New Directions in Social Competence Research:

Examining Developmental Trajectories and Language Minority Populations

by

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A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved March 2014 by the
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May 2014

ABSTRACT

Research regarding social competence is growing rapidly, but there remain a few aspects of social development that merit more attention. The presented pair of studies were planned to address two such areas in the social development literature, specifically the longitudinal trajectories of social competence and the role of social competence in second language development in language minority (LM) students. The goal of the first investigation was to examine the developmental trends of interpersonal skills (IS) across the early childhood and elementary school years in a nationally representative, U.S. sample. The goal of the second study was to examine whether differing trajectories of IS development in language minority children in the U.S. were related to their language and literacy (LL) skills at grade 5. Both studies utilized data from the Early Childhood Longitudinal Study - Kindergarten Class of 1998-1999 and modeled ratings of children's IS at five time points between fall of kindergarten and spring of fifth grade using latent class growth analyses in Mplus.

In study 1, the best model was a quadratic two-class latent class growth analysis. Trajectory class 1 was a higher-level path with a marginally significant non-linear shape and class 2 was a primarily stable, moderate level path with a slight, non-significant increase over time. The same pattern of results emerged for both boys and girls separately as with the combined-sex model, and in all three final models the proportion of the sample in the higher-level class was greater than the moderate-level class.

In study 2 a sample of U.S. children whose primary language at home was something other than English was utilized. LL at the start of kindergarten and sex were included as covariates and LL in fifth grade as a distal outcome. The best model for the data was a cubic two-class latent class growth analysis. Class 1 followed a higher-level path with small, incremental change over time and class 2 was a moderate-level path with greater undulation. Both covariates significantly predicted latent class and language and literacy scores at grade 5 differed significantly across classes.

DEDICATION

For Matthew, my husband, my compass. I owe my success to your unwavering encouragement and endless support. You made this possible.

A million times, thank you.

ACKNOWLEDGMENTS

I would like to acknowledge a number of people for their invaluable support during the writing of my Dissertation. First, I would like to recognize my dissertation chair, Jeanne Wilcox, for her patience and support throughout my graduate career. I would not have made it to graduation day without her in my corner. I would like to thank my dissertation committee: Robert Bradley, Natalie Wilkens, and Carlos Valiente for their helpful feedback and suggestions. Natalie's guidance and feedback were essential to my progress and the preparation of my document. I learned so much in working with her. I would also like to acknowledge Amy Guimond for her help and feedback regarding my proposal. And finally, thank you to my family, friends, and coworkers (especially Rachel Mayercek and Dawn Cosgrove Greer) for your constant encouragement. I could not have done it without you!

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PREFACE

Attainment of interpersonal skills is a crucial developmental task for children as social competence has numerous important correlates with later achievement, well-being, and other outcomes. Empirical evidence demonstrates relations between social competence and both concurrent and later academic success (Denham, 2006; Izard et al., 2001; Ladd, Herald, & Kochel, 2006; Thompson, & Raikes, 2007). Social competence promotes positive peer relationships, which are important for academic achievement (Ladd, 1989; 1990; Ladd & Price, 1987). Positive peer relationships provide a child with a network of educational and emotional support in the school setting, contributing to how well children adapt to the demands of formal schooling (Ladd, 1989; 1990).

Social competence has been defined in many ways (Rose-Krasnor, 1997). This construct can include a variety of specific skills and behaviors, sociometric status, relationships, and functional outcomes; and theorists differ in what set of attributes or behaviors they believe constitute it and the level of conceptualization (Waters & Sroufe, 1983). For example, some highlight components such as emotion regulation (Brophy-Herb, Lee, Nievar, & Stollak, 2007), whereas others emphasize personality dimensions (e.g. shyness/gregariousness; Chasson, et al., 2011). Further complicating the literature regarding social competence, researchers use various assessment tools to measure social competence (La Paro & Pianta, 2000). Most researchers, though, generally agree on the more comprehensive definitions of this concept (Halberstadt, Denham, & Dunsmore, 2001). One such broad definition is social competence as "effectiveness in developmentally appropriate social

interactions" (Rose-Krasnor, 1997). Rose-Krasnor (1997) uses a three-tiered prism model of social competence to organize the many approaches to conceptualization of social competence. The expansive theoretical definition resides at the highest level of the prism. The tier below includes self- and other-related indices of context-specific social competence. This level encompasses social interactions, relationships, and group status. The bottom level reflects individual skills (social, emotional, and cognitive), behaviors, and motivations that comprise the indices above. The present studies measured social competence at the most concrete level, the skills level. The specific aspect of social competence of interest in these studies was the set of behaviors that encourage positive relationships with others, referred to as interpersonal skills (IS).

Most of the theory and research regarding IS discusses this construct as prosocial behavior, thus the literature review for the current investigation included studies pertaining specifically to prosocial behavior. Eisenberg, Fabes, and Spinrad (2006) define prosocial behavior as "voluntary behavior intended to benefit another" (p. 646). This definition does not necessarily require the intended goal of the behavior to be relationship building, however links between prosocial behavior and positive peer relations have gained empirical support (Bo-Liang & Lei, 2003; Sebanc, 2003). Prosocial behaviors are frequently used in measures of social competence (Eisenberg et al., 2006).

Research regarding social competence is growing rapidly, but there remain a few aspects of social development that merit more attention. The presented pair of studies were planned to address two such areas in the social development

literature, specifically the longitudinal trajectories of social competence and the role of social competence in second language development in language minority students.

CHAPTER 1: STUDY 1

Abstract

The goal of this investigation was to examine the developmental trends (trajectories) of social competence across the early childhood and elementary school years in a nationally representative, U.S. sample. Utilizing data from the Early Childhood Longitudinal Study – Kindergarten Class of 1998-1999, ratings of children's interpersonal skills at five time points between fall of kindergarten and spring of fifth grade were modeled using latent class growth analyses in Mplus. Analytic models were conducted with a mixed-sex sample and for boys and girl separately. The best model for the full sample was a quadratic two-class latent class growth analysis. Trajectory class 1 was a higher-level path with a marginally significant non-linear shape and class 2 was a primarily stable, moderate level path with a slight, non-significant increase over time. The same pattern of results emerged for both boys and girls separately as with the combined-sex model, and in all three final models the proportion of the sample in the higher-level class was greater that than the moderate-level class. The results of this study echo findings in previous research and add to the existing literature by providing an example of how social competence may develop over time for young boys and girls in the U.S.

Study 1: Developmental Trajectories

As children age, the challenges that they face in maintaining positive social interactions and peer relationships change. The successful progress through key social and emotional developmental milestones is related to adaptive resilience in response to adverse events or situations (Saarni, 2000), whereas difficulty negotiating these developmental challenges is associated with negative outcomes such as psychopathology, behavior problems, and poor academic achievement (Denham, Zahn-Waxler, Cummings, & Ionnatti, 1991; Kohlberg, LaCrosse, & Ricks, 1972; Rubin & Clark, 1983). A study that investigates patterns of social competence across childhood may offer insight into how children navigate these milestones and whether multiple developmental trajectories exist. The goal of the current study was to explore the developmental trend(s) of social competence from early childhood through early adolescence using a longitudinal and nationally representative U.S. sample. Additionally, the use of a latent class growth analysis analytic design in the present study allowed for detection of disparate developmental trajectories within the sample.

The advantage of tracking social competence over time rather than relying on a single assessment is the ability to identify points in development where aptitude in this area might falter. Recognizing these vulnerable junctures, preventionists can intercede and provide support to help children maintain positive interactions and relationships amid a difficult time. Ladd (2005) asserted that an important direction for future research in the area of social competence development is the identification of "the periods during children's development

when it may be most effective to implement prevention and intervention programs" (p.340-341). There is evidence from experimental intervention research demonstrating that increases in children's social competence are associated with improvements in peer group acceptance (Asher, Parker, & Walker, 1996). More of the existing applied research, however, pertains to techniques for assisting children in surmounting peer relationship problems such as rejection and victimization. Less is known about effective methods of preventing problems with peers by promoting social skills (Ladd, 2005). The proposed investigation is designed to address this paucity in the literature. Following children's progress in social competence from kindergarten through fifth grade and examining group characteristics associated with different developmental pathways during childhood will provide insight into how children withstand varying developmental demands in the social arena and at what points support might be most valuable.

Developmental Demands

The preschool and kindergarten years present a new social environment for most children. Whereas in infancy and toddlerhood children spend most of their time with adults or in small, closely monitored groups of familial children or peers, this first foray into formal schooling in preschool and kindergarten introduces children to interactions with same-age peers in a larger group setting. During this period, children must learn how to form friendships by interacting appropriately and effectively with peers. Particularly, in early childhood, children face the challenge of managing and regulating their own emotional arousal while simultaneously practicing prosocial behavior with peers.

During middle childhood, the grade school years, cognitive maturation allows for more abstract thought and as children's perspective-taking skills improve, they begin to better understand the intentions of others (Selman, 1980). Advances in children's perspective-taking skills may contribute to how they perceive and define friendship (Burgess & Rubin, 2000; Selman & Shultz, 1990). The form and function of friendship changes during each stage of development and during this period, dyadic friendships become more prevalent. Additionally, peer status solidifies in middle childhood. Greater awareness of their own and others' opinions of classmates brings the issue of social acceptance to the forefront (Parker, Rubin, Price, & DeRosier, 1995). The tasks of creating and maintaining close friendships and being well-liked are therefore critical for elementary school children.

Young adolescents are confronted with an entirely new set of obstacles. Fabes, Carlo, Kupanoff, and Laible, (1999) describe the many changes that arise during early adolescence, including physical, hormonal, cognitive, and relational. These various transformations coincide with an increased interest in romantic and sexual relationships during this period of life (Udry & Billy, 1987). The desire to achieve intimacy and close romantic relationships may cause an increase in prosocial behavior (Eisenberg & Fabes, 1991; Fabes et al., 1999). However, changes in prosocial behavior with the onset of adolescence are more complex because other interpersonal behaviors such as aggression and irritability have been found to escalate during puberty (Connolly, Paikoff, & Buchanan, 1996; Susman, Nottelmann, Inoff-Germain, & Dorn, 1987). Also, at this stage, individuals experience further growth in perspective-taking skills as they become capable of abstract thought

(Selman, 1980). With this potential for higher-level thinking, adolescents develop the ability to comprehend societal perspectives (Shantz, 1983), as well as a less egocentric perspective of relationships exhibited by increased concern for the thoughts and feelings of relationship partners (Selman & Shultz, 1990). There are numerous age-related influences on social behavior, warranting investigation of how children's social competence fares over time as they navigate these developmental demands.

Developmental Pathways

Theoretically, social competence development should be marked by a rise in prosocial behavior over time (Eisenberg & Fabes, 1998; Tremblay, 2003), but this has yet to be confirmed in empirical research. The use of various definitions and measures of social competence, divergent samples and age ranges, and the type of analysis applied all contribute to the inconsistencies found in the literature. For example, empirical work has shown that from toddlerhood to early childhood some social behaviors, such as spontaneous sharing, decrease over time whereas others, such as sharing by request, increase over time (Hay, Castle, Davies, Demetriou, & Stimson, 1999).

A meta-analysis reviewing results from studies between 1974 and 1994 showed an increase in prosocial behavior with age (Eisenberg & Fabes, 1998), but this review examined behavior over time by categorizing participants into age groups and cross-sectionally comparing the different age groups across studies. While there are some longitudinal studies that measure prosocial behavior over time (e.g. Eisenberg et al., 1998), most are point-in-time or cross-sectional in nature.

Some studies have used correlation analyses to determine the stability of prosocial behavior between timepoints (e.g., Howes and Phillipsen, 1998; Tremblay, Vitaro, Gagnon, Piché, & Royer, 1992), but these analyses only give a segmented picture of social competence, failing to address long-term developmental patterns. Although correlational studies and those utilizing structural equation modeling (e.g. Elias & Haynes, 2008; Obradović, Dulmen, Yates, Carlson, & Egeland, 2006) can provide information about rank-order stability, these analytic approaches do not address mean-level stability, within-person stability, or the potential for multiple developmental trajectories. The present study was designed to examine these other aspects of stability and to test for the existence of divergent developmental pathways.

Few have explored developmental trajectories of social competence, and those that have possess weaknesses such as examining only short-range associations or utilizing different measures across time points. There are two notable exceptions (Côté, Tremblay, Nagin, Zoccolillo, & Vitaro, 2002; Kokko, Tremblay, Lacourse, Nagin, & Vitaro, 2006). Côté et al. tracked helping behavior from childhood to early adolescence and employed latent class growth analysis to examine developmental pathways. They found this kind of prosocial behavior to be stable from age 6 to age 12. The only group differences in trajectory were the level of helping behavior that was maintained, meaning that initial values described most of the variation in the sample. The majority of children in their sample maintained a moderate level of prosocial behavior and the remaining children fell into smaller groups of either steady high (primarily girls) or low levels (primarily boys).

With a sample of male children followed from age 6 to age 12, Kokko et al. (2006) also used latent class growth analysis and had similar results to Côté et al. (2002). There were some slight differences, however. Kokko et al. only obtained two groups, the moderate- and low-level groups, and also detected a slight decline in prosocial behavior over time. This discrepancy in results is likely due to the exclusion of female participants in the study conducted by Kokko and colleagues. Further research is needed to reconcile theory and empirical findings, investigate these patterns in other samples, to explore other potentially related outcomes of developmental patterns, and to compare these trajectories with simultaneous developmental trajectories of related phenomena. The goal of the current study is to address some of these gaps in the literature by utilizing a sample of children from the U.S., focusing on the development of a different set of social competence skills (i.e. interpersonal skills), and comparing trajectory paths found in the present study to those discovered in Côté et al. and Kokko et al.'s work.

Sex Differences

Adding another layer of complexity to the development of social competence is that sex differences are often found in social behavior (Fabes et al., 1999; Semrud-Clikeman, 2007). Girls are commonly rated higher on measures of prosocial behavior (Diener & Kim, 2004; Eisenberg, Fabes, & Spinrad, 2006). This trend has been documented across a variety of study designs, methods, and characteristics of the behavior recipient (Eggum et al., 2011; Elias & Haynes, 2008; Fabes et al., 1999; Forehand, Neighbors, & Wierson, 1991; Whiting & Edwards, 1973), but not all findings have been consistent (Eisenberg et al., 2006). Sex differences in the helping behaviors of

older adolescents and adults, for example, have been found to vary depending on the particular behavior measured (Carlo, Hausmann, Christiansen, & Randall, 2003; Eagly & Crowley, 1986). Additionally, the magnitude of sex differences varies with the specific behavior in question, subject age, and assessment type (i.e. self- and other-report versus observation; Eisenberg & Fabes, 1998). Given these findings, potential sex differences in interpersonal behavior could play an instrumental role in the course of social competence development, so they were explored in the present study. Moreover, previous studies investigating social competence over time have performed analyses independently by sex (e.g. Côté et al., 2002) and doing so in the present study allowed for a more direct comparison to existing research.

The Present Study

The objective of this investigation was to examine the developmental trends (trajectories) of social competence across the early childhood and elementary school years in a nationally representative, U.S. sample. The specific aspect of social competence of interest in this study was the set of behaviors that encourage positive relationships with others, referred to as interpersonal skills (IS). The analysis method for the present study was chosen to provide information about the patterning of IS over time as well as demonstrate whether there are subgroups of the sample that conform to different trajectory paths. Resulting trajectories were examined to reveal whether IS demonstrates a persistent course over time or if there are trajectories that include deviations from stable patterns. Based on previous findings, it was hypothesized that two or three distinct trajectories would be observed in the data and that these paths were not likely to intersect. Sex

differences in trajectories were expected such that if multiple trajectories were found, the highest-level path would be populated by more girls than boys and the lowest-level path would contain more boys than girls. Furthermore, it was thought that the boys-only model may not produce the highest-level class found in the girls-only model. It was also hypothesized that separating the sample by sex may improve the clarity of the trajectories found. There have been some discrepancies in previous work regarding whether boys and girls would display qualitatively different developmental patterns (trajectory shapes), so no a priori hypotheses were made in this respect.

This study builds on previous research in a number of ways. First, the present study will include a nationally representative U.S. sample, whereas the Côté et al. (2002) and Kokko et al. (2006) studies both utilized Canadian samples. The sample used by Kokko et al. consisted of boys in low socioeconomic areas, but both samples were of French-speaking kindergarten children from Québec. The present study will include both male and female participants, as Côté et al. did. Finally, the proposed investigation will employ a different measure of social competence than the Côté et al. (2002) and Kokko et al. (2006) studies, affording examination of other aspects of this construct. As opposed to the focus on helpful behavior singularly in these previous studies, the proposed study assessed a broader array of prosocial behaviors that constitute a measure of interpersonal skills. Specifically, the features of social competence examined in the present study included helping peers, but also aptitude in forming and maintaining friendships, compatibility with dissimilar peers, positive self-expression, empathy, and comforting. The inclusion of these

additional behaviors may prove to be an important extension of previous work because, as mentioned earlier, research has shown that different types of prosocial behaviors can have distinct developmental patterns over time. Another benefit of examining a different aspect of social competence lies in the potentially different shape of the trajectories. In a study examining a variety of prosocial behaviors across late childhood, for example, sharing increased linearly over time; however, cooperating and comforting behaviors were found to exhibit curvilinear patterns (Jackson & Tisak, 2001). The current investigation adds to existing literature regarding the nature of within-person stability and change in the development of various dimensions of social competence.

Method

Data and Sample

The present study utilized data from the Early Childhood Longitudinal Study – Kindergarten Class of 1998-1999 (ECLS-K), collected by the U.S. Department of Education's National Center for Educational Statistics (NCES). The ECLS-K is a large dataset that followed a nationally representative sample of U.S. children from kindergarten through eighth grade. The original sample included more than 21,000 kindergarten children (Westat, 2000). Participants were chosen using a stratified design in which geographic regions (counties or groups of counties) constituted the primary sampling units (PSUs), schools comprised the second-stage units, and students within schools were the third and final units. Some populations, such as children attending private schools and Asian and Pacific Islanders, were oversampled to ensure large enough subgroups. Effects of oversampling were

corrected for by assigning sample weights to all participants. A detailed description of sample design can be found in the *ECLS-K Base Year Public-Use Data Files and Electronic Codebook* (Westat, 2000). Data collected for the ECLS-K included parent interviews, teacher and school staff questionnaires, school records, and direct child assessment.

Sample Weights. Due to the complex nature of the ECLS-K sample, a series of weight variables were created by NCES to provide greater generalizability to the target population. These sample weights adjust for differential selection probabilities and reduce bias associated with nonresponse. Selection of the most appropriate sample weight is based on the population of inquiry, types of assessment and reporters, and waves of data collection included. For the current study, the variables of interests were child-level data but collected through teacher report at waves 1, 2, 4, 5, and 6. The sample weight corresponding to child-level data for these five waves is C1_6FC0, so this weight variable was chosen for the present study. For simplicity the time points fall of kindergarten, spring of kindergarten, spring of first grade, spring of third grade, and spring of fifth grade will be heretofore referred to as Time 1, 2, 3, 4, and 5, respectively.

Analytic Sample. Three inclusion criteria were imposed on the original ECLS-K sample that restricted the sample size for the current study: home language of the child, disability status, and grade level achieved at Time 5. Firstly, children who are non-English speakers at the beginning of kindergarten tend to have different school experiences than native English speakers. Social development may follow a somewhat dissimilar process in this subgroup; thus only kindergarten

children for whom it was ascertained that English was the primary language used at home were included. Information on home language was gathered from parents in the fall of kindergarten (or spring if responses were missing from the fall time point). The ECLS-K database contains a composite variable (WKLANGST) derived from a variety parent-response questions regarding language spoken at home. Based on this composite, 17,224 child participants were reported to speak English as the primary language in the home. Remaining participants either primarily spoke a language other than English at home (2,783) or the home language was unknown (1,402 missing data or not ascertained).

Next, because the goal of this study was to describe developmental trajectories of typically developing children, only those participants who were identified as not having a disability at Time 5 were included. Disability information was collected at other points during the study, but because disability status (e.g. severity of diagnosis or existence of an Individualized Education Program) can change over time, data from the final time point relevant to the present study was used. A composite variable (P6DISABL) was used to identify children who had a disability diagnosed by a professional. The composite was comprised of parents' responses to a variety of interview questions, in the spring of the fifth grade year, regarding any professional diagnosis, receipt of therapy services, or participation in a program for children with disabilities for their child. Ideally, a threshold score on a standardized, normed, age-based cognitive or language test would be used to determine participant inclusion, but no such measure of cognitive ability was available in the existing data. This constraint dropped the eligible sample size down

to 7,363 child participants (1,555 had a disability and 8,306 had missing data or responses not ascertained).

The last criterion enforced was that each participant had to follow typical grade progression, meaning that the child must have been in the fifth grade at Time 5. Of the 7,363 participants who qualified thus far, 6,621 met this final condition. An additional eleven participants were excluded from the sample due to missing data on all indicators of IS. The ultimate sample used for the present study was 6,610 participants. Fifty-three percent of participants were female (n = 3,501). Mean age of children at the beginning of data collection, specifically at the time of the fall child assessment, was around 5 years and 9 months (*M* = 68.69 months, *SD* = 4.16 months). Table 1 displays additional demographic information for the sample. Most family characteristics were reported by parents during a structured phone interview in the fall of the kindergarten year, except for gross household income, which was reported by parents in the spring. Total household income ranged from zero to $150,000, with a mean of $60,551 (*SD* = $36,534).

A socioeconomic scale (SES) variable was computed based on the following components: mother/female guardian's education, father/male guardian's education, mother/female guardian's occupation, father/male guardian's occupation, and household income. The amounts of missing data from the original ECLS-K sample for these variables were mostly small, with the largest percentage missing from income (2.1%, 3.8%, 11.3%, 11.3%, and 28.2%, respectively). Missing data for all components of the SES were imputed using a hot deck methodology. This process involves replacing missing values with those of a "similar" participant who

did respond to that item. Respondent similarity is determined by auxiliary information known for both participants. Groups or cells of similar participants are created and values from respondents in that pool are randomly assigned to the non-respondents. Following imputation of missing data, a continuous variable was created in which higher values indicate higher SES. Then a categorical variable was derived from the first using a weight variable. The distribution of this categorical variable in the current sample is reported in Table 1.

Measures

An adaptation of the Social Skills Rating System (Gresham & Elliott, 1990) was used in ECLS-K data collection. This adapted measure was called the Social Rating Scale (SRS) and included five modified subscales from the original measure (Approaches to Learning, Self-Control, Interpersonal Skills, Internalizing Problem Behavior, and Externalizing Problem Behavior). Parents and teachers rated children on the SRS in kindergarten and first grade. From third grade on, only teachers completed the SRS. The teacher-rated Interpersonal Skills (IS) scale was used for the present study. IS contained five items that represented children's competence in forming and maintaining friendships, compatibility with dissimilar peers, expressing themselves in positive ways (i.e. ideas, feelings, and opinions), demonstrating empathy for others' feelings, and helping or comforting peers. Items were rated on a four-point scale (1 = never, 2 = sometimes, 3 = often, 4 = very often) with an additional option to select "no opportunity to observe this behavior", which was coded as missing. Scale scores for the SRS were computed by taking the mean of items in the subscale. Scores were computed only if the student was rated on at least

two-thirds of the items in that scale. Split-half reliabilities for IS at each grade level were, .89, .89, .89, .89, .88, respectively for fall kindergarten, spring kindergarten, first, third, and fifth grades (National Center for Education Statistics, 2001; National Center for Education Statistics, 2002; Pollack, Atkins-Burnett, Najarian, & Rock, 2005; Pollack, Atkins-Burnett, Rock, & Weiss, 2005).

The items of the IS subscale were identical at each time point (fall of kindergarten through spring of fifth grade). Two items were added to the SRS for the last two time points (third and fifth grades) but were included in other subscales; thus this addition did not alter the measurement of IS. Even though IS items were consistent at each wave, caution is advised when interpreting change in scores over time. This is due to the potential for reporter bias either as a result of variations in construal of item wording by different teachers or differential meaning of items given the age or grade level of the children being assessed (Pollack, Atkins-Burnett, Najarian, & Rock, 2005; Pollack, Atkins-Burnett, Rock, & Weiss, 2005). Scale scores were used for all analyses.

Results

Number of respondents, means, standard deviations, and normality descriptives for un-weighted interpersonal skills scores at each time point are presented in Table 2. Skewness and kurtosis for all variables fell between -1 and +1, so they can be reasonably assumed to have a normal distribution. Bivariate correlations between un-weighted scores at each wave, using pairwise deletion, ranged between 0.26 and 0.58 and all were significant at $p < .001$.

Scores on the IS scale at fall kindergarten, spring kindergarten, spring first grade, spring third grade, and spring fifth grade were used to compute trajectories of IS over time. Latent class growth analyses were modeled using Mplus Version 7 (Muthén & Muthén, 1998-2012). A series of mixture models were constructed using maximum likelihood estimation with robust standard errors (MLR). This estimation approach uses the full-information maximum likelihood (FIML) algorithm for handling missing data, which utilizes all available data simultaneously (Acock, 2005). Research has shown that parameter estimates generated with FIML are less biased than pairwise deletion, listwise deletion, and mean imputation methods (Enders, 2001). Data are assumed to be missing at random (MAR) with this approach. The C1_6FC0 weight variable was identified in the data input statement to attain more appropriate standard errors. Because parameter estimation in mixture modeling is an iterative procedure, starting values were specified to help avoid non-convergence issues and settling on local maxima. In these models, 100 random sets of starting values and 20 final optimizations were employed. Indices used to examine the appropriateness and classification quality of the model were the Bayesian information criterion (BIC), class size, entropy, and the Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR; Lo, Mendell, & Rubin, 2001) for significant increase in model fit versus a model with one fewer class.

The first set of models tested were linear and quadratic latent class growth analyses (LCGAs) with one, two, three, four, and five classes. The latent intercept factor was indicated by IS scores at T1 through T5, with each of the factor loadings set at 1.00. The latent linear slope factor was indicated by IS at T1, T2, T3, T4, and

T5 and the factor loadings were set at 0.00, 0.50, 1.50, 3.5, and 5.5, respectively. For models including a quadratic term, the latent quadratic slope factor was indicated by IS at T1 through T5 and factor loadings were set at 0.0, 0.25, 2.25, 12.25, and 30.25, respectively. To eliminate the estimation of within-class variability, the variance of all growth factors was fixed at zero. Entropy and VLMR values suggested that the best model was a two-class LCGA (see Table 3). The maximum loglikelihood value was replicated numerous times, indicating that a global maximum was likely reached rather than the model settling in a local maximum. Although the BIC value continued to decrease as more classes were added to the model, the other model assessment measures did not concur. There is evidence that the BIC has a tendency to overestimate the number of classes appropriate for a given model (Nielsen et al., 2012). The graphical displays of the two trajectory classes heralded a quadratic trend in one of the classes. The quadratic term was significant ($p < .001$) for the first and larger class, and the quadratic two-class model was slightly better than the linear two-class model. The quadratic LCGA was selected as the superior model. Because the quadratic term was not significant in the second class, the model was analyzed again with this term removed for class 2. The mean for the quadratic latent growth variable was constrained to zero for class 2, producing a more parsimonious model. The BIC for this more concise model was slightly lower (50683.07) than the previous model and entropy was slightly higher at 0.728. The VLMR remained significant ($p < 0.001$). This was chosen as the final model for the full sample.

Figure 1 displays sample trajectories (calculated with mean scores for children's most likely class) and estimated trajectories (calculated using the model's

coefficient estimates), as well as the percent of participants in each class for the final model. For class 1, all latent growth factors' means (intercept, linear slope, and quadratic slope) were significant. In class 2, only the intercept factor mean was significant; the linear slope factor mean was not. This model demonstrates that there are two distinctly different trajectory groups in the data; one following a high-level, quadratic path and the other a moderate-level, linear path. As expected, the percent of girls in class 1 (54%) was slightly higher than the percent of boys. Class 2 was virtually split between the two sexes.

At 0.73, the entropy of the final model still lacks some clarity in classification. Entropy values range from zero to one, with values closer to one indicating a clearer categorization of participants into classes (Feldman, Masyn, & Conger, 2009; Jung & Wickrama, 2008). Lower values suggest that the class profiles do not precisely characterize group differences in the sample. There is no set guideline for cutoff value, but many regard values at or above 0.8 suggest high quality, cleaner class separation. Even though entropy for this model was not optimal, the average latent class probabilities for most likely latent class membership were good. Muthén and Muthén (2000) assert that "good classification quality is obtained when diagonal elements are high and off-diagonal elements are low" (p.889). On-diagonal values were 0.93 and 0.89, and off-diagonal values were 0.07 and 0.11.

The LCGA design allows for between-class variation in trajectories, which means different trajectory paths can assume qualitatively different shapes. However, within-class variance is not estimated in LCGAs. To explore models that permit heterogeneity within classes, the second set of models tested were growth

mixture models (GMMs), which allow for both between- and within-class variance. Again a series of linear and quadratic models were attempted starting with one class and increasing the number of classes by one. One-, two-, and three-class linear models terminated successfully, but the four- and five-class linear models could not be generated in GMMs due to fatal estimation errors. The only quadratic GMM that could be estimated was the 1-class model. All other quadratic GMMs produced fatal estimation errors as well. A number of attempts were made to resolve model errors but none were successful. Most often errors were found in the psi matrix, the factor variance-covariance matrix, during estimation. Specifically, correlations greater than one existed between latent growth factors. One recommended solution to this problem is to center the time series (Muthén, 2012). This tactic was considered, however, centering the time series would move the intercept to first grade, which is a less meaningful time point both theoretically and with regard to the amount of change observed between waves of data. Further efforts were made to correct the errors in the GMM models by allowing the variances and covariances of the latent growth factors to vary across classes or adding residual covariances between the observed outcome variables. Neither of these attempts was successful. The GMM approach was forfeited due to these irrevocable errors.

A final set of LCGA models were tested for boys and girls separately. One-, two-, and three-class linear and quadratic LCGA models were attempted for both boys and girls. Model evaluation measures for the models are displayed in Table 4. For both boys and girls, the same pattern of results emerged as with the combined model. Entropy and VLMR tests pointed to a two-class model and the significant

quadratic term (*ps* < .05) and graphical depiction of the two classes revealed a quadratic trend in one of the two trajectories (Figure 2). Again the BIC continued to fall as the number of classes increased, and thus this indicator suggested a different solution than the other two. The quadratic two-class LCGA was again the best model for both the boys and girls groups overall. The BIC was better in the sex-segregated models but entropy improved for the in the girls' model only. Sample and estimated means for IS at each time point are presented by class for the full sample, male-only, and female-only models in Table 5. Class proportions were almost identical between the three models (full sample, girls-only, and boys-only) with class 1 containing about 70% of the sample and class 2 containing around 30%.

Discussion

The objective of this study was to examine potential trajectories of social competence development in a nationally representative sample of children in the U.S. Using the ECLS-K data, ratings of children's interpersonal skills at five time points between fall of kindergarten and spring of fifth grade were modeled using latent growth modeling. Both LCGA and GMM techniques were employed to discern whether multiple distinct trajectory paths, represented by latent growth classes, existed in the data. Subsequently, the sample was divided by sex and reexamined to compare model results between the boys and girls.

In the first set of models, with the full sample, a quadratic two-class LCGA was the most appropriate model for the data. The trajectory for class 1 had a slight, but significant, non-linear shape that demonstrated a small increase in IS from fall of kindergarten to spring of first grade, after which scores decreased in the final two

time points, spring of third and fifth grades. The path for class 2 was primarily stable with a slight, non-significant increase over time. Although the shape of the two trajectories was somewhat dissimilar, the greatest difference between the two paths lied in the intercepts. The mean on the IS measure (rating scale was 1 to 4) at fall of kindergarten was 3/4 of a point higher in class 1 than class 2 and this difference diminished slightly but carried through to spring of grade 5 where there was a difference of about 2/3 of a point between the two classes. Given these results, it seems that where one starts out at the beginning of kindergarten makes the biggest impact on where that person will end up five and a half years later.

The results for models in the two sex groups separately were much the same as with the full sample. In both groups, a quadratic two-class LCGA was selected as the best model. Within each sex subgroup, the same trends over time were observed for the two classes as in the full sample; one high-level, quadratic and one moderate-level, linear trajectory. Model assessment measures improved for the girls-only model, but entropy was lower in the boys-only model than in the full sample. This result suggests that the distinction between classes was clearer for the girls-only model. In looking at the shape of the trajectories for the boys-only model, it is evident that the two classes are qualitatively similar. Even though the BIC signaled that a two-class solution was better than a one-class, perhaps these trajectory paths were not truly different enough to warrant distinct classes. Of the three models, the highest entropy value achieved was 0.746 in the female-only model.

The results of this study echoed findings in previous, related research. The shape and pattern of the trajectory classes detected in this study were very similar

to those found in studies using similar methodology. A two-class quadratic LCGA was selected in Kokko et al.'s (2006) investigation of helpfulness in males from ages 6 to 12. The moderate-level class in that study had a quadratic trend and the second was a lower-level linear path, similar to the high-level quadratic and moderate-level linear classes found in the present study. Like Kokko et al., a third, highest-level, stable linear trajectory found for helpfulness by Côté et al. (2002) was not replicated in this data. Kokko and colleagues postulated that this class was not found in their data because the sample did not include girls, as did the Côté et al. study, but even within the girls-only model of the current study, this class was not obtained.

The absence of this low-level class could be attributable to the way social competence was measured in this study. Both Côté et al. and Kokko et al. measured social competence primarily in terms of helpful behaviors, whereas the measure used in the present study tapped a wider range of positive interpersonal behaviors. The IS scale used in the present study tapped teachers' views of a variety of children's prosocial behaviors' namely building and sustaining friendships, expressing oneself in positive ways, showing empathy for another's feelings, and comforting. Perhaps the development of these specific skills takes a different course than that of helping behaviors. Each of these behaviors was rated using a single item, whereas helpfulness in the studies mentioned above was a 10-item scale measuring helpfulness alone. The inclusion of multiple indicators for the same behavior may have allowed teacher reporters to rate children with more scrutiny. The helpfulness items in those studies were concrete and distinct behaviors such as "volunteers to help clean up a mess that someone else has made." Rating a child on

"building friendships" in the present study, versus on a set of friendship-related items such as "initiates play with peers", for example, would logically elicit different kinds of responses. While both approaches measure observable behaviors, the single-item approach used in the present study produces a more global assessment of a behavior or construct. It may be the case that teachers are less likely to rate children as low on global-style questions.

Furthermore, the response scales and subscale calculations could have contributed to the results of the present study. These attributes also differed from the Côté et al. and Kokko et al. investigations. Helpfulness in the two previous studies was calculated by a sum of 10 items rated on a 3-point scale (0 to 2). The possible range of scores was thus zero to 20, potentially allowing for more variability in responses than average scale score used in the current study. Replication studies testing a variety of prosocial behaviors longitudinally in different groups could help explain the incongruous findings of these studies.

The present study provides an interesting comparison to the findings of the Côté et al. and Kokko et al. studies. The results of the present study match most closely with those of Côté et al. The trajectories found here were one nonlinear, higher-level class with a very slight decrease from T1 for T5 and a stable path below that. Although, as mentioned previously, the highest class found by Côté et al. was not replicated in this study. The trajectory results of Kokko et al. indicated a declining trend over time in both classes, which was not replicated in this study. In the present study, the trajectory for class 1 had a nonlinear shape that demonstrated a small increase in IS from fall of kindergarten to spring of first grade,

after which scores decreased in the final two time points, spring of third and fifth grades. The path for class 2 was primarily stable with a slight increase over time. Overall, the results of this study did not demonstrate a marked increase or decrease in IS over time. These findings do not align with the prevalent theory that prosocial behavior escalates as children grow older (Eisenberg & Fabes, 1998). If not an artifact of the measurement tool used for the present study, the lack of much change in IS beyond the kindergarten year could be due to unique contribution of experience and development of these skills the early childhood years. The beginnings of prosocial behaviors emerge early, in toddlerhood and the preschool period (Eisenberg et al., 2006; Hay & Cook, 2007). It might be the case, at least for the IS studied here, that these behaviors are learned early and generally sustained over time. . These results add to the growing body of research comparing how varied aspects of positive social behaviors and competencies develop over time.

One of the limitations in evaluating models to describe the data was that the models (GMM) produced estimation errors that prevented interpretation. There are a variety of reasons that data would not support GMM, but a leading cause is "insufficient variability to estimate the within-class variances and covariances in one or more classes" (p.656-657, Feldman et al., 2009). Lack of variability in the observed variables may be the source of this problem. Even though measures of normality signaled normally distributed data, there is debate in the field regarding whether scaled response data should be treated as continuous in analyses as was done here (Feldman et al., 2009). Some researchers support this practice when the response scale has at least four categories (e.g., Bentler & Chou, 1987), whereas

others assert that assuming normal distributions for these types of data can lead to incorrect estimates and standard errors (e.g. Dolan, 1994). Relatedly, the IS scale was comprised of only 5 items. The small number of items and short response scale could mean that the measure was not sensitive enough to detect gradations in change over time or well-defined differences in the sample population; hence the low entropy in the LCGA models. Perhaps a more sensitive measure would have been able to more clearly define distinct trajectory classes.

Even with these potential limitations, the findings of the current study may serve as a valuable segue into intervention research. Because most of the difference in the two trajectories seems to be explained by the intercepts, and because the largest change in means between time points occurs predominantly between fall and spring of kindergarten, the results of this study suggest that kindergarten may be a pivotal time to assess social and academic difficulties before they govern a child's developmental course. In practice, this means that interventions targeting the development of IS may be best applied to the preschool and kindergarten years. As these years are children's first introduction into formal schooling, and for many, their first experience in a large, same-age peer group, their experiences during that time could serve as formative for their future social behavior. An interesting avenue of research would be to take more frequent assessments of IS during the preschool and kindergarten years.

By using latent class growth modeling techniques to examine IS across the elementary school years, it was possible to identify groups of children that take disparate paths of development. There are few investigations that have employed

this analytic technique to positive social behaviors and the use of a large, national sample offers a unique opportunity to explore the developmental trends that likely occur for children in the U.S. This study provides a foundation for numerous avenues of future research.

Table 1

Kindergarten Child and Family Demographic Information for Analytic Sample

Characteristic	%
Child race/ethnicity	
White	69.8
Black or African American, non-Hispanic	10.8
Hispanic (Race specified)	6.2
Hispanic (Race not specified)	4.0
Asian	3.2
Native Hawaiian or Other Pacific Islander	1.2
American Indian or Alaska Native	1.8
More than one Race, non-Hispanic	2.8
Household poverty status	
At or above the federal poverty threshold	89.1
Below the federal poverty threshold	10.9
Socioeconomic Status	
First quintile (highest SES)	8.5
Second quintile	17.0
Third quintile	21.4
Fourth quintile	24.8
Fifth quintile (lowest SES)	28.3
Maternal education	
Eighth grade or below	0.7
Nine – twelfth grade	3.3
High school diploma or equivalent	21.4
Vocational/Tech program	5.3
Some college	29.0
Bachelor's degree	22.5
Graduate/Professional school, no degree	3.1
Master's degree	9.2
Doctorate or professional degree	5.6
Not ascertained/Not applicable	1.4
Family type	
Two parent household, plus siblings	66.9
Two parent household, no siblings	9.2
Single parent household, plus siblings	10.2
Single parent household, no siblings	4.9
Other family type (i.e. other guardians)	1.2
Unreported/Missing	7.6

Table 2

Number of Respondents, Means and Standard Deviations for Interpersonal Skills

	N	*Mean (SD)*	*Skewness*	*Kurtosis*
Total Sample				
T1 – Fall K	5894	3.10 (0.59)	-0.25	-0.70
T2 – Spring K	6391	3.26 (0.59)	-0.50	-0.52
T3 – Spring 1st	6077	3.23 (0.61)	-0.50	-0.57
T4 – Spring 3rd	5707	3.20 (0.62)	-0.43	-0.67
T5 – Spring 5th	6197	3.17 (0.61)	-0.41	-0.61
Girls				
T1 – Fall K	3148	3.17 (0.59)	-0.36	-0.64
T2 – Spring K	3391	3.33 (0.58)	-0.65	-0.33
T3 – Spring 1st	3232	3.32 (0.59)	-0.64	-0.46
T4 – Spring 3rd	3058	3.30 (0.60)	-0.62	-0.46
T5 – Spring 5th	3295	3.28 (0.58)	-0.59	-0.39
Boys				
T1 – Fall K	2746	3.02 (0.59)	-0.13	-0.70
T2 – Spring K	3000	3.17 (0.60)	-0.36	-0.61
T3 – Spring 1st	2845	3.12 (0.61)	-0.35	-0.60
T4 – Spring 3rd	2649	3.08 (0.62)	-0.24	-0.74
T5 – Spring 5th	2902	3.03 (0.62)	-0.23	-0.68

Table 3

Model Assessment for Nested Sequence of Growth Models

Model	BIC	Entropy	VLMR value
Linear LCGA			
1 Class	55575.52		
2 Classes	50740.26	0.725	-27756.97***
3 Classes	50049.71	0.653	-25326.15
4 Classes	49326.39	0.665	-24967.68
5 Classes	49242.61	0.645	-24592.82
Quadratic LCGA			
1 Class	55549.30		
2 Classes	50690.03	0.727	-27739.47***
3 Classes	49970.84	0.656	-25292.24
4 Classes	49186.47	0.658	-24915.05
5 Classes	49061.78	0.624	-24505.27
Linear GMM			
1 Class	49919.23		
2 Classes	49435.00	0.627	-24915.635†
3 Classes	49388.25	0.662	-24660.324

† $p < .06$. *** $p < .001$

Table 4

Model Assessment for Sequence of LCGA Models by Sex

Model	BIC	Entropy	VLMR value
Boys			
Linear			
1 Class	26167.579		
2 Classes	24082.799	0.690	-13055.643**
3 Classes	23795.893	0.618	-12001.189
Quadratic			
1 Class	26157.125		
2 Classes	24061.088	0.692	-13046.394*
3 Classes	23758.471	0.623	-11982.292
Girls			
Linear			
1 Class	28423.078		
2 Classes	26111.809	0.743	-14182.976**
3 Classes	25797.876	0.684	-13015.1
Quadratic			
1 Class	28416.786		
2 Classes	26098.829	0.745	-14175.75*
3 Classes	25778.662	0.685	-13000.449

† $p < .06$. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 5

Latent Growth Means, Sample Means, and Estimated Means for Interpersonal Skills by Class

	Class 1		Class 2	
	Sample	*Estimated*	*Sample*	*Estimated*
Total Sample				
Intercept		3.40***		2.65***
Linear Slope		0.05**		0.02
Quadratic Slope		-0.01***		n/a
T1 – Fall K	3.35	3.40	2.62	2.65
T2 – Spring K	3.48	3.43	2.70	2.66
T3 – Spring 1st	3.47	3.45	2.69	2.68
T4 – Spring 3rd	3.38	3.44	2.70	2.71
T5 – Spring 5th	3.35	3.33	2.75	2.75
Girls				
Intercept		3.46***		2.69***
Linear Slope		0.04*		0.04**
Quadratic Slope		-0.01**		n/a
T1 – Fall K	3.41	3.46	2.66	2.69
T2 – Spring K	3.54	3.48	2.73	2.71
T3 – Spring 1st	3.54	3.51	2.79	2.76
T4 – Spring 3rd	3.43	3.50	2.81	2.85
T5 – Spring 5th	3.43	3.41	2.94	2.93
Boys				
Intercept		3.31***		2.60***
Linear Slope		0.05		0.00
Quadratic Slope		-0.01**		n/a
T1 – Fall K	3.27	3.31	2.55	2.60
T2 – Spring K	3.40	3.34	2.66	2.60
T3 – Spring 1st	3.36	3.36	2.60	2.60
T4 – Spring 3rd	3.30	3.33	2.59	2.60
T5 – Spring 5th	3.21	3.20	2.61	2.61

* $p < .05$. ** $p < .01$. *** $p < .001$

Note: n/a = not applicable, meaning not included in the model.

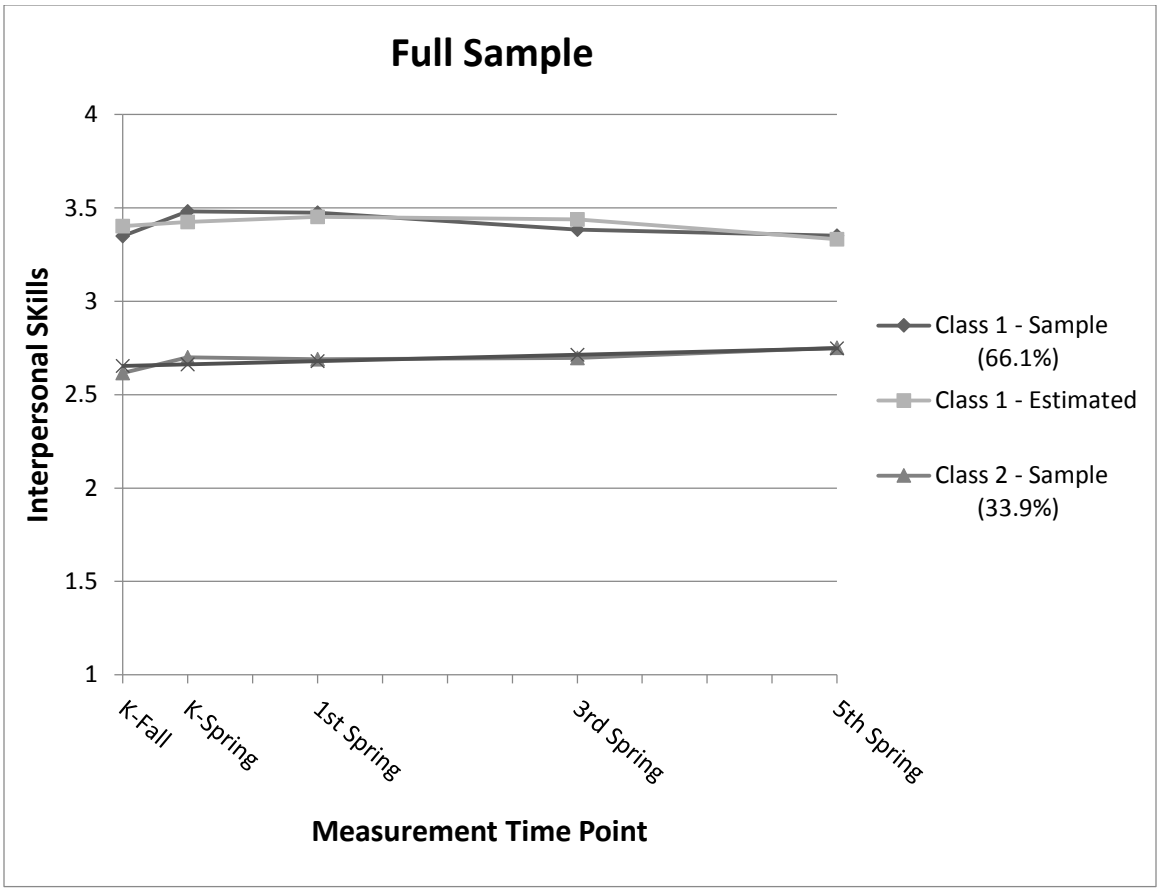

Figure 1. Quadratic Two-Class LCGA Estimated Trajectories for the Full Sample (Sample and Estimated).

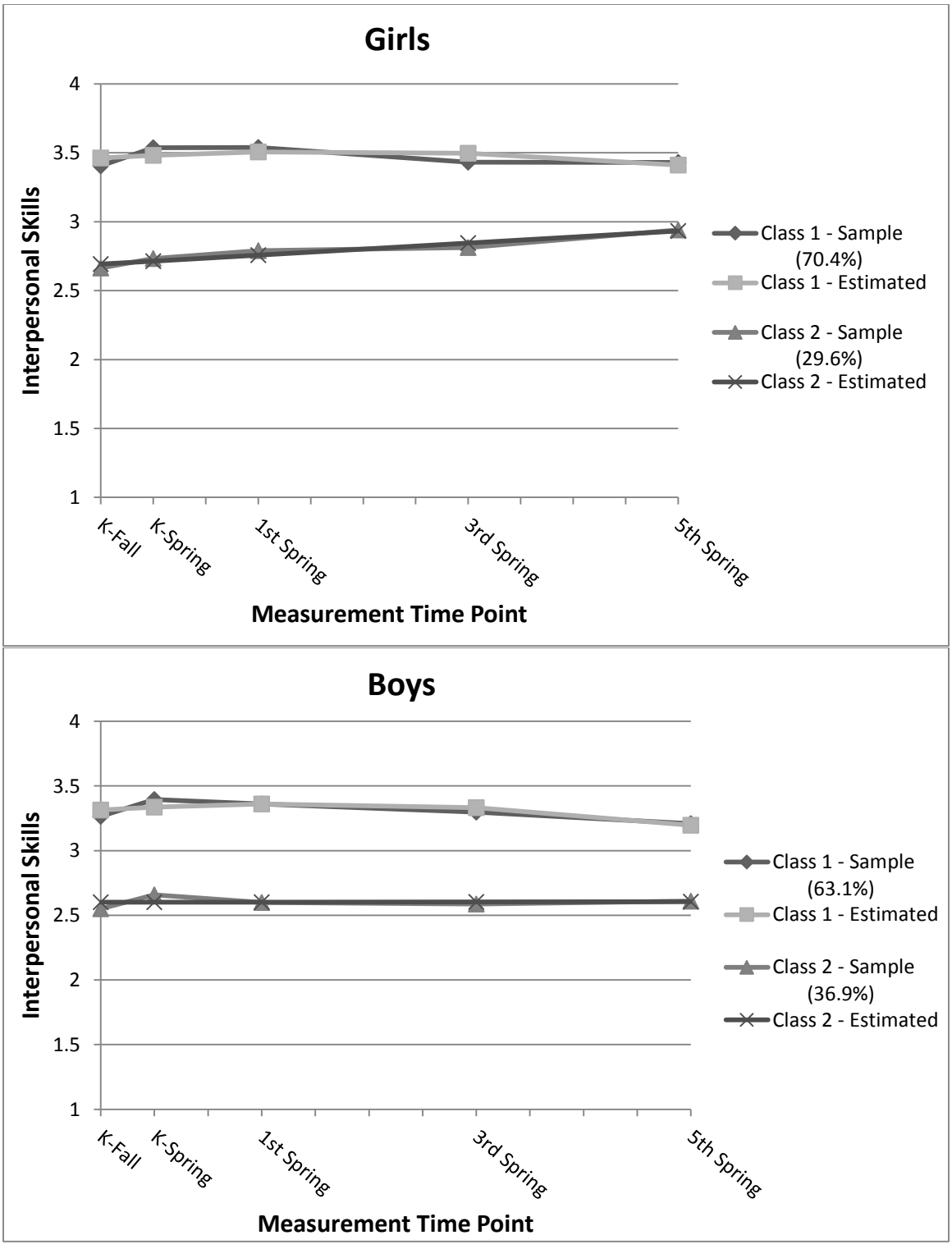

Figure 2. Quadratic Two-Class LCGA Estimated Trajectories for Girls and Boys (Sample and Estimated).

CHAPTER 2: STUDY 2

Study 2: Abstract

The goal of this study was to examine whether differing trajectories of social competence development in language minority children were related to their language and literacy skills (LL) at grade 5. Data from the Early Childhood Longitudinal Study – Kindergarten Class of 1998-1999 were used to generate a subsample of children in the U.S. whose primary language at home was something other than English. Latent class trajectories of interpersonal skills at five time points between fall of kindergarten and spring of fifth grade were modeled and LL at the end of fifth grade was compared across latent classes. LL at the start of kindergarten and sex were included as covariates of the latent class variable. Growth mixture analyses in Mplus were used to identify the best model for the data, which was a cubic two-class latent class growth analysis. Both classes had significant linear, quadratic, and cubic slope factors. The main difference between the two was that class 1 was consistently about 2/3 of a point higher than class 2 over time (on a 4-point scale). Both covariates significantly predicted latent class and LL scores at grade 5 differed significantly across classes. Results are discussed with respect to previous related research and what the findings could reveal about social and academic development in language minority children in the U.S.

Study 2: Language Minority Children

Language minority (LM) refers to those whose primary language is not the prevalent language in a given region. For example, a child in the United States whose parents speak French in the home and whose first language is French is in the language minority because English is the primary language of the U.S. U.S. student populations are becoming increasingly linguistically diverse and meeting the needs of LM children is a major concern. Unfortunately, due to their second language acquisition status, these children commonly fall behind their English-speaking peers in academic performance (August & Hakuta, 1997; Olivos & Quintana de Valladolid, 2005) and much remains to be explored in terms of the educational experiences of this population.

Although the research on LM children's secondary language and literacy development continues to expand, there remain many unknowns with respect to the specific aspects of the school experience that facilitate acquisition of these skills. More in-depth investigation of the processes through which LM children become more proficient in English is needed. One important point of access for LM children to practice English use is through interaction with peers. Links between social behavior and language skill (e.g., Herbert-Myers, Guttentag, Swank, Smith, & Landry, 2006) and literacy (e.g. Malecki, & Elliot, 2002) have been documented in English-speaking children with typical language development, and to some degree with LM children (e.g., Gertner et al., 1994). However, research regarding how social interaction at school may be related to English language and literacy skills for LM children in the U.S. is in its infancy.

The purpose of this study was to investigate how developmental trajectories of social competence may relate to later language and literacy skills for LM children in the U.S. The particular aspect of social competence of interest in this study was the set of behaviors that encourage positive relationships with others, referred to as interpersonal skills (IS). Specifically, the features of social competence examined in the present study included helping peers, but also aptitude in forming and maintaining friendships, compatibility with dissimilar peers, positive self-expression, empathy, and comforting.

Social Development and Language

The majority of the research regarding links between social competence and language skills is concentrated primarily on preschool and early childhood, revealing the need for study in older age groups as well as longitudinally. An area of research with a focus on the benefit of positive social development for later academic success is the study of school-based social-emotional intervention programs (Taylor & Dymnicki, 2007; Zins, Weissberg, Wang, & Walberg, 2004). A meta-analysis regarding these kinds of programs concluded that they show enhanced positive outcomes, including academic performance (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). As Greenberg, Kusché, and Riggs (2004) point out, the self-awareness and self-regulation abilities that are necessary for positive social interaction and behavior benefit children's performance in both social and academic spheres. Children who engage in positive social interactions have the opportunity to practice and enhance these skills. Additionally, friendships and positive peer relationships provide opportunities for practicing and building

language. For example, peer interactions offer settings for language modeling and feedback (Gallagher, 1991).

Although specific demands of social interactions change with age (Eisenberg, Fabes, & Spinrad, 2006; Semrud-Clikeman, 2007), links between language skill and social competence exist across the various stages of development (Gallagher, 1993). For young children, group activities, rule-based games, and even dramatic play require effective communication and negotiation skills. As children engage socially with their peers, their opportunities to practice language increase. In middle childhood, social acceptance and social comparison become more salient issues (Denham, Wyatt, Bassett, Echeverria, & Knox, 2009; Eccles, 1999; Ladd, 1988). Peer status and inclusion/exclusion from social groups become key concerns in children's social lives (Burgess, & Rubin, 2000). Effective conflict resolution is an important skill to acquire at this age in order to maintain positive relationships with peers and stay connected with the desired social group. Cognitive maturity affords children of this age the capacity to consider others' perspectives and that those views do not necessarily mirror their own (Flavell, 1999; 2000; Perner, & Wimmer, 1985; Selman, 1980). Children must integrate their own intentions and opinions with the intentions and opinions of their peers and use language to negotiate a resolution that satisfies both individuals. Language is also used to find common ground and shared interest, important foundations on which to build peer relationships for this age group. Here again, successful social behavior is closely linked to language. Lastly, there is an increase in the use of gossip between friends

in middle childhood (Ladd, 1988; Parker & Gottman, 1989), demonstrating a rise in social conversation.

Combined, the literature on social relations in middle childhood conveys that language is a valuable medium for children in the building and maintaining of peer relationships during these years (Stafford, 2004). Thus differing paths of social growth are likely to be linked to language development. Herbert-Myers et al. (2006), for example, found that language ability at age 3 predicted peer relations at age 8 and that this relation was mediated by language skill at age 8. This research demonstrated both concurrent and longitudinal relations between social competence and language skills; however, assessments were conducted at only two time points. One way the present study adds to the empirical work in this area is that additional data points were used to provide a more fluid view of changes in social skills over time.

Social Development and Literacy

Theoretically, cooperative and collaborative social relationships provide a supportive and educationally stimulating environment for children to develop academic skills (Malecki, & Elliot, 2002). Malecki and Elliot argue that a positive social context can act as an enabling force for academic achievement. The links between social behavior and academic outcomes such as reading and literacy are increasingly discovered in empirical research (e.g. McClelland, Acock, & Morrison, 2006), but many studies focus more on inverse relations between literacy and negative social behaviors or learning-related problem behavior such as poor task engagement (Morgan, Farkas, Tufis, & Sperling, 2008) and inattention (Lonigan et

al., 1999). There is a fair amount of research, though, that has demonstrated positive associations between positive indicators of social competence and literacy (Caprara Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Hartas, 2011; 2012; Miles & Stipek, 2006; Malecki, & Elliot, 2002; Wentzel, 1993). In one such study, researchers observed 5- and 6-year old children in different social contexts to determine whether degree of peer familiarity (and friendship) related to literacy-related behaviors during a book re-read task, a drawing and writing task relevant to the book stories, and toy play (Pellegrini, Melhuish, Jones, Trojanowska, & Gilden, 2002). They found that children used more emotion terms (an indicator of emotional investment) and literacy-related language with more familiar peers. Pellegrini et al. (2002) explained their results from the perspective of evolutionary developmental psychology (Bjorklund & Pellegrini, 2000) and inclusive fitness theory (Axelrod & Hamilton, 1981). The researchers argued that familiarity with another person fosters trust, mutuality, and collaboration between the two. In closer relationships, children are more comfortable and motivated to collaborate on the joint task. Thus, children who are socially competent and have better peer relations in the classroom are more likely to gain exposure to practice using literacy concepts during collaborative literacy-related tasks and potentially in unstructured play. Much of the research relating social competence and literacy applies to emergent literacy in early childhood (Doctoroff, Greer, & Arnold, 2006; Lonigan et al., 1999; Pellegrini et al, 2002). Further investigation into the associations between social competence and literacy is needed for older children and over longer periods of time. A few investigations have examined these constructs longitudinally. Miles and

Stipek (2006) used path analysis to investigate associations between social skills and literacy at first, third, and fifth grades. Although both prosocial behavior and literacy in each grade predicted the same construct at the following time point, the researchers only found a significant cross-domain association between prosocial behavior in first grade and literacy achievement in third grade. The lack of a significant relation between socially competent behavior and literacy at the later time points is inconsistent with other studies that have found this association in later grades (Caprara et al., 2000; Wentzel, 1993) and reflects the needs for more research in this area. Lim and Kim (2011) used ECLS-K data to track reading growth from kindergarten to fifth grade in dichotomized groups of children high and low on social competence. Applying multilevel growth models, the researchers found that children rated higher on interpersonal skills made gains in reading achievement more quickly that those rated lower. Their study added to the research finding associations between literacy and social behavior, but the investigators used a static assessment of social competence to define groups of children and to predict reading achievement. In the present study, a more fluid view of social competence and its development was taken to characterize groups of children. This approach was taken to explore whether groups of children are qualitatively different in the way they mature socially, and whether these groups reach different levels of academic success. Additionally, the present study was designed to investigate these questions in a specific population, language minority students.

Social, Language, and Literacy Development in LM Children

The links between social competence and language and literacy skills (LL) in LM populations have not been widely researched, but investigations in this area are becoming more frequent. Some notable research, though, has elucidated ways these constructs are interconnected. Rice, Sell, and Hadley (1991), for example, investigated how different groups of children vary in the way they engage in conversational interactions with adults and peers in the classroom. Their sample included preschool participants from four different groups: typically developing English-speaking children, speech-impaired children, specific language impaired (SLI) children, and LM children learning English as a second language. Rice and colleagues found that typically developing children were more likely to interact with each other than with children from any of the other three groups or with adults (i.e. teachers) in the classroom. The three groups of children with some kind of language limitation preferred to engage adults in conversation than to initiate interaction with their peers. The findings also suggest that language-limited children are overall approached less often by peer interaction partners than children with typical language development. Thus, LM may have fewer opportunities to practice LL concepts with peers, highlighting the importance of strengths in social behavior skills for language development.

Using a sociometric measure, Gertner et al. (1994) examined the peer acceptance of English speaking children with typical language development, children with SLI, and LM children learning English as a second language. Peer acceptance was related to language limitations, such that greater language skill was

associated with being better liked by peers. Less well-liked children were approached and invited to play less often by peers and thus have fewer opportunities to engage in social conversation. Taken together, the results of these studies underscore the likelihood that LM children will face challenges with social interaction and peer relationships in the classroom. Because social interaction between peers provides a unique opportunity for children to practice and improve pragmatic features of language, LM and other language-limited children are at a disadvantage for developing appropriate pragmatics and the more complex aspects of the majority language. In a sample of 1090 kindergarten children, von Grünigen, Perren, Nägele, and Alsaker (2010) found that competence in the local language positively related to peer acceptance for children of an immigrant background but not for children with parents of foreign nationality. This result highlights the importance of language proficiency in the majority language for LM children.

There is also a small amount of empirical work linking developmental trajectories in social behaviors to language status for LM children. Comparing fluent bilingual, English-dominant bilingual, non-English dominant bilingual, and non-English monolingual Latino children to a White, English monolingual reference group, Han (2010) reported differences in social behavior development over time by language status group. For interpersonal skills, non-English monolingual children scored the lowest. English-dominant bilingual children had the most similar trajectory to the White English monolingual group. The remaining two groups, non-English dominant and fluent bilingual children demonstrated the highest gains over time and actually surpassed the reference group at the final two time points. These

findings clearly reveal the likelihood of differences in developmental pathways in social behavior as related to majority language status.

The Present Study

The goal of this study was to investigate how differing pathways of social competence development across early and middle childhood may be associated with differences in LL skill in fifth grade. The proposed model is presented in Figure 1. A LM sub-sample of U.S. children selected to be nationally representative of all children attending kindergarten at the first time point was utilized for this investigation. Social competence was measured at five time points between kindergarten and fifth grade and LL achievement was measured in fifth grade. The analytic design allowed exploration of different developmental pathways in social competence and whether divergent trajectories were associated with variation in LL achievement. Sex was included as a covariate in this model because sex differences are often found in both social behavior and academic achievement, including LL (Côté, Tremblay, Nagin, Zoccolillo, & Vitaro, 2002; Eisenberg, Fabes, & Spinrad, 2006). Given these findings, potential sex differences in interpersonal behavior could play an instrumental role in the course of social competence development and how it relates to LL skill. It was hypothesized that if more than one trajectory group was found for social competence development, that higher-level pathways would be related to higher levels of LL skill.

This investigation advances the research literature regarding the social and academic development of LM children in a number of ways. First, whereas much of the related research has been conducted in other countries, the present study

utilized a dataset nationally representative of the United States. Second, there is a strong need for empirical work that extends beyond early childhood. Most studies investigating the relation between socially competent behavior and academic achievement predict academic outcomes from social behavior at one time point in early childhood (e.g Caprara et al., 2000). The current investigation tracked social competence longitudinally from early through middle childhood and predicted LL outcomes in fifth grade from developmental trajectories of social competence rather than from only one time point. Third, findings from the present study add to the current body of literature by providing information about the paths by which LM children develop these interrelated competencies. Finally, if positive social interactions demonstrate promising avenues for English language acquisition in LM children, results would suggest that educators and professionals should be encouraged to promote and focus on building positive peer relationships for these children, especially with their English-dominant peers, as interactions with English-dominant peers could foster greater gains in English acquisition.

Although research in this area is limited, there is some evidence to support the premise that positive peer relationships encourage majority language acquisition by providing LM children with more exposure to the majority language through social interaction with majority language fluent peers (Verhoeven, 1991; Wong Fillmore, 1983). If peers are more likely to interact and play with socially competent LM children, these children will have more opportunities to practice the majority language interpersonally, which could promote their second language

acquisition. Taken together, the literature regarding social competence and LL skills provides cause for assessing the developmental relations between these constructs.

Method

Data and Sample

The present study utilized data from the Early Childhood Longitudinal Study – Kindergarten Class of 1998-1999 (ECLS-K), collected by the U.S. Department of Education's National Center for Educational Statistics (NCES). The ECLS-K is a large dataset that follows a nationally representative sample of U.S. children from kindergarten through eighth grade. The original sample included more than 21,000 kindergarten children (Westat, 2000). Participants were chosen using a stratified design in which geographic regions (counties or groups of counties) constituted the primary sampling units (PSUs), schools comprised the second-stage units, and students within schools were the third and final units. Some populations, such as children attending private schools and Asian and Pacific Islanders, were oversampled to ensure a large enough subgroup. Effects of oversampling were corrected for by assigning sample weights to all participants. A detailed description of sample design can be found in the *ECLS-K Base Year Public-Use Data Files and Electronic Codebook* (Westat, 2000). Data collected included parent interviews, teacher and school staff questionnaires, school records, and direct child assessment.

Sample Weights. Due to the complex nature of the ECLS-K sample, a series of weight variables were created by NCES to provide greater generalizability to the target population. These sample weights adjust for differential selection probabilities and reduce bias associated with nonresponse. Selection of the most

appropriate sample weight is based on the population of inquiry, types of assessment and reporters, and waves of data collection included. For the current study, the variables of interests were child-level data but collected through teacher report at waves 1, 2, 4, 5, and 6. The sample weight corresponding to child-level data for these five waves is C1_6FC0, so this weight variable was chosen for the present study. For simplicity the time points fall of kindergarten, spring of kindergarten, spring of first grade, spring of third grade, and spring of fifth grade will be heretofore referred to as Time 1, 2, 3, 4, and 5, respectively.

Analytic Sample. For the present study, only children whose home language was not English were selected to be included in analyses. Information on home language was gathered from parents in the fall of kindergarten (or spring if responses were missing from the fall time point). The ECLS-K database contains a composite variable (WKLANGST) derived from a variety parent-response questions regarding language spoken at home. Based on this composite, 2,783 child participants were reported to speak a language other than English as the primary language in the home. Home language was English for 17,224 children and unknown (missing data or not ascertained) for 1,402.

Next, because the goal of this study was to describe developmental trajectories of typically developing children, only those participants who were identified as not having a disability at Time 5 were included. Disability information was collected at other points during the study, but because disability status (e.g. severity of diagnosis or existence of an Individualized Education Program) can change over time, data from the final time point relevant to the present study was

used. A composite variable (P6DISABL) was used to identify children who had a disability diagnosed by a professional. The composite was comprised of parents' responses to a variety of interview questions, in the spring of the fifth grade year, regarding any professional diagnosis, receipt of therapy services, or participation in a program for children with disabilities for their child. Ideally, a threshold score on a standardized, normed, age-based cognitive or language test would be used to determine participant inclusion, but no such measure of cognitive ability was available in the existing data. This constraint dropped the eligible sample size down to 1,390 child participants (179 had a disability and 1,605 had missing data or responses not ascertained).

The last criterion enforced was that each participant had to follow typical grade progression, meaning that the child must have been in the fifth grade at Time 5. Of the 1,390 participants who qualified thus far, 1,211 met this final condition. An additional 6 participants were excluded from the sample due to missing data on either all IS variables or the weight variable. The ultimate sample used for the present study was 1205. Fifty-two percent of participants were female (n = 626). Mean age of children at the beginning of data collection, specifically at the time of the fall child assessment, was around 5 years and 8 months (M = 67.61 months, SD = 4.06 months). Of these 1205 children, about 35% reported Spanish was the primary language spoken at home, 18.5% reported an Asian, Pacific Island, or Native American language, and 9% said another language or that they could not choose only one. For about 35% of the sample, primary language was not ascertained,

unreported, or the number of respondents in the particular category was too small to report and maintain anonymity of participants.

Table 1 displays additional demographic information for the sample. Most family characteristics were reported by parents during a structured phone interview in the fall of the kindergarten year, except for gross household income, which was reported by parents in the spring. Total household income ranged from zero to $750,000, with a mean of $35,205 (*SD* = $40,089).

A socioeconomic scale (SES) variable was computed based on the following components: mother/female guardian's education, father/male guardian's education, mother/female guardian's occupation, father/male guardian's occupation, and household income. The amounts of missing data from the original ECLS-K sample for these variables were mostly small, with the largest percentage missing from income (2.1%, 3.8%, 11.3%, 11.3%, and 28.2%, respectively). Missing data for all components of the SES were imputed using a hot deck methodology. This process involves replacing missing values with those of a "similar" participant who did respond to that item. Respondent similarity is determined by auxiliary information known for both participants. Groups or cells of similar participants are created and values from respondents in that pool are randomly assigned to the non-respondents. Following imputation of missing data, a continuous variable was created in which higher values indicate higher SES. Then a categorical variable was derived from the first using a weight variable. The distribution of this categorical variable in the current sample is reported in Table 1.

Measures.

Social competence. An adaptation of the Social Skills Rating System (Gresham & Elliott, 1990) was used in ECLS-K data collection. This adapted measure was called the Social Rating Scale (SRS) and included five modified subscales from the original measure (Approaches to Learning, Self-Control, Interpersonal Skills, Internalizing Problem Behavior, and Externalizing Problem Behavior). Parents and teachers rated children on the SRS in kindergarten and first grade. From third grade on, only teachers completed the SRS. The teacher-rated Interpersonal Skills (IS) scale was used for the present study. IS contained five items that represented children's competence in forming and maintaining friendships, compatibility with dissimilar peers, expressing themselves in positive ways (i.e. ideas, feelings, and opinions), demonstrating empathy for others' feelings, and helping or comforting peers. Items were rated on a four-point scale (1 = never, 2 = sometimes, 3 = often, 4 = very often) with an additional option to select "no opportunity to observe this behavior." Scale scores for the SRS were computed by taking the mean of items in the subscale. Scores were computed only if the student was rated on at least two-thirds of the items in that scale. Split-half reliabilities for IS at each grade level are, .89, .89, .89, .89, .88, respectively for fall kindergarten, spring kindergarten, first, third, and fifth grades (National Center for Education Statistics, 2001; National Center for Education Statistics, 2002; Pollack, Atkins-Burnett, Najarian, & Rock, 2005; Pollack, Atkins-Burnett, Rock, & Weiss, 2005).

The items of the IS subscale were identical at each time point (fall of kindergarten through spring of fifth grade). Two items were added to the SRS for

the last two time points (third and fifth grades) but were included in other subscales; thus this addition did not alter the measurement of IS. Even though IS items were consistent at each wave, caution is advised when interpreting change in scores over time. This is due to the potential for reporter bias either as a result of variations in construal of item wording by different teachers or differential meaning of items given the age or grade level of the children being assessed (Pollack, Atkins-Burnett, Najarian, & Rock, 2005; Pollack, Atkins-Burnett, Rock, & Weiss, 2005) Scale scores were used for all analyses.

Language and literacy. Teacher report on children's LL was obtained using the language and literacy subscale of the Academic Rating Scale (a measure developed for the ECLS-K) at each measurement point. Exact items are presented by grade level in the Appendix. The ARS was designed to assess skills, knowledge, and behaviors on a 5-point scale (1 = not yet demonstrated, 2 = beginning, 3 = in progress, 4 = intermediate, and 5 = proficient). An option to select "not applicable" was also available if that particular skill, knowledge, or behavior had not yet been introduced in the classroom. "Not applicable" responses were coded as missing for analyses. Items within scales were not identical across years, but rather adjusted to reflect appropriate skills for each specific grade level. In kindergarten and first grade, the ARS was completed by the lead teacher. In later grades, teachers in the corresponding content area would complete the different subscales of the measure. Reading teachers completed the LL subscale in grades 3, 5 and 8. The LL subscale consisted of eight items. Language subscale items asked teachers to rate abilities such as proficiency in expressing ideas and the use of strategies to gain information.

Literacy subscale items tapped knowledge of print conventions, reading ability, and writing composition.

Results

Number of respondents, means, standard deviations, and normality descriptives for un-weighted interpersonal skills scores at each time point and LL at Time 5 are presented in Table 2. Skewness and kurtosis for all variables fell between -1 and +1, so they can be reasonably assumed to have a normal distribution. Tables 3 and 4 show the bivariate and partial correlations controlling for sex between un-weighted interpersonal skills scores at each time point and LL at Time 5, using pairwise deletion. All correlations, both bivariate and partial, were significant even though most of the correlation coefficients were in the smaller range.

Before a model including covariates was estimated, the first analytical step was to find the most appropriate growth curve model with the social competence variables alone. Scores on the IS scale at fall kindergarten, spring kindergarten, spring first grade, spring third grade, and spring fifth grade were used to compute trajectories of social competence over time. A series of mixture models were constructed using maximum likelihood estimation and robust standard errors (MLR) using Mplus Version 7 (Muthén & Muthén, 1998-2012). This estimation approach uses the full-information maximum likelihood (FIML) algorithm for handling missing data, which utilizes all available data simultaneously (Acock, 2005). Research has shown that parameter estimates generated with FIML are less biased than pairwise deletion, listwise deletion, and mean imputation methods

(Enders, 2001). Data are assumed to be missing at random (MAR) with this approach. The C1_6FC0 weight variable was identified in the data input statement to attain more appropriate standard errors. Because parameter estimation in mixture modeling is an iterative procedure, starting values were specified to help avoid non-convergence issues and settling on local maxima. In these models, 100 random sets of starting values and 20 final optimizations were employed. Indices used to examine the appropriateness and classification quality of the model were the Bayesian information criterion (BIC), class size, entropy, and the Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR; Lo, Mendell, & Rubin, 2001) for significant increase in model fit versus a model with one fewer class.

Linear, quadratic, and cubic latent class growth analyses (LCGAs) with one, two, and three classes were conducted. The latent intercept factor was indicated by IS scores at T1 through T5, with each of the factor loadings set at 1.00. The latent linear slope factor was indicated by IS at T1, T2, T3, T4, and T5 and the factor loadings were set at 0.00, 0.50, 1.50, 3.50, and 5.50, respectively. For models including a quadratic term, the latent quadratic slope factor was indicated by IS at T1 through T5 and factor loadings were set at 0.00, 0.25, 2.25, 12.25, and 30.25, respectively. For models including a cubic term, the latent cubic slope factor was indicated by IS at T1 through T5 and factor loadings were set at 0.00, 0.125, 3.375, 42.875, and 166.375, respectively. To eliminate the estimation of within-class variability, the variance of all growth factors was fixed at zero. Entropy, although poor overall, and VLMR values suggested that the best model was a cubic two-class LCGA (see Table 5). The maximum loglikelihood value was replicated numerous

times, indicating that a global maximum was likely reached rather than the model settling in a local maximum. Even though the BIC value continued to decrease as more classes were added to the model, the other model assessment measures did not concur. There is evidence that the BIC has a tendency to overestimate the number of classes appropriate for a given model (Nielsen et al., 2012). Growth mixture models (GMMs) were attempted to investigate whether relaxing the constraint of homogeneity within classes would improve the model, but these analyses resulted in fatal estimation errors.

After the appropriate latent class trajectory model for social competence had been determined (cubic two-class LCGA), sex and LL at Time 1 were included as covariates predicting latent class, and LL at Time 5 was included as a distal outcome (see Figure 1). Sex was coded as 0 for male and 1 for female. Language and Literacy at T1 (mean-centered) was designated to predict the latent class variable as well as each growth factor within latent class. Sex was designated to predict the latent class variable only, because paths to the intercept and slope growth factors were not significant and were therefore excluded. Again, the maximum loglikelihood value was replicated, indicating that a global maximum was likely reached rather than the model settling in a local maximum. Sample and estimated means for the two latent classes discovered are displayed in Table 6. Figure 2 depicts sample trajectories (calculated with mean scores for children's most likely class) and estimated trajectories (calculated using the model's coefficient estimates), as well as the percent of participants in each class. All four latent growth variables (intercept and

linear, quadratic, and cubic slopes) were significant on both classes (Table 6). For class 1, though, the fluctuation in mean over time was very small.

Entropy for this model remained poor at 0.689, but was an improvement on the unconditional model (entropy = 0.608). The average latent class probabilities for most likely latent class membership, however, were good. The on-diagonal values were 0.92 and .90 and the off-diagonal values were .10 and .08. Muthén and Muthén (2000) assert that "good classification quality is obtained when diagonal elements are high and off-diagonal elements are low" (p. 889). The VLMR likelihood ratio test indicated a significant increase in model fit versus a model with only one latent class (-4828.23, $p < .05$). The VLMR tests for all three-class models were not significant. The BIC for cubic two-class LCGA was 9181.78, higher than in the unconditional cubic two-class LCGA.

Both covariates significantly predicted latent class ($ps < .001$). For sex, the regression coefficient was 1.59 in class 1, meaning that the log odds for females was 1.59 higher than the log odds for males of being in class 1. The corresponding logistic regression odds ratio for sex in class 1 was 4.92. This indicates that the odds of being in class 1 versus class 2 were almost 5 times higher for females than for males. Seventy-sex percent of the girls in the sample belonged to class 1, whereas only 40% of the boys belonged to class 1. The prediction of the growth factors by LL at T1 was significant in both classes for the intercept ($p < .001$), linear slope($p < .001$), and quadratic slope ($p < .05$). The prediction of the cubic growth factor was marginally significant ($p = .08$) so it was retained in the model.

To test whether the mean of LL at Time 5 was significantly different across classes, a Wald chi-square test of parameter constraints was calculated (Wald test; see Asparouhov & Muthén, 2013; Mplus Technical Appendices, 2010; Muthén & Muthén, 1998-2012). Specifically, the constraint of equality between the means of LL at Time 5 in both classes was tested. The chi-square value of 66.04 was significant at $p < .001$, rejecting the hypothesis that these parameters are equal. The mean in class 1 was then significantly higher than that of class 2. Table 7 displays the frequency of different languages spoken in the home for each class.

Discussion

The goal of this study was to examine whether different trajectories of social competence development in language minority children was related to their LL skills at grade 5. The ECLS-K data were used to generate, from a nationally representative sample of kindergarten children in the U.S., a subsample of children whose primary language at home was something other than English. For this subsample, latent class trajectories of interpersonal skills at five time points between fall of kindergarten and spring of fifth grade were modeled and LL scores at the end of fifth grade were compared across latent classes. Sex and LL ratings at the fall of the kindergarten year were included in the model as covariates, predicting latent class. Paths from LL ratings at the fall of kindergarten to the intercept and slope factors of the model were included also. Both LCGA and GMM techniques were employed to discern whether multiple distinct trajectory paths, represented by latent growth classes, existed in the data. The best model was a cubic two-class LCGA, with one class taking a higher-level path (class 1) and the other following a

moderate-level trajectory (class 2). Both classes had significant linear, quadratic, and cubic slope factors. The main difference between the two was that class 1 was consistently about 2/3 of a point higher than class 2 over time.

The two trajectories found in the present study resemble those found in previous work with language majority sample populations in that they differed in level, one high and one moderate. An aspect of the results that is uncommon, though, is the cubic quality. In past studies with language majority samples, researchers have tended to find either linear or quadratic pathways of social competence development over time (Côté et al., 2002; Kokko, Tremblay, Lacourse, Nagin, & Vitaro, 2006). Although the predominant theoretical perspective is that prosocial behavior should increase in frequency over time, some researchers suggest that the development of these behaviors may not be as straight-forward (Caplan, 1993; Hay, 1994; Nantel-Vivier et al., 2009; Tomasello, 2009). This alternative view recognizes that in addition to the supportive factors that come with maturation (e.g., cognitive growth), other factors such as display rules and norms come into play as well (Nantel-Vivier et al., 2009). The exchange between factors that facilitate prosocial behavior and those that could inhibit it, like self-interest, may account for the curvilinear IS trajectories detected in the current study. As children grow older, the way they negotiate such potentially conflicting demands could generate behaviors that appear to waver over time. Another possible explanation for the present results has to do with the fact that the measure used to asses IS in this study included somewhat global ratings of a few behaviors. If those particular behaviors do not develop in the same way, the overall trend seen in the

present study could be an amalgamation of their general trends over time, providing an unclear picture of their true evolution.

The trajectories discovered in the current data did not decline over time as has been demonstrated in previous studies (Côté et al., 2002; Kokko et al., 2006; Nantel-Vivier et al., 2009). In this study, the trajectories fluctuated somewhat, but the difference in IS between T1 and T5 was only about two-tenths of a point. The moderate-level class demonstrated more vacillation in mean IS scores over time, illustrating an increase in social competence from fall of kindergarten to spring of first grade, a decrease between spring of first and spring of third grade, and then an increase again to the final time point at spring of fifth grade. The greater variability in the moderate-level class is an interesting result because not only does it suggest that social skills are less stable over time for this group, but also that the second and third grade school years may prove especially socially challenging for some LM children. Children typified by this moderate course may benefit from a social skills intervention focused on the window of time between first and third grade. If intervention efforts were successful, and the decline in social competence could be avoided, perhaps this group of children would continue to improve their skills and reach competence levels at or near the other trajectory group by the spring of fifth grade. Identifying weak points in development is a first step in designing interventions to promote positive growth. Without additional measurement points between the spring of first and third grades, the exact point at which this change occurs cannot be ascertained, but there is evidence that this time frame presents a vulnerable period in social competence development for this group. Further

exploration of social development and interpersonal relationships during this phase is warranted.

The growth trajectories found in the present study were important not only because they described differently developing groups, but also because they were associated with different levels of academic attainment. The mean of LL at the spring of grade 5 differed significantly between the two classes, demonstrating an important relation between the two skills. The Wald test of mean equality indicated that the mean of LL in the two classes at Time 5 was significantly higher in class 1. Thus, children whose IS development follows a path similar to that of class 1 are likely to attain greater LL skills by the spring of fifth grade than those whose development follows the path like that of class 2. As predicted, a higher-level social competence trajectory was related to higher ratings of LL. This finding illustrates the connection between social competence and LL outcomes. Because the model tested in this study predicted LL skill from social competence trajectories, the implied direction of effects flows from social competence to later LL proficiency. While the present study demonstrates the link between these two constructs, it must be noted that other research has conceptualized the relation between them in different ways. Morgan et al. (2008), for example, found that children with reading problems in first grade were significantly more likely to exhibit behavior problems in third grade. They argued that academic difficulties, in this case reading deficits, can trigger frustration, anxiety, and feelings of helplessness, which may over time present as more generalized trouble with motivation, self-regulation, and social interactions. Indeed it is a possibility that social behavior and academic skills, such

as LL, have a reciprocal relationship; future studies should examine the simultaneous development of social competence and LL.

Also, as was anticipated, sex was significantly related to the social competence latent class as well. Results showed that girls were almost 5 times more likely to belong to class 1 than boys. The percent of girls belonging to class 1 was almost twice that of boys. These findings demonstrate that girls were more likely to be members of the higher-level class. This result corroborates previous research finding girls to be rated as higher on measures of social competence than boys. In addition, the outcome that members belonging the higher social competence trajectory (class 1) were rated higher on LL than members of the lower path also aligns with previous findings.

A principal limitation of the current study lied in the measures used to assess the constructs of interest. First, both the IS and LL measures were quite brief. The social competence measure was comprised of only five items at each time point and the LL scale of only eight. The low number of items inhibits the researcher's ability to gain an in-depth appraisal of children's skill in the areas being measured. Moreover, the skill sets assessed in the present study are multifaceted and not all aspects were well represented by the questions in the scales. For example, the LL measure focused more on reading and literacy than language, and the language items emphasized expressive language over receptive. Thus children's skill levels may not have been appropriately characterized due to the nature of how LL aptitude was evaluated. Unfortunately, not having the liberty to choose measurement protocols is a chief disadvantage to using extant datasets. To build on the present

study, prospective investigations should utilize expanded assessments of these constructs.

Additionally, the indicators for social competence and LL were treated as continuous, given that skew and kurtosis statistics for both measures signaled normally distributed data. The social competence measure had a four-category response scale and the LL measure had five categories. There is debate in the field, though, regarding whether scaled response data should be treated as continuous in analyses (Feldman et al., 2009). Some scholars support this practice when the response scale has at least four categories (e.g., Bentler & Chou, 1987), whereas others assert that assuming normal distributions for these type of data can lead to incorrect estimates and standard errors (e.g. Dolan, 1994). These two things could have been a cause of the estimation errors in the attempted GMMs and the poor entropy in every LCGA. For social competence, the small number of items and short response scale could mean that the measure was not sensitive enough to detect more clearly defined group differences in developmental pathways within the sample population. More sensitive measures may have allowed for more variability in ratings and better models.

Another aspect of the study that requires caution when interpreting and generalizing results is the sample. It can be considered a strength that the present sample was heterogeneous in terms of the primary, non-English language spoken in the home. However, it may be the case that these different language groups should not be analyzed together. English acquisition may take a dissimilar course in children whose primary language is Spanish, versus children whose primary

language is something rarer in the US, like Czech. The poor classification quality of the models in the current study could be attributed to the sample selection, in that there may not have been enough participants from particular groups to clearly distinguish the typical developmental pathways representative of that group. Future research should isolate different language or cultural groups for study, in order to test whether the same patterns are found within a variety of LM groups.

Table 1

Kindergarten Child and Family Demographic Information for Analytic Sample

Characteristic	
Child race/ethnicity	
White	5.9
Black or African American, non-Hispanic	1.2
Hispanic (Race specified)	24.8
Hispanic (Race not specified)	38.6
Asian	26.2
Native Hawaiian or Other Pacific Islander	2.2
American Indian or Alaska Native	0.6
More than one Race, non-Hispanic	0.5
Household poverty status	
At or above the federal poverty threshold	62.1
Below the federal poverty threshold	37.9
Socioeconomic Status	
First quintile (highest SES)	44.0
Second quintile	18.9
Third quintile	12.8
Fourth quintile	11.9
Fifth quintile (lowest SES)	12.4
Maternal education	
Eighth grade or below	23.5
Nine – twelfth grade	23.5
High school diploma or equivalent	27.6
Vocational/Tech program	4.8
Some college	12.4
Bachelor's degree	11.3
Graduate/Professional school, no degree	0.7
Master's degree	3.3
Doctorate or professional degree	1.5
Not ascertained/Not applicable	1.2
Family type	
Two parent household, plus siblings	64.1
Two parent household, no siblings	9.9
Single parent household, plus siblings	7.4
Single parent household, no siblings	3.3
Other family type (i.e. other guardians)	0.8
Unreported/Missing	14.5

Table 2

Number of Respondents, Means and Standard Deviations for Interpersonal Skills T1-T5 and Language and Literacy at T1 and T5

	Total Sample (N = 1205)			
	N	*Mean (SD)*	*Skewness*	*Kurtosis*
Interpersonal Skills				
T1 – Fall K	992	2.95 (.59)	-0.03	-0.66
T2 – Spring K	1101	3.16 (.60)	-0.31	-0.70
T3 – Spring 1st	1029	3.16 (.60)	-0.36	-0.71
T4 – Spring 3rd	799	3.21 (.60)	-0.44	-0.66
T5 – Spring 5th	1041	3.18 (.59)	-0.41	-0.58
Language & Literacy				
T1 – Fall K	1032	2.17 (.69)	0.44	0.54
T5 – Spring 5th	1067	3.48 (.81)	0.01	-0.49

Table 3

Bivariate Correlations between Interpersonal Skills T1-T5 and Language and Literacy Subscales at T5

	IS1	IS2	IS3	IS4	IS5	LL5
IS1 – Fall K	-					
IS2 – Spring K	0.50***	-				
IS3 – Spring 1st	0.24***	0.33***	-			
IS4 – Spring 3rd	0.23***	0.26***	0.31***	-		
IS5 – Spring 5th	0.18***	0.23***	0.27***	0.33***	-	
LL5 – Spring 5th	0.20***	0.17***	0.23***	0.25***	0.43***	-

Note. IS = Interpersonal Skills; LL = Language and Literacy
*** $p < .001$

Table 4

Partial Correlations between Interpersonal Skills T1-T5 and Language and Literacy Subscales at T5, Controlling for Sex, and Correlations between These Measures and Sex

	IS1	IS2	IS3	IS4	IS5	LL5
IS1 – Fall K	-					
IS2 – Spring K	0.51***	-				
IS3 – Spring 1st	0.21***	0.27***	-			
IS4 – Spring 3rd	0.16*	0.22***	0.34***	-		
IS5 – Spring 5th	0.11*	0.20***	0.24***	0.27***	-	
LL5 – Spring 5th	0.19***	0.19***	0.16***	0.22***	0.37***	-
Sex	0.20***	0.15***	0.13***	0.22***	0.28***	0.14***

Note. IS = Interpersonal Skills; LL = Language and Literacy
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 5

Model Assessment for Nested Sequence of Unconditional LCGA Models

Model	BIC	Entropy	VLMR value
Linear LCGA			
1 Class	9101.512	-	-
2 Classes	8604.840	0.591	-4525.926*
3 Classes	8539.500	0.609	-4266.949
Quadratic LCGA			
1 Class	9081.796	-	-
2 Classes	8580.152	0.602	-4512.521
3 Classes	8508.927	0.609	-4247.511
Cubic LCGA			
1 Class	9076.993	-	-
2 Classes	8572.314	0.608	-4506.572*
3 Classes	8492.252	0.619	-4236.497

Note: Dashes represent that these indices are not calculated for models with only one latent class.
* $p < .05$

Table 6

Intercepts of Growth Factors and Sample and Estimated Means for Interpersonal Skills T1-T5 and Language and Literacy T5 for Both Classes

	Class 1		Class 2	
	Sample	Estimated	Sample	Estimated
Intercept		3.18***		2.66***
Linear Slope		0.32***		0.27**
Quadratic Slope		-0.11***		-0.12*
Cubic Slope		0.01**		0.02*
Interpersonal Skills				
Fall K	3.20	3.22	2.61	2.62
Spring K	3.39	3.34	2.78	2.75
Spring 1st	3.43	3.46	2.83	2.85
Spring 3rd	3.46	3.44	2.74	2.73
Spring 5th	3.43	3.43	2.85	2.85
Language & Literacy				
Spring 5th	-	3.76	-	3.04

* $p < .05$. ** $p < .01$. *** $p < .001$

Table 7

Language Spoken in the Home by Class (Percent)

	Class 1	Class 2
Spanish	34.8	39.7
Other European	2.6	1.9
Asian/Pacific Islander/Native American	22.4	17.5
Other language/Cannot Choose	10.1	7.9
Missing	30.1	33.0

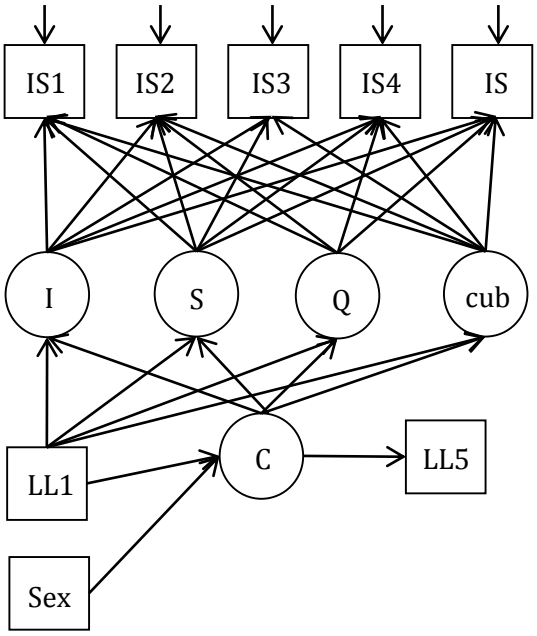

Figure 1. Representation of Statistical Model. IS1 through IS5 = Interpersonal Skills T1 through T5; I = intercept growth factor; S = linear slope growth factor; Q = quadratic slope growth factor; cub = cubic slope growth factor; LL1 = Language and Literacy Skills at T1, LL5 = Language and Literacy Skills at T5, Sex = sex of child; C = latent class variable.

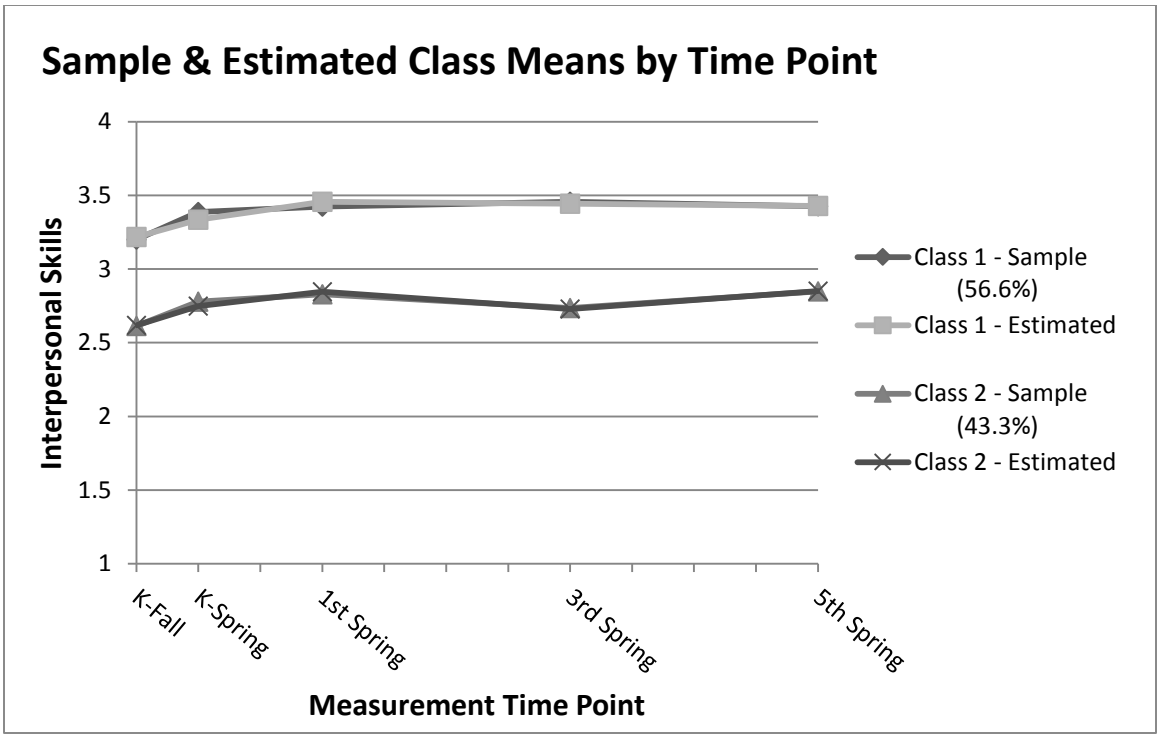

Figure 2. Social Competence Trajectories for the Two Latent Classes (Sample and Estimated Means).

Overarching Discussion

The two studies presented here make different but related contributions to the literature regarding social competence development. The first study expands on recent work using longitudinal growth modeling techniques to explore changes in behavior over time. When investigating the expression of a particular behavior or set of behaviors in children it is especially beneficial to obtain multiple assessments as children mature because with each stage of development, children encounter a unique array of challenges and potential supports. Longitudinal modeling provides a platform to go beyond snapshots of behavior at any one age and helps capture the evolution of a behavior or competency. Developments in statistical modeling have made it possible to not only model how a skill develops over time, but also to find patterns of development specific to different groups within a population. In study 1, latent class growth analyses were utilized to find two distinct developmental paths within one sample. Using these methods, children who fell into the lower-level group and who encountered more difficulty gaining IS could be identified. The findings of this study can potentially be applied to classroom settings in order to recognize children who may be at risk for difficulties in developing socially competent attitudes and behaviors. Additionally, future research can elucidate additional characteristics of the children belonging to the two trajectory groups as well as uncover antecedents and outcomes of their social competence growth patterns.

The second study built upon the first by examining one potential outcome associated with social competence development and also by analyzing IS over time

in an important subgroup of elementary school children in the U.S., those whose primary language was not English. Like study 1, two divergent IS trajectory paths were identified within the sample, both with a wave-like shape, offering more information about what points in the elementary years may be especially challenging for these children. Interestingly, the IS means between the children whose home language was English and the LM group were within the same range. They were almost similar enough to suggest that these two groups do not need to be segregated for study, but the curvilinear trajectories found in the LM group signaled that a qualitative difference does exist in the development of IS in these groups.

In addition, both studies showed that for those paths that were primarily stable over time, the period where the largest amount of change occurred was in the kindergarten year. It must be mentioned that because the time points were not equally spaced, there is a possibility that change occurred between some of the longer lags between measurement points, but was not captured. Using the data available for the current studies, it would be prudent to conclude that the stage at which the greatest change takes place is during kindergarten. For language majority children in particular, future efforts may be best focused on that period of early childhood.

The outcome included in the model for study 2, LL skill at the end of fifth grade, was indeed related to IS trajectories. This result lends support to findings in the existing literature that social competence is important for academic achievement. The pervasive link between these two domains of abilities suggests

that incorporating goals for improving both skill sets into curricula or educational intervention efforts may have the most promising outcomes.

The present pair of studies offers a wide range of possibilities for extension in future research and as well as in practice. First, these being two of few studies investigating social competence trajectories in a large U.S. sample, further research of social competence development focusing detailed attention on sample characteristics and on subpopulations within in the U.S. are warranted. Second, the set of behaviors used in this study to measure IS are only some of the variety of behaviors under the umbrella of social competence. Future studies should employ a similar design but vary the specific behaviors measured to test whether the particular behavior or group of behaviors in question exhibit the same developmental pathways for U.S. children. Also, as previously mentioned, antecedents, other potential covariates, and additional outcomes of social competence trajectories can be explored. Together, these studies provide an important bridge between existing research in the arena of positive social development and studies that are on the horizon due to continued advances in statistical methods.

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APPENDIX A

ACADEMIC RATING SCALE: LANGUAGE AND LITERACY ITEMS BY GRADE

Kindergarten

1. Easily and quickly names all upper- and lower-case letters of the alphabet
2. Produces rhyming words
3. Understands and interprets a story or other text read to him/her
4. Uses complex sentence structures
5. Demonstrates an understanding of some of the conventions of print
6. Reads simple books independently
7. Uses different strategies to read unfamiliar words
8. Composes simple stories

Spring-Fifth Grade

1. Understands and interprets a story or other text read aloud
2. Reads fluently
3. Conveys ideas clearly when speaking
4. Reads and comprehends expository text
5. Composes multi-paragraph stories/reports with an understandable clear beginning, middle, and end
6. Uses various strategies to gain information
7. Makes mechanical corrections when reviewing a rough draft
8. Rereads and reflects on writing, making changes to clarify or elaborate

Note. Items are listed in order of difficulty for each grade.