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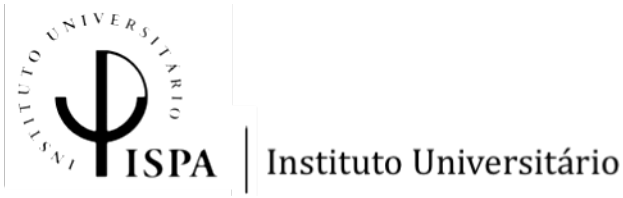

A COMPETÊNCIA SOCIAL DA CRIANÇA EM MEIO PRÉ-ESCOLAR: UM MODELO HIERÁRQUICO NO CONTEXTO DAS RELAÇÕES ENTRE PARES

Maria Inês Duarte Peceguina

Tese submetida como requisito parcial para obtenção do grau de

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Área de Especialidade.....Psicologia do Desenvolvimento

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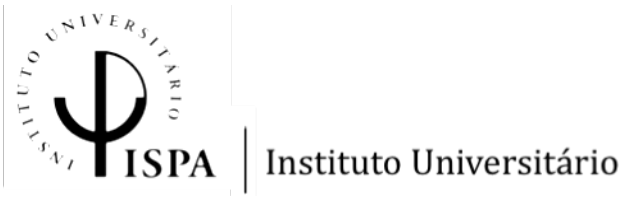

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Maria Inês Duarte Peceguina

Tese orientada por Professor Doutor António José dos Santos

(ISPA – Instituto Universitário)

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Tese apresentada para cumprimento dos requisitos necessários à obtenção do grau de Doutor em Psicologia na área de especialização Psicologia do Desenvolvimento realizada sob a orientação de António José dos Santos, apresentada no ISPA - Instituto Universitário no ano de 2010.

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Aos pequenitos. Poucas pessoas se sujeitariam a tão prolongado escrutínio a troco de um beijo, ou de uma salva de palmas acompanhado de um "Boa! Estiveste muito bem!! Aos pais dos pequeninos que não se assustaram com a lista de tarefas que as suas crianças haviam de repetir, ano sim, ano sim. Às educadoras, que deixaram que, por ano, pelo menos seis criaturas aprendizes de cientistas invadissem as salas munidos de computadores, blocos de anotações e ainda marmitas com almoço que as auxiliares nos faziam o favor de aquecer no micro-ondas para não estarmos sempre a "comer fora". Às auxiliares. Qualquer função que se caracterize por esta palavra, soa bem. Fica-se mais descansado.

Ao Professor António José dos Santos. Um elogio à inteligência. Imagino as sinapses em vibração permanente. Uma biblioteca gigante de livros e experiências que se tornaram tecido cerebral. Invejo a capacidade de articulação e de mobilização de conhecimentos. É verdade que o caos aparente pode esconder processos extraordinariamente organizados. Pelos desafios. Pelos obstáculos. Pelas crises de identidade. E pelo esforço em integrar-me numa equipa de trabalho dominada pela testoesterona.

À Professora Manuela Veríssimo. Uma âncora num dia de vendaval. Porque é preciso alguém que opere no plano da realidade.

Aos dois, por partilharem a família e os almoços. E por me confiarem a tarefa de ligar o forno.

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Ao Alberto. Mais uma formação em Psicologia a custo zero.

À minha irmã.

Ao Sebastião. Que no momento em que escrevo me relembra que tem 3 meses e que ainda não consegue perceber o conceito de "parágrafo", nem da expressão "estou mesmo, mesmo a acabar". Aos meus pais. Porque eu também já tive 3 meses.

Palavras-chave:

Competência Social; Relações entre Pares; Pré-Escolar; Modelação de Equações Estruturais

Key words:

Social competence; Peer Relations; Preschool; Structural Equation Modeling

Categorias de Classificação da tese

2800 Developmental Psychology

2200 Psychometrics & Statistics & Methodology

RESUMO

Integrados numa moldura desenvolvimental, os estudos apresentados nesta investigação avaliam um modelo de medidas para a competência social com os pares, durante o período pré-escolar. A competência social é definida como um traço latente de diferenças individuais que reflecte a capacidade das crianças para coordenar os afectos, cognição, e comportamento na realização de objectivos pessoais de natureza social (Waters & Sroufe, 1983). Adicionalmente, a concretização dos objectivos pessoais não deverá constituir um obstáculo à concretização dos objectivos pessoais dos pares, nem limitar a realização de objectivos futuros.

O modelo de mensuração caracteriza-se por ter uma estrutura hierárquica de três níveis, onde a competência social se situa no nível de topo, enquanto factor latente de segunda ordem, com implicações nos três domínios da competência social, situados no nível latente inferior – motivação social e envolvimento, perfis de atributos comportamentais e psicológicos e aceitação de pares. Cada um destes domínios (as famílias de medidas) é medido através de dois ou três indicadores, constituindo a base do modelo (i.e., proporção de atenção visual recebida, proporção de interacções positivas e neutras iniciadas, dois Q-sorts da competência social, e duas medidas sociométricas).

Foram testadas hipóteses sobre o ajustamento do modelo a dados Portugueses, bem como sobre a estabilidade do modelo durante o pré-escolar foram testadas. De um modo geral, os resultados foram consistentes com estudos anteriores (e.g., Bost, Vaughn, Washington, Cielinski, & Bradbard, 1998; Vaughn, 2001; Vaughn, et al., 2009), indicando que o modelo tem um bom ajustamento aos dados das crianças portuguesas. Adicionalmente, os resultados sustentam o pressuposto de que, embora pequenas diferenças de natureza cultural, desenvolvimental e de contexto social possam ocorrer ao nível das medidas (o nível base do modelo), a estrutura hierárquica é idêntica ao longo destas dimensões, uma vez que os domínios sociais considerados são considerados como universalmente relevantes para crianças desta faixa etária (i.e., entre os 3 e os 5 anos).

A característica que melhor distingue o modelo hierárquico é que, contrariamente a outras abordagens, diversos conteúdos essenciais são considerados, e diversos tipos de instrumentos (e níveis de análise) são utilizados de modo a que seja possível obter uma descrição global da competência social (i.e., sem os constrangimentos situacionais, contextuais, ou dependentes de determinadas habilidades sociais). Como resultado, a avaliação da estabilidade é também possível.

As relações entre a competência social, a amizade recíproca e o estatuto sociométrico (duas variáveis frequentemente utilizadas na avaliação da competência social das crianças) foram também exploradas no último estudo. Entre outros resultados, verificou-se que as medidas do modelo apresentavam maior estabilidade de um ano para outro, quer em comparação à amizade, quer ao estatuto sociométrico, sugerindo que a avaliação obtida através do protocolo de medidas é mais abrangente e consistente.

As limitações de cada estudo, bem como orientações para futuras investigações são apresentadas na secção de discussão de cada trabalho, e na discussão geral.

ABSTRACT

Embedded in a developmental framework, the studies presented in this research investigate a measurement model for social competence with peers, during the preschool years. Social competence construct is described as an individual differences latent trait that reflects children's ability in coordinating affect, cognition, and behavior in achieving personal social goals (Waters & Sroufe, 1983). Moreover, the attainment of personal goals should not excessively constrain peers' opportunities in achieving their own social goals, or reduce the chances for the achievement personal social goals in the future.

The measurement model characterizes by having a three-level hierarchical structure, where social competence is placed at the top level, as a second-order latent factor influencing three lower social competence domains – social motivation and engagement, profiles of behavioral and psychological attributes, and peer acceptance. Each of these domains (the measurement families) is measured using two or three indicators, which constitute the base level of the model (i.e., rates of visual attention received, rates of positive and neutral interactions initiated, two social competence Q-sorts, and two sociometric measures).

Hypothesis regarding the fit of the model to Portuguese data, as well as the stability of the model across the preschool years were tested. Overall, results were consistent with prior studies (e.g., Bost, Vaughn, Washington, Cielinski, & Bradbard, 1998; Vaughn, 2001; Vaughn, et al., 2009), indicating that the model has a good fit to Portuguese preschool data. Results also support the assumption that, even though small differences associated with cultural, developmental, and social contexts variability may occur at the base level of the model (i.e., the observed measures/indicators), the hierarchical structure is identical across these dimensions, because the social domains considered are thought to be universally relevant to children at these ages (i.e., between the ages of 3-, and 5-years)

The most distinguishable feature of the hierarchical model is that, contrary to other approaches, several main issues are taken into account, and several types of instruments (and levels of analyses) are used so that a broad characterization of social competence (i.e., non situational, or contextual, or skills' based) is possible. As a result, the assessment of stability is also possible.

The relations between social competence, friendship reciprocity, and sociometric status (two variables frequently assessed in the evaluation of children's social competence) were also explored in the last study. Among other findings, the model's measures was found to be more stable than both friendship and sociometric status, indicating that a broader and consistent assessment is given by the protocol of measures that are used in model operationalization.

Limitations of each study and future directions of research are presented in the discussion section of each work, as well as in the general discussion.

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CHAPTER I

General Introduction

The goal of this dissertation is the testing of an assessment model of children's social competence in the context of peer relationships. Conceptually, social competence is described as the flexible management of behavior, cognition, and emotion/affect in attaining social goals (Waters & Sroufe, 1983) without entering into social trajectories that reduce the chances for the attainment of future social goals, and without excessively constrain peers' opportunities in achieving their own social goals (Rose-Krasnor, 1997; Bost, Vaughn, Washington, Cielinski, & Bradbard, 1998). Empirically, this definition translates into a hierarchical model structure, where social competence is placed at the top level, as an individual differences latent trait. This latent trait is then hypothesized to influence two subordinate lower levels, namely (a) three first-order latent variables representing three social competence domains or measurement families (i.e., *social motivation and engagement*, *profiles of behavioral and psychological attributes*, and *peer acceptance*), and (b) the actual scores on the measures or indicators used to assess each measurement family (e.g., rates of visual attention received from peers, rates of positive and neutral interactions initiated towards peers).

Overall the nature of the thesis is essentially methodological. The chapters focus on a measurement or assessment model for social competence during the preschool years, and only the fifth chapter explores in a more theoretical way, the relations between social competence and both friendship and sociometric status.

As indicated above, social competence was operationalized using a set of three measurement families, representing three broad domains. The first family of measurement – *social motivation and engagement* – was assessed using three measures or indicators: (a) *rates of visual attention received*, (b) *rates of positive interactions initiated* and, (c) *rates of neutral interactions initiated*. The reason why these measures are thought to be broad indices of the *social motivation and engagement* domain and, more generally, of social competence, grounds on the assumption that one of the primary needs of children is the establishment of themselves within a peer group **(**Omark, & Edelman, 1976). As a result, children seem to be motivated by a natural desire to be part of a group, a drive to *fit in*, which changes their behaviors and interactions in response to group norms and expectations (Harris, 1995). Furthermore, because humans are responsive to eye gaze of others, visual attention measures, as well as interaction measures have been a valuable tool to study social development, in particular, at the group level (Baron-Cohen, 1995). Among other indicators, the number of eye gazes an individual receives is one of the cues to which a behavioral strategy mechanism

might be sensitive. And that is because how often individuals are looked at by the others in their group, can serve as an indication of their social status, and those who rank high in the dominance structure tend to receive more gazes (Chance & Larsen, 1976).

Moreover, although the notion of *attention structure* was initially introduced as an indicator of social dominance (Chance, 1967; Chance & Larsen, 1976; Hold, 1976) other researchers (e.g., Vaughn & Waters, 1983; LaFreniere & Charlesworth, 1983) have suggested that the behavioral and social-structural correlates of attention, are considerably wider than the correlates of dominance based on traditional indicators (e.g., winning conflicts regarding objects and positions). For example, there is evidence that during the preschool years, the attention rank is highly correlated with sociometric preference, whereas the dominance rank is not strongly related with attention, or with sociometric status (Vaughn & Waters, 1981).

Thus, in addition to its value for specifying dominance structures, the rate of visual attention a child receives from peers, during the preschool period, is significantly correlated with other measures of social competence such as Q-sort measures of social competence (Vaughn & Martino, 1988; Waters, Garber, Gornal, & Vaughn, 1983; Waters, Noyes, Vaughn, & Ricks, 1985) and sociometric preference (Vaughn & Waters, 1981). Vaughn and Martino (1988), reported that the clusters of CCQ items (i.e., California Child Q-sort, Block & Block, 1980) correlated with visual attention received, indicating that socially competent children (when compared to their less competent peers) receive proportionally higher rates of visual attention from peers. These children, who had greater rates of visual attention directed towards them, were described by adult observers as *socially oriented, socially motivated, and socially skilled*.

With respect to children's interactions with peers and how the measurement of these interactions associates with social competence, broadly, and with *social motivation and engagement*, specifically, it is known, for instance, that although children's behaviors may vary as a function of the interactive partner and the social context where the interactions occurs, some continuity is also present, reflecting significant patterns over time (Fabes, Martin, & Hanish, 2009). Following Hinde's model (1979), the concept of *interaction* refers to dyadic behavior in which individual's actions are mutually dependent (i.e., each person's behavior is both a reply to, and a motivation for, the other person's behavior). Three general types of interaction have been traditionally investigated: (a) *movement toward others*, (b) *movement against others* and, (c) *movement away from others* (Rubin, Bukowski, & Parker, 2006). On average, regardless of the diversity of social interactions, children who move

toward others are considered *sociable* (whereas the second and the third profiles are typically characterized as *aggressive* and *socially withdrawn*, respectively). Therefore, the initiation of positive and neutral interactions tends to associate positively with children's social competence, broadly, and with children's sociometric status and or their likeability, in particular (e.g., Denham, McKinley, Couchoud, & Holt, 1990; Hartup, Glazer, & Charlesworth, 1967; Masters & Furman, 1981). Moreover, it appears that prosocial behaviors are more important than assertiveness in predicting peer preferences and therefore, during the preschool years, being a determined, dominant leader, able to start new activities may not be as relevant as the ability to interact while maintaining positive affect in one-self and other (Denham & Holt, 1993).

Because preschool years frequently correspond to a period when children are initially confronted with large number of peers outside their family - a time when children move from playing alone (or alongside other children) towards authentic interactive play, where more complex social dynamics are established - this developmental period has been considered particularly important in setting the basis for the development of behaviors, attitudes and preferences underlying peer interactions and relationships (Martin, Fabes, Hanish, & Hollenstein, 2005), ultimately associated with children's social competence. Research also indicates that over the course of preschool years, the emergent social behaviors reflect an increasing orientation towards cohesion, affiliation, and engagement with peers (e.g., Howes, 1988; Strayer, 1980). Among other indicators, the ability to positively interact with peers is considered a critical feature of young children's successful peer interactions (Rubin, et al., 2006).

The second family of measurement – *profiles of behavioral and psychological attributes* – is derived from two Q-sets (i.e., CCQ – California Child Q-sort, Block & Block, 1980; and PQ – Preschool Q-sort, Bronson's adaptation of a Q-sort originally used by Baumrind, 1967) and is mostly based on the work of Block and Block (1980) concerning the construct of *ego-resiliency*. Briefly, the notion of ego-resiliency refers to the dynamic ability of individuals to change a characteristic level of *ego-control* (i.e., the degree to which individuals express their impulses; J. H. Block & Kremen, 1996; Block & Block, 1980) in either direction, in response to contextual or situational demands and it has implications for the individuals' adaptive capacities under conditions of environmental stress, uncertainty, conflict, or disequilibrium (Block & Block, 1980; Letzringa, Block, Funder, 2005). Emphasizing the flexible management of desires and impulses in dealing with the

complexities and opportunities in the environment (e.g., delay of gratification, inhibition of aggression, awareness in unstructured situations; Block, 1993) the ego-resilience concept is closely related to the notion of competence underlying the social competence wide-range approach (Waters & Sroufe, 1983). Q-sort techniques were developed to assess individual differences with respect to these and other constructs (e.g., *ego control*; Letzringa, et al., 2005) and results consistently suggest that these dimensions tend to be stable over time, from age $3_{1/2}$ to 7 years. Overall the social competence Q-sort reflects the child's ability to establish and maintain positive social interactions, the ability to cope with stress, and behavioral self-reliance and autonomy. CCQ-sort items have also been used to assess emotional regulation and autonomy (e.g., Mendez, Fantuzzo, Cicchetti, 2002; Shields & Cicchetti, 1997) as well as inhibition and aggressiveness (Asendorpf, Denissen, & van Aken, 2008). High correlations between social competence and self-esteem, assessed using both the Q-sorts have also been reported for preschool-age children (Waters, Noyes, Vaughn, & Ricks, 1985).

Finally, the third family of measurement – *peer acceptance* – was assessed using two sociometric measures: *peer nominations task* (McCandless & Marshall, 1957) and *paired comparison task* (Vaughn, 2001; Vaughn, Colvin, Azria, Caya, & Krzysik, 2001; Vaughn & Waters, 1981). Sociometric measures have been widely used as reliable instruments to assess social adjustment/development and several correlations among these measures and other correlates of social competence have been systematically reported (e.g., *social withdrawal*, for children who receive low rates of positive sociometric choices or high rates of negative sociometric choices; Harrist, Zaia, Bates, Dodge, & Pettit, 1997; *school adjustment*; Buhs & Ladd, 2001; Coie & Cillessen, 1993; *moral reasoning* and *social behavior*; Bear & Rys, 1994; *aggressive* and *prosocial behavior*, for children who receive high rates of negative sociometric choices *vs.* high rates of positive sociometric choices, respectively; Denham & Holt, 1993; Ladd, Price, & Hart, 1988; Salmivalli, Kaukiainen, & Lagerspetz, 2000).

In addition, because most social competence conceptions agree on the assumption that one of the features that characterizes children's social competency is the ability to effectively establish relationships with peers, sociometric peer acceptance (or popularity) has been frequently considered an indicator of social competence (Rose-Krasnor, 1997; Waters & Sroufe, 1983), and a good predictor of later social adjustment (Kupersmidt, Coie, & Dodge, 1990; Parker & Asher, 1987).

Sociometric measures have also been used to study friendship relations, in particular, friendship reciprocity (e.g., Hartup, French, Laursen, Johnston, & Ogawa, 1993; Hartup,

Laursen, Stewart, & Eastenson, 1988; Vaughn, et al., 2001). Recent studies suggest that, by the age of four, sociometric methods provide reliable and valid data about friendship (Vaughn et al., 2001; Vaughn, 2001). Using sociometric dyadic analyses, rather than *child-to-group* analyses, it is possible to identify reciprocal preferences, an indicator of friendship among pairs of children (Santos, Vaughn, & Bonnet, 2000). Furthermore, these measures have also proved to be an accurate tool in obtaining useful information about children's social networks (Santos & Winegar, 1999; Strayer, 1980; Vaughn & Santos, 2009). As the measures described before, sociometric measures might be characterized as broadband, complying with the theoretical assumption underlying the social competence hierarchical model, that is, social competence as an integrative construct that refers generally to the ability to create and flexibly coordinate adaptive responses to demands, and to generate and benefit from the opportunities in the environment (Waters & Sroufe, 1983).

In sum, our research presents an assessment model for social competence with peers, during the preschool years, drawn upon seven broad measures that were chosen as significant indicators of children's social competence at this particular age-period. When compared with more restrict approaches to social competence, the model has consistently yielded better indicators of cross-time and cross-situation stability (Shin, et al., in press; Waters & Sroufe, 1983), as well as cross-culture validity (Vaughn, et al., 2009).

The first study – Chapter II – explores the stability of the seven social competence measures, in a sample of Portuguese preschool children (ages 3 to 5), using longitudinal and cross-sectional data. Sociometric status and friendship reciprocal choices were additionally computed and assessed regarding stability, as both measures are frequently used as social competence correlates (Bukowski & Hoza, 1988; Bukowski, Newcomb, & Hartup, 1996). Overall, the measures are expected to be moderately stable, across years, in particular, from 4- to 5-years.

The second study – Chapter III – tests a hierarchical model for social competence with a multinational sample of preschool-age children. This study replicates in part the Vaughn et al.' research (2009), and further explores the model by adding new questions regarding the effects of age (using a different cut-of criteria for age) and sample as grouping variables. Larger differences are anticipated between the younger (3-year olds) and the older children (5-year olds), than between contiguous ages (i.e., 3 to 4, and 4 to 5 years).

Chapter IV focuses on the stability of the social competence hierarchical model across preschool-years, in a sample of Portuguese children. In accordance with the theoretical

assumptions supporting the model (e.g., social competence as an organizing construct or an individual differences latent trait, Waters & Sroufe, 1983), stability from one year to another is anticipated.

Chapter V presents a correlational study that assesses the relations between social competence (measured through the seven measures used to investigate the hierarchical model), sociometric status, and reciprocal friendship in a two-year longitudinal sample of Portuguese preschool children. Hypothesis regarding the impact of the child's sex on the associations patterns between variables were tested. Based on the literature, it was anticipated that, for boys, the association between sociometric status and social competence would be stronger (e.g., Dodge, 1983; Waldrop & Halverson, 1975), whereas for girls, reciprocal friendship would have a stronger association with social competence (e.g., Maccoby, 1998; Vaughn, et al., 2000).

General results and implications of each study are presented in Chapter V. Suggestions for future research are offered, in light of an integrative model that emphasizes developmental and ethological perspectives, providing a coherent multidisciplinary framework on the study social competence.

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CHAPTER II

The Stability of Social Competence Measures: Sociometric Choices, Social Competence Q-sorts, and Visual Attention and Interaction Measures

Abstract

This study tests the stability of seven general measures, or indicators, of social competence (i.e., rates of visual attention received, positive an neutral interactions initiated, two social competence Q-sorts, positive nominations received, and sociometric paired comparisons), in a Portuguese sample of preschool children (ages 3 to 5), using longitudinal and cross-sectional data. In addition, sociometric status and reciprocal friendship stability are also assessed, because these two measures are frequently used on the evaluation of children's social adjustment to peers.

Correlation analyses were computed between the measures collected in three distinct periods. Results indicate that, in general, the seven measures are fairly stable. Plus, regarding sociometric status, grater agreement is observed for both popular and rejected social statuses. Friendship data indicate that, overall, no agreement exists between having reciprocal friends in one year, and having reciprocal friends the next year.

Keywords: social competence measures, cross-time stability, preschool children

Introduction

Research on social competence may well be characterized by a more or less consensual assumption – social competence it is not a simple concept to work with (especially to operationalize and measure) and, as a consequence, several distinct measures or indicators of social competence should be used, rather than a *single measure* or *single trait* approach (Bost, Vaughn, Washington, Cielinski, & Bradbard, 1998; Rose-Krasnor, 1997; Vaughn, 2001; Waters & Sroufe, 1983).

In this study, we propose to assess the stability of seven general measures used as a group (a protocol) to evaluate social competence during the preschool years (e.g., Bost et al., 1998; Vaughn, 2001; Vaughn & Waters, 1981; Vaughn, et al., 2000; Vaughn, et al., in press; Waters, Noyes, Vaughn, & Ricks, 1985). Moreover, this set of measures has been theorized as representing three broad social competence domains, namely, *social motivation and engagement* (assessed through rates of visual attention received, and positive and neutral interactions initiated), *profiles of behavioral and psychological attributes* (assessed by two Q-sorts), and *peer acceptance* (assessed using two sociometric tasks – standard peer nominations, McCandless, & Marshall, 1957; and paired comparisons).

In addition, sociometric status and friendship reciprocity were also tested in respect to overall stability, because these two measures are also frequently used to assess children's social adjustment to peers (e.g., Berndt, 1996; Coie, & Cillessen, 1998; Dunn, 2006; Howes, 1988, 1996; Newcomb & Bagwell, 1996; Newcomb, Bukowski, & Pattee, 1993; Sandstrom, & Coie, 1999; Spence, 1987).

Measures of visual attention received have been traditionally used to study social development at the group level (Baron-Cohen, 1995), in particular, as indicators of children's social status and/or dominance status in the peer group (Omark & Edelman, 1976; Abramovitch, 1976). Similar to what has been found in other primate species (e.g., Chance, 1976; Hinde, 1974) research as indicated that, in general, higher rates of visual attention are directed to those who rank high in the dominance structure (Abramovitch, 1976; Chance & Larsen, 1976). Furthermore, investigations with preschool-age children have indicated that sociometric preferences are also associated (sometimes even more) with the amount of visual attention a child receives from playmates (e.g., LaFreniere & Charlesworth, 1983; Vaughn & Waters, 1980; Vaughn & Waters, 1981). Vaughn and Martino (1988) further reported significant associations between visual attention and social competence (assessed using Q-sort measures), during the preschool period. In general, when compared with their less

competent classmates, socially competent children (i.e., children who were described by adult observers as socially oriented, socially motivated and socially skilled) received significantly higher proportions of visual attention from peers.

In accordance with the evolutionary approach, attention structures are gradually formed and both experience and development are important requisites in learning such systems (Chance & Larsen, 1976). Additionally, the literature indicates that a well-developed hierarchical structure is generally more common among boys than among girls (Omark & Edelman, 1976). For example, in a study with school-age boys (e.g., Pettit, Bakshi, Dodge, Coie, 1990), dominance hierarchies were rapidly developed in newly formed groups of boys (as rapidly as after 45 minutes of interaction), showing consistency and stability across time, especially for the older children (third-graders). In part, these results may be due to the fact that, in general, boys tend to engage in more aggressive forms of behavior (at least, in overt or direct forms of aggression; Coie & Dodge, 1988; Coie, Dodge, Terry, & Wright, 1991; Crick & Grotpeter, 1995) and, theoretically, the formation and maintenance of stable dominance structures is important in minimizing intra-group aggression (Strayer & Strayer, 1976, 1978).

Based on these data and theoretical assumptions, that is, given that dominance and/or social status structures are associated with visual attention and, as research indicates, both tend to be stable over time (and to become more consistent as children grow older), we expect to find significant associations among repeated measures of visual attention, in particular, from ages 4 to 5 and, and among boys.

On the subject of children's interactions with peers, research has suggested that although some behavioral continuity is present, such as a greater propensity to behave in a sociable way (or instead, to avoid interactions or to be less smooth on social approaches; Hinde, 1979; Rubin, Bukowski, & Parker, 2006) several factors appear to influence children's interactive behaviors. Among these factors, the social context (e.g., dyadic *versus* group situations, Benenson, Joyce, Nicholson, Waite, Roy, & Simpson, 2001;Waldrop & Halverson, 1975; free-play *versus* structured cognitive tasks) as well as the social partner with whom the interaction occurs (e.g., friend *versus* acquaintance, Bernd, 1981; Jones, 1985; same-sex *versus* opposite-sex; Leman, & Lam, 2008; Markovits, Benenson, & Dolenszky, 2001) have been identified as major influences on social interactions (Fabes, Martin, & Hanish, 2009). In addition, children's behaviors and interactions also change as a function of development, through the acquisition of new and more sophisticated cognitive and social skills (Brownell, 1986; Rardin, & Moan, 1971). Nevertheless, it is true that some behavioral patterns do exist,

even at this early age. Aggressive behavior, for instance, has been recognized by its stability over time, especially among boys (e.g., Cummings, Iannotti, & Zahn-Waxler, 1989; Olweus, 1979).

Moreover, in a review on children's peer relations, based on sociometric status classifications, empirical evidences for consistent behavioral differences among the different groups were found (Newcomb, et al., 1993). In particular, results indicated that children in each sociometric group had distinct behavioral repertoires that affected the quality of their relationships with peers. For example, when compared with other sociometric groups, popular children were identified, in general, as displaying higher levels of sociability (e.g., positive social actions) and cognitive abilities, and lower levels of aggressive and withdrawal behavior. In contrast, rejected children were more prompt to behave aggressively (or to withdrawal from interactions) and less sociable and cognitively skilled (Newcomb, et al., 1993). Overall, both stability and change appear to characterize peer interactions during the preschool years. Therefore, regarding the measures of positive and neutral interactions initiated, a mixture of stability *versus* instability over time is expected.

Q-sorts measures of social competence (i.e., CCQ – California Child Q-sort, Block & Block, 1980; and PQ – Preschool Q-sort, Bronson's adaptation of a Q-sort originally used by Baumrind, 1967) are mostly based on the work of Block and Block (1980) on the constructs of *ego-control* (i.e., the inhibition/expression of impulse) and *ego-resiliency* (i.e., the dynamic ability to contextually modify the level of ego-control in response to situational demands, Block & Block, 1980; Letzringa, Block, Funder, 2005). Investigation on these concepts has suggested that both ego-control and ego-resiliency (as well as other constructs assessed using the Q-sorts, e.g., *social competence* and *self-esteem*, Waters, et al., 1985) are stable over time, from ages $3_{1/2}$ to 7. As a whole, the Q-sorts allow the assessment of children's ability to cope with stressful events, to establish and maintain positive social interactions, and their global level of behavioral autonomy, inhibition and aggressiveness (e.g., Asendorpf, Denissen, & van Aken, 2008; Mendez, Fantuzzo, Cicchetti, 2002; Shields & Cicchetti, 1997).

The CCQ-sort has also been used to assess the *Big Five* personality factors (John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994) – *extraversion*, *agreeableness*, *conscientiousness*, *neuroticism*, and *openness*. These five factors summarize a domain of broad individual differences, including a large number of distinct and more specific personality characteristics, and were based on initial analyses of personality-traits in natural-language dictionaries (John, Angleitner, & Ostendorf, 1988). With regard to stability, data

from elementary school-age children (Digman, 1989) suggests that fair amount of stability exists over periods of 3 to 4 years of assessment.

In the present study, both Q-sorts were used to assess the social competence dimension over time. In accordance with the literature presented before, moderate stability is expected.

Finally, regarding the stability of sociometric measures, most research has focused on the sociometric status classifications, rather than in the actual measures (e.g., Coie & Dodge, 1983; Coie, Dodge, & Coppotelli, 1982; DeRosier & Thomas, 2003) suggesting that, for some groups (mainly the popular and rejected status), relatively good temporal stability is observed. Usually, the stability of sociometric classification is assessed using Cohen's [Kappa] coefficient (a measure of association for nominal measures). In a review of several studies that reported the stability of sociometric classifications (Cillessen, Bukowski, & Haselager, 2000), the values of Kappa were found to range between .01 and .44, suggesting that sociometric classifications is relatively unstable. In accordance with Maassen, Steenbeek, and van Geert (2004), such variability is not surprising because the stability of sociometric status appears to strongly depend on the social context where the assessment takes place. And because the circumstances where data are collected might change relatively fast (e.g., due to vacation breaks, new playmates arrival, absence of *socially significant* children, etc.), a high level of instability is hypothetically expected. In addition, especially among very young children, social preferences might be less stable, despite changes on the group structure (Wu, Hart, Draper, & Olsen, 2001).

Other studies suggest, however, that sociometric status, or at least, some statutes (typically, the popular and rejected) are very stable over time, and that once these extreme social positions are defined within the group, they then to *stay with the child*, even when she/he enters a new peer group (e.g., Coie & Dodge, 1983; Dodge, 1983; Dodge, Pettit, McClaskey, & Brown, 1986). As a consequence, for sociometric status, and because our groups characterize by a high level of stability (i.e., in each year, only 2 to 3 children enter or leave the group) moderate to high stability over time is expected, especially from 4- to 5-years and for popular and rejected groups.

Regarding the measures used to derive sociometric status, few studies reporting stability were found, as indicated earlier. In one of those rare studies, the stability of two sociometric measures (nominations and rating-scale) was assessed, in a sample of preschool children, evaluated twice in a 5-months interval (Wasik, 1987). Results indicated that the

measures were stable and, surprisingly, higher correlations were found for negative nominations, and rating-scale.

In a meta-analysis on the stability of sociometric measures (Jiang & Cillessen, 2005), test-retest reliability was found for all tested sociometric measures, namely – acceptance, rejection, social preference, and rating-scale. Finally, substantial reliability for both nominations and paired comparison sociometric measures have been reported, even in children as young as 3-year olds (i.e., Bost et al., 1998; Vaughn, 2001; Vaughn, et al., 2000).

Overall, the literature suggests some amount of stability. Consequently, moderate stability is anticipated, especially for older children, while from 3- to 4-years, lower levels of stability are predicted.

Regarding the stability of friendship reciprocity, literature suggests that, with age, children become more accurate about whom their friends are and, although the number of friendship nominations does not increase, the number of mutual choices does (e.g., Berndt & Hoyle, 1985). Increased selectivity with age might reflect socio-cognitive changes that allow older children to base their friendship choices on more criteria and to gather and assess information on both internal and external attributes of their friends (Aboud & Mendelson, 1996).

Despite that, research identifying peer preferences from observations and maternal reports suggests that early mutual relationships are already reasonably stable (e.g., Howes, 2009; Ladd, Kochenderfer, & Coleman, 1996), though the specific dynamics and social behaviors appear to change with development. Howes (1983), for instance, found that infants had fewer stable dyadic relations than both toddlers and preschoolers and that social interactions among partners were primarily based on object exchange rather than on verbal exchanges. Toddlers' friendly interactions, in contrast, were less likely than infant interactions to be based on object exchanges and, when compared with their younger playmates, toddlers tended to form more friendship relations. Finally, among preschoolers, two friendship patterns appear to emerge; or children were more prompt to have several short-term friendships, or their relationships were in small number and more stable. In both cases, social interactions were primarily based on verbal exchanges, rather than on object exchanges (Howes, 1983).

Vaughn et al. (2000), reported growing stability of friendship relations during the preschool years, in particular, the study indicated that for girls, but not for boys, the number

of reciprocal friendships was stable across time (although friendship status per se was not stable).

Thus, based on the information reported above, cross-time stability is anticipated for friendship reciprocity, in particular from 4- to 5-years-old. In addition, because girls, more than boys, seem to have a preference for dyadic relationships, and dyadic reciprocity is one of the features that characterize friendship (Benenson, Apostoleris, & Parnass, 1997; Ladd, 1983), grater stability of reciprocal friends is anticipated for girls.

Method

Participants

145 children (74 ♀ and 71 ♂), attending two private preschool institutions in Lisbon, participated in this study. Measures were collected for three consecutive years. At Time 1 (age 3) 85 children were observed (45 ♀ and 40 ♂); at Time 2 (age 4) 103 were observed (54 ♀ and 49 ♂) and, at Time 3 (age 5) 122 children were observed (59 ♀ and 63 ♂). Of the 145 children, 106 had longitudinal data for two or three years. In particular, 56 children had data for three consecutive years (3, 4, and 5-years old); 32 children had data for ages 4 and 5; 18 children had data for ages 3 and 5, and the remaining children (39) had data for only one year, mostly, for age 5 or, in a few cases, for both ages 3, and 4.

The families were middle-up socio-economic-status in terms of education levels and family incomes, by the standards of the local community. All assessments took place in the day-care centers. Children were observed in different settings (e.g., free-play and group activities in the classroom, meals, playground, transitions between activities). Consent was obtained from school directors, teachers, and parents prior to data collection.

Instruments

Seven distinct measures of social competence were collected in this study, namely, three observational measures (i.e., rates of visual attention received, and rates of positive and neutral interactions initiated), two social competence Q-sorts (i.e., California Child Q-sort – CCQ, Block & Block, 1980; and Preschool Q-sort –PQ, a Bronson's adaptation of a Q-sort originally used by Baumrind, 1967), and two sociometric tasks. In addition, sociometric status

and friendship status were also computed. The first was derived from the sociometric nomination measure and, the second, from three distinct sociometric measures (i.e., nominations and paired comparison tasks, and a rating-scale task).

Observation Measures: Rates of Visual attention Received, and Positive and Neutral Interactions Initiated. For the three measures children were observed using a randomized class roster, over two hundred rounds of observation *per* child. For each round, a target child was observed when his or her name appeared on the class roster and no child was observed two times before all children were observed once.

Rates of visual attention received were collected for 6-seconds observation intervals. At the end of that period the codes identifying the children who received visual attention from the focal child were wrote down, as *units of visual attention*. Specifically, a *look* unit was coded when the focal child directed her/his eyes and/or her/his head in the direction of another child, for a 2 seconds period, or more; when this period lasted for less than 2 seconds, a *glance* unit was coded. If the direction of the eyes (or head) was uncertain, a doubtful occurrence was marked (i.e., "?"). Eye-gaze direction towards an object and not directly to the child who had it was also coded as a doubtful occurrence. Doubtful occurrences were not considered in the child's total score computation.

Interaction initiation (both positive and neutral) was measured during 15-seconds observation intervals; throughout this time, a particular child (i.e., the focal child) was observed. At the end of this, the codes identifying all the children with whom the focal child interacted with were wrote down, along with the interaction emotional tone (i.e., each interaction was coded as *positive*, *neutral*, or *negative*). Positive interactions were coded when one or both children manifested clear signs of positive affect, during the social interaction. Moreover, the positive affect expression should not go along (or be followed) by negative affect expressions from the interactive child. Social exchanges that were neither coded as positive, nor as negative (e.g., anger, distress, fear, sadness, whether through vocal, gestural, or facial means, that does not take place in the context of pretend/fantasy play), were coded as neutral (including the verbal and nonverbal exchanges that do not contain affect expression).

Prior investigations using these observational procedures (e.g., Vaughn & Martino, 1988; Vaughn & Waters, 1981; Waters, et al., 1983) reported agreement rates of 80% (and above), within short training periods.

Social Competence Q-sorts. Q-sort techniques were developed to assess individual differences with respect to personality constructs (e.g., *ego control*, Letzringa, et al., 2005; *ego-resiliency*, Block & Block, 1980; Block & Kremen, 1996; *social competence*, Waters, Garber, Gornal, & Vaughn, 1983; Waters, et al., 1985), and results consistently suggest that these dimensions tend to be stable over time, from ages $3_{1/2}$ to 7. In general terms, the Q-sets (CCQ – California Child Q-sort, and PQ – Preschool Q-sort) consist in collection of 100 and 72 statements, respectively, concerning the child's personality and social characteristics. Each child can be psychologically described by sorting the statements into a 9-step, fixed, quasi-normal distribution ranging from 1 (not at all characteristic) to 9 (extremely characteristic). The child's description with the Q-sorts was performed when more than 20hr of observation per classroom (by teams of two independent observers), in a variety of settings (e.g., small groups activities, meal times, free play indoors, outdoor play, etc.) were accomplished. The descriptions were used to derive SC scores in accordance with the criteria published by Waters, et al. (1985).

When observations were completed, each assistant described the children with both CCQ-set (100 items) and PQ-set (72 items). The items were sorted into 9 categories (1 representing the most atypical attributes and 9, the most typical attributes of the child), with a rectangular distribution. The Q-sort for a given child was subsequently correlated with the profile of a hypothetical child at the extreme for SC, generated by aggregating the descriptions provided by experts on social development (Waters, et al., 1985). Pearson's correlation between a Q-sort for a given child and the "criterion" sort for the construct becomes his or her "score" for that construct. For each classroom, each observer used the CCQ for describe half of the children and the PQ for the other half. Scores for both Q-sorts were used to derive the social competence composite score. Observers for these measures were different across study years.

Sociometric measures. Teams of two observers individually interviewed each child outside the classroom, in a quiet place of the school centre. During the interviews, three picture sociometric tasks were presented to the child, in general, following the same order, namely, (a) positive and negative nominations, (b) rating-scale and, (c) paired comparisons. Overall, the interviews took between 30 and 45 minutes to complete (2 or 3 sessions; 15 minute-sessions). At any point, if the child revealed signs of fatigue, the interview was paused and resumed at another time (usually, the day after).

For the nomination task (McCandless & Marshall, 1957) children were asked to choose each of his/her peers in accordance with a *linking* criterion. That is, using the set of photographs of all classmates, children were asked to name a peer he/she *especially likes to play with*. The request is repeated two more times. After that, the children were asked to select a peer with whom they *did not especially like to play with* (repeated, again, two more times). As peers were chosen, their photographs are turned face down. Once the three positive and the three negative choices were completed, children were asked, as before, to positively nominate the remaining peers (i.e., to chose between the available peers with whom does she or he *especially likes to play with*). The request was repeated until no photographs were left. Using this procedure, all children receive a score representing the order they chosen by peers.

For the rating-scale task, children were asked to classify each peer using a three-point scale, ranging between 1 (*does not especially like to play with*) and 3 (*especially likes to play with*). The photos were presented randomly and, along with the verbal choice, children were also asked to place the photo into one of three boxes, representing the rate each child could receive (usually, smile faces are used to identify each box).

Finally, for the paired comparison task, photographs of all the possible pairs within each classroom (i.e., N. (N-1)/2) were presented to the child, who was asked to choose for each pair of photographs the peer she/he *especially liked to play with*. The pairs are randomly organized, and no child was seen twice before all other children were seen once. Each child's photograph was presented the same number of times on the left- and right-hand sections of the picture file. The acceptance score for this measure was the total number of choices received from peers, divided by the number of classmates who concluded the task.

Sociometric Status and Friendship Reciprocity. As mentioned earlier, sociometric measures were used to compute two additional measures – (a) sociometric status, and (b) friendship reciprocity. Sociometric status was computed from the nomination measure previously described according to Coie et al.' (1982), and Newcomb and Bukowski's (1983) procedures. In sum, the child's sociometric status is determined using two scores/dimensions, defined as *social preference* (P) and, *social impact* (I). Characterized as a *normative continuous model* of sociometric classification, this method is based on the absolute frequencies of positive and negative nominations, received by each child. These raw values are subsequently converted into standardized scores (i.e., *z* scores), representing the *like most* (LM) and *like least* (LL) measures. Using the LM and LL standardized scores, P (=LM-LL) and I (=LM+LL), may now be computed. The final taxonomy, is based on the normal

distribution, and given by the four standardized scores (i.e., LM, LL, P and, I), as it follows: (a) *popular children* – P>1.0; LM>0 and LL<0; (b) *rejected children* – P<1.0; LM<0 and LL>0; (c) *neglected children* – I<1.0; positive nominations absolute frequency=0; (d) *controversial children* – I>1.0; LM and LL>0 and; (e) *average children* – all children who do not fit into the criteria formerly defined.

In accordance with these procedures, at Time 1 (age 3), 9 children were classified as *popular* (4 ♀ and 5 ♂), 13 children were classified as *rejected* (7 ♀ and 6 ♂) 13 children were classified as *neglected* (11 ♀ and 2 ♂), and 49 children received the *average* status (22 ♀ and 27 ♂). At Time 2 (age 4), 12 children were classified as *popular* (6 ♀ and 6 ♂), 10 children were classified as *rejected* (6 ♀ and 4 ♂) 15 children were classified as *neglected* (9 ♀ and 6 ♂), and 57 children were classified as *average* (30 ♀ and 27 ♂). Finally, at Time 3 (age 5), 15 children were classified as *popular* (9 ♀ and 7 ♂), 13 children were classified as *rejected* (5 ♀ and 8 ♂) 15 children were classified as *neglected* (11 ♀ and 4 ♂), and 68 children were classified as *average* (31 ♀ and 37 ♂). No children received the status of controversial, at either year.

Following Vaughn et al. (2000), friendship reciprocity was computed from the three sociometric tasks described before. Specifically, a reciprocal friendship dyad was identified when each peer was: (a) among the top four nominated children in the sociometric nominations task or; (b) among the top four chosen children in the paired comparison task and; (c) received and give a rating of 3 (i.e., *like to play a lot*) in the rating-scale task. At 3-years old, 45 children (24 ♀ and 19 ♂) were identified as having, at least, one reciprocal friendship, and the number of reciprocal friendship dyads ranged from 0 to 4, for both boys (M = 1.22, *SD* = 1.25) and girls (M = 1.03, *SD* = 1.27). At 4-years old, 58 children (29 ♀ and 29 ♂) were identified as having, at least, one reciprocal friendship, and the number of reciprocal friendship dyads ranged from 0 to 4, for both boys (M = 1.24, *SD* = 1.09) and girls (M = 1.16, *SD* = 1.13). Finally, at 5-years old, 85 children (41 ♀ and 44 ♂) were identified as having, at least, one reciprocal friendship, and the number of reciprocal friendship dyads ranged from 0 to 4, for girls (M = 1.45, *SD* = 1.22) and from 0 to 5, for boys (M = 1.75, *SD* = 1.60). Most children, across the 3 years, were found to have 0 or 1 reciprocal friend, and the number of reciprocal friendship dyads moderately increased with age (from .61 at 3-years, to .67, at 4-years, and to .77 at 5-years).

Results

For scale measures (i.e., rates visual attention received, and of positive and neutral interactions initiated, nominations and paired comparison sociometric choices, and Q-sorts,), stability was assessed through correlation analysis (Pearson coefficients) between the measurements on two or three longitudinal or cross-sectional years (i.e., Time 1, Time 2, and Time 3; Time 1 and Time 2; Time 1 and 3 and; Time 2 and 3). All the seven measures were standardized prior analyses. For nominal measures (i.e., sociometric status, and friendship reciprocity) Cohen's Kappa coefficient was computed across years.

Fisher tests for *r*-to-*z* transformed values were used to assess the differences between boys' *versus* girls' correlations.

For observation measures (i.e., visual attention received, and positive and neutral interactions initiates), results indicate that, in general, repeated visual attention measures are more strongly associated, than both positive and neutral repeated interactions measures, especially for boys. In contrast, positive interactions initiated measure showed greater stability for girls. For boys, the associations for positive interactions initiation were not only nonsignificant, but also negative between Time 1 (T1) and Time 3 (T3), and Time 2 (T2) and T3. Regarding neutral interactions, significant correlations were found only between T2 and T3, for both boys and girls, as presented in Table 1. Of the possible 9 comparisons between boys and girls, only 2 were marginally significant (p = .05). For visual attention measure, the correlations between T1 x T2, and T1 x T3, were stronger for boys.

Table 1

Visual Attention, Positive, and Neutral Interactions Stability (z_scores) T1 x T2 x T3

	VAR_T2	VAR_T3	PII_T2	PII_T3	NII_T2	NII_T3
VAR_T1	.16 *vs*. .60**	.36* *vs*. .70**				
VAR_T2		.43* *vs*. .54**				
PII_T1			.35* *vs*. .12	.23 *vs*. -.07		
PII_T2				.31* *vs*. -.08		
NII_T1					.21 *vs*. .29	.31 *vs*. .24
NII_T2						.44* *vs*. .44*

Note. *p<.05; **p<.001; Ns=63-120; ♀ on the left; ♂ on the right. VAR – Visual Attention Received, PII – Positive Interactions Initiated, NII – Neutral Interactions Initiated.

With respect to Q-sorts, results suggest that both measures are fairly stable from one year to another. In particular, correlations between the CCQ-sort at T1 and T2, and T1 and T3 indicate grater stability for girls' data, whereas the correlation between the CCQ-sort at T2 and T3 is only significant for boys. None of the differences between boys and girls was, however, significant. For the PQ-sort all the correlations were statistically significant, except the association between T1 and T2, which was nonsignificant for both boys and girls. Again, the differences between boys' and girls' correlations were not significant. Table 2 presents the correlation coefficients for these measures.

Table 2

Social Competence Q-sorts stability (z_scores) T1 x T2 x T3

	CCQ_T2	CCQ_T3	PQ_T2	PQ _T3
CCQ _T1	.51* *vs*. .27	.55* *vs*. .39		
CCQ_T2		.21 *vs*. .52**		
PQ_T1			.13 *vs*. .10	.51* *vs*. .44*
PQ_T2				.38* *vs*. .41*

Note. *p<.05; **p<.001; Ns=36-98; ♀ on the left; ♂ on the right. CCQ – California Q-sort, PQ – Preschool Q-sort.

As Table 3 indicates, from one year to another, the repeated measures of positive nominations received and paired comparison tasks are, in general, positively and significantly correlated. Out of 10 possible associations (5 per sex), only two failed to reach statistical significance. From T1 to T2, the association between the positive nominations received measures was somewhat stronger for girls than for boys (p = .05).

Table 3

Sociometric Choices Stability (z_scores) T1 x T2 x T3

	PN_T2	PN_T3	PC_T2	PC_T3
PN_T1	.57** *vs*. .12	.04 *vs*. .27		
PN_T2		.45* *vs*. .57**		
PC_T1			.80** *vs*. .53*	.63** *vs*. .66**
PC_T2				.74** *vs*. .84**

Note. *p<.05; **p<.001; Ns=65-114; ♀ on the left; ♂ on the right. PN – Positive Nominations Received, PC – Paired Comparison.

Stability of sociometric status and reciprocal friendship classifications (i.e., inter-rater agreement) were assessed using Cohen's Kappa coefficient for nominal measures.

For sociometric status, moderate agreement across years was observed for popular and rejected status (and also for neglected status in one case, for boys). In particular, results indicate that popular status is moderately stable for girls, from T1 to T2 (K = .43), and from T2 to T3 (K = .38), but not for T1 to T3 (K = .15) cross-sectional data. For boys, on the other hand, no agreement existed between popular status classifications from T1 to T2 (K = -.15). For rejected status, grater agreement was found in boys' data. In particular, moderate agreement was found from T1 to T2 (K = .42), and from T2 to T3 (K = .38). In general, neglected and average sociometric labels appear to hold lower agreement. As mentioned above, only for boys, and only from T2 to T3, neglected status label was found to be moderately stable (K = .38).

Finally, inter-rater agreement for friendship reciprocity across years indicated that, in general, this social competence indicator is not very consensual, that is, having reciprocal friendships at one year does not strongly associates with having reciprocal friends the next year. Only for boys, from T2 to T3, moderate agreement was found (K = .39).

Discussion

This study tested the stability of seven measures or indicators of social competence (i.e., rates of visual attention receives, positive and neutral interactions initiated, two Q-sort measures of social competence, nominations and paired comparisons sociometric tasks) that have been collected as a group to assess children's social competence, during the preschool years (e.g., Bost, et al., 1998; Vaughn, 2001; Vaughn & Waters, 1981; Vaughn, et al., 2000; Vaughn, et al., in press; Waters, Noyes, Vaughn, & Ricks, 1985). In addition, sociometric status and friendship reciprocity were also analyzed, regarding their temporal stability, because both measures are also frequently used to characterize children's social adjustment (or social success) within the peer group (e.g., Berndt, 1996; Coie, & Cillessen, 1998; Dunn, 2006; Howes, 1988, 1996; Newcomb & Bagwell, 1996; Newcomb, Bukowski, & Pattee, 1993; Sandstrom, & Coie, 1999; Spence, 1987).

Overall, moderate stability was anticipated (and confirmed) for most measures, in accordance with the literature and prior empirical studies that, more or less directly, reported stability indices for the constructs here evaluated.

Regarding visual attention measures, results seem to support the hypothesis that both experience and development are important features in structuring (and consolidating) visual attention structures. In particular, only from 3 to 4 years a nonsignificant association (for girls) was found; the remaining associations were all positive and significant, in particular for boys. Moreover, the grater stability for boys is also in agreement with the literature in that a well-developed hierarchical attention structure is more common among boys than among girls (e.g., Omark & Edelman, 1976; Pettit, Bakshi, Dodge, Coie, 1990). Quite in contrast, positive and neutral interaction initiation measures were, in general, less stable from one year to another, especially for boys. In general, distinct patterns appear to emerge in accordance with children's sex. For boys, rates of positive interaction initiated at one year, did not associated with rates of positive interaction initiated the next year. In fact, from Time 1 to Time 3, and from Time 2 to Time 3, the associations were negative, although nonsignificant. For girls, initiation of positive interactions at Time 1 was positively and significantly associated with initiation of positive interactions at Time 2. The same was true between Time 2 and Time 3. Finally, for neutral interactions, positive and significant association were found between Time 2 and Time 3, for both boys and girls.

These distinct stability patterns were initially anticipated. In accordance with the literature, both continuity and change are expected in children's social interactions and behaviors with peers. Concerning stability, past research has indicated that aggressive behavior (or a tendency to interact with peers using aggressive and coercive strategies) is one of the behaviors known to be stable over time, from a very early age (e.g., Cummings, Iannotti, & Zahn-Waxler, 1989; Olweus, 1979). Moreover, behavioral stability has also been found in distinct sociometric groups (Newcomb, et al., 1993), particularly in popular and rejected children. Overall, popular children seem to continuously behave more socially toward peers, displaying lower levels of aggressive and withdrawal behavior. On the contrary, rejected children tend to behave more aggressively and to be less sociable toward peers.

In our study, only neutral and positive interactions were considered and, overall, relatively higher stability was observed for girls' interactions. These results are in agreement with other studies suggesting that girls, as toddlers and young preschoolers, are better able to self-regulate their negative emotions in interacting with peers (e.g., Eisenberg & Fabes, 1994;

Saarni, 1999), displaying more positive behaviors and emotional facial expressions toward peers, when compared with same-age boys (e.g., Parker & Asher, 1993; Roopnarine, 1984; Saarni, 1999).

Regarding the stability of the two social competence Q-sorts, results indicated that both measures were relatively stable over time. For the CCQ-sort, stability was observed between Time 1 and Time 2, and Time 1 and Time 3, for girls, and between Time 2 and Time 3, for boys. For the PQ-sort, only the correlation between Time 1 and Time 2 was nonsignificant for both sexes. In general, results are consistent with the literature, which indicates that the constructs assessed using Q-sort measures (e.g., social competence, ego-control, ego-resiliency), tend to be relatively stable from ages $3_{1/2}$ to 7.

Concerning the stability of the two sociometric measures representing the peer acceptance domain, results indicated that, in general, these measures were stable from one year to another. In fact, only the association between Time 1 and Time 3 for the nomination measure did not reach statistical significance. Results are in accordance with previous studies that have reported substantial reliability for both nominations and paired comparison sociometric measures, in the preschool years (e.g., Bost, et al., 1998; Vaughn, 2001; Vaughn, et al., 2000).

On the subject of sociometric status, previous literature has suggested that both popular and rejected status, in comparison with other social status classifications, tend to be more stable over time (e.g., Coie & Dodge, 1983; Dodge, 1983; Dodge, Pettit, McClaskey, & Brown, 1986). Based on this indication, moderate to high stability (i.e., inter-rater agreement) was anticipated for both popular and rejected status, in particular from ages 4 to 5. Results were, in general, consistent with our hypothesis, that is, overall (and moderate) temporal stability was observed only for popular and rejected statuses. Specifically, popular status classification was more stable for girls, and rejected status classification was more stable for boys.

Finally, analyses of inter-rater agreement regarding friendship reciprocity were performed. Results indicated that, in general, there is no agreement between classifications from one year to the next. Only for boys, from Time 2 to Time 3, contradicting the initial hypothesis moderate agreement was found. Nonetheless, some studies have suggested that, during the preschool period, some children tend to develop several short-term friendships and only later, increasingly stable friendships are formed, based on a more rigorous choice of

friends, which results also in fewer new friendships throughout the year (e.g., Berndt & Hoyle, 1985; Howes, 1983).

Another reason that could explain the lack of agreement might be the stringent criteria used to determine reciprocal friendship (i.e., a reciprocal friendship dyad was identified when each peer was (a) among the top four nominated children in the sociometric nominations task or (b) among the top four chosen children in the paired comparison task and (c) received and give a rating of 3 in the rating-scale task). With such a rigorous norm, few reciprocal dyads were identified, which could have reduced the chances to find stability across time.

In sum, regarding the seven broad measures of social competence, moderate stability was found, supporting the notion that this set of measures is appropriate to assess children's social competence during the preschool years.

Among the three measures representing the *social motivation and engagement domain*, visual attention measures were observed to be the most stable from one year to another. This finding is very interesting, because measures of social structures of attention were primarily considered in the study of nonhuman primates species (e.g., Chance, 1976), and although their incorporation in the study of human social organization gained prominence during the late 1970s, few researchers use this valuable (and fairly simple) tool nowadays (e.g., Abramovitch, 1976; Omark & Edelman, 1976; Waters, et al., 1983; Vaughn & Martino, 1988; Vaughn, et al., in press). When compared with interactions initiation measures, visual attention measures are less ambiguous, because the affective tone does not have to be decoded. The observer simply has to observe the eye and head orientation of the *focal child*, and then to compute a total score of *visual attention units* received by each child. As mentioned earlier in this report, visual attention measures have been used has valid indicators of the individual's social status within the dominance hierarchy (e.g., Abramovitch, 1976; Chance & Larsen, 1976). Moreover, social attention has also been found to associate with positive peer acceptance (e.g., LaFreniere & Charlesworth, 1983; Vaughn & Waters, 1980; Vaughn & Waters, 1981), and with social competence assessed using Q-sort measures (e.g., Vaughn & Martino, 1988). Therefore, because visual attention measures appear to be relatively stable over time, we could infer that, within our Portuguese sample of preschool children, both dominance structures and sociometric preferences are also, hypothetically, considerably stable. Sociometric status data are fairly consistent with this assumption, indicating that, in general, the extreme social positions in the peer group (i.e., the popular

status, and the rejected status classifications) are, in fact, more stable than both average and neglected sociometric status.

With respect to measures' stability, future investigations using larger samples (especially, 3-year olds), are important in validating the findings here reported, contributing also to better understand if the cross-year associations patterns (or their absence) for the seven measures (as well as for sociometric status and friendship reciprocity), are related with the measures it self or, on the contrary, are an attribute of this developmental period. For example, are the lower associations between the rates of positive interactions from one year to another (in comparison with visual attention measures) reflecting an instrument's contingency or is it the case that, this changeability is a characteristic from these ages? It is worth to note that some indicators of stability were found for interactions measures; nevertheless, further studies could help to clarify the variability found for some of the measures, in comparison with others.

On the subject of friendship reciprocity, our results indicated that, in general, no agreement exists in reciprocal friendship classifications from one year to the next. As suggested earlier, these results are in accord with some studies suggesting that the stability of friendship dyads tends to increase with age (Aboud & Mendelson, 1996). Also in agreement with the literature is the increase on the average number of reciprocal choices with age (Berndt & Hoyle, 1985). In general, research has shown that, from a very early age, girls tend to concentrate mainly on reciprocal friendship, while boys invest on their larger male groups (Maccoby, 1998). Nonetheless, Benenson (Benenson, at al., 1997) also found that, although 6-years old boys were more likely than girls to engage in coordinated group activities with larger groups of peers, they did not differentiated from girls regarding their involvement in dyadic interaction (while the opposite was not true for girls, i.e., girls did nor interacted in larger groups as frequently as boys did). Therefore, it is reasonable to assume that, boys' reciprocal friendship relations can possess as much endurance as girls' dyadic relations, despite the fact that those relations are, we suppose, embedded in larger groups membership. Future investigation considering children's social networks (see Strayer & Santos, 1996; Vaughn & Santos, 2009) would permit, for instance, to assess how friendship choices relate to in-group and out-group membership.

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CHAPTER III

Social Competence as an Individual Differences Latent Trait: Retesting a Hierarchical Model with a Multinational Sample of Preschool-age Children

Abstract

This study was designed to retest and further explore a hierarchical model of social competence, using a multi-group subsample of preschool children (ages 3 to 5), selected from the original sample studied (Vaughn, et al., 2009). Social competence was conceptualized within a developmental framework and empirically tested as a second-order latent trait influencing the scores children obtain in seven broad measured variables. Results indicate that the model fits equally well across samples. Adding age and sex as grouping variables in SEM analyses did not strongly influence model fit, indicating that for the three age-levels, for both boys and girls the model is equivalent.

Keywords: child social competence, individual differences latent trait, assessment model

Introduction

In this study, social competence is assessed in the context of peer relationships and interactions, in a 3-group multinational sample, of preschool children (ages 3 to 5), selected from the original sample used in a previous study (Vaughn, et al., 2009). The sample consists of all Portuguese children and 5-years old children from the original sample, and a randomly selected group of children from two of the three US samples, namely, namely, their community and university affiliated samples

Theoretically the study is grounded on the assumption that the development of children's social competence with peers results from an individual ability to adaptively manage personal and environmental social resources, by coordinating affect, cognition, and behavior in attaining social goals (Waters & Sroufe, 1983; Howes, 1987). In order to operationalize social competence, three broad domains of peer social competence were assessed (i.e., *Social Motivation and Engagement* – SME: *Profiles of Behavioral and Psychological Attributes* – BPA; and *Peer Acceptance* – PA), each representing a significant aspect of social development within the preschool years. Although additional aspects of social development and social competence might also be included, the domains assessed are quite broad and the measurement procedures are demanding (seven measures of social competence are collected by different teams of observers for each of the three domains), and previous studies using this protocol (e.g., Bost, Vaughn, Washington, Cielinski, & Bradbard, 1998; Vaughn, 2001; Vaughn et al., 2009), have shown that social competence with peers is satisfactorily characterized by the domains and measurements used here.

Research on social competence has been characterized by a multiplicity of definitions, varying from a very objective level (i.e., the behavioral or skills level; e.g., social information processes; Dodge, Murphy, & Buchsbaum, 1984; Rose-Krasnor, 1997), to a quite abstract or theoretical level (e.g., functional descriptions – the efficacy or success in achieving social goals; Attili, 1990; Vaughn, et al., 2009; Waters, & Sroufe, 1983). At this abstract level, social competence is characterized as a latent individual differences trait that may be relatively stable over time (Waters & Sroufe, 1983). Between these extremes, social competence has also been defined at an intermediate level of abstraction focused on the coordination of the *Self*-domain and the *Other*-domain that facilitates (or inhibits), for example, the development of peer friendship relations (see Rose-Krasnor, 1997, for an extensive description of each level).

In the present study, social competence is conceptualized at a high level of abstraction (Waters & Sroufe, 1983) as the *ability* (or effectiveness or success) *to generate and coordinate flexible, adaptive responses to demands and to generate and capitalize on opportunities in the environment* (Waters & Sroufe, p. 79), through the expression and coordination of affect, cognition, and behavior. Because this *ability* does not refer to any particular situation, task, or age, this conception is embedded in a developmental perspective, where changes in specific skills (i.e., the relative frequencies of each measured behavior) are expected to occur, as a consequence of qualitative as well as quantitative changes in the way children interact with peers (either as outcomes of development and/or of distinct cultural/socialization experiences). In contrast, at the trait level, individual differences in social competence with peers are expected to remain stable across time (e.g., Shin et al., in press).

At the measurement level, this approach relies upon some of the *primary issues* (or social challenges) characterizing a particular developmental period, which serve as guides for choosing certain types of measures rather than others. In the case of preschool-age children research has shown, for instance, that being generally accepted by the peer group (Bukowsky & Hoza, 1988; Bukowsky, Newcomb, & Hartup, 1996; Ladd, 2005), and initiating/responding to others with positive affect (Waters & Sroufe, 1983), are two important features in evaluation of children's social competence. Therefore, within a developmental approach, social competence assessment (for preschool age children) could include general indicators of both peer acceptance, and initiation of positive peer interactions as well as other indicators that reflect how children manage their affects, cognitions and behaviors in the context of peer group relations. Furthermore, the developmental approach entails the assumption that social competence in each developmental period is the foundation of social competence at subsequent developmental periods (Howes, 1988; Waters & Sroufe, 1983). That is, if children are successful in coordinating personal and environmental resources in their interactions with peers, they should be more prepared to face future social demands and opportunities, than their less competent age mates. This continuity is also in accord with the hypothesis that social competence is well characterized as an individual differences latent trait that shows coherence over time, despite changes in the suite of specific social abilities available at different age periods.

Previous studies using this framework and the hypotheses associated with it (e.g., the requirement to consider general measures or indicators rather than specific skills in assessing

social competence) have suggested that social competence construct is appropriately described as a hierarchical structure with, at least, three subordinate factors (e.g., Bost et al., 1998; Vaughn, 2001; Vaughn, et al., 2009; Shin, et al., in press). Specifically, as indicated initially, social competence (second-order factor or latent trait), has been conceptualized (and tested) as influencing three general domains (i.e., the selected *primary issues*) characterizing preschool-age children's social lives – *social motivation and engagement*, children's *profiles of behavioral and psychological attributes*, and *peer acceptance*. Each of these *issues* (referred as *measurement families* or *families of measures*, or first-order factors) is then hypothesized to influence children's performance in seven measured variables (two or three measures/indicators *per* each measurement family) that together account for or reflect children's ability in coordinating affect, cognition, and behavior.

In reviewing the *nature of social competence*, Rose-Krasnor (1997), proposed a theoretical *prism* model, which bears some similarity to the hierarchical model used in this study. Overall, both models consider that the top level of the model's structure represents the functional abstract dimension of the construct, where social competence is described as an individual differences latent trait (Waters & Sroufe, 1983). The foundation level, in both models, represents the skills, or behaviors children's use in interacting with peers (i.e., the seven indicators of social competence in the hierarchical model). However, contrary to Rose-Krasnor's model, the bottom level in our model also includes some measures (e.g., sociometric peer acceptance measures) that are best characterized at the intermediate level (Rose-Krasnor's *index level*), which includes assessments that capture the coordination of personal social needs (*Self*-domain) with others' social needs (*Other*-domain).

As described earlier, this study retests a hierarchical model of social competence (Vaughn, et al., 2009), in a multinational subsample of preschool age children, selected from the original sample. Overall, results from the original study indicated that the structural paths weights (i.e., the paths relating social competence second-order latent factor to the three first-order measurement families) were different from group to group, despite the fact that the hierarchical structure for social competence was apparent for each group. Ethnic differences, social class, age distribution, and culture are suggested as possible causes for the divergence between the samples. Results further suggested that the measurement model (i.e., the relations between the three measurement families and the seven social competence indicators) was not equivalent for younger and older children within samples.

Finally, some cases of cross-factor colinearity were indentified, suggesting that certain variables integrated in a particular social competence measurement family, may be also strongly associated with variables from a distinct measurement family. This result was not further explored.

In view of these results the present study address three specific questions: (a) are the age differences reported for the measurement model maintained in this subsample, which is now structured in three (rather than two) age periods (b) Does sample (as a grouping variable) continue to affect the structural model, suggesting that the pattern of relations between social competence (as a second-order latent variable) and the three social competence domains (or measurement families) is not equivalent across samples? (c) In the case of cross-factor colinearity for measured variables (i.e., measured variables with high "out of family" correlations with other measured variables, resulting in structural coefficients > 1.0), can Exploratory Factor Analysis (EFA) help explain relations among the seven measures and the hypothesized families/domains of measurement (i.e., the hierarchical model first-order factors)?

Method

Participants

A total of 465 children from 3 distinct samples (227 girls and 238 boys), ages 3 to 5 (144 observed as 3-year olds, 151 observed as 4-year olds, and 170 observed as 5-year olds), participated in this study. All Portuguese children and 5-years old children were initially selected; the remaining children were randomly selected from the two US samples (Alabama and NAYEC centers).

All classrooms were homogeneous with respect to children's age (i.e., each having either 3-, 4-, or 5-year olds). Previous to data collection, letters describing the research project were sent to schools and parents and the child participation in the study only took place when a signed consent from parents was sent back.

Sample 1 consists of 130 children (68 girls and 62 boys) recruited from two Portuguese preschool centers affiliated with primary schools (5 different classrooms). 24 children were observed as 3-year olds; 47 were observed as 4-year olds, and 59 as 5-year olds.

Participation rates averaged 97% across classrooms. Most children from this sample entered the preschool setting when they were about 36 months of age and remained there (usually with the same peer group) until the 4th grade level. All families were middle-up socio-economic-status, by the standards of their community.

Sample 2 consists of 216 children (103 girls and 113 boys) recruited from eleven centers in two communities from Alabama (2 of them were accredited by the National Association for the Education of Young Children – NAYEC, and administered by a major university; one was a nonprofit center serving lower income families, and the remaining 8 were for-profit centers serving primarily middle and working class families). One center was located in a large urban area and the others in a smaller community in the east central region of the state. 60 children were observed as 3-year olds; 52 were observed as 4-year olds, and 104 as 5-year olds. Participation rates ranged from 80 to 100% across classrooms.

Sample 3 consists of 119 children (56 girls and 63 boys) recruited from two NAEYC accredited centers managed by a major southeastern university. 60 children were observed as 3-year olds; 52 were observed as 4-year olds, and 7 as 5-year olds. Participation rates ranged from 80 to 100% across classrooms.

Instruments and Procedures

Social Competence Assessment. Social competence was evaluated using a set seven measures, representing three broad dimensions namely, (1) *Social Motivation and Engagement* (SME), using observational measures (rate score for *visual attention received* and *positive and neutral initiated interactions*) (2) *Behavioral and Psychological Attributes* (BPA), using *Q-sort descriptions* (CCQ, California Child Q-sort, Block & Block, 1980; PQ, Preschool Q-sort, Bronson's adaptation of a Q-sort originally used by Baumrind, 1967); and; (3) *Peer Acceptance* (PA), using *sociometric interviews* (acceptance scores for the *nominations* and *paired comparison* sociometric tasks, McCandless & Marshall, 1957).

Social Motivation and Engagement. Rates of visual attention received, and positive and neutral interaction initiated were used as measures of social engagement and motivation measurement family.

Interaction Initiated. Concerning peer interactions (i.e., the dyadic behavior in which individual's actions are both a reply and a stimulus for the other person's actions; Hinde, 1979), literature has shown that positive (or prosocial) interaction with peers is generally associated with other measures of social competence (Rubin, Bukowski, & Parker, 2006), and more specifically, with the child's sociometric status or peer acceptance (e.g., Denham & Holt, 1993; Denham, McKinley, Couchoud, & Holt, 1990; Hartup, Glazer, & Charlesworth, 1967; Masters & Furman, 1981).

For measuring the rates of interactions initiated towards peers, each child was observed during 15-s intervals. At the end of this 15-s period, the observers registered the identification codes of all the children with whom the focal child interacted. Additionally, the affective tone of the exchange was recorded (i.e., the interaction was characterized as a *positive*, *neutral*, or *negative* interaction based on expressed affect of one or both children). In order to be categorized as *positive*, (a) one or both children had to clearly evidence positive affect, during the social exchange (e.g., smiles, laughs, gestures or vocalizations indicative of positive emotions); (b) the positive affect expression was not followed by negative affect demonstrations from the interactive partner (e.g., crying, distress, pain, intense irritability). To be coded as *negative*, (a) one or both children had to clearly evidence negative affect, during the social exchange (e.g., anger, distress, fear, sadness), whether through vocal, gestural, or facial means; (b) the negative affect expression did not occur in the context of pretend/fantasy play (e.g., at the doll house, a child, pretending to be a mother, uses an angry tone of voice with her (pretend) husband because he was late for dinner). Social interactions that were not coded as either positive or negative were coded as *neutral* and included all the verbal and non-verbal exchanges that did not contain affect expression. For our purposes, only positive and neutral interactions were considered. Final scores were standardized within classroom group prior to further analysis (i.e., inferential analyses all use *z*-score variables).

Past research using this observation procedure has showed that observers rapidly attain agreement rates of 80% and above with only limited training periods (Vaughn & Martino, 1988; Vaughn & Waters, 1981; Waters, Garber, Gornal, & Vaughn, 1983). Vaughn et al. (2009) reported reliability coefficients (alpha's) ranging from .43 to .90 across all interaction categories.

Visual Regard. Rates of visual attention received from peers were collected using a randomized class list. Each observer (2 to 4 per classroom), worked independently and each watched a given child (the focal child), for a 6-s observation interval. At the end of the

interval, the codes identifying the children who received attention from the focal child were recorded as a *unit of visual attention*, namely, a *look* (described as the orientation of the head and/or eyes in the direction of another person for a period of 2 seconds or more) or a *glance* (described as a similar orientation of the head and/or eyes for less than two seconds).

When the target child looked at a group in which a specific child could not be designated as the recipient, the orientation was registered as a doubtful occurrence (i.e. "?"). When the child looked at an object held by a peer and not directly at him/her, the orientation was also recorded as a doubtful occurrence. These questionable occurrences were not considered in the child total received scores.

Only one unit of visual regard from a target child was attributed for a given interval. For each round, a target child was observed when his/her name appeared on the class roster and no child was observed two times before all children present were observed once. The total score for visual attention corresponds to the sum of *looks* and *glances* each child received from peers. Approximately 200 rounds of visual attention observation were done per classroom. The sum of visual attention units received or interactions initiated, was divided by the number of rounds that the child was present, to adjust the final score for absences. Final scores were standardized within classroom group prior to further analysis

Prior to collecting visual regard data, each observer spent at least 2hr in the classroom in order to become familiar with the names of the children and also to allow the children to become familiar with him/her.

Profiles of Behavioral and Psychological Attributes. This measurement family was assessed using two social competence Q-sorts, namely, the CCQ-sort (California Child Q-sort; Block & Block, 1980; a 100-item set consisting of personality and behavior-descriptive items designed specifically for the description of preschool children) and the PQ-sort (Preschool Q-sort; Bronson's adaptation of a Q-sort originally used by Baumrind, 1967; a 72-item set consisting of items more explicitly related to social competence and more oriented towards observable interactions). Q-sorting methodology is an ipsative procedure for assigning scores to the items in a standard personality or behavior descriptive item pool or Q-set. Both CCQ and PQ-sets have been widely used to describe children's behavioral and personality characteristics (e.g., Buss, Block, & Block, 1980; Shields, & Cicchetti, 1997), reflecting the general ability to establish and maintain positive social interactions, to manage emotionally demanding situations as well as the child's autonomy and behavioral confidence. CCQ-sort items have also been used to assess emotional regulation and autonomy (e.g.,

Mendez, Fantuzzo, Cicchetti, 2002; Shields & Cicchetti, 1997) as well as inhibition and aggressiveness (Asendorpf, Denissen, & van Aken, 2008).

Q-sort descriptions of each child were use to derive social competence scores according to the criteria published by Waters and colleagues (Waters, et al., 1985). Q-sort observers worked in teams of two, spending 20 hours observing the children in a variety of activity settings (e.g., small groups, meal times, free play indoors, outdoor play, etc.). When observations were completed, each assistant described the children with both CCQ-set (100 items) and PQ-set (72 items). In the CCQ-set, the items were sorted into nine categories, with a rectangular distribution of 11 items per category (with the exception of the middle category, which receives 12 items). In the PQ-set, equally sorted into a nine category rectangular distribution, each category received a total of 8 items. For the Portuguese sample, each observer used the CCQ for describe half of the children and the PQ for the other half, in each classroom. For most of the children included in the US samples, both observers completed both Q-sorts for every child, except when a child was absent for over 50% of the observation time for an observer. In that case only one observer completed the sort (if a child was missing for both observers 50% or more of the observation time, she was not described by either sorter). Vaughn et al. (2009) reported an average of cross-rater agreements of .59 and .62 for the CCQ social competence criterion score, and for the PQ, respectively.

The Q-sort for a child provided by the observers was subsequently correlated with the profile of a hypothetical child at the extreme for social competence that had been generated by aggregating descriptions provided by social development experts (Waters, et al., 1985). Pearson's correlation between a Q-sort for a given child and the "criterion" sort for the construct becomes her or his "score" for that construct. Scores for both Q-sorts were used to derive the social competence composite score. For the 340 participants with both CCQ and PQ descriptions, CCQ SC scores averaged .07 (range = -.49 to .52), and for the PQ SC scores, the mean was .08 (range = -.44 to .52) across the four samples. As with the visual attention/interaction measures, final scores were standardized within classroom group prior to further analysis.

Peer Acceptance. Peer acceptance family of measures was assessed using two sociometric interviews – peer nominations (McCandless & Marshall, 1957) and paired comparison task (Vaughn, 2001; Vaughn, Colvin, Azria, Caya, & Krzysik, 2001; Vaughn & Waters, 1981). Similar to the measures described earlier, sociometric measures have the quality of being broadband measures (i.e., they do not assess a particular skill or social ability,

reflecting instead an array of behaviors, interactions and social competencies in the context of peer relations that affect likeability choices). For the collection of these measures, teams of two observers, in the Portuguese sample, individually interviewed the children. In the two US samples, only one observer was used. Interviews took place outside of the classroom, in a quiet place of the preschool setting.

In the nomination task children were presented with the set of photographs of all classmates and asked to name a peer he/she *especially likes to play with*. The request was repeated two more times and after that the child was asked to identify a colleague he/she *did not especially like to play with* (repeated again two additional times). As the child named the peers, the photographs were turned face down. The child score of peer acceptance, for this measure, was the number of times he/she was one of his/her peers' first three choices.

For the paired comparison task, photographs of all the possible pairs within each classroom (i.e., N. (N-1)/2) were presented to the child being interviewed, who was asked to choose for each pair of photographs, the peer she/he *especially liked to play with*. The pairs were randomly organized, and no child was seen twice before all other was seen once. Each child's photograph appeared the same number of times on the left and right hand sections of the picture file. The acceptance score for this measure was the total number of choices received from peers, divided by the number of classmates who concluded the task. Similar to the other measures, the scores were standardized within the classroom previous to the analysis.

Scores for each of the seven social competence measures were standardized within classroom before analysis, to adjust for effects of class-size. Missing cases for these seven social competence indicators were imputed using the expectation-maximization algorithm (EM).

Results

Univariate ANOVAs tested mean differences for the seven standardized scores across sample, sex, and age. Although this study tests a subsample of the original study (Vaughn et al., 2009), and similar results are expected, regarding the effect of sex (and the sex by sample interaction), we further explore potential age main effects on the scores for the seven social competence measures, because in contrast with their study, our sample was split into three

(rather than two) distinct ages, namely, 3-year olds (36 to 47 months), 4-year olds (48 to 59 months), and 5-year olds (> than 60 months). Yet, given that all social competence indicators had been standardized within classroom and because same-age children were grouped together in most sites, only major age differences are anticipated.

Because hypothesis about the effects of sample and age on model fit are addressed, correlation analyses between the seven measures of social competence (within-sample and within-age) were computed to assess if the pattern of correlations among samples and age-levels is significantly different (using Fisher tests for *r* to *z* transformed values).

Exploratory factor analyses (EFA) were computed before the testing of the hierarchical model, to examine the structure of the seven measured variables. In addition, in the case of cross-factor colinearity, these analyses also inform which measures (or which associations between the measures) are the sources of structural paths coefficients above 1.0, answering to the third question of the study.

ANOVA results. Although three factors are being tested (sample, age, and sex), we did not run three-factor ANOVAs because one of the samples (NAYEC centers sample) has only 7 children at 5-years old, which would raise problems in computing the age by sample interactions. As a result, the mean differences for the seven social competence indicators across sample, sex and age are tested using Univariate two-factor ANOVAs. In the first set of analyses, sample and sex were independent variables; in the second set, sex and age were independent, and finally, in the third set, sample and age were independent variables. Means and standard deviations on the scores for the seven social competence indicators, by sample, sex, and age are presented in Table 1.

In the first set of analyses, a main effect of sex, favoring boys, was observed for the visual attention received score, $F(1, 464) = 6.44$, $p = .011$, $\eta_p^2 = .01$). A significant Sample x Sex interaction, was also observed for this measure, $F(2, 464) = 4.55$, $p = .011$, $\eta_p^2 = .02$. Subsequent (Tukey) tests indicated that only for the Portuguese sample, the difference between boys and girls (boys having higher scores) was significant, $F(1,129) = 16.24$, $p = .001$, $\eta_p^2 = .11$. A significant Sample x Sex interaction was also found for the Positive Nominations score, $F(2, 464) = 3.94$, $p = .001$, $\eta_p^2 = .02$. However, this difference was not significant in post-hoc (Tukey). Finally, a main effect of sex, favoring boys, was found for the PQ-sort criterion score, $F(1, 464) = 8.17$, $p = .004$, $\eta_p^2 = .02$.

In the second set of analyses (sex and age as independent variables), a significant age effect was found for the Neutral Interactions Initiated score, $F(2, 464) = 3.65$, $p = .027$, $\eta_p^2 = .02$. Post-hoc tests (Tukey) indicated that 3-years old girls had higher scores than 5-years old girls. A significant Sex x Age interaction was observed for the PQ-sort, $F(1, 464) = 7.60$, $p = .006$, $\eta_p^2 = .02$. Post-hoc analyses (Tukey) indicated that 5-years old boys had higher mean scores than 5-years old girls for this measure. The same effect of sex, favoring boys, on the visual attention received score was identified (see first set of analyses). No main effects of age were found.

In the third set of analyses (sample and age as independent variable), a significant age effect was indentified for neutral interactions initiated score, $F(2, 464) = 4.18$, $p = .016$, $\eta_p^2 = .02$. Three-year olds had higher scores than 5-year olds. A significant Sample x Age interaction was found for Positive Interactions Initiated score, $F(2, 464) = 2.50$, $p = .042$, $\eta_p^2 = .02$. Post-hoc tests (Tukey) showed that 4-year olds from the NAYEC sample had higher mean scores for this measure than 3-year olds (from the same sample).

Overall the results suggest that regardless of sample site, age, or sex, no major differences distinguish the mean scores obtained by the children. When differences are found, sex appears to be the most influential variable (for the 9 cases where mean differences were observed, 5 were related to sex).

Table 1

Means and Standard Deviations on the Scores for the Seven Social Competence Indicators, by Sample, Sex, and Age

3-Years Old Girls	PT Sample		AC Sample		NAYEC Sample	
	M	*DP*	*M*	*DP*	*M*	*DP*
VAR	-.36	.88	-.06	1.00	.37	1.29
PII	-.12	.86	.08	1.00	-.28	.88
NII	-.06	1.10	.15	1.02	.39	1.38
PN	-.46	.63	.15	1.01	.15	.19
PC	-.24	.77	.26	.85	.01	.89
CCQ	-.10	.85	.17	.88	.11	.86
PQ	-.21	.95	.12	.71	-.02	.83

Note. VAR – Visual Attention Received; PII – Positive Interactions Initiated; NII – Neutral Interactions Initiated; PN – Positive Nominations; PC - Paired Comparisons; CCQ – California Q-sort; PQ – Preschool Q-sort.

(continued)

Table 1

Means and Standard Deviations on the Scores for the Seven Social Competence Indicators, by Sample, Sex, and Age (continued)

3-Years Old Boys	PT Sample		AC Sample		NAYEC Sample	
	M	*DP*	*M*	*DP*	*M*	*DP*
VAR	.42	1.00	.08	.86	.04	1.09
PII	.14	1.18	-.05	.88	-.37	.59
NII	.07	.92	.14	.80	.20	1.15
PN	.28	1.10	-.06	.78	-.30	.74
PC	.26	1.16	-.21	.80	-.08	.89
CCQ	.13	1.18	.23	.72	-.13	1.01
PQ	.25	1.04	.23	.86	.03	.96
4-Years Old Girls						
VAR	-.23	.90	.05	.76	-.15	.92
PII	.03	1.16	-.12	.46	.15	1.03
NII	-.15	1.00	.21	.75	-.13	.86
PN	-.10	1.02	.27	.97	.24	.95
PC	.03	.89	.43	.64	.14	1.02
CCQ	.19	.93	.05	.58	.16	.92
PQ	-.06	.96	-.03	.62	-.15	.99
4-Years Old Boys						
VAR	.32	.99	-.10	.83	.14	1.13
PII	-.02	.64	-.20	.86	.18	.95
NII	.22	.90	.20	.86	-.09	.92
PN	-.01	.95	-.05	.95	.14	1.11
PC	-.08	1.12	.04	.90	.22	1.13
CCQ	.32	.90	-.17	.91	.12	.88
PQ	.03	.95	-.12	.81	.41	.93
5-Years Old Girls						
VAR	-.42	.78	-.17	.98	-.15	.38
PII	-.42	.72	.04	.85	-.44	.69
NII	-.34	.91	-.24	.94	-1.05	.99
PN	-.24	.75	.12	1.04	-.05	1.36
PC	-.19	.98	.11	.94	-.55	1.13
CCQ	-.12	1.06	-.01	.91	.07	1.71
PQ	-.19	1.06	-.13	.88	-1.09	.43

Note. VAR – Visual Attention Received; PII – Positive Interactions Initiated; NII – Neutral Interactions Initiated; PN – Positive Nominations; PC - Paired Comparisons; CCQ – California Q-sort; PQ – Preschool Q-sort.

(continued)

Table 1

Means and Standard Deviations on the Scores for the Seven Social Competence Indicators, by Sample, Sex, and Age (continued)

3-Years Old Girls	PT Sample		AC Sample		NAYEC Sample	
	M	*DP*	*M*	*DP*	*M*	*DP*
VAR	.29	1.06	.07	1.07	-.35	1.21
PII	.23	1.06	.23	1.26	-.31	.38
NII	.24	.97	.02	1.03	-.65	.73
PN	.13	1.07	.07	.89	-.87	.41
PC	.16	.93	.02	.98	-.45	.49
CCQ	.06	.83	.13	.95	.61	.66
PQ	.12	.81	.23	.91	-.48	1.47

Note. VAR – Visual Attention Received; PII – Positive Interactions Initiated; NII – Neutral Interactions Initiated; PN – Positive Nominations; PC - Paired Comparisons; CCQ – California Q-sort; PQ – Preschool Q-sort.

Correlation analyses. Within-sample correlations are shown in Table 2. Overall, correlations among same-family measures tended to be higher than distinct family measures correlations. Of the possible 63 contrasts between the samples, only 6 were significant.

Table 2

Within-Sample Correlations between the Seven Measures (Pearson coefficients)

Measure	1	2	3	4	5	6	7
1. VAR	—	.38** .42** .45**	.39** .37** .69**	.30* .36** .30*	.28* .41** .30*	.43** .42** .40**	.42** .49** .50**
2. PII		—	.53** .36** .20*	.20* .30** .30*	.23* .36** .40**	.24* .42** .34**	.18* .39** .42**
3. NII			—	.23* .17* .15	.22* .27** .27**	.37** .33** .27**	.24* .32** .34**
4. PN				—	.71** .65** .54**	.38** .34** .39**	.24* .24** .28**
5. PC					—	.50** .36** .37**	.40** .28** .32**
6. CCQ						—	.50** .81** .79**
7. PQ							—

Note. $p < .05$, ** $p < .001$. Correlations for Portuguese sample (n = 130) are on the first line; correlations for Alabama Communities sample (n = 119) are on the second line; and correlations for NAEYC centers sample (n = 216) are on the third line. VAR – Visual Attention Received, PII – Positive Interactions Initiated, NII – Neutral Interactions Initiated, PN – Positive Nominations, PC – Paired Comparisons, CCQ – California Q-sort, PQ – Preschool Q-sort. Correlations presented where calculated after data imputation (Expectation-Maximization algorithm). Overall, correlations from the original dataset were substantially similar without the imputation procedure.

Within sample correlations are presented in Table 3. They also suggest an equivalent pattern of associations between the seven social competence measures; same-family measures are generally highly correlated than distinct family measures. Of the 63 comparisons (21 *per* each age level), only 4 differences were significant. For all cases, 3-year olds have lower correlations than either 4- or 5-year olds. Overall, results indicate neither sample, nor age appears to largely affect the relations between the seven social competence indicators.

Table 3

Within-Age Correlations between the Seven Measures (Pearson coefficients)

Measure	1	2	3	4	5	6	7
1. VAR	—	.31** .45** 48**	.53** .50** .41**	.37* .66** .36*	.37* .30** .36*	.28** .42** .53**	.39** .54** .48**
2. PII		—	.34** .44** .34**	.28** .26* .28**	.25* .39** .35**	.24* .39** .40**	.31** .39** .33**
3. NII			—	.27* .16* .14	.30** .31** .19*	.22** .40** .37**	.21* .39** .31**
4. PN				—	.45** .72** .69**	.29* .37** .43**	.25* .24* 27*
5. PC					—	.33** .47** .41**	.37** .33** .31**
6. CCQ						—	.80** .63** .71**
7. PQ							—

Note. *p<.005; **p<.001. Correlations for 3-year olds (n=144) on the first line; correlations for 4-year olds (n=151) on the second line, and correlations for 5-year olds (n=170) on the third line. VAR – Visual Attention Received, PII – Positive Interactions Initiated, NII – Neutral Interactions Initiated, PN – Positive Nominations, PC – Paired Comparisons, CCQ – California Q-sort, PQ – Preschool Q-sort. Correlations presented where computed after data imputation (Expectation-Maximization algorithm). Overall, correlations from the original dataset were substantially similar without the imputation procedure.

Exploratory factor analyses (EFA). Factor loadings for exploratory factor analysis of the seven measures for social competence are presented in Table 4. These analyses indicate

that for all samples, a two-factor structure is the best representation of the seven measures. In general, Social Motivation and Engagement measures (i.e., rates of visual attention received from peers, and positive and neutral interactions initiated) and measures from Behavioral and Psychological Attributes domain (i.e., the two Q-sorts), are combined within one factor, and Peer Acceptance measures (i.e., the two sociometric interviews) are placed in the other factor. Only for NAYEC sample, Peer Acceptance and Social Motivation and Engagement measures belong to the same factor. Results also indicate that, in several cases, the same variable loads equivalently in the two factors (e.g., CCQ-sort and PQ-sort, for the Portuguese sample, and measures from Social Motivation and Engagement domain, for the Alabama community sample). As a consequence, cases of colinearity regarding the hierarchical model of social competence are anticipated.

Table 4

Factor Loadings for Exploratory Factor Analysis with Oblimin Rotation of the Seven Measures of Social Competence

Measures	Full Sample		[1]PT Sample		[2]AC Sample		NAYEC Sample	
Factors	1	2	1	2	1	2	1	2
	(3.263)	(1.080)	(3.122)	(1.206)	(3.340)	(1.131)	(3.323)	(1.134)
VAR	**.58**	.42	.31	**.69**	**.55**	.51	**1.00**	.57
PII	**.45**	.39	.26	**.56**	**.47**	.46	**.45**	.44
NII	**.42**	.30	.25	**.64**	**.37**	.34	**.70**	.39
PN	.42	**.79**	**.72**	.40	.36	**.76**	.30	**.42**
PC	.50	**.80**	**1.00**	.44	.41	**.84**	.30	**.42**
CCQ	**.81**	.45	.52	**.62**	**.86**	.45	.39	**.93**
PQ	**.86**	.33	.42	**.53**	**.95**	.35	.49	**.85**

Note. Higher loadings for each factor are in boldface. [1]PT – Portuguese sample; [2]AC – Alabama Community sample. Initial eigenvalues are in parenthesis. VAR – Visual Attention Received, PII – Positive Interactions Initiated, NII – Neutral Interactions Initiated, PN – Positive Nominations, PC – Paired Comparisons, CCQ – California Q-sort, PQ – Preschool Q-sort.

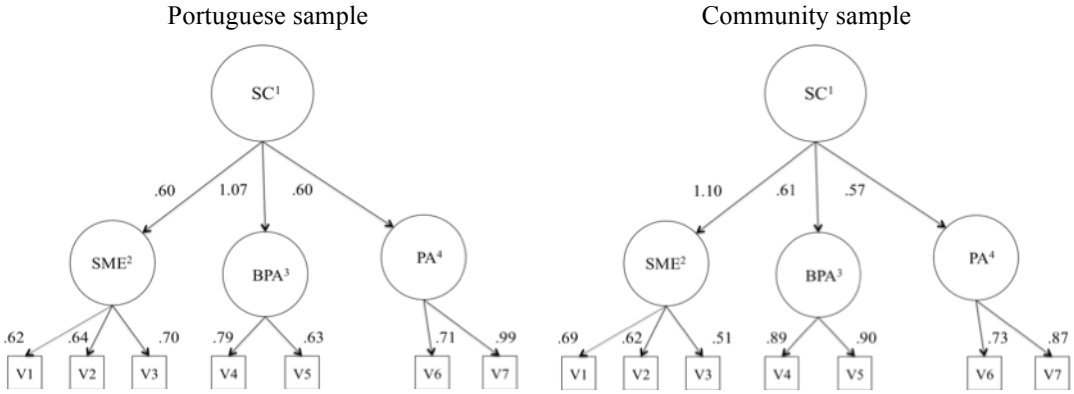
The Hierarchical Model of Social Competence. AMOS 7 software (Analysis of Moment Structures) was used to test both the measurement and the structural models, providing goodness of fit standard estimates between the hypothesized model and the observed data. Missing data were treated using the full information maximum likelihood estimation procedure (FIML) (Arbuckle, 2006; Kline, 2005).

Before the testing of the measurement and structural equivalence of the hierarchical model (HM) for social competence, a two-orthogonal factor model (Social Motivation and Engagement/profiles of Behavior and Psychological Attributes *vs.* Peer Acceptance) reflecting the most frequent structure in EFA was tested for comparison with the baseline (i.e., unconstrained) hierarchical model, combining all the three samples. Results indicate that the hierarchical model has a better fit to data, as suggested by the fit indices (χ^2 = 243.38 χ^2 /$df_{(19)}$ = 12.33, CFI = .80, NFI = .79, RMSEA = .14; χ^2 = 84.81, χ^2 /$df_{(11)}$ = 2.36, CFI = .95, NFI =.92, RMSEA=.05, for the orthogonal model and the hierarchical model, respectively).

Given these results, and following the procedures described by Vaughn et al. (2009), the hierarchical model (HM) was tested using Confirmatory Factor Analyses (CFA), across the three samples. After Model 1 was tested (i.e., the unconstrained/baseline model), the HM was tested by imposing equality constraints on measurement factor loadings (Model 2), and subsequently (Model 3), on structural factor loadings across samples (i.e., by imposing equality constraints on both measurement and structural factor loadings). Figure 1 presents the measurement and structural path weights for Model 1.

Figure 1

Measurement and Structural Path Weights for the Three Samples: Baseline Models

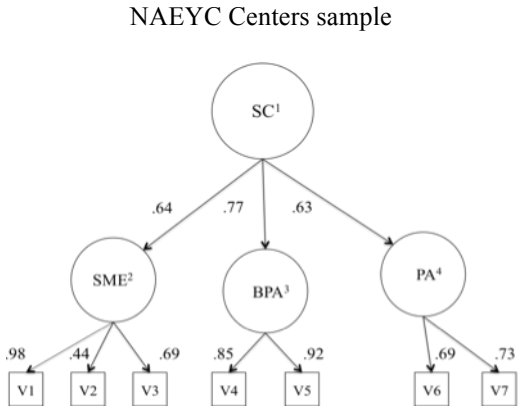


Note. **1** – Social Competence; **2** – Social Engagement and Motivation family of measures (**V1**= Visual Attention Received; **V2**=Neutral Interactions Initiated; **V3=** Positive Interactions Initiated); **3** – Profiles of Behavioral and Psychological Attributes family of measures (**V4**=CCQ-sort; **V5**=PQ-sort); **4** – Peer Acceptance family of measures (**V6**=Positive Nominations Received; **V7**=Paired Comparison Received Choices).

(continued)

Figure 1

Measurement and Structural Path Weights for the Three Samples: Baseline Models (continued)



Note. **1** – Social Competence; **2** – Social Engagement and Motivation family of measures (**V1**= Visual Attention Received; **V2**=Neutral Interactions Initiated; **V3=** Positive Interactions Initiated); **3** – Profiles of Behavioral and Psychological Attributes family of measures (**V4**=CCQ-sort; **V5**=PQ-sort); **4** – Peer Acceptance family of measures (**V6**=Positive Nominations Received; **V7**=Paired Comparison Received Choices).

The same sequence of steps regarding sex, and age was computed. Table 5 presents the relative chi-square statistics and other fit indexes for model testing across sample, sex and age. Overall, model fit was found for all three Models in each of the three variables in study. Thus, the HM global structure is not only equivalent across sample, sex, and age (Model 1), but also the measurement model (i.e., the relations between the seven measures of social competence and the three measurement families – Model 2) and the structural model (i.e., the relations between the three measurement families and social competence second-order latent variable – Model 3) are equivalent across sample site, sex, and age-level.

Table 5

Hierarchical Model Invariance across Sample, Sex, and Age

	χ^2	*df*	χ^2/df	CFI	RMSEA	$\Delta\chi^2(df)$
Sample						
Model 1	84.81	36	2.36	.95	.05	
Model 2	111.12	44	2.53	.93	.06	26.31 (8)
Model 3	119.25	48	2.49	.92	.06	34.45 (12)

Note. Model 1 – Unconstrained model; Model 2 – Invariance of measurement factor loadings; Model 3 – Invariance of structural factor loadings; CFI= Comparative Fit Index; RMSEA= Root Mean Squared Error of Approximation.

(continued)

Table 5

Hierarchical Model Invariance across Sample, Sex, and Age (continued)

	χ^2	*df*	χ^2/df	CFI	RMSEA	$\Delta\chi^2(df)$
Sex						
Model 1	27.30	22	1.24	.99	.02	
Model 2	29.78	26	1.15	.99	.02	2.48 (4)
Model 3	30.94	28	1.11	.99	.02	3.64 (6)
Age						
Model 1	56.89	36	1.58	.97	.04	
Model 2	66.65	44	1.52	.97	.04	9.76 (8)
Model 3	68.36	48	1.42	.97	.03	11.47 (12)

Note. Model 1 – Unconstrained model; Model 2 – Invariance of measurement factor loadings; Model 3 – Invariance of structural factor loadings; CFI= Comparative Fit Index; RMSEA= Root Mean Squared Error of Approximation.

Discussion

This study retested an assessment model for social competence with peers in a 3-group multinational sample of preschool children (ages 3 to 5), selected from the original sample (Vaughn, et al., 2009). The sample includes all 5-year olds and all Portuguese children; the other children were randomly selected from the two US samples (Alabama and NAYEC centers).

The original model (Vaughn, et al., 2009) was tested as a hierarchical structure (i.e., Social Competence as the second-order factor influencing three subordinate first-order factors which, in turn, influence the scores children obtain in several broad measures of social competence), and the results from the original study indicated that the overall structure (i.e., the unconstrained model) fits the data equally well across samples. Subsequent analyses testing the model across samples, age, and sex, additionally indicated model fit for all three models. However, differences on the structural paths suggest that the relations between social competence and the first-order latent variables were distinct for each of the five samples (in terms of the magnitude of the association). Plus, the measurement model (i.e., the relations between the three measurement families and the seven measured variables) was also found to be different between younger and older children. The present study was designed to further explore these results.

With respect to the first question – *do the age differences reported for the measurement model are maintained in this subsample, which is now structured in three, rather than two, age periods?* The answer is *no*. For the sample studied in this set of analyses, age does not appear to affect the relations between the seven measured variables and the three social competence domains (i.e., the measurement model), nor the relations between these domains and social competence second-order latent variable (i.e., the structural model).

Regarding the second question – *does sample, as a grouping variable, continue to affect the structural model, suggesting that the pattern of relations between social competence and the three social competence domains is not equivalent across samples?* The answer is *no*. For the subsamples used in the study, the structural paths are equivalent across samples, suggesting that the seven measures associate with the three social competence domains in an equivalent way, and that the associations among social competence second-order factor and the three domains are also quite similar across samples.

Prior analyses testing mean differences for the seven social competence scores as well as correlation analyses anticipated these results. In general, few significant differences existed between the scores (being sex the most influential variable), and the profile of associations between the seven social competence measures was very similar. Specifically, same-family measures were typically associated at higher magnitudes than different-family measures. Even so, most measures were also significantly associated with each other (despite of their *original* family), which is consistent with the assumption that all the seven measures are broadly related with (as outcomes of) social competence.

Following the procedures from previous studies (e.g., Bost, et al., 1998; Vaughn, 2001; Vaughn, et al., 2009), the unconstrained hierarchical model (Model 1) was first tested across samples. Results indicated that the model yields an adequate fit to the observed data for all three samples, in accord with the results from the previous studies. Also in accord with prior results, the two orthogonal factors model did not fit the observed data well, supporting the hierarchical structure as a better representation of these data. Further tests, imposing equality constraints (first at the measurement level – Model 2, and later, at the structural level – Model 3) showed that the models also fit the data well. These results are different from those reported by Vaughn et al. (2009) suggesting that the overall hierarchical structure is not only identical across samples, but also that both the measurement model and the structural model are equivalent as well.

Subsequent analyses indicated that the hierarchical global structure was also

equivalent across sex. This last result is also relatively distinct from findings reported by Vaughn et al. (2009), which suggested that, at the structural level, only the path from social competence second-order latent variable to BPA (i.e., profiles of behavioral and psychological attributes) family of measurement was equivalent for boys and girls within each sample.

The third question of the study addressed the subject of colinearity on the structural paths. Similar to the original findings, our results also suggested that some measures might be related to other measures from a distinct measurement family than that they were first assigned to. Results from exploratory indicated that, for the two cases where colinearity was found, BPA measures (i.e., the two social competence Q-sets) were strongly related to SME measures (i.e., rates of visual attention received from peers, and rates of positive and neutral interactions initiated towards peers). Peer acceptance measures, on the contrary, tended to be included in a distinct factor.

In sum, the results of the study suggest that (a) age does not seem to interfere in the fit of the model to the observed data. This finding is also distinct from the original results, which indicated differences between older and younger children at the measurement level. On the contrary, for the data of the present study, the hierarchical model, as well as the measurement and the structural models, does not differ for children at different age levels. Again, this result could be an indication that the children who were included in the subsamples are more alike regarding their social competence despite the specific age (i.e., 3-, 4-, or 5-year olds) they had at the time of data collection. Overall, for the three age groups studied, no significant differences in path weights were observed at any level of the hierarchical model. (b) the subsamples used in this report are more similar regarding the expression of their social competence than the samples originally studied in Vaughn et al.' research (2009). Another implication or suggestion from the results of the study is that.

At last, the results of the study suggest that (c) the measures from the behavioral and psychological attributes domain (i.e., the two social competence Q-sorts) and the measures from the social motivation and engagement domain (i.e., rates of visual attention received from peers, and rates of positive and neutral interactions initiated) have substantial cross-domain relations. This result is consistent with previous literature (e.g., Vaughn & Martino, 1988; Waters, et al., 1983) that shows significant correlations between Q-sort items and the amount of visual regard a preschool age child receives from peers. Evidence of colinearity was found for some path coefficients, suggesting that a measured variable assigned to one

first-order latent variables (i.e., one of the 3 measurement families) also has a significant relation to variables on a different first-order latent variable. In particular (see Figure 1), structural paths above 1.0 were found in the Portuguese sample for the path connecting social competence (second-order factor) to Behavioral and Psychological Attributes (BPA) first-order measurement family, and in the Alabama Communities sample for the path connecting social competence and Social Motivation and Engagement (SME) measurement family. This result was anticipated from the EFA computed before. In fact, for both the Portuguese and Alabama community samples, EFA results show that BPA measures (i.e., the two social competence Q-sets) and SME measures (i.e., rates of visual attention received from peers, and rates of positive and neutral interactions initiated towards peers) have high weights on the two factors, indicating that strong correlations exist between them.

Because the utility of the hierarchical model has been progressively (and positively) established (e.g., Bost, et al., 1998; Vaughn, 2001; Vaughn, et al., 2009; Shin, et al., in press), future studies might explore how social competence during the preschool years (assessed through the model) supports the growth of social competence in the subsequent years. This question, as described in the introduction section of the report, is grounded on developmental approach, which assumes that social competence in each developmental period affects social competence in subsequent developmental periods (Howes, 1987, 1988; Waters & Sroufe, 1983). As a consequence, it is expected that children who are successful in coordinating personal and environmental resources in their interactions with peers, during the preschool years (i.e., children who are socially competent), be also more prepared to deal with future social and cognitive demands, than their less competent peers. For example, as children begin school, they must face new academic challenges, new school settings, new teachers', and parents' expectations (both about their behavior and their academic achievements), and gain acceptance into a (sometimes completely) new peer group (Ladd & Price, 1987). Ladd (1989), suggested that the degree to which children adapt to this increasingly complex array of interpersonal and cognitive tasks, is partly dependent on the degree of support provided by parents and teachers, but, especially, by their classmates.

In general, children who experienced prolonged social difficulties during the preschool years (e.g., low acceptance by peers), might have lacked the opportunity (or have a limited number of opportunities) to experience and learn adaptive strategies of social behavior and interpersonal exchanges with their peers (Parker & Asher, 1987). As a result, in the subsequent school years, which characterize by academic challenges that take place in a social

context, those poor peer relationships might undermine academic progress as well. In particular, research as shown that both characteristics of the children (e.g., interpersonal behavior in prior school settings) and the context of transition (e.g., peer composition of the children's kindergarten classrooms) are important predictors of peers' and teachers' perceptions, as indicators of school adjustment (Ladd & Price, 1987). Furthermore, children who were characterized as socially competent during the preschool years (e.g., high levels of cooperative play; extensive and positive interactions with peers), tended to become better liked by peers, during the first school year, and also to be perceived by teachers as more involved with the new classmates.

On the contrary, children who frequently displayed aggressive behaviors towards peers in the preschool, tended to become disliked by their school classmates and to be seen as hostile to others by their teachers (Ladd & Price, 1987). Other studies also indicate that having friendship relations in the classroom, and being accepted by the peer group (two indicators of social competence), is strongly and consistently associated with both later academic readiness and school involvement (Ladd, Kochenderfer, & Coleman, 1997). As the authors suggest, being accepted by most of classmates might lead to a sense of fit in or inclusion in the group and, as a consequence, to higher levels of motivation and engagement in academic tasks.

The continuity hypothesis also accords with the assumption that social competence, characterized as an individual differences latent trait, shows coherence over time, regardless of changes at the skills level. In line with this continuity feature, Ladd and Price (1987) suggested that one of the reasons that could explain why preschool and kindergarten children with more extensive patterns of positive relations tended to be characterized as socially competent (e.g., high levels of peer preference and higher average levels of likeability ratings children) was their successful or rewarding interactions history with many of their classmates. On the other hand, children who persistently engaged in patterns of negative interactions may have been rejected by their preschool and kindergarten peers, as a consequence of having established a history of less socially competent experiences with many of their group members. In sum, several findings are consistent with the premise that early successful peer relations function as precursors of late positive school adjustment (Ladd, 1990).

Regarding the assessment model of social competence evaluated in the present study, future studies could examine the continuity of social competence from the preschool to the school years using a similar protocol of measures and adding some new measures that further

characterize the *primary issues* that distinguish this new stage of development. Two of those *new* issues might be (a) having dyadic and stable friendship relations (school adjustment appears to positively correlate with the presence of (prior and novel) friends in the classroom; Ladd, 1990; Ladd & Price, 1987), and (b) self-confidence in their competencies, independence, and responsibility (as major personality traits that develop in the context of social interactions, during this age period; Erikson, 1950). Similar to the measures used in assessing preschool children's social competence, new measures should meet the criteria of broadband assessments, reflecting the child's ability in coordinating affect, cognition, and behavior. In addition, data on academic achievement and school involvement (i.e., motivation for learning) could be used to explore in what degree social competence with peers affects school performance.

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CHAPTER IV

A Hierarchical Model of Social Competence: Stability across Preschool-Years

Abstract

This study tests a hierarchical model of social competence using longitudinal data across two consecutive years in a sample of Portuguese preschool children. Seven indicators of social competence, collected by multiple observers, were assessed when the children were 4-years-old (Year 1) and, again, at 5-years-old (Year 2). The seven indicators were used to characterize three broad domains of social competence: *social motivation and engagement*, *profiles of behavioral and psychological attributes*, and *peer acceptance*. Results support past research on preschoolers' social competence, indicating that the hierarchical model fits the data. Further analyses supported the longitudinal validity of the hierarchical model. Latent mean structure analyses indicate that Year 1 data did not significantly differ from Year 2 data, suggesting that the average level of social competence does not increase from age 4 to age 5, although significant increases were observed for some of the seven indicators.

Keywords: social competence, longitudinal hierarchical model, stability across years, preschool children

Introduction

The study of social competence, particularly on what it means to be or become *socially competent*, is marked by a diversity of descriptions, ranging from very specific characterization (e.g., social competence as a collection of specific skills and behaviors, Dodge, 1986; Dodge, Murphy, & Buchsbaum, 1984), to broad definitions suggesting that social competence is better understood as a *latent trait* or an *organizational construct*, reflecting the quality of the child's adaptation in the peer group (Waters & Sroufe, 1983). Due to this lack of consensus, difficulties on how to evaluate children's social competence have arisen.

In the present study social competence is described at a high level of abstraction (see Rose-Krasnor, [1997] for a detailed description of each level), as a latent dimension reflecting the quality of the child's adaptation in the peer group or the child's efficacy or success in achieving social goals (e.g., Attili, 1990; Vaughn, et al., 2009; Waters, & Sroufe, 1983). At this level of analysis, social competence is characterized as a broadly descriptive and functional construct (i.e., social competence is what it works in a certain social context or situation). Furthermore, social competence is described as an individual differences latent trait with a particular developmental trajectory (e.g., Waters & Sroufe, 1983). An underlying assumption of this approach is that complementary methods of assessment, covering a wide range of social domains are necessary for a global characterization of social competence. In particular, these methods should allow the assessment of social competence as the flexible manipulation of behavior, affect, and cognition concerning (1) the achievement of personal social goals, (2) without excessively restricting peers' opportunities in achieving their own social goals and, (3) preserving developmental pathways that afford access to future options for achieving social goals, not predictable at the present moment (Bost, Vaughn, Washington, Cielinski, & Bradbard, 1998; Waters and Sroufe, 1983).

In comparison with definitions at lower levels of abstraction (e.g., social competence as the ability to process social information; Dodge, et al., 1984; social competence as the ability to develop and maintain reciprocal friendships; Hartup, 1989; Rose-Krasnor, 1997), definitions at this level of analysis can be developmental in nature, allowing for predictable changes or adjustments in behavior, affect, and cognition, used in the achievement of social goals during childhood and adolescence. As a result, social competence is better characterized as a property of the person that is consistent over time and social contexts and is distinct, from, but influences, status and relational variables (e.g., popularity in the peer group or

friendship reciprocity). Additionally, this approach has the advantage, over more inflexible characterizations of considering and expecting diversity on the behavioral indicators of social competence across different developmental, cultural, and social milieus (e.g., Chen, Rubin, & Sun, 1992). Comparable descriptions have been presented by other theorists (e.g., Fabes, et al., 1999; Rose-Krasnor, 1997; Rubin & Rose-Krasnor, 1992).

On the other hand, adopting such a broad approach poses challenges at the measurement level, requiring not only multiple and general social competence measures, but also an adjustment of these measures to a particular developmental stage (Waters & Sroufe, 1983). Broadband measures address a range of behavioral, cognitive and affective strategies that assist goal achievement within social contexts and should cover a significant period of time in the group's history (Waters & Sroufe, 1983).

Over the last 30 years, a group of researchers have devoted themselves to the demanding and time consuming task of developing and validating broadband measures for social competence (e.g., Vaughn & Martino, 1988; Vaughn et al., 2009; Vaughn & Waters, 1980, 1981; Waters Garber, Gornal, & Vaughn, 1983; Waters, Noyes, Vaughn, & Ricks, 1985). As a result, it is now possible to test a number of questions and hypotheses concerning the structure and stability (or change) of social competence across distinct samples, cultures and developmental periods (e.g., Bost et al., 1998; Shin, et al., in press; Vaughn, 2001; Vaughn, et al., 2009).

Following Waters and Sroufe's (1983) rationale and the work of Bost et al. (1998) and Vaughn et al. (2009), social competence was operationalized in terms of three broad index domains: a) *social motivation and engagement,* b) *profiles of behavioral and psychological attributes* and, c) *peer acceptance*. Each domain (from here on referred as *measurement family* or *family of measures*) was assessed using two or three indicators (i.e., measured variables) collected by different teams of observers (e.g., peer nominations, rates of visual attention received from peers, etc.).

In Bost et al. (1998) and Vaughn et al. (2009) studies, the structure of relations among the measures was tested and the results consistently support the notion that social competence with peers is reliably described as a hierarchically organized construct with three subordinate factors (i.e., the three measurement families). Analyses of these data using confirmatory factor models indicated that the hierarchical model is a better solution than either a single factor model or a two-factor model. Vaughn et al. (2009) showed that the hierarchical model fit data from five groups that differed along dimensions of ethnicity and national origin.

Theoretically, the convergence of these broadband measures in multiple studies supports the notion that social competence is a latent trait that reflects the quality of the child's social adaptation (Vaughn et al., 2009; Waters & Sroufe, 1983).

The main goal of the present study is to evaluate the hierarchical model of social competence described by Bost et al. (1998) and Vaughn et al. (2009) using longitudinal data for a sample of Portuguese preschool children (N = 132) assessed across two consecutive years. Initially, a baseline model was tested for each age group. Then, a longitudinal model including data from both ages was analyzed and, finally, latent means structure analyses were computed to test the equivalence of means related to social competence second-order factor across time.

Method

Participants

132 children, 65 girls, and 67 boys participated in this study. Children were recruited from Portuguese preschool programs (5 different classrooms) affiliated with primary schools, and observed as 4-year-olds and again as 5-year-olds in the following year. All families were from European ethnic backgrounds and were middle to upper socio-economic-status in terms of education levels and family incomes, by the standards of the local community. All assessments took place in the day-care centers. Children were observed in different settings (e.g., free-play and group activities in the classroom, meals, playground, transitions between activities). Consent was obtained from school directors, teachers, and parents prior to data collection.

Instruments and Procedures

Using the protocols described by Vaughn et al. (2009), social competence was operationalized with reference to three measurement *families*, representing three broad dimensions: (1) *Social Motivation and Engagement* (SME), (2) *Profiles of Behavioral and Psychological Attributes* (BPA) and, (3) *Peer Acceptance* (PA). Each domain was measured using two or three indicators, and multiple observers collected data within each domain.

Prior to data collection, each observer spent at least 2 hr in the classrooms to become familiar with the names of the children and also to allow the children to become familiar with him/her.

Social motivation and engagement. Rates of visual attention received, and positive and neutral interaction initiated were measured indicators of the social motivation and engagement measurement family.

For interaction initiation, each child was observed during a period of 15-s. At the end of the interval, the observer recorded the identification codes of all the children with whom the focal child interacted. The interaction emotional or affective tone was also recorded (i.e., the interaction was characterized as *positive*, *neutral*, or *negative*). To be coded as *positive interaction*, (a) one or both children had to clearly evidence positive affect, during the social exchange and (b) the positive affect expression should not be followed by negative affect demonstrations from the interactive partner. Social interactions that were neither recorded as positive nor recorded as negative were coded as *neutral* and included all the verbal and non-verbal exchanges that did not contain affect expression. Two hundred rounds of observation/per child were made.

For visual attention received, pairs of observers watched a particular child (the *focal child*) for a 6-seconds observation period. At the end of this, the codes identifying the children who received attention from the focal child were recorded as *units of visual attention*. For each round, a target child was observed when his or her name appeared on the class roster and no child was observed two times before all children were observed once. When the eye-gaze direction was ambiguous, the orientation was recorded as a doubtful occurrence (i.e., "?"). Likewise, eye-gaze direction at an object and not directly at the peer who held it, was recorded as a doubtful occurrence. In both cases, doubtful occurrences were not considered in the computation of the child's total score.

Only one unit of visual regard from a target child was credited to a single recipient for a given interval, although two or more children could each receive a single unit for the same 6-s interval, and no child was observed twice before all children present were observed once. Two hundred rounds of visual attention observation were completed per classroom. The sum of visual attention units received or interactions initiated, was divided by the number of rounds when the child was present, to adjust the final score for absences. Past research using these observation procedures has showed that observers rapidly attain agreement rates of 80%

and above, with only limited training periods (Vaughn & Martino, 1988; Vaughn & Waters, 1981; Waters, Garber, Gornal, & Vaughn, 1983).

Profiles of behavioral and psychological attributes: Q-sort descriptions. Profiles of behavioral and psychological attributes – were assessed using two Q-sets, the California Child Q-sort (CCQ – Block & Block, 1980) and the Preschool Q-sort (PQ – Bronson's adaptation of a Q-sort originally used by Baumrind, 1967), after more then 20 hours of observation per classroom, in a variety of settings (e.g., small groups activities, meal times, free play indoors, outdoor play, etc.). These descriptions were used to derive social competence scores in accordance with the criteria published by Waters et al. (1985).

When observations were completed, each assistant described the children with both CCQ-set (100 items) and PQ-set (72 items). The items were sorted into 9 categories (1 representing the most atypical attributes and 9, the most typical attributes of the child), with a rectangular distribution. The Q-sort for a given child was subsequently correlated with the profile of a hypothetical child at the extreme for social competence, generated by aggregating the descriptions provided by experts on social development (Waters, et al., 1985). Pearson's correlation between a Q-sort for a given child and the "criterion" sort for the construct becomes his or her "score" for that construct. In each classroom, each observer used the CCQ for describe half of the children and the PQ for the other half. Scores for both Q-sorts were used to derive the social competence composite score. Observers for these measures were different across study years. During training, complete Q-sort descriptions were provided by each pair of observers (N = 8) for children who did not participate in the present study. Agreement rates for the full set of items ranged between .71 and .90, for the PQ-set (M = .79), and between .69 and .90, for the CCQ-set (M = .77).

Peer acceptance. Peer acceptance family of measures was assessed using two individual sociometric interviews: (a) *positive nominations* (McCandless & Marshall, 1957) and; (b) *paired comparisons*. Teams of two observers individually interviewed the children, outside the classroom, in a quiet place of the preschool setting.

The nomination task is a standard procedure consisting in the request for judgments about all the classmates. Specifically, children are presented with the set of photographs of all classmates and asked to name a peer he or she *especially likes to play with*. The request is repeated 2 more times. As the child named the peers, the photographs were turned face down.

For the paired comparison task, photographs of all the possible pairs within each classroom (i.e., N. (N-1)/2) are presented to the child being interviewed, who is asked to choose for each pair of photographs the peer she or he *especially liked to play with*. The pairs were randomly organized, and no child was seen twice before all other children were seen once. Each child's photograph appeared the same number of times on the left and right hand sections of the picture file.

The acceptance score for this measure was the total number of choices received from peers, divided by the number of classmates who completed the task. The scores for both sociometric tasks were standardized within the classroom previous to the analysis.

Results

Scores for each of the seven social competence measures were standardized within classroom before analysis, to adjust for effects of class-size. Missing cases for these seven social competence indicators were imputed using the maximum likelihood estimation method.

Univariate ANOVAs tested mean differences for the seven standardized scores across sex for each year of data collection. Pearson's correlation coefficients between the seven measured social competence indicators were computed to determine within and cross-year associations. Fisher *r* to *z* transformation was used to test the significance of the differences between correlation coefficients.

Paired-sample *t*-tests (with raw scores) were computed to explore differences between the scores for the seven indicators across the 2 consecutive years.

Univariate ANOVAs. When the children were 4-year-olds, significant sex main effects were found for two measures from Social Motivation and Engagement family; the visual attention received score, $F(1, 131) = 7.56$, $p = .007$, $\eta_p^2 = .06$, and the positive interactions initiated score $F(1, 131) = 7.76$, $p = .006$, $\eta_p^2 = .06$. Sex main effects were also found in scores for the Preschool Q-sort, $F(1, 131) = 6.43$, $p = .012$, $\eta_p^2 = .05$. For the three measures, boys had higher average scores than girls.

In the following year, when the children were 5-year-olds, sex main effects favoring boys were also found in Social Motivation and Engagement measures, namely, for visual

attention received score, $F(1, 131) = 16.49$, $p < .001$, $\eta_p^2 = .11$, for positive interactions initiated score, $F(1, 131) = 17.34$, $p < .001$, $\eta_p^2 = .12$, and for neutral interactions initiated score, $F(1, 131) = 8.66$, $p = .004$, $\eta_p^2 = .06$. Sex main effects favoring boys were also present in the Preschool Q-sort scores, $F(1, 131) = 15.59$, $p = .001$, $\eta_p^2 = .11$.

Correlation analysis. Table 1 presents the correlations (Pearson coefficients) among the seven measured variables. Overall, correlations between same-family measures are higher than correlations between distinct-family measures. However, for some measures from Social Motivation and Engagement, there are also strong associations with Q-sort measures. For 4-year olds, visual attention received score is strongly associated with both Q-sorts. Yet, the correlation is not significantly higher than the associations to the other two same-family measures (i.e., positive, and neural interactions initiated). For 5-year olds, the correlation between visual attention measure and CCQ-sort is significantly higher than the correlation between visual attention measure and positive interactions initiated, $z = 2.45$, $p = .014$. Also, the correlation between neutral interactions initiated and CCQ-sort is significantly higher than the correlation between the first measure and positive interactions initiated measure, $z = 3.47$, $p < .001$.

Of the 42 comparisons (21 for each year), only 4 differences were significant. For 3 of the 4 cases, 5-year olds had higher correlations than 4-year olds. In general, results indicate that the pattern of relations between the seven social competence indicators is very similar across years. Based on these results, equivalence between the hierarchical models across years is anticipated.

Table 1

Correlations between the Seven Measures of Social Competence (Pearson coefficients)

Measure	1	2	3	4	5	6	7
1. VAR	.63**	.33**	.38**	.19*	.28*	.37**	.51**
2. PII	.33**	.12	.57**	.13	.31**	.25*	.18*
3. NII	.67**	.27*	.39**	.20*	.31**	.30*	.26*
4. PN	.24*	.19*	.20*	.61**	.62**	.24*	.22*
5. PC	.21*	.15	.28*	.74**	.84**	.43**	.31**
6. CCQ	.57**	.25*	.61**	.40**	.37**	.47**	.53**
7. PQ	.47**	.30**	.43**	.28*	.28*	.66**	.54**

Note. $p < .05$, ** $p < .001$. Year 1 correlations are above the diagonal (i.e., 4-year olds, $N = 132$); Year 2 correlations are bellow the diagonal (i.e., 5-year olds, $N = 132$); cross-year correlations on the diagonal. VAR – Visual Attention Received, PII – Positive Interactions Initiated, NII – Neutral Interactions Initiated, PN – Positive Nominations, PC – Paired

Comparisons, CCQ – California Q-sort, PQ – Preschool Q-sort. Correlations presented where obtain after data imputation (Maximum Likelihood Estimation). Overall, correlations from the original dataset were substantially similar without the imputation procedure.

Paired-sample t-tests, using raw scores indicated significant cross-year changes in three of the seven social competence indicators. Specifically, for both boys and girls, the scores for visual attention received from peers were higher at 5-years old, t (37) = 3.61, p = .001, and t (42) = 5.31, p = .001, for boys and girls, respectively. Moreover, for boys, scores for neutral interactions initiated were higher at 5-years old, t (37) = 2.65, p = .012.

The hierarchical model of social competence. Structural equation models (SEM) were used to test and compare the hierarchical model of social competence across the two years of data collection, and to assess longitudinal invariance over time. Three models with progressively more restrictive constraints on parameters were tested. Model 1 tested equality of the global structure; Model 2 added constraints on first-order factor loadings paths and, Model 3, further imposed equivalence constraints on second-order factor loadings paths. Finally, changes in the mean level of the second order factor (i.e., social competence) across time were evaluated using latent mean structural model. AMOS 7 software (Analysis of Moment Structures) was used to test both the measurement and the structural models, providing standard estimates of the goodness of fit between the hypothesized model and the observed data. Missing data were treated using the full information maximum likelihood estimation procedure (FIML) (Arbuckle, 2006; Kline, 2005).

Testing for the validity of the hierarchical structure: Preliminary single-group analyses. As a prerequisite for testing factorial invariance, it is recommended to consider a baseline model estimated for each group separately, because measuring instruments are often group specific and a priori knowledge of such group differences might be critical to the application of invariance-testing procedures (Byrne, 2001). Accordingly, we first tested the hypothesized second-order factor structure for social competence, for each age group separately. No constraints were imposed on the parameters, neither at the measurement level, nor at the structural level.

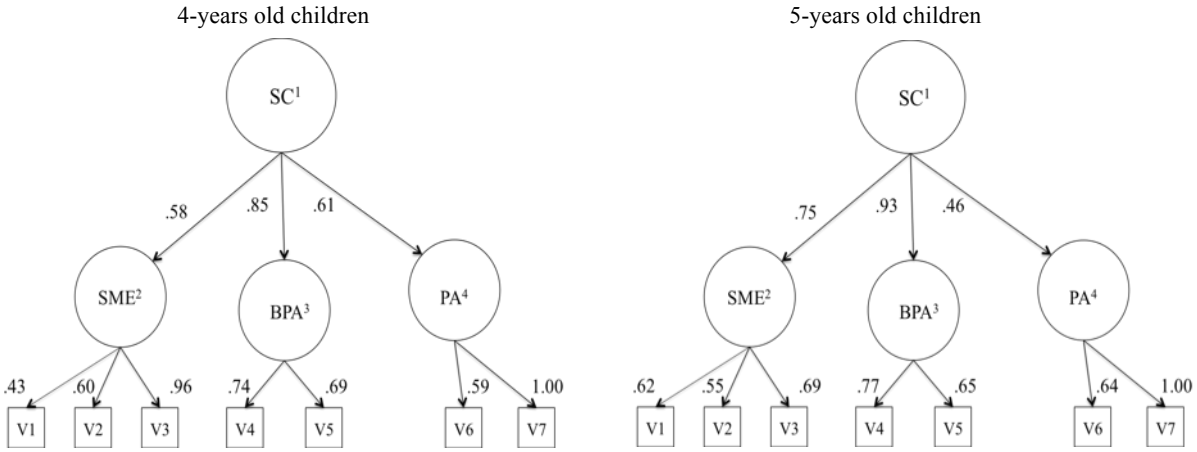
For the 5-year-olds, results indicated that the model properly fit the data. χ^2 statistic was non significant (χ^2(11 df) = 7.251, p = .778) and other goodness of fit statistics also indicate a good model fit. For instance, χ^2 /df ratio (.659) is less then 2 (Kline, 1998; 2005);

NFI (.97), IFI (1.00), and CFI (1.00) are > .90 (Hu & Bentler, 1995); and RMSEA (.00) is < .05 (Browne & Cudeck, 1993).

For 4-years-old data, an improper solution was detected, specifically, a nonpositive error variance, associated with the paired-comparison sociometric measure. Following the recommendations described by experts on the subject (see for instance Anderson & Gerbing, 1984; Arbuckle, 2006; Boomsma, 1985; Bollen & Arminger, 1991; Cadigan, 1995; and Chen, Bollen, Paxton, Curran, & Kirby, 2001, for a discussion on how to handle improper solutions in structural equation models), the negative error variance was constrained to zero and the model was re-assessed. Results indicate only minor differences on the test statistic and goodness-of-fit indices. Overall, the model fulfilled the requirements of model fit; the ratio χ^2/df was less than 2, and the CFI index-of-fit was, over .90. Model and factor loadings from the unconstrained baseline models are presented in Figure 1.

Figure 1

Social Competence Path Model: Baseline Models for 4- and 5-years-old Children



Note. **1** – Social Competence; **2** – Social Motivation and Engagement family of measures (**V1**=Positive Interactions Initiated; **V2**=Neutral Interactions Initiated; **V3=**Visual Attention Received); **3** – Profiles of Behavioral and Psychological Attributes family of measures (**V4**=CCQ-sort; **V5**=PQ-sort); **4** – Peer Acceptance family of measures (**V6**=Positive Nominations Received; **V7**=Paired Comparison Received Choices).

Testing for the validity of the hierarchical structure: Analysis of longitudinal invariance. After the estimation of the baseline models, invariance across years was tested. First, tests for the validity of the social competence structure as best represented by a hierarchically organized construct with three subordinate factors, were conducted across the two years, by fitting Year 1 and Year 2 data simultaneously. The fit of this simultaneously estimated model provides the baseline model against which all subsequently specified models

will then be compared (Byrne, 2001). In this first model (Model 1), no equality constraints were imposed and the co-variances of error and disturbance terms for the same indicators across time were freely estimated, with exception of the error variance e10 (which corresponds to paired-comparison scores) for 4-year-olds data that was constrained to zero.

In the subsequent model (Model 2), specification of equality constraints were imposed on the first-order factor loadings (i.e., the measurement loadings), that is to say, the parameters were specified as being invariant across years. The last model (Model 3) tested the invariance of the structural model (i.e., equivalence of the second-order factor loadings), by imposing constraints on the paths from social competence to the three measurement families. As shown in Table 2 (goodness-of-fit statistics for the three models), all three models fit the data well. The chi-squares/degrees of freedom ratios were less then 2, and the fit indices were within the recommended boundaries (Bentler, 1990; Browne & Cudeck, 1993; Marsh, Balla, & McDonald, 1988). In general, results support the longitudinal invariance of the hierarchical model, both at the measurement and the structural level.

Table 2

Summary of Goodness-of-Fit Indices for Model Comparisons

	Goodness-of-Fit Statistics							
	$\chi^2(\Delta\chi^2)$[a]	*df*	*p*	χ^2/df	NFI[b]	CFI[c]	IFI[d]	RMSEA[e]
Model 1	28.79	23	.187	1.25	.93	.98	.98	.03
Model 2	38.57 (9.78)	28 (5)	.088	1.39	.90	.97	.97	.04
Model 3	40.52 (11.72)	30 (7)	.095	1.35	.90	.97	.97	.04

Note. Model 1: Unconstrained model; Model 2: Invariance of measurement loadings; Model 3: Invariance of measurement and structural loadings.

[a] $\Delta\chi^2$ is the increase of χ^2 statistic relative to the base model because of the additional invariance constraints, and Δdf is the *df* differences between the two models.[b] *NFI* (*Normed Fit Index*) and *CFI* (*Comparative Fit Index*) – values for both range from 0 to 1.00. Values close (and above) .95 indicates a well-fitting model (Hu & Bentler, 1999). [c] CFI is identical do NFI, except that sample size is taken into account. [d] *IFI* (*Incremental Fit Index*) – equivalent to NFI, except that degrees of freedom are take into account. Values range from 0 to 1.00. Values close to .95 indicate good fit (Hu & Bentler, 1999).[e] *RMSEA* (*Root Mean Square Error of Approximation*) – Parsimony-adjusted index: values ranging from .00 to .06 are indicative of good fit (Hu & Bentler, 1999); values ranging from .08 to .10 indicate mediocre fit; values greater than .10, indicate poor fit (MacCallum, Browne, & Sugawara, 1996).

Finally, the hierarchical model (Model 1) was further compared with two alternative models: a single factor (SF) model, and a two orthogonal factors (OF) model. In the SF Model, the seven measures were treated as indicators of a single latent variable (Social Competence). The SF Model did not fit the data acceptably, suggesting that the seven measures used as indicators of social competence, are not correctly described in a single first-

order dimension (χ^2 (30) = 208.89 $p <$ .001; χ^2/df = 6.963)

In the OF Model, the design included two orthogonal latent factors, one representing the group of observation measures (i.e., the Social Motivation and Engagement measures, and the Profiles of Behavioral and Psychological Attributes measures) and the other representing the indirect measures (i.e., the Peer Acceptance measures). The OF Model also did not fit the data well, indicating that this structure is not adequate to characterize the social competence construct as assessed in the present study (χ^2 (30) = 139.11, $p <$ .001; χ^2/df = 2.890).

Testing for latent mean structure. As a final step, and because cross-year mean differences were found in the paired sample t-tests, in four of the seven behavioral indicators, latent mean structure analysis was performed to test the equivalence of means related to social competence second-order factor across time. Intercept terms and factor loadings (i.e., regression weights) were constrained equal in both groups and the latent mean of the second-order factor (i.e., social competence) was fixed to zero at Year 2 (the reference group; 5-years-old children) and freely estimated at Year 1 (the comparison group; 4-years-old children). This procedure allows us to test whether the social competence latent variable mean from one year differs from that of the other.

Statistical significance of latent means differences was determined by the critical ratios (CRs) associated with the estimate of the latent mean. In order to reject the hypothesis that there is no significant differences in mean scores between age, the absolute value of the CR for the latent mean must be greater than 1.96. For our data, the estimate of the latent mean (.001) had a CR = .003, indicating that the data from Year1 data did not significantly differed from the data in Year 2. That is to say, no indication of substantial growth on the social competence latent trait was noticed for our sample of Portuguese preschool children, despite the increases observed, at the measurement level, for some of the indicators. Moreover, results showed that the overall model correctly fit the data; χ^2 (36 df) = 43.247 was nonsignificant (p = .189); the ratio χ^2/df = 1.201, was less than 2, NFI, IFI, and CFI fit indices, indicated model fit (.90, .98, and .98, respectively) and RMSEA = .03, indicated good fit (Hu & Bentler, 1995; MacCallum, Browne, & Sugawara, 1996).

Sex and the hierarchical model. Although the main focus of the structural analyses are the longitudinal changes from 4- to 5-years old, we further explored the baseline model, separately, for boys and girls, in order to ensure that sex does not interfere with the general hierarchical structure of social competence. This *sex innocuousness* hypothesis is based on the

conceptual nature of the hierarchical model of social competence which does not requires that the associations between each indicator and social competence second-order factor (i.e., their magnitudes) have to be identical. Culture, as well as development, and sex (as a specific cultural context within children's social experience occurs; Maccoby, 1998), are expected to influence the relations between social competence latent trait and its behavioral indicators (Chen, et al., 1992). In general, results supported this assumption, indicating that the hierarchical structure is a valid representation of data, for both boys and girls. Only for 4-years old boys' subsample, the model was found to be less reliable, as could be predictable by the correlations between the seven measures, observed for boys at this age (see Table 2). Nonetheless, at 5-years old, baseline models strongly fit the data, for both boys (χ^2 (11 *df*) = 6.695, p = .823; χ^2/df ratio = .608 less than 2) and girls (χ^2 (11 *df*) = 3.676, p = .978; χ^2/df ratio = .334 less than 2). As anticipated the associations among social competence second-order factor and the three measurement families (and the associations among these and the seven behavioral indicators) were, for some regression paths, different in magnitude. For example, whereas for both boys and girls, the regression path estimates (i.e., factor loadings) between social competence and behavioral and psychological attributes measurement family were equivalent (= 1.00), the regression path estimate between social competence and social motivation and engagement measurement family was slightly higher for boys (= .74, *vs*. .67 for girls). Equivalent small differences on factor loadings magnitudes were observed in the associations between the measurement families and the seven observed variables.

Discussion

The goal of this study was to test a hierarchical model of social competence, using longitudinal data across two consecutive years, in a sample of Portuguese preschool children. Seven indicators of social competence were repeatedly measured when children were 4-years old (Year 1) and, again, when they were 5-years old (Year 2). Preliminary analyses suggested that the correlations among the seven indicators tend to be higher when the measures belong to what was defined as *the same family of measurement* (i.e., social motivation and engagement; profiles of behavioral and psychological attributes and, peer acceptance). Moreover, a higher number of positive and significant correlations were found in girls' data,

at both age periods. Cross-year correlations were, in general, positive and significant, for both boys and girls.

Univariate analyses (ANOVA) for the seven measures across gender, within each year, indicated significant gender main effects favoring boys at both ages. At age 4, boys had significantly higher scores in three of the seven social competence indicators (visual attention received, neutral interactions initiated, and Preschool Q-sort scores); at age 5, boys' scores were significantly higher in four of the seven indicators (visual attention received, positive and neutral interactions initiated, and Preschool Q-sort scores). These findings contrast with results from prior studies suggesting that girls tend to be favored over boys in such contrasts (e.g., Bost et al., 1998; Denham & Mckinley, 1993; Vaughn, 2001), however they are in agreement with the results found earlier using Portuguese preschool data (Vaughn. et al., 2009). When compared to older girls, older boys had significantly higher scores in both positive and negative interactions initiated score. Other studies (e.g., Baldia, Punia, & Singh, 2005), also failed to find significant sex differences among average scores in sociometric nomination tasks. Taken together, results suggest that it might be inappropriate to speak about a general pattern of association among sex and the social competence measures used in the studies reported ahead, including our. Future research on the subject, using larger samples, distinct cultures, and developmental periods, could shed light on how the child sex may influence children's performance on these social competence measures.

It is also important to note that the differences between boys and girls were only significant for the measures of social motivation and engagement dimension, and for the Preschool Q-sort. Concerning this last measure, no empirical explanation is available. Replication studies using larger Portuguese samples might help to clarify how significant the higher performance of boys in this specific measure is. Regarding the first two measures (i.e., rates of visual attention received and interaction initiation), it may be that these sex differences are reflecting typical features that distinguish boys' and girls' social interactions. That is to say, because boys' interactions are more likely to be characterized by dominance and competitiveness demonstrations (Maccoby, 1990) their interactive behaviors might stand out at a higher degree in comparison with girls' interactions, which tend to be less intense (i.e., more characterized by cooperation, intimate friendship, and efforts to maintain harmony; Maccoby, 1990). Therefore, due to their energetic and sometimes *noisy* interactions (e.g., boys in all-boys groups, compared with girls in all-girls groups, more often interrupt one another, more often use threats, commands and boasts of authority; Maltz & Borker, 1983), it

could be easier for the observers to identify and label boys' social interaction, including its emotional or affective tone. Likewise, as being more noticeable, boys' interactive style could also attract peers' attention, in general, giving them a greater probability for receiving higher rates of visual attention.

In addition, with respect to sex differences, it is worth noting that, rather than a few stable, enduring, and broad sex differences in behavior, what has become apparent is a mosaic consisting of small differences in some contexts, no differences in other contexts, and *inverted* differences in others (Zakriski, Wright & Underwood, 2005). For instance, on the subject of sex segregation in boys' and girls' peer groups, research consistently suggests that, by age 3 (sometimes earlier; e.g., LaFreniere, Strayer & Gauthier, 1984), preference for same-sex playmates emerges in children's interactions. However, the degree of segregation appears to vary as a function of setting, with cross-sex relations more frequent at home than at school (Daniels-Beirness, 1989). Moreover, some studies have indicated that the degree of sex-segregation boys and girls show might also vary and that, in general, girls are the first to segregate (LaFreniere, et al., 1984).

Another example of the *gender mosaic* hypothesis derives from the research on aggressive behavior. Because several initial (and more current) studies have focused on physical aggression (a form of aggressive behavior more typical in the male gender; Block, 1983; Maccoby, 1998), boys were, for a long time, generally characterized as more aggressive than girls. In comparison with the literature that gives primary attention to girls' forms of aggression (e.g., Underwood, 2003), much work has been devoted to boys' forms of aggression, as indicated by the number of studies that includes only boys in their samples (e.g., Coie, Dodge, Terry, & Wright, 1991; Dodge, 1980; Dodge, Coie, Pettit, & Price, 1990; Willner, 1991). As the field of female aggression evolved, the assumption that boys' were, typically, *fighters* while girls were, typically, *peacemakers*, gradually changed. Nowadays, regarding aggression behavior, a new *mosaic* has gradually occupied the old one and, instead of a distinction in terms of behavior frequency, the spotlight is now turned to the *quality* of the behavior. In this case, girls do fight; however, in general, they do it using more invisible strategies (Björkqvist, Lagerspetz, & Kaukiainen, 1992; Underwood, 2003). Clearly, context-specific research is very important for a comprehensive appreciation of gender differences.

Turning now to the main focus of the present study – to test the longitudinal stability of a hierarchical model of social competence, using Portuguese preschool data across two consecutive years –, the present results support past research on preschoolers' social

competence (e.g., Bost et al., 1998; Vaughn, 2001; Vaughn et al., 2009), indicating that the hierarchical model is an appropriate characterization of the data. Overall, the model showed a good fit to data, both at the measurement and the structural levels, in both years, supporting the assumption that social competence is well understood as an intra-personal trait, showing stability over time and social situations.

Nevertheless, diversity at the indicators level is expected, as a result of small cultural, social, and developmental differences (e.g., Chen, et al., 1992). Therefore, the small variation found at the measurement level for the baseline models at Year 1 (age 4) and Year 2 (age 5), is not inconsistent with the theoretical construct, but in accordance with it. As children grow older and acquire experience with the peer group, distinct abilities may become relevant in achieving social goals (Waters & Sroufe, 1983); in fact, consistent with this assumption, paired-sample *t*-tests revealed significant cross-year increases, on three of the seven indicators for social competence (i.e., measures of visual attention received, for both boys and girls, and positive and neutral interactions initiated, for boys). Similar results were reported in prior studies (Shin, et al., in press).

In the same way, the significant sex differences found on the means for the seven indicators as well as the distinct correlation patterns between them (for each sex), are in accordance with the model's conceptual nature. Gender, as a specific cultural milieu (Maccoby, 1988, 1990, 1998), is expected the influence the type of social skills and behaviors children use in their sex-segregated interactions. As a consequence, and although all the seven social competence indicators are considered relevant in assessing preschool-age children social competence, despite their sex, small variation on the relations between social competence latent trait and the behavioral indicators is possible (and desirable) as a result of the distinct value (associated to different peer interaction experiences) attributed to the distinct social competencies at a particular age, in a specific social or cultural context and with a specific social partner that motivates (or inhibit) certain social strategies.

After the hierarchical model testing, two alternative models were further evaluated (i.e., a single factor model, and a two orthogonal factors model); results indicate that these models are not appropriate to characterize the social competence construct, as indicated by the Chi-square values and other fit indexes statistics.

At the measurement level, results suggest that the relations held between the seven social competence indicators and the first-order latent variables (which represent the three measurement families) are equivalent over time. As such, it is possible to claim that the seven

broad indicators of social competence used in our study, do account for three distinct social competence domains, which fulfill the social competence Index-Level (IL) requirements, described by Rose-Krasnor (1997). In accordance with her theoretical proposal, the IL includes a basic distinction between the *Self*-Domain and the *Other*-Domain; correspondingly, the measurement families in which the measures in our study were organized, reflect this distinction as well. Specifically, in order to engage with peers (and to be motivated to do so), the child must, for instance, to belief in his/her ability to effectively interact with peers (which motivates him/her to try new and demanding social tasks; Ford, 1987). Simultaneously, the child must consider his/her peer's abilities and motivations, so that positive relationships and interactions can arise and maintain (Putallaz & Sheppard, 1992; Waters & Sroufe, 1983). Moreover, the profiles of behavioral and psychological attributes (given by the two Q-sorts), although more focused on the child's individual skills, are also an outcome of the children's ability in managing the *self* and *other* domains, for a reasonable portion of items, specifically focus on social interactions and/or in the strategies the child favors when interacting with peers (e.g., *Keeps people at a distance, avoids close interpersonal relationships*; *Seeks reassurance from others*; *Evaluates the motivation of others in interpreting situations*; California Child Q-sort, Block & Block, 1980).

Finally, the peer acceptance family of measures (given by the rate of positive nominations received, and the paired comparisons acceptance score) is also reflecting the child's ability to coordinate his/her own social needs/goals with other's social needs/goals. In general, within groups that are not deviant or highly aggressive, peer preference and/or acceptance entails a certain level of competence to behave in a friendly way (e.g., being cooperative, deal with conflict effectively; Hartup, et al., 1993) and to express affection toward peers (Attili, 1990; Hartup, 1996). As with the other two measurement families, the child must consider both her/his own wishes and the other's wishes, balancing the aggressive/coercive strategies with more prosocial and cooperative behaviors, in order to be positively regarded by peers (Hawley, 2003). In addition, these sociometric assessments have the advantage of being made by the children, instead of an adult, reflecting the collective judgments of the peer group, and summarizing the behavioral and affective components of social competence (Denham, et al., 1990).

The findings of structural stability (i.e., the relations held among the second-order factor – Social Competence –, and the first-order latent variables – the three families of measurement) are also consistent with Rose-Krasnor's (1997) conceptual model of social

competence. The results showed that all path coefficients from social competence to the three measurement families were positive and significant at both years supporting the assumption that social success (i.e., Social Competence at a theoretical level) is a combined outcome of the individual (i.e., the Skills Level) and its relations with the social environment (i.e., the Index Level). The second-order latent variable – Social Competence – represents the *organizing* construct proposed by Waters and Sroufe (1983), and the structural analyses carried out in our study indicate that it is appropriate to consider that this *transactional* trait-like ability influences the child's efficacy on the three broad social domains, which, in turn, influence the skills and behaviors children employ to interact with peers. As mentioned earlier, the results are also consistent with previous studies (e.g., Bost et al., 1998; Vaughn, 2001; Vaughn et al., 2009), using distinct cultural samples.

Given that significant cross-year changes were found at the indicators level, latent mean structure analyses were performed to test equivalence of social competence second-order factor means across time. Results indicated that Year 1 data did not significantly differ from Year 2 data, suggesting that the average level of social competence did not increase from age 4 to age 5. That is to say, although some differences at the measurement level are observed, suggesting that the scores for some indicators do increase from one year to another, the general level of social competence does not significantly improves from 4- to 5-years. One of the reasons that could explain these results is the fact that standard scores were used to test changes on the latent mean of social competence, whether *t*-tests were computed using raw scores. In this case, only very significant differences would be noticed. Previous studies (Shin, et al., in press) however, did found evidences of social competence latent mean growth across consecutive years. Nevertheless, in comparison with their sample size (N = 345), our sample is considerable smaller (N = 143), which could have an impact on the model's power for detecting major differences on the second-order factor representing social competence.

Another difference between our study and Shin et al. (in press), regards the fact that, contrary to their samples, most of our children are classmates since they were 3-months of age. The differences they found were between the longitudinal cases (in their second year of participation) and the same-age peers who had not been in the same child care program the previous year. The reasons why these new children did not attend the program before were unknown to the researchers (e.g., possibly because their parents decided to delay their entrance based in their evaluations of the children as immature with respect to their social abilities). Thus, as they remark, the group differences (i.e., experienced *vs.* entering care), for

older preschoolers, might reflect individual differences that are not an outcome of peer experience.

In contrast, children in our study were compared to themselves at age 4 and age 5 (and this is why raw scores were used for paired-sample *t*-tests), and the majority of them, had equivalent peer experience, knowing each other from a very early age. Given these particularities, and contrasts between the Portuguese sample and the US samples, it is difficult to compare the results between the two studies. Further studies using larger sample sizes, and controlling for the time when children first enter a peer group would help understand the meaning of these differences. Moreover, it would be important that future studies include parents' reports concerning the reasons why their children enrolled childcare at a given age.

In sum, results indicate that the hierarchical model is a good representation of data, being consistent with both the conceptual model (Rose-Krasnor, 1997; Waters & Sroufe, 1983), and the empirical model previously tested in other samples (Bost et al., 1998; Shin, et al., in press; Vaughn, 2001; Vaughn et al., 2009). Structural analyses suggest that the relations between social competence latent variable and the three measurement families are consistent and stable over time, as well as the relations between the measurement families and the seven behavioral indicators repeatedly collected over a period of two consecutive years. Moreover, preliminary analyses indicated that sex might have a significant influence on the strength of the associations between social competence and the seven behavioral indicators, despite overall model fit. These results, already discussed in this section, are quite unique, adding new questions to research on social competence (in particular, regarding the hierarchical model). For example, although the model, as a whole, does predict differences associated with development, culture, and sex (as a sub-cultural context), it could be interesting, in the future, to distinguish between the total level of attention a child receives from their peers, and the partial level of same-sex visual attention received. The same could be applied to rates of interaction initiated, positive nominations, and paired comparison measures.

Evidently, larger samples are needed to allow these distinctions and still be able to perform powerful statistical analyses. Nevertheless, because investigation deals with averages, or tendencies, or patterns, as opposed to the personal or individual level, the relevance of these distinctions could merit the effort. And that is because (we hypothesize), it may not be really important to say that boys (or girls) had a better (or a worse) performance than girls (or boys). If distinct abilities and interactions characterize this sex-segregated developmental period, then boys' and girls' social competence should be assessed and

compared within each sex group, rather than between. Of course that the comparison between sexes is important, as it is important to study sex differences regarding other cognitive and social skills; however, in this particular situation, if gender differences are associated with differences on the male and female *na(r)ture* (which we do not know) comparison between boys and girls might be *unfair*, because boys and girls (on average) could differ on their baseline social skills.

At this point, and because the model does seem to fit the data in distinct cultures (Vaughn, et al., 2009), the challenge is to quantify and qualify how development and culture (and sub-cultures, as sex, family income, previous experience in peer groups, having or not having older siblings, etc.), affects the specific dynamics between social competence latent trait and the behavioral indicators used to broadly assess this trait-like construct (Waters & Sroufe, 1983), characterized as the ability to succeed in the *social territory*, by flexibly coordinating emotions, cognitions, and behaviors.

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CHAPTER V

Social Competence, Friendship, and Sociometric Status: A Two-year Longitudinal Study in a Sample of Portuguese Preschool Children

Abstract

The present research was designed to explore the relations between social competence, reciprocal friendship, and sociometric status, in a Portuguese sample of preschool children, assessed for a period of two consecutive years (at 4-years old and, again, at 5-years old). Additionally, the hypothesis that sex would affect the pattern of relations between the variables was also tested. Consistent with the existent literature, results indicate that both friendship relations and general peer acceptance influence and predict later social competence. Overall, no sex differences were found in the pattern of associations between social competence and friendship and/or social status. For both boys and girls, having friends and being popular appear to be good correlates of social competence.

Keywords: social competence, friendship reciprocity, sociometric status, sex differences

Introduction

Children's relationships in the *peer's land* have long been thought as greatly significant for social development, providing rich opportunities for learning cooperation and competition, gaining social support, or developing interpersonal skills (e.g., Hartup, 1979; Parker & Asher, 1987; Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006; Rubin, Bukowski, & Parker, 2006). Also consensual is the notion that persistent difficulties with peers, are likely to foreshadow social difficulties later in life and, in the extreme, clinically significant behavioral and affective disorders (Buhs & Ladd, 2001; Coie, Lochman, Terry, & Hyman, 1992; Deater-Deckard, 2001; Parker & Asher, 1987; Parkhurst & Asher, 1992; Prinstein & La Greca, 2004). Therefore, becoming accepted by the peer group is, in general, considered a good indicator of social adjustment (e.g., Coie, & Cillessen, 1998; Newcomb, Bukowski, & Pattee, 1993; Sandstrom, & Coie, 1999; Spence, 1987). In addition, children's ability or success in establishing and maintaining dyadic relationships (i.e., making friends) is also considered a milestone and an important indicator of children's social adjustment (Berndt, 1996; Dunn, 2006; Howes, 1988, 1996; Newcomb & Bagwell, 1996).

These two dimensions, which characterize peer relations at distinct conceptual levels, appear to have different contributions to social adaptation (Asher, Parker, & Walker, 1996; Bukowski & Hoza, 1989; Parker & Asher, 1987; Prinstein & La Greca, 2004), each having its own protective functions or advantages for the child's social and emotional development. For example, although some studies have attempted to conceptualize and assess children's social adjustment by focusing, exclusively, on sociometric status (e.g., Asher & Coie, 1990; Coie, et al., 1992), other studies, using both sociometric status and friendship measures (e.g., Parker & Asher, 1993), suggest that being accepted by peers, and having friends (plus the friendship's quality), differently contributes to predict loneliness during middle childhood. In particular, children without significant friendships were lonelier than children with significant friendships, regardless of how well they were accepted by their peers. Moreover, research also indicates that not all highly accepted children (i.e., popular) have friends, which supports the distinction between acceptance and friendship (e.g., Parker & Asher, 1993). Furthermore, among preschool children, participation in one form of peer relationship does not necessarily entails participation in another (Asher, et al., 1996; Ladd, Kochenderfer, & Coleman, 1997). That is, group acceptance neither guarantees nor precludes successful friendship relations, neither having valuable friends determines peer group acceptance. Finally, problems in peer

group acceptance appear to be less pronounced if low-accepted children enjoy satisfying mutual friendships (Bukowski, & Hoza, 1989).

Overall, group acceptance (i.e., sociometric status or popularity in the classroom) has been considered an important feature of children's successful adaptation to peers. Specifically, the experience of being rejected by peers, and its outcomes, is well documented, and a variety of relations among peer rejection and cognitive, behavioral, and emotional difficulties have been systematically established (Asher & Coie, 1990; Buhs, & Ladd, 2001; Coie & Cillessen, 1998). Other studies further suggest that group acceptance is a good predictor of later social adjustment (Kupersmidt, Coie & Dodge, 1990; Parker & Asher, 1987). For instance, in contrast with their well-accepted peers, nonpopular children tend to abandon school more often (Asher & Parker, 1989). With respect to their emotions, nonpopular children often report feelings of loneliness and social dissatisfaction (Cassidy & Asher, 1992) having yet an additional propensity towards externalization problems such as aggressiveness and anti-social behavior (Sandstrom & Coie, 1999) and internalization problems such as depression and anxiety (Rubin, et al., 2006).

Friendships, on the other hand, are characterized by dyadic reciprocity, that is, by *liking* or being attracted to someone who is attracted in return. Research on friendship relations has suggested that these especial ties are good sources of emotional security (Asher & Parker, 1989) contributing, as well, to the child's social and cognitive development, by facilitating the acquisition of essential skills and competencies (Newcomb & Bagwell, 1996). In comparison with nonfriends dyads, friends seem to interact more frequently, smile and laugh with each other more, gave grater importance to equality rules, and turn their conversations towards shared ends rather than egocentric ones (Newcomb, & Brady, 1982). In the context of these close and mutual relationships, opportunities for intimacy and affection appear to emerge, providing emotional support and enhancing self-esteem (Furman & Buhrmester, 1985).

Moreover, on the subject of social competence, friendship relations have been regarded as favorable contexts for social competence growth, facilitating the acquisition of social skills. Within stable friendship dyads, for example, grater increases in complexity of social interactions has been observed, as indicated by higher rates of successful initiations, elaborated exchanges, and time spent in complementary and reciprocal peer play, and in positive affect expression (Howes, 1983). On the whole, both sociometric status and friendship appear to be important sources to children's social competence development.

Previous research assessing the relations between social competence and measures of friendship (cross-sectional and longitudinally), during the preschool period (e.g., Vaughn, et al., 2000), supports the existing knowledge on the subject (e.g., Berndt, Newcomb & Bagwell, 1995, 1996) indicating that reciprocal friendship (measured as reciprocal sociometric choices in three distinct tasks) is associated with several indicators of social competence. In particular, children who had reciprocal friends, where found to initiate interactions with peers more frequently, receiving as well visual attention from peers at higher rates, than children who did not enjoyed this type of social bond. However, though the benefits of having mutual friends were more evident, the pattern of relations between nonreciprocal friendships and social competence was not so consistent.

Furthermore, for the longitudinal sample (Vaughn, et al., 2000), significant sex main effects were observed. In general, reciprocal friendship, at Time 1, was associated with social competence at Time 2, for girls, but not for boys. For boys, the correlations between social competence and rates of visual attention/interaction were, surprisingly, signed negatively. Also, the pattern of relations between social competence composites at T1 and reciprocal friendship at T2 was also distinct for boys and girls. As before, both social competence composites were positively correlated with friendship reciprocity at T2, for girls. For boys, these correlations were nonsignificant. Although unexpected (Vaughn, et al., 2000) these sex divergences were later hypothesized to be associated with developmental differences on the significance of this type of relation (i.e., friendship) for both boys and girls. As the authors suggested, it might be that, for girls, friendship relations' meaning appears earlier on development, whereas for boys, only later this sort of affiliative tie gains a similar relevance. Sex segregation was also another possible explanation, because girls are known to be the first to segregate (Maccoby, 1988, 1990, 1998). Overall, it is worth to stress that additional research is needed so that the nature of the associations between friendship and social competence, during the preschool years, becomes clearer (Vaughn, et al., 2000).

In the present study, we further explore these relations, in a sample of Portuguese preschool children, for the period of two consecutive years. Social competence was measured in terms of three broad domains or composites (i.e., *social engagement and motivation*, *profiles of behavioral and psychological attributes* and, *peer acceptance*) successfully used in previous research on social competence during this developmental phase (Bost, Vaughn, Washington, Cielinski, & Bradbard, 1998; Vaughn, 2001; Vaughn et al., 2000). Each domain (or *measurement family*) was assessed using two or three indicators (i.e., measured variables)

collected by different teams of observers in each year (e.g., peer nominations, rates of visual attention received from peers, etc.).

In addition to friendship reciprocity, relations between sociometric status and social competence were also considered, given that, as discussed before, these two domains appear to have distinct roles on the child's social adaptation (Asher, Parker, & Walker, 1996; Bukowski & Hoza, 1989; Parker & Asher, 1987; Prinstein & La Greca, 2004). Moreover, the sex effects previously reported (Vaughn et al., 2000), in particular the positive and significant association between friendship and social competence, for girls, *versus* a quite different pattern for boys, lead us to several research questions, which required sociometric status data. Specifically, could it be that, for boys, being positively accepted by the peer group is more relevant for social competence (hence, for social adjustment) than having reciprocal friendship relations? In other words, is peer status more important, for boys, than close dyadic relations, at this age? What about girls? Do the results found in Vaughn et al. (2000) study, replicate in our Portuguese sample? Is it the case that, for girls, having a reciprocal friendship is more relevant that being highly popular in the peer group?

The hypothesis that peer group acceptance is possibly more salient for boys, whereas dyadic friendship is more salient for girls is supported, in the first place, by the fact that, during the preschool years most of children's peer interactions are sex-segregated - even in classrooms were sex equity in play is encouraged by teachers (LaFreniere, Strayer, & Gauthier, 1984; Maccoby, 1988; Martin & Fabes, 2001) - which could lead to the development of sex-based *distinctive cultures* and different personal/social needs (Maccoby, 1988). Secondly, within this greatly *girls' only*, or *boys' only* peer interactions, there is one sex difference that is frequently observed, namely that, in general, boys prefer to interact in larger groups, while girls are more attracted to dyadic interactions (e.g., Benenson, 1993; Benenson, Apostoleris, & Parnass, 1997; Ladd, 1983; Waldrop, & Halverson, 1975).

In addition, when compared to girls, boys appear to be more concern with dominance and competition issues (Maccoby, 1998; Pellegrini & Archer, 2005), even when their competitor is a close friend. In fact, in a series of studies with preschool and school age children, Berndt (1981a, 1981b), found that the behavioral (prosocial) intentions towards friends *vs.* acquaintances were significantly different only for girls. Specifically, when asked about their intentions to share and help (a) a friend or, (b) an acquaintance, girls said they would share and help a friend more than an acquaintance, whereas boys said they would treat friends and acquaintances in the same way (Berndt, 1981a). Furthermore, when the behaviors

were actually measured, it was found that boys shared less and competed more with friends than with other classmates. Girls, on the contrary, shared fairly equally with both friends and nonfriends. Also, boys' competitive behavior seemed to increase with age and, in some cases, the sharing behavior was even lower with friends than with acquaintances (Berndt, 1981b).

These findings were attributed to a combination of greater competiveness in boys and grater freedom to deviate from sharing among friendship dyads. As a whole, results suggest that boys are strongly motivated to avoid losing competitions with other boys, including, or especially, if those boys are their friends (Berndt, 1981b).

Other studies, however, indicate that girls as well as boys then to display higher rates of competitive behavior, when interacting in larger social groups and less competitive behavior within dyadic-play situations (Benenson, Joyce, Nicholson, Waite, Roy, & Simpson, 2001; Maccoby, 1990). As a consequence, boys' competitive and other power-assertive behaviors may thus be a function of the fact that they more typically congregate in larger groups than do girls. Nevertheless, they do appear, in general, to be fond of that type of rough and competitive interactions (Jarvis, 2006; Pellegrini, 1988). Girls, on the other hand, tend to prefer dyadic interactions.

According to an ethological perspective (Strayer, 1980; Strayer & Strayer, 1976), the root of these distinct behaviors may be traced back to our evolutionary history. Specifically, in the view of this perspective, females would have developed a natural motivation for interaction and preparation for nurture, and form attachments with others, in order to promote the survival of their offspring. Males, in contrast, would have developed a natural incentive for impact, being prepared to engage in assertive behavior, in order to provide food and protect their relatives from external aggressors. Yet, it is not the ability to compete that is affected by sex; girls can and do compete (Charlesworth, 1996). The difference is that, for *minor prizes*, they usually choose other, less risky, competition tactics, as indirect/relational aggression (Bjorkqvist, Lagerspetz, & Kaukiainen, 1992; Kaukiainen, et al., 1999; Underwood, 2003); and when what is threatened is of crucial importance (e.g., their own life or the life of their offspring) they do compete in a rougher, manly style (Smuts, 1987). Overall, evidence seem to suggest that girls are, generally, less competitive than boys, show less evidence of hierarchical organization, are more concerned with maintaining relationships of mutuality and reciprocity and less interested in achieving leadership within the group (Campbell, 1999).

On the subject of friendship *vs.* sociometric status, there exists also several data suggesting that, for boys, social acceptance is more related to general acceptance by the group, while for girls, social acceptance is more related with having a few close friends (Waldrop & Halverson, 1975). Moreover, research on emergence of peer status in boys' groups, suggests that those who become popular are viewed by group members as leaders (Dodge, 1983), which could indicate that dominance and popularity are associated features for boys. Their status as leaders was reflected in behaviors such as, reminding others of the rules, providing suggestions and directions in ambiguous or difficult situations, and establishing group norms (Dodge, 1983). Simultaneously, peers saw them as displaying happy, positive affect during their interactions and, interestingly, these popular boys demonstrated also a grater tendency to engage in dyadic interactions (Dodge, Coie, Pettit, & Price, 1990), which could, hypothetically, increase their popularity among girls.

Finally, for girls, participation in same-sex social groups is usually characterized by the formation of friendships (Maccoby, 1998). Research indicates that preschool girls are more interested in dyadic social situations than boys, investing more time on reciprocal friendships (Benenson, 1993). During middle childhood, girls' conversations on the topic of *who is a friend* and *who is not* are very prominent, and the breakup of friendship, especially in adolescence, appears to have more serious emotional consequences for girls than for boys (Benenson & Christakos, 2003; Maccoby, 1998; Underwood, 2003).

Hence, resuming to our hypothesis, though both friendship and popularity might be important correlates of social competence, regardless of the child sex, friendship relations, we predict, could be a more valid indicator of social competence, for girls, whereas for boys, social competence could be more strongly associated with being popular in the peer group. Our main goal is then to explore the relations between social competence and (a) friendship status (i.e., reciprocal *vs.* nonreciprocal *liking* choices), and (b) sociometric status. In detail, three questions were addressed: (1) do children with reciprocal friendships and/or with popular sociometric status have higher mean scores for social competence than children without mutual friends and/or from other sociometric groups (in particular, the rejected and neglected sociometric statuses)? (2) is friendship reciprocity and/or sociometric status associated with higher levels of social competence, for both boys and girls? (3) Does having reciprocal friends and/or a positive sociometric status, at 4-years old predict social competence, at 5-years old? Does sex have an effect on the overall patterns of relations?

Analyses of variance were used to answer the first question; sociometric status, friendship reciprocity and, sex main effects on social competence were explored, across the two years. Correlational analyses between social competence and (a) friendship reciprocity and, (b) sociometric status were computed to assess the second question. Finally, the third question was analyzed using standard regression analyses.

Methods

Participants

Participants for this study included 106 Portuguese preschool children (56 girls, and 50 boys) drawn from 4 private preschool settings in the surrounds of Lisbon (2 classrooms from each school). Children were observed during two consecutive years, first when they were 4-years old (Year1) and in the following year, when they were 5-years old (Year 2). Classrooms were homogeneous with respect to children's age (i.e., in each year each classroom had only children with 4- or 5-years old). Nearly all children came from middle to middle-up income families. Signed consent from parents and schools was obtained before data collection.

Prior to data collection, the observers spent at least 2 hr in each classroom to become familiar with the names of the children and to allow the children to become familiar with them.

Instruments and Procedures

Friendship Assessment. In accordance with Vaughn et al. (2000), friendship status (i.e., reciprocal *vs.* nonreciprocal friendship dyadic choices) was derived from three types of sociometric data. A reciprocal friendship dyad was identified when each peer was (a) among the top four nominated children in the sociometric nominations task or; (b) among the top four chosen children in the paired comparison task and; (c) received and give a rating of 3 (i.e., *like to play a lot*) in the rating-scale task. At 4-years old, the number of reciprocal friendship dyads ranged from 0 to 4, for girls (M = 1.20, *SD* = 1.17), and from 0 to 3, for boys (M = 1.17, *SD* = 1.00). At age 5, the number of reciprocal friendship choices ranged from 0 to 4, for girls (M = 1.14, *SD* = 1.06), and from 0 to 5, for boys (M = 1.86, *SD* = 1.68). For both ages, most children had 1 or 0 reciprocal friends.

Sociometric Measures. All children completed three picture sociometric tasks. Teams of two observers interviewed each child outside the classroom, in a quiet place of the school setting. The three tasks were in general presented following the same order, namely, (a) positive and negative nominations, (b) rating scale and, (c) paired comparisons. Overall, the interviews took between 30 and 45 minutes to complete (2 or 3 sessions; 15 minute-sessions). At any stage, if the child manifested signs of fatigue, the interview was paused and resumed at another time (usually, the day after).

For the nomination task (McCandless & Marshall, 1957) the observers request each child for judgments about peers, using the set of photographs of all classmates. In particular, the child is asked to name a peer he or she *especially likes to play with*. The request is repeated two more times. After that, the child is asked to nominate a peer she or he *does not especially like to play with* (repeated, again, two more times). As peers are chosen, their photographs are turned face down. Once the three positive and the three negative choices are complete, the child is asked, again, to positively nominate the remaining peers (i.e., to chose between the available peers whom does she or he *especially likes to play with*). The request continues until no photographs are left. Using this procedure, all children receive a score representing the order they are chosen by peers.

For the rating-scale task, the child is asked to classify each peer in a three points scale, ranging from 1 (*does not especially like to play with*) to 3 (*especially likes to play with*). The photos are presented randomly and individually. Along with the verbal choice, the child is also asked to place the photo into one of three boxes, representing the rate a child can receive (usually, smile faces are used to identify each box).

Finally, for the paired comparison task, photographs of all the possible pairs within each classroom (i.e., N. (N-1)/2) are presented to the child, who is asked to choose for each pair of photographs the peer she or he *especially liked to play with*. The pairs are randomly organized, and no child is seen twice before all other children are seen once. Each child's photograph is showed the same number of times on the left and right hand sections of the picture file. The acceptance score for this measure was the total number of choices received from peers, divided by the number of classmates who concluded the task.

Sociometric Status. Sociometric status was computed from the nomination measure, previously describe, in accordance with Coie, Dodge, and Coppotelli's (1982), and Newcomb and Bukowski's (1983) procedures. In sum, the child's sociometric status is computed using two scores/dimensions, defined as *social preference* (P) and, *social impact* (I). Characterized

as a *normative continuous model* of sociometric classification, this method is based on the absolute frequencies of positive and negative nominations, each child receives. These raw values are then transformed into standardized scores (i.e., *z* scores), representing the *like most* (LM) and *like least* (LL) measures. Using the LM and LL standardized scores, P (= LM - LL) and I (= LM + LL), may now be computed. The final taxonomy, is based on the normal distribution, and given by the four standardized scores (i.e., LM, LL, P and, I), as it follows: (a) *popular children* – P > 1.0; LM > 0 and LL < 0; (b) *rejected children* – P < 1.0; LM < 0 and LL > 0; (c) *neglected children* – I < 1.0; positive nominations absolute frequency = 0; (d) *controversial children* – I > 1.0; LM and LL > 0 and; (e) *average children* – all children who do not fit into the criteria formerly defined.

In accordance with these procedures, at Year 1 (age 4), 11 children were classified as *popular* (6 ♀ *vs.* 5 ♂), 9 children were classified as *rejected* (5 ♀ *vs.* 4 ♂) and, 13 children were classified as *neglected* (8 ♀ *vs.* 5 ♂). The rest of the children were classified as average (31 ♀ *vs.* 24 ♂). At Year 2 (age 5), 15 children were classified as *popular* (7 ♀ *vs.* 8 ♂), 13 children were classified as *rejected* (6 ♀ *vs.* 7 ♂) and, 16 children were classified as *neglected* (12 ♀ *vs.* 4 ♂). The remaining children were classified as average (30 ♀ *vs.* 32 ♂). No children received the status of controversial, neither at 4-, nor at 5-years.

Social Competence Assessment. Social competence was measured using the protocols described by Bost et al. (1998) and Vaughn (2001). Following their proposal, three broad dimensions of social competence, representing three measurement families, were used to operationalize the social competence construct, specifically: (1) *Social Motivation and Engagement*, (2) *Profiles of Behavioral and Psychological Attributes* and, (3) *Peer Acceptance*. For each set of measures multiple and independent observers collected the data (two *per* measurement family) using two or three indicators for each domain.

Social Motivation and Engagement. Social motivation and engagement was assessed using three indicators – (a) rates of visual attention received, (b) positive interactions initiated and, (c) neutral interactions initiated. For the three measures (or indicators), children were observed using a randomized class roster, over two hundred rounds of observation *per* child. For each round, a target child was observed when his or her name appeared on the class roster and no child was observed two times before all children were observed once.

Interaction initiation was measured during 15-seconds observation intervals; throughout this 15-s period, a particular child (i.e., the focal child) was observed. At the end of this, the codes identifying all the children with whom the focal child interacted with were

wrote down, along with the interaction emotional tone (i.e., each interaction was coded as *positive*, *neutral*, or *negative*). Clear signs of positive affect, manifested by one or both children, during the social interaction, characterize positive interactions. Moreover, the positive affect expression should not go along (or be followed) by negative affect demonstrations from the interactive child. Social exchanges that were neither coded as positive, nor coded as negative (e.g., anger, distress, fear, sadness, whether through vocal, gestural, or facial means, that does not take place in the context of pretend/fantasy play), were coded as neutral (including the verbal and nonverbal exchanges that do not contain affect expression).

Rates of visual attention received were collected for a 6-seconds observation interval. At the end of that period, the codes identifying the children who received visual attention from the focal child were recorded, as *units of visual attention*. Specifically, a *look* unit was coded when the focal child directed her/his eyes and/or her/his head in the direction of another child, for a 2 seconds period, or more; when this period lasted for less than 2 seconds, a *glance* unit was coded. If the direction of the eyes (or head) was uncertain, a doubtful occurrence was wrote-down (i.e. "?"). Eye-gaze direction towards an object and not directly to the child who had it was also coded as a doubtful occurrence. Doubtful occurrences were not considered in the child's total score computation.

Previous investigations using the same observation procedures (e.g., Vaughn & Martino, 1988; Vaughn & Waters, 1981; Waters, Garber, Gornal, & Vaughn, 1983) have indicated that observers readily attain agreement rates of 80% (and above), within short training periods.

Profiles of Behavioral and Psychological Attributes. Profiles of behavioral and psychological attributes were derived from two Q-sorts – the California Child Q-sort (CCQ – Block & Block, 1980) and the Preschool Q-sort (PQ – Bronson's adaptation of a Q-sort originally used by Baumrind, 1967). Each classroom was observed for more than 20 hr, in a variety of situations (e.g., small groups activities, meal times, free play indoors, outdoor play, etc.), by two independent observers. Once the observation period was over, and reasonable information had been collected for all children, each observer described the children using the two Q-sorts (CCQ – 100 items; PQ – 72 items). For each Q-sort, the items were arranged into 9 categories with a rectangular distribution (1 representing the most atypical attributes and 9, the most typical attributes of the child). The Q-sort for a given child was then correlated with the profile of a hypothetical child at the extreme for social competence, generated by

aggregating the descriptions provided by experts on social development (Waters et al., 1985). Pearson's correlation between a Q-sort for a given child and the "criterion" sort for the construct becomes his or her "score" for that construct. For each classroom, each observer used the CCQ for describe half of the children and the PQ for the other half. Scores for both Q-sorts were used to derive the social competence composite score. Observers for these measures were different across study years.

Peer Acceptance. Peer acceptance, the third social competence family of measurement, was assed using two of the three sociometric interviews described before, for friendship status assessment, namely, the nomination task (McCandless & Marshall, 1957), and the paired comparison task. The only difference is that, for the nomination task, the acceptance score on peer acceptance was now given, exclusively, by the first three positive choices. Negative nominations were not considered here, nor positive nominations after the first three choices.

Results

In order to answer the first question (i.e., *do children with reciprocal friendships and/or with popular sociometric status have higher mean scores for social competence than children without mutual friends and/or from other sociometric groups?*), analyses of variance (three factor Univariate ANOVA) were performed. These analyses explored friendship reciprocity, sociometric status and, sex main effects on the means for social competence composite score (derived from the three measurement families), and for each of the three families of measurement, across the two years.

The second question of our study (i.e., *is friendship reciprocity and/or positive sociometric status associated with higher levels of social competence, for both boys and girls?*) was assessed using correlational analyses between friendship status and sociometric status and both the social competence composite score and the scores for the three families of measurement.

Finally, the last question (i.e., *does having reciprocal friends and, or a positive sociometric status, at Year 1, predicts social competence at Year 2? Does the child sex have an effect on this relation?*), was analyzed using standard regression analyses.

Analyses of variance. Three factor univariate ANOVAs were used to explore sociometric status, friendship reciprocity, and sex main effects on the social competence composite score and on the composite scores for each of the three families of measurement, across the two years.

At age 4, a main effect of friendship, for both boys and girls, on the social competence composite score was observed ($F(1, 73) = 4.073$, $p = .048$). Children with, at least, one reciprocal friendship had higher mean scores then children with no reciprocal friendships.

Sociometric status had also a main effect on social competence composite ($F(1, 73) = 10.832$, $p < .001$). Post-Hoc tests (Tukey) showed that the differences were among (a) popular children and average ($p = .005$), rejected, and neglected children (both with $p < .001$), with popular children having higher mean scores than all the other children; (b) average children and rejected ($p < .001$), and neglected children ($p = .005$), with average children having higher mean scores than both rejected and neglected children. No sex differences were found. No interactions between sex and friendship or sex and sociometric status were observed.

With respect to the three families of measurement (i.e., social motivation and engagement – SME, profiles of behavioral and psychological attributes – BPA, and peer acceptance – PA), main effects of sociometric status were found on BPA family of measures ($F(79) = 5.801$, $p = .001$). Post-Hoc tests (Tukey) indicated that the differences were among: (a) popular and rejected children ($p = .003$), with popular children having higher mean scores than rejected children; (b) average children and rejected ($p < .001$) and neglected ($p = .032$) children with average children having higher mean scores than both rejected and neglected children. Neither sex nor friendship status effects were detected. No interactions among the variables were significant.

Sociometric status had also a main effect on PA family of measures ($F(1, 79) = 15.022$, $p < .001$). Post-Hoc tests (Tukey) showed that the differences were among: (a) popular children and average ($p < .001$), rejected ($p < .001$), and neglected ($p < .001$) children, with popular children having significantly higher scores all the other children; (b) average children and rejected ($p < .001$), and neglected ($p = .004$) children, with average children having higher mean scores than both rejected and neglected children. No sex or friendship effects were observed. No interactions between the friendship, sociometric status and sex were significant.

Finally, no significant main effects of sociometric status were found for SME family of measures. Neither sex effects nor interactions among sex, friendship, and sociometric status were found.

At age 5, no significant friendship, sociometric status, or sex main effects were found on the global social competence composite, or on the BPA family of measures.

Significant sex main effects were observed on the SME family of measures ($F(1, 98) = 5.479$, $p = .022$). Boys had higher scores than girls. No main effects of friendship and sociometric status were noticed. The interaction between the variables was not significant.

Significant main effects of friendship on PA family of measures were noticed ($F(1, 98) = 5.944$, $p = .017$). Children with, at least, one reciprocal friend, had higher mean scores than children with no reciprocal friendships, for this composite. An interaction effect between sex and friendship on PA family of measures was also observed ($F(1, 98) = 5.479$, $p = .005$). Results suggest that boys who had at least one reciprocal friend had higher mean scores on this composite than boys with no reciprocal friendships, and girls (with or without reciprocal friends).

Main effects of sociometric status ($F(1, 98) = 14.867$, $p < .001$) on PA measures were also observed. Post-Hoc tests (Tukey) showed that the differences were among: (a) popular children and average ($p < .001$), rejected ($p < .001$), and neglected ($p < .001$) children, with popular children having higher mean scores than all the other children; (b) average and rejected children ($p < .001$), with average children having higher mean scores than rejected children; (c) neglected and rejected sociometric status ($p = .001$), with neglected children having higher scores than rejected children.

Means and standard deviations for these variables, across age and sex, are presented in Table 1.

Table 1

Means and Standard Deviations across Age and Sex

Age/Sex [a]	SC	SME	BPA	PA
4-years old (*N*=97; 52 ♀, 45 ♂)	-.09 *vs*. .25 (.66 *vs*. .52)	-.11 *vs*. .23 (.78 *vs*.71)	-.10 *vs*. .15 (.88 *vs*. .83)	-.04 *vs*. .04 (.91 *vs* .94)
5-years-old (*N*=120; 57 ♀, 63 ♂)	-.08 *vs*. .20 (.63 *vs*. .62)	-.27 *vs*. .25 (.82 *vs*. .70)	.16 *vs*. .05 (.88 *vs*. .86)	-.17 *vs*. .28 (.90 *vs*. .76)

Note. Standard deviations in parentheses; [a] Girls *vs*. Boys

Correlational analyses. Correlational analyses (Pearson coefficients) were computed to assess the hypothesis that (a) friendship reciprocity and/or (b) positive sociometric status is associated with higher levels of social competence, for both boys and girls.

Friendship Status x Social Competence composite. With respect to friendship status (i.e., having at least one reciprocal friend *vs.* having no reciprocal friends) x global composite for social competence, results indicate that, in general, and despite the child's sex, the relation between the social competence and friendship reciprocity is positive and significant. Specifically, at Year 1 (4-years old children), having at least one reciprocal friend is significantly associated with higher levels of social competence in that same year (.56, $p <$ .001, and .51, $p < .05$, for girls and boys, respectively).

At Year 2 (5-years old children), the association between friendship status and social competence was, for the global sample, also positive and significant (.31, $p < .05$). However, analyses by sex indicated that only for boys this relation was, indeed, significant (.47, $p < .05$, and .18, for boys and girls, respectively).

Friendship Status x Measurement Families. In addition, correlations between the three measurement families (i.e., Social Motivation and Engagement – SME; Profiles of Behavioral and Psychological Attributes – BPA, and Peer Acceptance – PA) and friendship were also computed. At Year 1, in general, having at least one reciprocal friend was positively and significantly associated with all the three composites defining the measurement families (.33, $p < .05$, .41, $p < .001$, and .48, $p < .001$, for SME, BPA, and PA, respectively). Further analyses by sex indicated, however, that only for girls the associations were always significant (.40, .50, and .39, $p < .05$, for SME, BPA, and PA, respectively), whereas for boys only the association between friendship reciprocity and PA was significant (.21, and .28, $p >$ .05, and .59, $p < .001$, for SME, BPA, and PA, respectively).

Finally, correlation analyses between friendship status at Year 2 and the measurement families' mean scores at Year 2, indicate that, for both boys and girls, only the association among PA and friendship status is significant (.51, $p < .001$, and .33, $p < .05$, for boys and girls, respectively).

Sociometric Status x Social Competence global composite. At 4-years old, the correlation between popular status (PS) and global social competence was positive and

significant for both boys and girls (.35, and .42, $p < .05$, respectively). For average sociometric status x global social competence, the correlation was also positive, however, nonsignificant (.26, and .21, $p > .05$, for boys and girls, respectively). Finally, the associations between rejected and neglected status with global social competence were, in general, negative and significant (-.45, and -.44, $p < .05$, for rejected boys and girls, respectively, and -.22, $p > .05$ and -.34, $p < .05$, for neglected boys and girls, respectively).

Next, correlations between sociometric status (Year 2) and global social competence (Year 2) were computed. The results are equivalent to the results obtain at Year 1 (age 4). Children with popular sociometric status at age 5 had significantly higher mean levels of social competence (.34, $p < .05$, and .52, $p < .001$, for boys and girls, respectively). The correlation between average sociometric status and global social competence was nonsignificant, for both boys and girls, and negative for girls (.08, and -.15, $p>.05$, for boys and girls, respectively). Finally, the associations between rejected and neglected status, and social competence were, in general, negative and nonsignificant (-.36, $p < .05$, and -.23, $p > .05$, for rejected boys and girls, respectively, and -.12, and -.25, $p > .05$, for neglected boys and girls, respectively), except for rejected boys; for boys, the association was significant suggesting that having a rejected status is negatively and significantly associated with lower mean levels of social competence, at age 5.

Sociometric Status x Measurement Families. At Year 1 (age 4), popular status was positively associated with the three measurement families. However, only the correlation with Peer Acceptance (PA) family of measures was significant, for both boys and girls (.48, $p < .05$, and .67, $p < .001$, for boys and girls, respectively). For average sociometric status, a significant correlation with Profiles of Behavioral and Psychological Attributes (BPA) was noticed (.33, $p < .05$, and .40, $p < .001$, for boys and girls, respectively). The remaining correlations were equally positive, though nonsignificant. For rejected status, a negative and significant correlation with BPA, for girls, was also observed (-.25, $p > .05$, and -.50, $p < .001$, for boys and girls, respectively). Having a rejected status, for both sexes, was also negatively and significantly associated with PA measures (-.56, $p < .001$, and -.34, $p < .05$, for boys and girls, respectively). Correlations between rejected status and Social Motivation and Engagement (SME) measures were negative and nonsignificant (-.05, and -.12, $p > 05$, for boys and girls, respectively). Lastly, correlations between neglected status and the three families of measurement were all negative and nonsignificant (SME: -.24, and -.01, $p > .05$; BPA: -.32, and -.21, $p > .05$; PA: .19, and -.25, $p > .05$, for boys and girls, respectively).

A last set of correlation analyses explored the associations between sociometric status at age 5 (Year 2) and the three families of measurement in the same year of data collection. Results indicate that, for girls, popular status is positively and significantly associated with BPA measures (.08, $p > 05$, and .37, $p < .05$, for boys and girls, respectively). For both sexes, popular status is also significantly correlated with PA measures (.48, $p < .05$, and .65, $p < .001$, for boys and girls, respectively). Correlations between popular status and SME measures were positive, but nonsignificant. For average sociometric status, none of the correlations were significant. Further, and contrary to what has been observed with average sociometric status, some of the associations were negative, though nonsignificant, especially for girls.

For rejected status, significant and negative correlations were found with PA measures (-.44, and -.35, $p < .05$, for boys and girls, respectively). The remaining associations were also negative, though nonsignificant.

Last of all, correlations among neglected sociometric status and the three families of measures were non significant and always negative for boys. For girls, the correlation with PA measures was also negative.

Regression Analyses. Standard regression analyses were used to assess the relationship between the social competence global composite at Year 2 (age 5) and (a) friendship reciprocity, and (b) popular sociometric status, both measured at Year 1 (age 4). These analyses were addressed to answer our last questions, namely, *does having reciprocal friends and, or a positive sociometric status, at Year 1, predicts social competence at Year 2? Does sex have an effect on this relation?* Given that the correlation analyses, presented earlier, indicated that popular status was the sociometric status that most strongly and significantly associates with the social competence measures, only this status was considered when performing the analyses.

Girls, 4-5 Years Old. For girls, a significant relation between reciprocal friendship at Year 1 and global social competence at Year 2 was found (adjusted $R^2 = .21$, $F(2, 36) = 3.039$, $p = .005$; $\beta(\text{REC\_FRI}) = .447$, $p = .004$). Further analyses indicated that friendship reciprocity, at age 4, significantly predicted higher mean scores on (1) Profiles of Behavior and Psychological Attributes (BPA) family of measures (adjusted $R^2 = .12$, $F(2, 36) = 3.608$, $p = .037$; $\beta(\text{REC\_FRI}) = .365$, $p = .022$); and (2) Peer Acceptance (PA) family of measures. Finally, popular sociometric status (Year 1), also significantly predicted PA family of measures at Year 2 (adjusted $R^2 = .20$, $F(2, 37) = 5.840$, $p = .006$; (REC_FRI) = .326, $p = .029$, (POP_STA) = .344, $p = .022$). No significant relations were found between friendship

status and popular sociometric status and the Social Motivation and Engagement (SME) family of measurement.

Boys, 4-5 Years Old. For boys, both having, at least one reciprocal friendship, and being popular in the peer group, at age 4, were related to PA family of measures, at age 5 (adjusted $R^2 = .35$, $F(2, 20) = 5.840$, $p = .005$; β(POP_STA) = .425, $p = .026$), β(REC_FRI) = .357, $p = .039$). No significant relations were found between friendship, and popular sociometric status, and the global measure of social competence, or with the other two measurement families (i.e., SME, and BPA).

Discussion

The central goal of this study was to explore the relations between social competence, friendship reciprocity, and sociometric status. In particular, and following the existent literature (e.g., Benenson, 1993; Benenson, Apostoleris, & Parnass, 1997; Ladd, 1983; Maccoby, 1998; Pellegrini & Archer, 2005; Waldrop, & Halverson, 1975), we tested the general hypotheses that (1) social competence is influenced by mutual friendship and/or sociometric status in the peer group; (2) friendship reciprocity and/or sociometric status are associated with higher levels of social competence and; (3) having reciprocal friends and/or a positive sociometric status, at 4-years old, predicts social competence, at 5-years old. Moreover, the hypothesis that, for girls, friendship relations would be more strongly associated with social competence, whereas for boys, social competence would be more associated with being popular in the peer group was also explored.

In general, the answer to our first question/hypothesis is yes. Children who have reciprocal friends and who are popular in the peer group, have also higher mean levels of social competence in both years.

In particular, 4-year old children who had mutual friends achieved significantly greater mean scores on the global composite for social competence. In the case of sociometric status, subsequent analyses indicated, as anticipated, that popular children had higher mean levels of social competence, in comparison with all the other children. Furthermore, with respect to the measurement families, children with popular status also achieved significantly higher mean scores in both peer acceptance (PA) and profiles of behavioral and psychological attributes (BPA) composite measures. No sex effects (and no interaction between friendship,

sociometric status, and sex) were observed. Thus, for 4-years olds, sex does not appear to significantly affect the pattern of relations between social competence and (a) friendship reciprocity, and (b) sociometric status.

At 5-years of age, children with reciprocal friendships had higher mean levels on the PA composite measure. Additionally, for this measure of social competence, an interaction effect between sex and friendship was observed and, quite surprisingly, results indicated that boys who had at least one reciprocal friend had higher mean scores on PA composite than boys with no reciprocal friendships, and girls (with or without reciprocal friends). Finally, PA composite scores were also significantly higher for both popular boys and popular girls. Moreover, a sex main effect, favoring boys was observed on social motivation and engagement (SME) family of measures. Overall, the results suggest that both reciprocal friendship and popular sociometric status positively and significantly associate with measures of social competence. Further, sex does not appear to influence the nature of the associations, and if a tendency could be drawn, it would be that boys, more than girls, seem to benefit of having mutual friendships (but also of being popular in the peer group). Either way, the results are in line with the literature on the subject of peer social adjustment (e.g., Berndt, 1996; Coie, & Cillessen, 1998; Dunn, 2006; Howes, 1988, 1996; Newcomb & Bagwell, 1996; Newcomb, Bukowski, & Pattee, 1993; Sandstrom, & Coie, 1999; Spence, 1987), indicating that social adjustment (measured through our broad-band social competence measures) is influenced by the establishment of dyadic mutual relations as well by general sociometric peer acceptance.

Regarding our second question (i.e., whether friendship reciprocity and/or sociometric status associated with higher levels of social competence), the general answer is, again, yes. Both having friends and being positively accepted by peer are significantly related with measures of social competence. Specifically, for 4-year olds having at least one mutual friendship was associated with higher levels of social competence, measured in the same year, for both boys and girls. Sex differences were found only at the measurement family level, with friendship being significantly associated with all three families for girls, while for boys, only PA measures significantly correlated with friendship reciprocity. Thus, for 4-year olds, mutual friendship appears to be a more salient social competence correlate for girls, than for boys.

At 5-year of age, significant correlations between friendship and PA social competence measures were observed for the global sample.

With respect to sociometric status, results indicated that, at both ages, being popular in the peer group was significantly correlated with global social competence, for both boys and girls. On the contrary, for rejected and neglected children the associations with social competence were negative and significant for both 4-year old boys and girls, and only for 5-year old boys. Analyses by measurement family replicated the general pattern with popular children having positive correlations with all three measures (significant for PA composite), and rejected children having significant and negative correlations with PA and BPA composite measures. Finally, at Year 2, having a popular status was positively and significantly associated with BPA measures, for girls, and with PA measures, for both boys and girls. Similar to Year 1, rejected social status was negatively and significantly associated with PA composite, for both boys and girls.

As a whole, results corroborate past research, indicating that being popular associates with high levels of social competence, whereas being nonpopular associates with low levels of social competence (e.g., Coie, & Cillessen, 1998; Newcomb, Bukowski, & Pattee, 1993; Sandstrom, & Coie, 1999).

Considering the last general question (i.e. does having reciprocal friends and/or a positive sociometric status, at age 4, predicts social competence, at age 5?) was also answered with a general yes. For girls, having reciprocal friends at age 4 significantly predicted social competence at age 5. In particular, mutual friendship significantly accounted for higher mean scores on BPA and PA composites. In addition social competence at Year 2 (specifically, PA measures) was also predicted by popular sociometric status. For boys, the results were quite similar, and both mutual friendship and popularity at age 4 predicted PA scores at age 5.

Overall, and despite the occasional differences between boys and girls, results seem to suggest that having, at least, a mutual close relationship, and a popular status in the peer group, similarly influences social competence. Hence, the expected distinctions between the strength of the associations, in accordance with sex, were not found. That is, the hypothesis that, for girls, having reciprocal friends may be a more valuable resource, in terms of social competence and social adjustment, whereas for boys, being popular in the peer group constituted a more salient achievement in social competence development was not confirmed.

The results are, in general, quite mixed and no sex direction or pattern can be confidently perceived. One of the causes for these results could be the fact that the number of children who actually received the status of popular was very small (11 children at age 4, 15 children at age 5), concealing the possibilities to properly assess sex differences. Nevertheless, popular children did achieved significantly higher scores in comparison with all

the other children, and rejected children did achieved significantly lower scores when compared to all the other children, confirming the tendencies reported in previous researches (e.g., Newcomb, et al., 1993; Parker & Asher, 1987). Another reason for our results could be that within this sample of preschool children, both social competence indicators (i.e., friendship and sociometric status) are important assets for social skills development, despite the child sex. On the other hand, because some studies have shown that popular boys may, in fact, have a grater tendency to engage in dyadic interaction (Dodge, et al., 1990) our results are not in fully contradiction with the stated sex hypothesis.

Given the above pattern of results, it is clearly important to expand the research on the subject, using larger samples and direct measures of social dominance, in order to explore possible sex differences on the strategies used by children to influence or socially dominate their playmates. Prior research using measures of social dominance as *the ability to control the resources* (e.g., Hawley, 1999; 2002; 2003), did not found (nor anticipated) sex differences on the type of strategies boys and girls use to fulfill their social needs. However, the resource control strategies were only assessed in dyadic situations and, in addition, no boy-boy, *vs*. girl-girl, *vs*. boy-girl analysis were performed. In accordance with the literature, the play context (dyadic *vs*. group), strongly affects the type of behavior children use to interact and to exert control over their peers (e.g., Benenson, Joyce, Nicholson, Waite, Roy, & Simpson, 2001; Maccoby, 1990). Finally, creating a research design were stereotyped situations are experimented, could also clarify the existence of sex-based preferences for certain types of social exchanges.

Overall, the results suggest that the measures of social competence used in the present study are jointly affect by the abilities associated with (a) the competence for develop and maintain reciprocal dyadic friendships and, (b) being popular within the peer group. In other words, having a mutual friend as well as being well accepted by peers contributes, associates, and predicts social competence in the second year of measurement.

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CHAPTER VI

General Discussion

With time, better knowledge of the basic neural, psychological, and social processes underlying mental health should allow us to worry less about what compromises adjusted development and more about what promotes it or compensates for the losses and disruptive experiences that may jeopardize long term adaptation.

Social competence, as a requirement for social adjustment/adaptation and, ultimately, for mental (see Deater-Deckard, 2001, for a review) and physical health (e.g., blood pressure problems, increased natural killer cells produced under stress, and higher cortisol levels in the brain have recently been found to be associated with loneliness; Doane & Adam, 2010; Steptoe, Owen, Kunz-Ebrecht, & Brydon, 2004) is one of those intricate, multi-origins processes which an improved (and progressively consensual) knowledge will facilitate not only assessment and intervention, but also the creation of contexts/situations that contribute for a good social development from the beginning of our lives. This urge to understand the impact and the development of social competencies appears to be in contradiction with the notion that, contrary to other human skills (e.g., read, calculate, play an instrument, etc.), social skills make up our *long time ago* inheritance, being so deeply embedded in our nature that even while newborns, we are able to react differently to facelike and nonfacelike patterns (Fantz, 1963), that is say, to social *versus* nonsocial stimulus.

However, most of these bio-psycho-social mechanisms, including a special talent to learn social abilities, evolved to solve adaptive problems our hominid ancestors faced and, nowadays, although many evolved mechanisms may still serve human's survival, others may be lost or poorly-developed because of the extraordinary social changes that occurred since then. Cities, birth control, and well-stocked grocery stores are foreign to our ancient ancestors. Being alone for long periods of time, being separate from the mother and grow-up in childcare facilities from increasingly early ages (in Portugal, and other European countries, a child may enter childcare as earlier as 3 months of age), would be at least bizarre to our old relatives and very often, is overwhelming for us, XXI century' technological-virtual-full-of-friends-but-so-amazingly-alone-people. And that is why social competence is getting closer to those human skills that require formal education. In order to become a person, an adapted, and healthy person, one needs to be surrounded by others, familiar, and nurturing others. Over and over again.

Along with the several changes that irreversibly altered our adult lives, children's routines were also dramatically changed. Today, developed countries raise their children in social contexts very different from the family and neighborhood milieus. Among the changes

that lead to the need for these institutions is the increase in the number of working parents, namely, the rate of women in the labor force, which increased from 34% in 1950 to 60% in 2000 (in the U.S. population, Toosi, 2002); in European countries, activity rates for women (ages 25 to 54) are mostly higher than 80% (Eurostat, 2009). Plus, the number of families that remain together (i.e., having grandparents, parents, aunts and uncles, living nearby) is also gradually small, in comparison to what happened, for instance, one hundred years ago. As a result nonfamily childcare turned into a necessity.

Narrowing this discussion, as constraints of space and thoughts are required, it is in the context of this evolutionary innovation – the childcare setting – that social competence is here studied. Our goal is to contribute to a better assessment of social competence in the peer group, during the preschool years. In our proposal, social competence measurement entails the evaluation of several spheres of the child's social abilities, because social competence, as Waters and Sroufe (1983) suggested, is a *coordinative ability* or an *organizing construct* of affects, cognition, and behavior. In addition, as suggested earlier, social competence is interpersonal. It is through interactions with others, in this case, same-age others, that children develop their social expertise.

Based in Waters and Sroufe's (1983) definition, and their suggestions that (as a broad concept) social competence assessment should cover a wide range of features, a group of researchers began the laborious tasks of test a number of social competence indicators, during preschool years (e.g. attention structure, sociometric status, and dominance, Vaughn and Waters, 1980, 1981; Q-sort definitions for scoring social competence, Waters, Noyes, Vaughn, & Ricks, 1985). Positive associations between these measures were also tested (e.g., visual attention received and Q-sort criterion for social competence, Vaughn & Martino, 1988; Waters, Garber, Gornal, & Vaughn, 1983; visual attention received and social status, Omark & Edelman, 1976; Abramovitch, 1976), indicating that each of these measures captured a meaningful aspect of young children's social competence.

Consistent with this multi-level or multi-trait approach, Rose-Krasnor (1997) prism model for social competence is also an important contribution in understanding how the hierarchical model of social competence, described further down, was operationalized. Analyzing the relations between several descriptions and operationalizations of the social competence construct, Rose-Krasnor (1997) suggested a multifaceted prism-shape model, with the most abstract definitions (e.g., the Waters and Sroufe's *social competence as an organizing construct* or an *individual differences latent trait*; or the functional descriptions,

i.e., social competence as the success in achieving social goals) located at the top level in the model. The bottom level of the prism, in contrast, comprised the less abstract definitions and measures of social competence, namely, the specific context-relevant skills. Finally, the middle level (*index level*) includes descriptions and measures that are based in "the self" *versus* "the other" equation, that is, the relationships domain (e.g., friendship, peer acceptance, social status). The base level (or *skills level*) may serve as indicators of the indexes at the relationship level.

Using a set of broadband measures that could be located at the skills' and/or at the indexes' level in Rose-Krasnor (1997) model (i.e., rates of visual attention, rates of interactions, Q-sort measures of social competence, and sociometric measures), Bost, Vaughn, Washington, Cielinski, and Bradbard (1998), operationalized social competence with reference to three broad domains (i.e., social motivation and engagement, profiles of behavioral and psychological attributes, and peer acceptance), in two samples of African American preschool children (from Head Start programs), proposing a hierarchical model were social competence is represented at the top level, as a latent variable (second-order latent variables). The three domains compose the middle level (first-order latent variable) and, finally, the base level comprises the actual measures. Results from this study supported the hypothesis that social competence could be described as a hierarchical organized construct. In addition, data suggested that none of the domains (also referred as *measurement families*) is completely saturated with social competence variance, indicating that an adequate evaluation of social competence cannot be achieved through the use of single measures (or through the assessment of only one dimension).

Subsequent studies replicated these findings (e.g., Vaughn, 2001) and further tested the model using multi-site and multi-national samples (Vaughn et al., 2009). Results were promising. Overall, the model fitted the data equally well across samples, and only a few differences between samples and age were found.

Recently, longitudinal analyses testing the stability of the model across the preschool years (Shin, et al., in press) showed evidences of longitudinal rank-order stability across consecutive years. Specifically, more than 50% of the trait-level variance in social competence at Time 2 was predictable from Time 1 latent scores. This significant association indicates that from one year to another, children maintain their rank-order position in the peer group. This result is even more impressive because, from one year to the next, the groups were shuffled and the teachers were changed. Because of this variability feature

characterizing the samples, higher levels of stability were anticipated for preschool groups that remain approximately identical from one year to the next.

The studies presented in the present dissertation further contributed for the validation of the hierarchical model of social competence, by testing the model in samples of Portuguese preschool children (except for the second study – Chapter III – that included also two samples of American preschool children).

Validation of the model in different populations (regarding culture, socio-economical status, or other demographic variables) is an important task because one of the premises of the model is that the theoretical construct level (i.e., social competence as an internal trait of individual differences that influences the child's ability in coordinating affect, cognition, and behavior in attaining personal social goals), applies universally across the various demographic indicators (e.g., age, sex, socio-economical status, ethnicity, etc.) (Bost et al., 1998). On the contrary, the index measures used to characterize social competence may change in accordance with these demographic variables because, for example, the social competence relevant domains (and respective skills and behaviors) are necessarily different in distinct developmental periods; some domains and measures may be more (or less) appropriate in assessing girl's (or boys) social competence (the same is true for different ethnicities, and distinct socio-economical populations). All these questions are still open for future research.

In the first study, the seven social competence measures or indicators (i.e., rates of visual attention received, positive an neutral interactions initiated, two social competence Q-sorts, positive nominations received, and sociometric paired comparisons) used in prior studies (e.g., Bost, et al., 1998; Vaughn, 2001; Vaughn, et al., 2009), where examined regarding their stability across the preschool period, in a Portuguese sample of preschool children. Sociometric status and friendship stability were further tested. Overall, results indicated that the measures were moderately stable across the preschool years (ages 3 to 5). For both boys and girls, the cross-year associations between repeated measures were positive and significant in more than 50% of all possible cases. In general, the association pattern between the measures was identical for both sexes.

Sociometric status and reciprocal friendship were also assessed regarding stability, because (1) each of these measures is frequently used as an indicator of social competence (e.g., Berndt, 1996; Coie, & Cillessen, 1998; Dunn, 2006; Howes, 1988, 1996; Newcomb & Bagwell, 1996; Newcomb, Bukowski, & Pattee, 1993; Sandstrom, & Coie, 1999; Spence,

1987), and (2) data for computation of these measures was available. Contrary to what was found for the models' seven indicators, the sociometric status cross-year associations were less stable (for both boys and girls, stability was found only in 25% of all the possibilities). Yet, in accordance with the literature, grater stability was found for popular and rejected status (e.g., Coie & Dodge, 1983; Dodge, 1983; Dodge, Pettit, McClaskey, & Brown, 1986).

Reciprocal friendship stability was even lower than sociometric status, although the number of reciprocal friends increased with age, as found in other studies (e.g., Vaughn et al., 2000). Although some studies suggest that during this phase some children do keep their friendships from one year to the next (e.g., Howes, 2009; Ladd, Kochenderfer, & Coleman, 1996), others indicate that some preschoolers develop short-term friendships and only later begin to have increasingly stable friendship relations (e.g., Berndt & Hoyle, 1985; Howes, 1983). Failure in finding friendship stability could also be attributed to the rigorous criteria adopted to determine friendship reciprocal relations. In order to be characterized as a friendship dyad, each child would have to be among the top 4 nominated children both in the sociometric positive nominations, and the paired comparison task, and further receive (and give) a rating of 3 (i.e., *especially likes to play with*), in the rating-scale task. Because these criteria necessarily diminish the number of reciprocal dyads identified, the probability to find stability across years was also reduced.

Globally, when compared with the seven broad measures, sociometric status and reciprocal friendship appear to be less reliable in assessing social competence. Such findings are particularly important when a general approach to social competence at these early ages is the main research goal. Briefly, they validate the significance of the seven social competence measures in the Portuguese preschool samples and, in addition, anticipate the fit of the hierarchical model.

Once the measures were found to work properly in the Portuguese samples, the next step would be to test the full model. For this purpose, two samples of American children, plus the Portuguese sample, were available. With the exception of the Portuguese sample (from which all cases and a few new cases were used), the American samples were a fraction of the original samples used in Vaughn's et al. (Vaughn et al., 2009) study.

The following study was designed to retest and further explore the hierarchical model of social competence. Specifically, by trying to organize the samples in three rather than two age-periods, and by having a more equilibrated sample in respect to socio-economical status (because the Head-Start samples were not included), this study aimed to test if the structural

model (as in Vaughn et al., 2009) was not equivalent across samples, and if the measurement model (contrary to Vaughn et al., 2009) was identical across ages.

Overall, results indicated that the model fitted equally all across samples, both at the measurement and the structural levels. These results are distinct from previous findings (Vaughn et al., 2009) suggesting that the patterns of relations between social competence second-order latent variable and the three measurement families are affected by differences in socio-economical status. Because several features distinguished the original samples in Vaughn et al. (e.g., ethnic composition, social class, age distribution, and culture, Vaughn, et al., 2009), the causes leading to lack of model equivalence between samples (structural equivalence) were not easy to disentangle. Given that the Head Start samples were not included in our study (and because model equivalence across samples was found), it appears that social class, rather than the other variables, was causing model variation. Future studies involving lower social classes, in the Portuguese population, might be enlightening.

Contrary to Vaughn et al. results (Vaughn et al., 2009), the model was equivalent across age, suggesting grater similarity between children's social competence in these subsamples. Because in Vaughn et al. (Vaughn et al., 2009) the Head Start sample, alone, accounted for almost 50% of the younger sample, it is possible that the differences between older and younger children have been mainly caused by this sample. Overall, results indicate that the hierarchical model does fit the data, however, questions regarding the influence of variables such as age and socio-economical status require further investigation.

In the concluding remarks of the study, some thoughts on how preschoolers' social competence may support later social competence were presented. In sum, the developmental approach suggests that from one developmental stage to the next, some continuity is present, which means that, being social competent at age 3 is a precursor of being social competent at age 4, and so on, and so on (Howes, 1987, 1988; Waters & Sroufe, 1983). However, in moving from preschool to school, new social competencies are required (because environmental demands also change), meaning that a different set of measures is necessary in assessing children's social competence. Finding stability between these two periods would be a strong evidence that social competence does operates as an internal organizational trait that overcomes specific abilities at specific social contexts. Indications of that latent stability come from studies showing that children who have social difficulties as preschoolers (e.g., low peer acceptance, associated to persistent display of aggressive behavior towards peers) tend to maintain their low acceptance in the peer context, and to be viewed as hostile by classmates

and teachers (Ladd & Price, 1987). Similarly, children characterized as socially competent as preschoolers, tend to remain socially competent during the first school years (as indicated by positive peer acceptance and teacher reports) (Ladd & Price, 1987).

The third study tested the stability of the hierarchical model of social competence in a sample of Portuguese preschool children, across two consecutive years (4- and 5-year olds). In general, results supported the longitudinal validity of the hierarchical model, further suggesting that, for this sample, the overall level of social competence at Year 1 does not significantly differs from Year 2, that is, no significant increases from one year to the next were observed, despite significant increases at the measures level.

Although the main subject of this study is the hierarchical model's stability, we also briefly discussed the influence the child's sex may have in the relations between social competence and the three social competence domains. Succinctly, it is suggested that while in general the protocol of measures is adequate in assessing social competence, both across age and sex, some sex specificities may perhaps result in a different dynamic (not a different structure) that reflects bio-psychological sex differences evolved many years ago. Another hypothesis, regarding the fact that the patterns found for the Portuguese sample are in contrast with the findings from prior studies (namely, the fact that boys, rather than girls, persistently achieved higher scores in three of the seven measures) is that there is no pattern but, instead, a chaotic system.

More precisely, on the subject of sex differences, some studies show that girls are to ones who surpass boys in social competence measures (e.g., Bost et al., 1998; Denham & Mckinley, 1993; Vaughn, 2001), whereas other studies do not find significant differences between boys and girls (e.g., positive nominations received; Baldia, Punia, & Singh, 2005). As a result, whether there is chaos or a Newtonian order on how sex relates to social competence is open to debate and future studies. Probably both theories have ground where to land. For example (on the perspective of chaos theory), it is truth that the relations between the child's sex and social competence development must be sensitive to small changes in the initial conditions characterizing the peer group (e.g., the boys vs. girls ratio in the peer group; the availability and type of play resources; the sex of the teacher, etc.). Nevertheless, it is also truth that our evolutionary past does gave boys and girls different sensibilities to act in response to an array of environmental cues (see for example the Parental Investment Theory, Trivers, 1972, and how it relates to sex differences in play behavior, Bjorklund & Pellegrini, 2000). Thus, some Newtonian predictability also exists.

In support of the chaotic perspective is the hypothesis that, rather than a collection of stable, long-term, and universal sex differences in behavior, what appears to occur is a *mosaic* structure (i.e., variability) where small differences are found in some contexts, no differences in others, and reversed differences in others (Zakriski, Wright & Underwood, 2005). An example of this mosaic (or chaotic organization) is sex segregation in the peer group. As some studies indicate, although preference for same-sex playmates appears to be universal, the degree of segregation fluctuates as a function of setting (e.g., cross-sex relations are more uncommon in the school context, in comparison with the home context; Daniels-Beirness, 1989).

In discussing the differences between boys and girls, found in our sample, we have further suggested that distinct sex-typical interaction styles might have given boys an advantage for getting higher scores in these measures (i.e., rates of visual attention received, and rates of interactions initiated). Specifically, it was hypothesized that because boys tend behave in a more dominant or competitive way (Maccoby, 1990; Maltz & Borker, 1983), their actions might be more noticeable (for both the observers and the peers) in comparison with girls' actions (in general more smooth and harmony concerned; Maccoby, 1990). As a result, both the detection and coding by the observers could be facilitated (hence, inflated). Also, this visibility feature in boys' interaction styles could function as an attractor to peers attention and interactions, leading to higher scores in both measures.

Whatever the reasons behind the mean differences between boys and girls, sex was not used as a grouping variable in testing the stability on the social competence hierarchical model. And that was because, first, diversity at the indicators/measures level is expected as a result of small (but not unimportant) differences in culture, developmental level, social milieu, and sex (as a cultural context) (Chen, Rubin, & Sun, 1992) and, second, sample size is not large enough to fully test the model using statistical powerful methods.

To test model's stability across years was the main goal and, overall, results indicated that the model was stable, both at the structural level, and the measurement level, indicating that the relations between social competence second-order latent variable and the three measurement families were equivalent at both ages, as well as the relations between these domains and the seven social competence indicators. Contrary to Shin, et al. (in press), latent mean structure testing the equivalence of social competence latent trait across years, did not indicate significant changes from Year 1 to Year 2. This result translates in that from 4 to 5 years, the general level of social competence did not increased significantly (although

significant increases were observed at the measures level). Beyond size sample reasons (Shin, et al., sample size was more than twice of our sample size), one of the causes that could explain our results may be the fact that a significant part of our children were enrolled in the same school setting since they were 3-monts old, being classmates during all the preschool period. Shin, et al. (in press) found differences between the longitudinal cases (in their second year of participation) and the same-age peers who had not been in the same child care program the year before. Thus, this last group was a beginner regarding preschool experience. Also, the motives that lead to school attendance delay were not known (it might be, as the researchers suggest, that children were unprepared, or socially immature and, for that reason, parents decided to postpone school attendance). Consequently, the differences may well be reflecting individual differences, rather than peer experience.

Another feature that distinguishes American groups (Shin, et al., in press) from the Portuguese groups is the fact that, while the former are shuffled from one year to the next (having also a new teacher), Portuguese groups are remarkably stable (in each year only one or two children leave/join the group, and the teacher is always the same). Could this high stability negatively influence social competence development? Although the model assumes that stability in peer relations is a necessary requirement for social competence development and stability, we hypothesized that a certain level of variability may be necessary in order to create new challenges, which, in turn, stimulate development. In the same way as Vygotsky's theory (1978) on the subject of cognitive development, it is reasonable to think that social development also benefits from a small proportion of disequilibrium. In the case of social competence, the "full potential" for development could be more easily promoted if once in a while the child faces the challenges of joining a new group, developing new friendships, solving new conflicts, "fighting" for his/her previous social achievements. In an orderly, long-standing group, it is more likely (we suppose), that once the relations, roles, status, hierarchies, etc., are established, the lower is the motivation to "improve". Future research comparing peer groups that vary in this characteristic (e.g., highly stable, vs. moderately stable, vs. highly unstable) may reveal if, similar to cognitive development, there is an optimal "zone" of group stability that better promotes social competence development.

Finally, the forth study explored the relations between social competence (assessed using the seven measures protocol), reciprocal friendship, and sociometric status, in a Portuguese sample of preschool children (at age 4 and again at age 5). It was hypothesized that a stronger relation between friendship reciprocity and social competence would be

observed for girls, whereas for boys social competence would be more related with sociometric status.

In general, results indicated that, for all children, both reciprocal friendship and positive sociometric status were associated with social competence composite in both years. Regarding the "sex hypothesis", results showed that, contrary to what was predicted, when differences arose (which was an exception, because most results indicate similarities rather than differences), they indicated that reciprocal friendship was in fact a strong correlate of social competence composite for boys (at age 5). Specifically, boys who had at least one reciprocal friend achieved significantly higher mean scores in the peer acceptance social competence domain than boys without reciprocal friends and girls (with or without reciprocal friendships).

Yet, correlational analyses between social competence and each social competence domain indicated that whereas for 4-year old girls, reciprocal friendship was significantly associated with all social competence domains, for the same-age boys, reciprocal friendship was only significantly associated with peer acceptance measurement family. Thus, for girls at this age, friendship reciprocity does appear to be related with social competence more broadly, than for boys. At age 5, however, social competence was only significantly associated to one of the three domains for both boys and girls social, namely, to peer acceptance measures.

Regarding sociometric status, results showed that, across sex and age, being popular was associated to social competence composite. Correlational analyses between sociometric status and each social competence domain replicated these findings: at 4 years, popularity was associated with the three measures (significant for peer acceptance domain); rejection was negatively and (and significantly) associated to peer acceptance, and behavioral and psychological attributes domains. At 5 years popularity was significantly associated to behavioral and psychological attributes domain (for girls), and to peer acceptance, across sex.

Regression analyses indicated that, for girls, reciprocal friendship ate age 4 significantly predicted social competence measures one year later (significant associations were found for two of the three domains). Also, popularity at age 4, significantly predicted social competence peer acceptance measures at age 5. Similar results were found for boys.

Overall, although results are in line with the literature in that both friendship and sociometric status are good correlates of peers social competence, the hypothesis that

different patterns of relations between social competence, friendship, and sociometric status would arise depending on the child's sex was not supported. Essentially, the mixture of relations (and the similarities rather than differences) between the variables well fits the discussion presented for the third study. That is to say, no pattern is evident (which does not mean that no pattern exists). Several causes could have influenced the results (small changes in the initial conditions characterizing the peer groups?). Sample size is certainly a major limit of the study. In particular when, for purposes of analyses, we needed to split the sample in smaller groups (as it was the case for sociometric status, and also for friendship, although at a lower degree, because only two categories existed). Thus, larger samples, and more direct measures of dominance and competitiveness might have shown a different picture.

Summarizing, the main goal of the thesis was to contribute to the validation of an assessment model for social competence with peers during the preschool years. Because a variety of definitions and measures of social competence are available, the development of an instrument that simultaneously comprises several social competence domains and distinct levels of analyses, (which in theory are universally relevant in measuring social competence, despite cultural, sexual, and developmental differences) is a big step, both theoretically and empirically. Being an ambitious purpose, a number of researchers (e.g., Rose-Krasnor, 1997; Shin, et al., in press; Vaughn, 2001; Vaughn & Martino, 1988; Vaughn & Waters, 1980, 1981; Vaughn et al., 2000; Vaughn et al., 2009; Waters et al., 1983; Waters et al., 1985) had to work together, for a long time, collecting and testing a variety of measures so that the assumptions of broadband, age-appropriate, and affect-cognition-behavior coordinated measures (Waters & Sroufe, 1983) were met. The result was a hierarchical model for social competence, assessed through seven direct measures or indicators that capture three distinct (but not independent) domains of preschoolers' social competence in the context of peer relations. By testing the model in a new population (the initial studies were conducted in US samples) our work extended its scope and validity. With a few exceptions (discussed earlier), the fit of the model for the Portuguese data was equivalent to what was found for the US data.

The next big step would be to synthesize the model in a more "user-friendly" instrument, so that others than a team of researchers (at least 6 independent observers per session of assessment are necessary to collect the data) can effectively measure social competence. Such an instrument (preserving the qualities of the original one) would allow teachers and school psychologist to easily (yet widely), assess children's social competence.

Because social adjustment to peer group entails many features, the ability to cover a significant number of these features with only one instrument is not just a profit in time, but also a benefit for the quality of intervention.

Back to the beginning… With time, better knowledge of the basic neural, psychological, and social processes underlying mental health should allow us to worry less about what compromises adjusted development and more about what promotes it or compensates for the losses and disruptive experiences that may jeopardize long term adaptation. By knowing how social competence develops, what it entails, and how a particular developmental path can affect the child's adjustment (both socially and cognitively), prevention measures (or promotion measures) rather than interventions, can also be design.

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