyses indicated that the study was adequately powered (.80) to detect moderate effect sizes ($r = .30$) for Pearson correlation analyses with parent reports of social competence, and moderate to large effect sizes ($r = .43$) for Pearson correlation analyses with teacher reports of social competence. For the moderation analyses the study was adequately powered (.80) to detect moderate effect sizes for parent reports, and ($f^2 = .14$) moderate to large effect sizes ($f^2 = .30$) for teacher reports. The present study was adequately powered (.80) to detect moderate to large effect sizes ($d = .64$ or greater) for the t-tests comparing the food-allergic and healthy children. Finally, the study was adequately powered to detect a medium effect size of $r = .31$ for the correlation between parent and teacher reports of social competence.

Preliminary Analyses

Descriptive analyses. Descriptive analyses were conducted for all of the predictor and dependent variables to determine the normalcy of their distributions. Tests for skewness and kurtosis suggested that no transformations were necessary for analyses, per guidelines by Tabachnick and Fidell (2001) (See Table 1). Further regression diagnostics revealed no significant outliers, and thus all cases were retained for analyses.

Covariates. Child gender, ethnicity and age were considered potential covariates. Additional analyses were conducted to examine if demographic variables differed between the food allergic and healthy groups. Chi-square analyses revealed that gender did not differ between groups, $\chi^2(1, 82) = 2.07, p = .15$, and that ethnicity did not differ

between groups $\chi^2(1, 82) = 2.18, p = .70$ (see Table 2). An independent t test indicated that the groups also did not differ with respect to age, $t(80) = -.41, p = .69$.

Primary Hypotheses

Hypothesis 1. Correlations were calculated to examine the strength of the relation between peer contact frequency and social competence scores. Results indicated there were non-significant, positive, relations between peer contact frequency and social competence scores, as reported by parents, ($r = .11, p = .32$), by teachers, ($r = .11, p = .28$), and the composite of parent and teacher scores ($r = .26, p = .12$) (see Table 3). All of the relations are considered small effects.

Hypothesis 2. Correlations were calculated to examine the strength of the relation between peer network size and social competence scores. Results indicated there were non-significant, positive, relations between peer network size and social competence scores, as reported by parents, ($r = .20, p = .08$), by teachers, ($r = .09, p = .59$), and the composite of parent and teacher scores ($r = .18, p = .30$) (see Table 3). All of the relations are considered small effects.

Hypothesis 3. Three regression models were tested to examine if the presence of an older sibling moderates the relation between peer contact frequency and social competence. As shown in Table 4, one model examined the moderation using parents' reports; the two predictors and the interaction were entered into a simultaneous regression model with parents' reports of social competence as the dependent variable. Results indicated that older sibling status did not moderate the relation, as there was not a significant interaction between peer contact frequency and older sibling status, ($\beta = -.15, p = .58$) suggesting that the effect of peer contact frequency on social competence does

not depend on the presence of an older sibling. The second model, using teachers' reports of children's social competence indicated similar findings, ($\beta = .15, p = .71$). Finally, the last model examined the composite of parent and teacher reports, and the results indicated a non-significant moderation ($\beta = .21, p = .61$). These findings do not support the moderation hypotheses.

Hypothesis 4. Three regression models were tested to examine if the presence of an older sibling moderates the relation between social network size and social competence. One model examined the moderation using parents' reports; the two predictors and the interaction were entered into a simultaneous regression model with parents' reports of social competence as the dependent variable. Results indicated that older sibling status did not moderate the relation, as there was not a significant interaction between peer network size and older sibling status, ($\beta = .12, p = .49$) suggesting that the effect of peer network size on social competence does not depend on the presence of an older sibling. The second model, using teachers' reports of children's social competence indicated similar findings, ($\beta = -.15, p = .64$) (see Table 5). Finally, the last model examined the composite of parent and teacher reports, and the results indicated a non-significant moderation ($\beta = .01, p = .97$). These findings do not support the moderation hypotheses.

Secondary Hypotheses

Hypotheses 5-8. The food allergic and healthy groups did not differ with respect to peer contact frequency, $t(80) = .01, p = .99, d = .002$, peer network size, $t(80) = -.03, p = .98, d = .006$, social competence as rated by parents, $t(80) = -1.06, p = .29, d = .23$, social competence as rated by teachers, $t(36) = -.92, p = .36, d = .30$, or social

competence as a composite of parent and teacher reports, $t(36) = -1.12$, $p = .32$, $d = .33$ (see Table 6 for means). As expected, parent and teacher ratings of social competence were significantly correlated, $r = .35$.

Discussion

The current study examined the relation between access to peers, and preschool children's social competence, as previous research has found that high frequency of peer interaction has positive impacts on children's development of social competence. This study also aimed to examine the impact of food allergy on children's social competence, as much of the extant literature suggests that chronic illness impedes social development.

The results indicated that the relations between peer access and social competence in this study were not consistent with previous research, which has found links between peer interactions and social competence. As such, social competence was not statistically significantly related with peer contact frequency or peer network size. One explanation for the lack of significant findings is that the literature on peer relations and social competence suggests that a number of other factors, other than peer contact frequency and social network size contribute to social competence. Therefore, this study may focus on a small component of what is thought to influence the development of social competence, and these variables alone may not account for a significant amount of the variability in social competence.

Additionally, this study focused on a sample of children between the ages of 3 and 6. In a preschool sample, all children are beginning with similar levels of social competence, and therefore differences in competence may not be noticeable until later in childhood, after repeated obstructions of peer contact, and other obstacles to developing

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social competence. As an example from the chronic illness literature, Pinquart and Teubert (2012) did not find moderating effects of age or illness duration on social competence (or other outcomes) in their meta-analysis of chronic illnesses. In their discussion of the lack of findings, the investigators noted the possibility that the effects of chronic illness on social competence may accumulate over time. This would support the hypothesis articulated in this investigation as it is expected that the impact of a lack of peer access accumulates and results in lower social competence over time. If that is the trajectory, then the current study may not be able to detect those differences at such an early time point in childhood given the restricted age range of the children in this study. Pinquart and Teubert (2012) also noted the possibility that longer illness duration may cancel out the negative effects on social competence as children have more time to adapt to their illness. Therefore the relation between age and social competence may be non-linear and moderated by various factors, particularly in chronically ill populations.

Peer contact frequency as a construct may not be sensitive enough to explain differences in social competence. For example, it is possible that although children interacted with another peer in an activity, they were not actively playing together. Play is the modality through which children learn and practice social skills and other skills. Therefore, it may be important to distinguish the quality of interactions in predicting social competence. Similarly, a raw count of peers in a child's network may not provide enough information to predict social competence without additional descriptive details about the peers and their interactions. Other research has found that the gender of peers in a social network may play a role in predicting peer outcomes. Specifically, research has shown that girls with more boys in their social networks had higher peer acceptance

(Bost, 1995). Therefore, additional details about peer interactions may be useful for a future examination to uncover the active ingredients of peer relations variables that predict social competence.

Results in this study indicated that having an older sibling did not moderate the relations between social competence and peer relations as was hypothesized. However, although the relations did not reach statistical significance, it was interesting that the presence of an older sibling had different effects for parents' and teachers' reports.

Parents, on average, rated children as less socially competent if the child had an older sibling, as evidenced by a non-significant negative correlation between older sibling status and parent report of social competence. In contrast, on average, teachers rated children who had an older sibling as more socially competent, as evidenced by a non-significant positive correlation coefficient between older sibling status and teacher social competence. There may be several reasons why having an older sibling did not have the anticipated relations with social competence between reporters. First, it is possible that parents view their child as less socially competent in comparison to older siblings.

Parents may compare their child's social skills to the sibling's current skills, or they may compare them to their recollection of the sibling's skills at their age. Previous research examining parent-report of sibling temperament suggests that parents tend to compare their children such that parents report larger discrepancies between siblings' temperaments than are captured through other methods of measurement of activity level (i.e. actigraphy) (Saudino, Wertz, Gagne, & Chawla, 2004). In light of these findings, it is possible that in the current study parents with more than one child reported lower social competence for younger children as a result of comparing their child to an older sibling.

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In comparison, it is reasonable that teachers' ratings would not be impacted by the child having an older sibling as the teacher would not compare the child with older siblings, or other older children as easily, therefore explaining the difference in direction of the correlations between the older sibling status and social competence ratings between reporters. Nonetheless, parent and teacher reports were significantly correlated, as was hypothesized.

Children with food allergy did not differ from healthy children with respect to peer contact frequency, peer network size or social competence. However the correlations were in the expected direction. One possible explanation for the lack of significant findings may be a cohort effect. The data for this study was collected between 2005 and 2011. During this time, changes were rapidly occurring in schools and other public places to keep children with food allergy safer. This may have impacted parent's sense of their child's safety in a variety of ways, and may have had effects on the data. Another possibility is that children with food allergy had varying degrees of allergy severity, or that children in the healthy condition had other medical concerns that were not reported by parents.

Limitations. It is important to note the various limitations of the current study. First, it is important to note that the sample was highly educated, and therefore the results may be limited in generalizability. In addition, using pre-collected data has its disadvantages. The number of completed teacher SCBEs available for analysis was smaller than desirable for this investigation. The limited sample restricted the power to detect small effects. This was particularly notable with respect to the teacher reports due to the smaller number of completed SCBEs than parent reports. However, as teachers can

provide a rich source of data on social competence during early childhood, inclusion of their data in this examination was theoretically important. In addition, this study was conducted through summer and academic school year months. Therefore, time of year may be a confound given that children's peer interactions may differ depending on the time of year.

This study was limited by the use of the preschool version of the PIR, which has not been extensively validated. Although the PIR-P measure was developed with the intention of collecting peer contact frequency data in a less intrusive, time-intensive modality compared to other ways of collecting peer interaction data, it does have its limitations. First the measure relies on parent's retrospective report, which may have lower validity than direct observation. Similarly, the measure asks about various specific activities, rather than asking about all possible peer contact during the week. Similarly, for this investigation, group activities were excluded from analyses as it was not possible to determine the age of the children, and therefore classify the interactions as being with peers or older or younger children. As noted above, the PIR-P does not collect information regarding the quality of interactions, and therefore may limit the usefulness of the measure for purposes of predicting social competence.

Strengths and Contributions to the Literature. The current study explores the social development of preschool age children, with and without a chronic illness. This is an important stage of development to consider the impact of early peer relations on the development of social competence, as the relation between social competence and later outcomes has been well established in the literature. Therefore, by examining these associations early in childhood research can inform parents and practitioners of the

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importance of children's peer relations at a critical time point. Further, this study utilizes a succinct measure of peer contact frequency and social network size. Although the validity of the PIR-P has not been fully established, one preliminary unpublished study (Gaultney, 2011) showed significant correlations with a prospective report of children's actual peer interactions. This suggests the usefulness of the PIR-P for obtaining information regarding children's peer relations when more complex measurement strategies such as direct observation are not feasible.

Future Directions. Further research is needed with a larger sample to enhance the power to detect small effects. In addition, a broader age range, with data collected at multiple time points would enable researchers to better understand the links between peer contact frequency, social network size and social competence. As no differences were found between children with food allergy and healthy children, it is possible that food allergy is a chronic illness that does not significantly impact children's social competence development. However, further research is needed with a larger sample to replicate this examination. Future studies should explore the impact of food allergy severity, experience of anaphylaxis, duration of illness, as well as parental anxiety and overprotection to further distinguish children who may be at risk for disruption of social competence development

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Table 1

Descriptive Statistics for Correlation and Regression Variables

Variable	<i>n</i>	Min.	Max.	<i>M</i>	<i>SD</i>	Skewness	<i>SE</i>	<i>Skewness</i> <i>z-score</i>	<i>Kurtosis</i>	<i>SE</i>	<i>Kurtosis</i> <i>z-score</i>
Peer contact frequency	82	0	15	4.02	3.48	.88	.27	.88	.76	.53	.76
Peer network size	82	0	5	1.76	1.53	.53	.27	.53	-.67	.53	-.67
Social competence- Parent	82	76	182	132.60	24.49	-.03	.27	-.03	-.72	.53	-.72
Social competence- Teacher	38	45	195	144.61	31.63	-1.14	.38	-1.14	1.70	.75	-1.70
Child age (months)	82	36.14	83.52	56.46	14.49	.23	.27	.23	-1.21	.53	-1.21

Note: Acceptable skewness and kurtosis values for z-scores (i.e., $z < \pm 1.64$) indicating skewness/kurtosis values are not significantly different from zero (Tabachnick & Fidell, 2001).

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Table 2

Frequencies of Condition and Race/Ethnicity by Child Gender

	Condition		Race/Ethnicity				
	Healthy	Food Allergic	Caucasian	African American	Latino	Asian	Other
Male	20	18	30	2	1	1	1
Female	30	14	33	5	2	1	3
Total N	50	32	63	7	3	2	4

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Table 3

Correlation Matrix

Variable		1	2	3	4	5	6	7	8
1. Peer contact frequency	(n)	1.00 (82)							
2. Peer network size	(n)	.82** (82)	1.00 (82)						
3. Social competence- parent	(n)	.11 (82)	.20 (82)	1.00 (82)					
4. Social competence- teacher	(n)	.18 (38)	.09 (38)	.35* (38)	1.00 (38)				
5. Social competence- composite	(n)	.26 (38)	.18 (38)	.76** (38)	.87** (38)	1.00 (38)			
6. Older sibling status	(n)	-.15 (82)	-.10 (82)	-.12 (82)	.14 (38)	.02 (38)	1.00 (82)		
7. Child gender	(n)	.04 (82)	.01 (82)	.12 (82)	.07 (38)	.18 (38)	-.03 (82)	1.00 (82)	
8. Child age	(n)	.13 (82)	.19 (82)	.09 (82)	.20 (38)	.33* (38)	-.16 (82)	.09 (82)	1.00 (82)

* $p < .05$

** $p < .01$

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Table 4

Moderation Models Examining the Effects of Peer Contact Frequency and Older Sibling Status on Social Competence

Predictor	<i>b</i>	<i>SE_b</i>	β	<i>t</i>	<i>R</i> ²
Parent (n = 82)					
Peer contact frequency	1.38	1.50	.20	.92	.03
Older sibling status	-8.86	8.61	-.17	-1.03	
Contact frequency* Older Sibling	-.98	1.77	-.15	-.56	
Teacher (n = 38)					
Peer contact frequency	.61	3.37	.06	.18	.05
Older sibling status	15.24	20.14	.23	.76	
Contact frequency* Older Sibling	1.44	3.86	.15	.71	
Parent and Teacher Composite (n = 38)					
Peer contact frequency	1.51	4.82	.11	.31	.07
Older sibling status	12.72	28.83	.13	.44	
Contact frequency* Older Sibling	2.85	5.52	.21	.52	

Note. ** $p < .01$ * $p < .05$ ^a $p < .10$

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Table 5

Moderation Models Examining the Effects of Peer Contact, Network Size and Older Sibling Status on Social Competence

Predictor	<i>b</i>	<i>SE_b</i>	β	<i>t</i>	<i>R</i> ²
Parent (n = 82)					
Peer network size	2.09	2.20	.13	.95	.05
Older sibling status	-9.40	8.37	-.19	-1.12	
Network size* Older Sibling	2.59	3.72	.12	.70	
Teacher (n = 38)					
Peer network size	2.66	4.10	.13	.65	.03
Older sibling status	16.79	19.79	.25	.85	
Network size* Older Sibling	-3.91	8.33	-.15	-.47	
Parent and Teacher Composite (n = 38)					
Peer network size	5.51	5.93	.18	.93	.03
Older sibling status	-.56	28.62	-.01	-.02	
Network size* Older Sibling	.44	12.06	.01	.04	

Note. ** $p < .01$ * $p < .05$ ^a $p < .10$

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Table 6

Descriptive Statistics and Independent Samples t-tests between Food Allergy and Control Participants

Variable	Condition	<i>n</i>	Mean	SD	Min	Max	<i>t</i>	<i>p</i>	<i>d</i>
Peer contact frequency	Food Allergy	32	4.03	3.51	0	15	.01	.989	.002
	Control	50	4.02	3.50	0	15			
Peer network size	Food Allergy	32	1.75	1.39	0	5	-.03	.977	.006
	Control	50	1.76	1.62	0	5			
Social competence- Parent	Food Allergy	32	129.03	27.96	76	182	-1.06	.294	.23
	Control	50	134.88	21.97	95	181			
Social competence- Teacher	Food Allergy	16	139.06	33.26	74	195	-.92	.364	.30
	Control	22	148.64	30.54	45	187			

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Appendices

Appendix A: Peer Interaction Record

Parent Report—Preschool Version
(Administer via interview) (rev 08/30/06)

Participant Number _____ Age _____ Date: _____
Interviewer _____

In the past week (past 7 days), how often did your child do the following activities with FRIENDS (not family members)?

	Yes or No	If yes, how many times last week?	With whom did your child do it? List first names.	Is this person a boy or a girl? (Circle one)	How old is this friend?
1. Did your child eat a meal with a friend (other than at school)?				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
2. Did your child go to a friend's house to play?				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
3. Did your child have a friend over to play?				Boy Girl	
				Boy Girl	
				Boy Girl	

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				Boy Girl	
				Boy Girl	
4. Did your child watch TV or listen to music with a friend?				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
5. Did your child play an outdoor game or activity with a friend (e.g., softball, swimming)?				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
6. Did your child play an indoor interactive game or activity with a friend (e.g., computer game, cards, board game, toys, crafts)?				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
7. Did your child go somewhere with a friend, like to the movies, the beach, skating?				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	
				Boy Girl	

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8. Did your child go to a friend's party?			NA	Boys only Girls only Boys and Girls	How old were the other children at the party? List ages
9. Did your child go to a club meeting or other organized group activity with other children (e.g., Mother's Day out, scouts, YMCA, church club, 4H)? specify _____ Were caregivers present? Yes no			NA	Boys only Girls only Boys and Girls	How old are the other children in the club? (List ages)
10. Did your child participate in an organized sport with an adult coach or instructor after school or on the weekend (e.g., dance, swim team, baseball, gymnastics, soccer, tennis)			NA	Boys only Girls only Boys and Girls	How old are the other children on the team? List ages

11. Who are your child's friends? List first name, whether the person is a boy or girl, and the person's age for each friend.	First name	Boy or Girl	Age

Appendix B: The Social Competence and Behavior Evaluation Scale (SCBE)

The following is a list of statements describing a child in three broad categories: emotional adjustment, social interactions with peers, and social interactions with adults. Use the following scale to rate the child by circling one choice for each statement to indicate the child's typical behavior or emotional state. Each of the ratings indicates how often a typical emotional state or behavior occurs. Make every effort to assign a rating to each statement; leave an item blank only if you have no way of evaluating the child on that particular statement. If more than a few items are left without any ratings, the results may not be meaningful.

	Never	Sometimes		Often		Always
1. Enjoys demonstrating new songs, games, and other things he/she has learned.	1	2	3	4	5	6
2. Maintains neutral facial expression (doesn't laugh or smile)	1	2	3	4	5	6
3. Sensitive to another's problem	1	2	3	4	5	6
4. Wets or dirties pants	1	2	3	4	5	6
5. Curious	1	2	3	4	5	6
6. Tired	1	2	3	4	5	6
7. Easily frustrated	1	2	3	4	5	6
8. Gets angry when interrupted	1	2	3	4	5	6
9. Looks directly at you when speaking	1	2	3	4	5	6
10. Irritable, gets mad easily	1	2	3	4	5	6
11. Worries	1	2	3	4	5	6
12. Laughs easily	1	2	3	4	5	6
13. Easily adjusts to new situations	1	2	3	4	5	6
14. Gets bored quickly and appears uninterested in play	1	2	3	4	5	6
15. In a good mood	1	2	3	4	5	6
16. Patient and tolerant	1	2	3	4	5	6
17. Takes pleasure in own accomplishments	1	2	3	4	5	6
18. Tolerates interruptions and disturbances	1	2	3	4	5	6

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19. Difficult to console when he/she cries	1	2	3	4	5	6
20. Self-confident	1	2	3	4	5	6
21. Explores his/her environment	1	2	3	4	5	6
22. Readily adapts to difficulties	1	2	3	4	5	6
23. Timid, afraid (e.g., avoids new situations)	1	2	3	4	5	6
	Never	Sometimes	Often		Always	
24. Sad, unhappy or depressed	1	2	3	4	5	6
25. Anxious, nervous (e.g., bites fingernails)	1	2	3	4	5	6
26. Active, ready to play	1	2	3	4	5	6
27. Whines or complains easily	1	2	3	4	5	6
28. Inhibited or uneasy in the group	1	2	3	4	5	6
29. Listens attentively when spoken to	1	2	3	4	5	6
30. Screams or yells easily	1	2	3	4	5	6
31. Bullies weaker children	1	2	3	4	5	6
32. Forces other children to do things they don't want to do	1	2	3	4	5	6
33. Gets upset when parent attends to another child	1	2	3	4	5	6
34. Inactive, watches the other children play	1	2	3	4	5	6
35. Negotiates solutions to conflicts with other children	1	2	3	4	5	6
36. Remains apart, isolated from the group	1	2	3	4	5	6
37. Children seek him/her out to play with them	1	2	3	4	5	6
38. Does not respond to other children's invitations to play	1	2	3	4	5	6
39. Takes other children and their point of view into account	1	2	3	4	5	6

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40. Self-centered, does not recognize other children's interests	1	2	3	4	5	6
41. Is involved wherever the children are having lots of fun	1	2	3	4	5	6
42. Hits, bites, or kicks other children	1	2	3	4	5	6
43. Cooperates with other children in group activities	1	2	3	4	5	6
44. Gets into conflict with other children	1	2	3	4	5	6
45. Comforts or assists another child in difficulty	1	2	3	4	5	6
46. Has to be first	1	2	3	4	5	6
47. Refuses to share toys	1	2	3	4	5	6
48. Takes care of toys	1	2	3	4	5	6
49. Doesn't talk or interact during group activities	1	2	3	4	5	6
50. Attentive towards younger children	1	2	3	4	5	6
51. Stays calm when there are conflicts in group	1	2	3	4	5	6
52. Initiates or proposes games to other children	1	2	3	4	5	6
53. Spontaneously helps a child pick up toys or other objects	1	2	3	4	5	6
	Never	Sometimes	Often		Always	
54. Makes games competitive	1	2	3	4	5	6
55. Spontaneously apologizes to other children for causing a problem	1	2	3	4	5	6
56. Delights in play with other children	1	2	3	4	5	6
57. Goes unnoticed in a group	1	2	3	4	5	6
58. Works easily in groups	1	2	3	4	5	6
59. Takes pleasure in hurting other children	1	2	3	4	5	6

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60. Shares toys with other children	1	2	3	4	5	6
61. Recovers quickly when he/she falls or hurts self (doesn't cry very long)	1	2	3	4	5	6
62. Hits parent or destroys things when angry with parent	1	2	3	4	5	6
63. Helps with everyday tasks (e.g., distribute snacks)	1	2	3	4	5	6
64. Persistent in solving own problems	1	2	3	4	5	6
65. Disrespectful of parent	1	2	3	4	5	6
66. Accepts compromises when reasons are given	1	2	3	4	5	6
67. Clear and direct when he/she wants something	1	2	3	4	5	6
68. Stops talking immediately when asked	1	2	3	4	5	6
69. Needs parent's presence to function well	1	2	3	4	5	6
70. Asks for help when it is unnecessary	1	2	3	4	5	6
71. Opposes the parent's suggestions	1	2	3	4	5	6
72. Cries for no apparent reason	1	2	3	4	5	6
73. Is autonomous and able to organize him/herself	1	2	3	4	5	6
74. Defiant when reprimanded	1	2	3	4	5	6
75. Clingy towards parent in novel situations (e.g., field trip)	1	2	3	4	5	6
76. Takes initiative in situations with new people	1	2	3	4	5	6
77. Ignores directives and continues what he/she is doing	1	2	3	4	5	6
78. Accepts parent's involvement in own activity	1	2	3	4	5	6

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79. Cries when parent leaves

1	2	3	4	5	6
1	2	3	4	5	6

80. Asks permission when necessary

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