The emergence of learning-related social skills in preschool children

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Abstract

Recent research has pointed to the role of learning-related social skills in academic achievement and school success [Cooper & Farran, 1988; McClelland, Morrison, & Holmes, 2000]. Learning-related social skills tap the domains of independence, responsibility, self-regulation, and cooperation. The present study examined the nature and stability of teacher ratings of early learning-related social skills in 72 preschool children at 3–4 years and 1 year later. Confirmatory factor analysis (CFA) using structural equation modeling (SEM) revealed that a construct labeled “learning-related social skills” emerged in ratings of preschool children and showed moderate variability. Further, ratings of children’s early learning-related social skills were relatively stable over a 1-year period. Discussion focused on the emergence of learning-related social skills during the preschool period and possible role of these skills for early school success.

Keywords: Social skills; School success; Preschool children; School readiness; Academic achievement

A growing body of research has underscored the importance of children’s early social behavior in school adaptation and achievement (DeRosier, Kupersmidt, & Patterson, 1994; Dishion, 1990; Ladd, 1990; Ladd & Price, 1987). Young children entering school with poor social behavior often have a plethora of problems including peer rejection, behavior problems, and low levels of academic achievement (Alexander, Entwisle, & Dauber, 1993; Cooper & Farran, 1988; McClelland, Morrison, & Holmes, 2000). In addition, teacher reports suggest

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that children come into school with differing levels of social skills and that these skills are critical for early school success (Foulks & Morrow, 1989). For example, a recent monograph emphasized the importance of social and emotional competence in preschool children for a successful transition to kindergarten (Huffman, Mehlinger, & Kerivan, 2000). Another study found that some teachers reported at least 50% of children entering their kindergarten class did not have the basic competencies needed to do well in school such as following directions, working independently, and having adequate academic skills (Rimm-Kaufman, Pianta, & Cox, 2000).

Most research focusing on children’s early social behavior and school achievement has concentrated on social behavior in general, without specifying the aspects of social behavior that are especially important in school performance. However, increasing evidence suggests that aspects of children’s learning-related social skills are related to early school performance and the transition to school (Bachman & Morrison, 2002; Cooper & Farran, 1988; Cooper & Speece, 1988; McClelland, Kessenich, & Morrison, in press; McClelland et al., 2000). Based on research pointing to the relation between children’s learning-related social skills and early school success, the present study examined these social skills in young preschool children.

1. Conceptualizations of social behavior

Research examining children’s social behavior in school adjustment and performance has historically focused on a single category of behavior. For instance, a number of researchers have demonstrated the importance of children’s peer relations and social competence for school adjustment (e.g., Coie & Dodge, 1998; DeRosier et al., 1994; Dishion, 1990; Olson & Hoza, 1993; Pettit, Clawson, Dodge, & Bates, 1996; Rose-Krasnor, 1997; Vitaro, Tremblay, & Gagnon, 1992). Although this body of research points to an association between peer relations, social competence, and school adjustment (Wentzel, 1991, 1993), it does not specify those aspects of social skills that may be especially relevant.

Recently, a small body of research has started to differentiate between social behavior and learning-related social skills. For example, research by Cooper & Farran (1988, 1991), and Bronson (1994, 1996) has identified two subcategories of social behavior, one that relates to learning-related social skills and one that relates to interpersonal skills. Interpersonal skills include behaviors such as interacting positively with peers, sharing, and respecting other children; whereas learning-related social skills encompass behaviors like listening and following directions, participating appropriately in groups, staying on task, and organizing work materials. In general, learning-related skills tap the domains of independence, responsibility, self-regulation, and cooperation (Cooper & Farran, 1991).

Similarly, Bronson (Bronson, 1994, 1996, 2000; Bronson, Tivnan, & Seppanen, 1995) and colleagues have differentiated between social and mastery behaviors in preschool children. Bronson’s category of social behaviors is related to Cooper and Farran’s (1988) concept of interpersonal skills and includes a child’s ability to participate positively with other children using negotiation and cooperation. Bronson’s category of mastery behaviors is also similar to the concept of learning-related skills and includes a child’s ability to organize, regulate their behavior, and use self-direction to complete a task. A number of studies suggest that
these subcategories are differentially related to school performance making it important to
distinguish between learning-related social skills and interpersonal skills (Cooper & Farran,
1988; Ladd, Birch, & Buhs, 1999; McClelland et al., 2000).

2. Recent interest in learning-related social skills

In addition to research differentiating learning-related social skills from other aspects of
social behavior, there has been an increased interest in how to define learning-related social
skills. For example, some of the terms used include executive functioning skills (Bronson, 2000;
Karmiloff-Smith, 1993); self-regulation (Bronson, 2000; Shonkoff & Phillips, 2000); mastery
skills (Bronson, 1994; Bronson et al., 1995), and social competence (Rose-Krasnor, 1997;
Wentzel, 1991, 1993). Although these terms come from a variety of perspectives, they reflect
a similar constellation of skills and encompass a number of behaviors relating to attention,
self-regulation, independence, organization, and cooperation. For simplicity, in the present
paper we use the term learning-related social skills to describe behaviors such as listening
and following directions, participating appropriately in groups (such as taking turns), staying
on task, and organizing work materials (Cooper & Farran, 1991; McClelland et al., in press;
McClelland et al., 2000).

3. The importance of learning-related social skills

Existing research has pointed to the importance of children’s learning-related social skills
for early school success and school adjustment. For example, a recent study by Ladd et al.
(1999) found that children’s classroom participation and their ability to be cooperative and
independent in kindergarten was an important predictor of early school achievement. Foulks
and Morrow (1989) have also shown that according to teachers, learning-related skills such
as listening to instructions and directions, and compliance with teacher demands, were most
important for success in kindergarten. Finally, Bronson et al. (1995) found that prekindergarten
children who spent more time uninvolved in the classroom and had difficulty with rules or with
the teacher, scored lower on a standardized cognitive achievement measure. These children also
had more risk indicators such as family problems, lower parental education, and behavioral or
emotional problems. Although the risk indicators were not controlled for when examining the
impact of children’s learning-related skills on achievement, this study underscores the need to
focus on the relation between learning-related skills and early school success.

4. Learning-related skills and academic achievement

Once children make the transition to school, learning-related social skills continue to be
linked to school adjustment. These early skills can be said to “set the stage” for later social be-
havior and academic performance by providing the foundation for positive classroom behavior.
In a study examining the relationship between classroom behavior and school performance,
Alexander et al. (1993) found that children’s interest, participation, and attention were statistically significantly related to children’s academic performance in first grade and fourth grade. Children who were interested and involved in classroom activities, and were able to focus and pay attention, performed better academically. Similarly, Green and Francis (1988), Stott, Green, and Francis (1983), and Swartz and Walker (1984) found that early learning skills as measured by teacher ratings, were related to later academic achievement 2 and 4 years later.

In addition, a number of studies have found that children’s learning-related skills uniquely predicted academic performance whereas children’s interpersonal skills did not (Bachman & Morrison, 2002; Cooper & Farran, 1988; Cooper & Speece, 1988). For example, Cooper and Farran (1988) found that having poor learning-related skills was associated with being identified with a behavior problem to a greater extent than having poor interpersonal skills for a sample of 650 kindergarten children. The study found that, according to kindergarten teachers, having poor interpersonal skills was not as detrimental to school performance as was having poor learning-related skills. Interestingly, the children rated low on learning-related skills were more likely to be boys who were inattentive, disorganized, impulsive, and unable to follow directions.

More recently, McClelland et al. (2000) studied the unique contribution of learning-related skills to children’s academic skills at the beginning of kindergarten and at the end of second grade. They found that learning-related skills uniquely predicted literacy outcomes at both time points after controlling for the effects of child IQ, school entrance age, amount of preschool experience, ethnicity, parent education level, and family learning environment.

The study also found that children rated as having poor learning-related skills differed from the overall sample of children on a number of child, family, and sociocultural variables including: statistically significantly lower IQs, more behavior difficulties, poorer family learning environments, and more medical problems such as hearing and language problems. Furthermore, children with poor learning-related skills scored lower on academic outcomes at the beginning of kindergarten and at the end of second grade compared to the overall group of children. Finally, these children learned at statistically significantly slower rates than their peers between school entry and second grade on measures of reading recognition and mathematics (McClelland et al., 2000).

Recently, a follow-up of the McClelland et al. (2000) study found that children rated as having poor learning-related skills in kindergarten remained statistically significantly behind their peers in reading and math between kindergarten and sixth grade, with the gap widening over time (McClelland & Hansen, 2001). In addition, the low learning-related skill group’s first grade reading and math scores predicted their sixth grade math scores and third grade reading scores. In other words, based on the first grade reading and math scores for the low group of children, the authors could predict how children with poor learning-related skills would perform on reading in third grade and math in sixth grade.

The results from the McClelland and Hansen (2001) study extend previous research suggesting that children rated as having poor learning-related skills scored lower on reading and math than their peers between kindergarten and second grade. This study also provides additional support for the importance of these skills at the beginning of school and continuing to sixth grade.
5. Goals of the present study

These studies examining the importance of learning-related skills for early school achievement raise questions of when a coherent construct of learning-related skills emerges and how early differences in children’s learning-related skills can be discerned. Addressing these two questions has theoretical and practical implications. The theoretical implications include the importance of learning-related skills for early literacy and academic development. It is critical to build a research base that documents when learning-related skills become an important source of academic success in order to ensure that children make a successful transition to school. In addition, if a learning-related skills construct is present in preschool children, then practically speaking, parents and preschool teachers can be encouraged to support the development of these skills in children before they enter kindergarten.

To our knowledge, this is the first study specifically investigating the emergence of children’s learning-related social skills in preschool. There is little research on the development of children’s social skills that incorporates the domains of independence, responsibility, self-control, and cooperation. Furthermore, few studies have attempted to integrate these domains to build a comprehensive picture of how children’s learning-related skills develop.

To address these issues, the present study investigated the nature, extent of variation, and stability of teacher rated learning-related social skills in a sample of preschool children assessed at two time points (when children were 3–4 years old, [Time 1] and 1 year later [Time 2]). It was hypothesized that a learning-related skills construct would emerge in a confirmatory factor analysis (CFA) of teacher ratings of scales assessing assertion, self-control, cooperation, and mastery behaviors (including planning, organizing, and self-regulation skills; Bronson et al., 1995). It was also predicted that individual differences in ratings of children’s learning-related social skills would be found at 3–4 years (Time 1) and 1 year later (Time 2). Finally, it was expected that ratings of learning-related skills would significantly improve from Time 1 to Time 2, but remain stable in terms of children’s relative ranking between Time 1 (when children were 3–4 years old), and Time 2 (when children were 4–5 years old). Thus, while we expected that children’s ratings of learning-related skills would statistically significantly improve from Time 1 to Time 2, it was hypothesized that children’s ratings at Time 1 would predict their ratings at Time 2.

6. Method

6.1. Participants

Children, parents, and teachers were part of a larger study investigating factors related to the emergence of learning-related social skills in preschool. Initially, letters inviting parents to participate in the study were sent home with 200 children from six preschools in the North Chicago area and 75 families (or 37.5%) agreed to participate. The sample of 75 children aged 3–4 years and their families were studied at two time points: during the winter of the preschool year when children were 3–4 years old (Time 1), and in the winter 1 year later (Time 2). Three children were excluded because English was not their first language, making the sample size
72 for the Time 1 data collection. At Time 2, the sample size was 68 due to one family moving away and three children moving to different preschools and their parents not responding to follow-up attempts.

The sample of children was primarily Caucasian (81%) with well-educated parents (\( M = 16.79 \) years of education), and with somewhat more females than males (58% females, 42% males). The average age of children at Time 1 was 45 months (\( SD = 3.7 \) months) or 3 years, 9 months, with children’s ages ranging from 37 to 53 months (or 3 years, 1 month to 4 years, 5 months). At Time 2, the children’s average age was 57 months (\( SD = 3.5 \) months) or 4 years, 9 months, with children’s ages ranging from 48 to 65 months (or 4–5 years, 5 months).

In addition to children and parents, preschool teachers participated in the study. At Time 1, 6 preschools and 20 teachers participated in the study, and at Time 2, 11 preschools and 30 teachers participated in the study (9 of the teachers were the same from Time 1 to Time 2). Information on teachers’ ethnicity or other characteristics was not collected because it was not a focus of the study. At Time 1, the 6 preschools that agreed to participate in the study were NAEYC accredited and located in a similar geographical location in North Chicago and Evanston, IL. At Time 2, 5 additional preschools agreed to participate after 5 children moved to new preschools, while the remaining 63 children remained in the same preschools as at Time 1. The 5 additional preschools at Time 2 were located in suburban Chicago and Evanston, IL. Because only 5 of the 68 children at Time 2 changed to new preschools it was not possible to statistically compare characteristics of Time 1 and Time 2 preschools or teachers. However, preliminary analyses comparing the mean change in children’s learning-related skill ratings from Time 1 to Time 2 for children who changed schools (\( n = 5 \)) to those that stayed in the same schools (\( n = 63 \)) did not find significant differences (changed schools \( M = -0.013 \) vs. same school \( M = 0.062, F(1, 60) = 0.204, p > .05 \)).

Written informed consents, outlining the extent of participation and nature of the study, were obtained from parents prior to participation. In addition, written consent letters were obtained from each preschool participating in the study, and written consent forms from participating teachers were also acquired. To reward teachers and families for their participation, each teacher and family was given a $10.00 gift certificate to Barnes & Noble bookstore at Time 1 and Time 2.

6.2. Materials

6.2.1. Background demographics

6.2.1.1. Background questionnaire. At Time 1, a background questionnaire was given to parents to complete with information about their child’s age, amount of preschool experience, ethnicity, parent education level and occupational status. Parents also completed the Parenting Questionnaire, which includes a dimension assessing the family learning environment (Morrison & Cooney, 2002). The family learning environment assesses parental reading habits, how often family members read to a child, library card use, the number of child and adult magazine and newspaper subscriptions, the number of books owned by a child, and the amount of television watched by a child (Griffin & Morrison, 1997). The family learning environment scale consists of 9 questions and parents rate the frequency for each question such as how often family members read to a child. The score for the scale is based on the mean for the
9 items using on a 0–2 scale except for amount of television watched which is reverse coded on a 0–5 scale. Possible scores on the scale range from 0 to 2.33. The reliability for scores in the family learning environment scale has been established in previous research. In one study, the inter-item reliability for scores in the scale was .74 (Griffin & Morrison, 1997), and in another study the internal reliability for scores in the scale was .75 (Morrison & Cooney, 2002).

6.3. Child learning-related social skills

Children’s learning-related social skills were measured using the assertion, self-control, and cooperation scales from the teacher form of the Social Skills Rating System (SSRS; Gresham & Elliott, 1990) and the mastery behaviors scale of the Child Behavior Rating Scale (CBRS; a teacher-rated form; Bronson, Goodson, Layzer, & Love, 1990).1

6.3.1. Learning-related social skills: measure one

The teacher form of the SSRS was used to measure children’s learning-related skills when children were 3–4 years old (Time 1) and 1 year later (Time 2; Gresham & Elliott, 1990). The SSRS has two scales, the Social Skills scale and the Problem Behaviors scale, but only the Social Skills scale was used in the present study. The Social Skills scale consists of 30 questions and three subscales assessing cooperation, assertion, and self-control. There are 10 questions for each of the three subscales. The scale is rated by teachers to indicate the frequency of children’s behaviors from 0 (never) to 2 (always). In past research, internal reliabilities for scores in the teacher version of the Social Skills scale were .94. Four-week test–retest reliabilities for scores in the Social Skills scale were .85 and internal reliabilities were: assertion, .90; cooperation, .90; and self-control, .91 (teacher version; Gresham & Elliott, 1990).

In the present study, the internal reliability for scores in the Social Skills scale (consisting of assertion, cooperation, and self-control) was .86 at Time 1 and .82 at Time 2. In addition, the internal consistencies for scores in each of the Social Skills subscales at Time 1 and Time 2 were as follows: assertion, .89 (Time 1), .84 (Time 2); cooperation, .84 (Time 1), .83 (Time 2); self-control, .90 (Time 1), .87 (Time 2).

6.3.2. Learning-related social skills: measure two

Teacher ratings of children’s learning-related skills were also assessed using the CBRS at Time 1 and Time 2 (Bronson et al., 1995). The CBRS is based on the Bronson Social and Task Skill Profile, which is an observational instrument designed to assess specific social and mastery behaviors such as children’s ability to plan, organize, and complete tasks, cooperate with peers, and regulate their behavior (Bronson, 1994). The CBRS consists of 32 items rated on a 5-point scale to indicate the frequency of the behaviors ranging from 1 (never) to 5 (usually/always) and has a Mastery Behaviors scale and Social Behaviors scale. In the present study, only the Mastery Behaviors scale was used. There are 15 questions in the Mastery Behaviors scale and items are used to compute an overall mean rating.

In previous research, the reliabilities for scores in the CBRS have been adequate: In one study, the test–retest reliability of scores between fall and spring was .67 and internal consistency for items in the scale was .96 (Abt Associates, 1988). In another study, the CBRS was
statistically significantly related to the observed time teachers spent on math or language activities \( (r = .39) \) and was statistically significantly related to the Preschool Inventory, a measure of cognitive achievement, \( (r = .34; \text{Bronson et al., 1995}) \). In the present study, a mean rating was computed for the Mastery Behaviors scale with items assessing independence, cooperation, self-regulation, responsibility, and assertion. The internal reliability for items in the Mastery Behaviors scale at Time 1 was .95 and .95 at Time 2.

6.4. Procedure

At Time 1, parents completed the background questionnaire, and the Parenting Questionnaire at Time 1 and Time 2. At each time point, parents were sent the questionnaires to complete and returned them to the researchers within a 1-month period. In addition, teachers rated children on their learning-related social skills using the SSRS and the CBRS at Time 1, in the winter of the preschool year when children were 3–4 years old, and again at Time 2, 1 year later. At both time points, teachers were given the ratings scales to complete and returned them to the preschool within a 1-month period.

7. Results

7.1. Analytic strategy

The analytic strategy for the present study used CFA using structural equation modeling (SEM) to determine if a learning-related skills construct was present in children as young as 3 years of age. CFA are methodologically stronger than using other exploratory methods such as exploratory factor analyses because they test a specific set of hypotheses rather than finding the strongest statistical solution (Kline, 1998). In addition, repeated measures ANCOVAs were employed to compare the mean change in ratings of learning-related skills from Time 1 to Time 2 and hierarchical multiple regressions were used to examine relative ranking stability over time. Specifically, regressions examined if teacher ratings of children’s learning-related skills at Time 1 were statistically significantly related to ratings of learning-related skills at Time 2, after taking into account child, family, and sociocultural characteristics (such as child age, amount of preschool experience, the family learning environment, parent education level, and ethnicity).

The sample size for analyses between Time 1 and Time 2 dropped because of missing data from a background variable that was only measured at Time 1 (amount of preschool experience). All analyses used listwise deletion, which is the most conservative method for dealing with missing data in analyses. However, this method also decreased the sample size for analyses between Time 1 and Time 2. To strengthen the power of the analyses conducted, missing data were estimated using the expectation maximization (EM) method (Dempster, Laird, & Rubin, 1977; Little & Rubin, 1987). EM is a maximum likelihood procedure that uses iterations to impute missing values. Schafer & Graham (2002) recommend maximum likelihood procedures as being appropriate for dealing with missing data. As a result, in the present study, all analyses have a sample size of 72.
7.2. Nature of learning-related skills at ages 3–4 and 4–5

To study the nature of early learning-related skills as rated by teachers, data at Time 1 were analyzed to determine if a construct of learning-related skills was present in 3–4-year-old children. Based on previous research (McClelland et al., 2000), it was hypothesized that a learning-related skills construct would emerge in a CFA of teacher ratings assessing self-control, cooperation, assertion, and mastery behaviors (including planning, organizing, and self-regulation skills). It was also predicted that moderate individual differences in teacher ratings of children’s learning-related skills would be present at ages 3–4 years (Time 1) and 1 year later (Time 2). Finally, it was expected that ratings of learning-related skills would statistically significantly improve over time in terms of the mean change in ratings, but remain stable in terms of relative ranking between Time 1 and Time 2 where learning-related skills at Time 1 would be statistically significantly related to learning-related skills at Time 2.

Initial correlations suggested that all scales measuring teacher ratings of learning-related skills were statistically significantly related to each other at Time 1. For example, the mastery behaviors scale was statistically significantly correlated with assertion ($r = .58$, $r^2 = .34$), self-control ($r = .50$, $r^2 = .25$), and with cooperation ($r = .68$, $r^2 = .46$). In addition, the scales from the SSRS were also statistically significantly related to each other (see Table 1).

To investigate the nature of learning-related skill ratings in children at 3–4 years, CFA using SEM was used. Initial results of the CFA on scales measuring self-control, cooperation, assertion, and mastery behaviors at Time 1 revealed a one-factor model labeled “learning-related skills” (see Fig. 1). Results of the CFA indicated a good fit to the data: $\chi^2(2, N = 72) = 4.12$, GFI = 0.97, NFI = 0.98, CFI = 0.99, RMSEA = 0.12, critical $N = 160$. An alternate CFA model was run after results indicated that the variables of cooperation and self-control were correlated, and theta-delta modification indices suggested correlating the error terms of the two variables. The alternate model provided the best fit to the data and was used as the final model.

![Fig. 1. Path diagram of CFA using structural equation modeling: Time 1.](image)

Note. Valid $N$ was 72. All path coefficients are standardized. SSRS is the Social Skills Rating System. CBRS is the Child Behavior Rating Scale.

* $p < .0001$.
Table 1
Correlations between predictor and outcome variables

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<th>S. no.</th>
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<td>.810***</td>
<td>.912***</td>
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<td>.452***</td>
<td>.481***</td>
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<td>Child age Time 1 (in months)</td>
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<td>Child age Time 2 (in months)</td>
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<td>−.045</td>
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<td>Preschool experience (in months)</td>
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Valid N was 72. SSRS is the Social Skills Rating System. CBRS is the Child Behavior Rating Scale.

a Scale for the SSRS is from 0–2.
b Scale for the CBRS is from 1–5.
c Range for the learning-related skills variable is from 0.25–2.75.
d Range for the family learning environment is from 0–2.33.

* p < .05.
** p < .01.
*** p < .001.
model: $\chi^2(1, N = 72) = 0.19$, GFI = 1.00, NFI = 1.00, CFI = 1.00, RMSEA = 0, critical $N = 2,515$ (see Fig. 1).

The sample size for the CFA was 72, which is within the minimum limits of the parameter-to-subject ratio for SEM reported by Kline (1998). According to Kline, the sample sizes should be at least 5–10 times the number of parameters that are estimated in the model (1998). In the present study, there were 9 parameters, which required a minimum sample size of 45 for interpretation of the model. It is important to note that given the small sample size of 72, it is possible that the CFA may be underpowered for rejecting the null model. However, all the path coefficients were statistically significant in the model, which strengthens the finding that they contribute to learning-related skills construct in preschool children as rated by teachers (see Fig. 1).

In addition, the statistically significant factor loadings of the scales in the final model demonstrated that each scale was a reliable indicator of learning-related social skill ratings. Reliability estimates are obtained by squaring the factor loading for each scale (Kline, 1998). For example, the reliability estimate for mastery behaviors as an indicator of learning-related skills was .58, the reliability estimate for assertion as a measure of learning-related skills was .59, the reliability estimate for self-control as an indicator of learning-related skills was .48, and the reliability estimate for cooperation as a measure of learning-related skills was .79 (see Fig. 1).

After results of the CFA found that the scales of mastery behaviors, assertion, self-control, and cooperation were statistically significant indicators of learning-related social skills, a learning-related social skills variable was created. The learning-related social skills variable was based on the mean of the mastery behaviors, assertion, self-control, and cooperation scales at Time 1 and Time 2. The possible range of scores for the learning-related skills variable ranged from 0.25 to 2.75 (see Table 1). The mean learning-related social skills variable was used to determine the stability of teacher ratings of children’s learning-related social skills between 3–4 years and 1 year later (see Section 7.3).

The second goal of the study was to examine the extent of individual variability in teacher ratings of children’s learning-related skills at 3–4 years (Time 1) and 1 year later (Time 2). Results indicated that there was moderate variability in ratings of children’s skills at 3–4 years and 1 year later (see Table 1). Examination of the descriptive statistics demonstrated that the scales measuring learning-related skills supported adequate variability in the ratings of learning-related skills, although there was some evidence of restricted variability in some of the scales. At Time 1, the means and standard deviations on the scales of the SSRS (self-control, cooperation, and assertion) illustrated that most children’s ratings on scales ranged from “sometimes” to “very often” and most children’s ratings on the mastery behavior scale of the CBRS ranged from “sometimes” to “frequently” displaying mastery skills. Similarly, descriptive statistics at Time 2 showed similar means and standard deviations (see Table 1).

In addition, at Time 1, although the majority of children were rated by teachers as “sometimes” showing self-control, cooperation, assertion, and mastery behaviors, 18% of the children were rated as “never” demonstrating the skills necessary for self-control, and 20% were rated as “never” showing skills important for assertion. However, 11% of the children were rated as “very often” showing cooperation skills and 7% were rated as “very often” demonstrating self-control skills. At Time 2, teachers rated children somewhat higher than at Time 1 with the majority of children being rated as “sometimes” showing self-control, cooperation, assertion
and mastery behaviors, and only 12% of the children being rated as “never” showing assertion, and 10% of the children being rated as “never” showing self-control.

To further examine the variability of ratings on the scales assessing learning-related skills, the coefficients of variation were computed for each scale at Time 1 and Time 2. The coefficient of variation allows for comparison of the variability among different variables when the variables are measured in different units and is computed by dividing the standard deviation by the mean and multiplying by 100 (Norušis, 2002). The coefficients of variation for each scale at Time 1 were: self-control, 32%; cooperation, 24%; assertion, 33%; and mastery behaviors, 15%. At Time 2, the coefficients of variation were: self-control, 26%; cooperation, 21%; assertion, 32%; and mastery behaviors, 18%. These results demonstrate that at Time 1 the scales showing the most variability were self-control and assertion followed by cooperation and mastery behaviors. At Time 2, the scales with the most variability were assertion and self-control followed by cooperation and mastery behaviors. Taken together, the coefficients of variation indicate that while there was some restricted variability in some of the scales, the restricted range was not marked and should not substantially influence the data, except to make it more difficult to find statistically significant effects. In addition, the distribution of data was fairly normal and the skewness values were all less than absolute values of 3.0, which is within the range for normality (Kline, 1998). At Time 1, skewness values for ratings of learning-related skill scales were as follows: self-control, $-0.654$; cooperation, $-0.624$; assertion, $-0.568$; and mastery behaviors, $-0.309$. At Time 2, skewness values for scales were: self-control, $-0.156$; cooperation, $-0.434$; assertion, $0.547$; and mastery behaviors, $-0.544$.

7.3. Stability of learning-related skills at ages 3–4 and 4–5

The third goal of the study was to examine the stability of children’s early learning-related skills between the ages of 3–4 years (Time 1) and 1 year later (Time 2) based on teacher ratings. Two types of stability were examined: stability in terms of mean change over time in ratings of children’s learning-related skills and relative ranking stability from Time 1 to Time 2.

To test the mean change in children’s ratings of learning-related skills from Time 1 to Time 2, a repeated measures ANCOVA was run with time as the within-subjects factor, and child age, preschool experience, family learning environment, parent education level, and ethnicity as covariates. Contrary to expectations, results demonstrated that there was not a statistically significant change in the mean ratings of learning-related skills between Time 1 and Time 2 for learning-related skills or any of the learning-related skills scales (self-control, cooperation, assertion, and mastery behaviors). Specifically, ratings of children’s learning-related skills did not significantly improve between the ages of 3–4 years and 1 year later $F(1, 66) = 0.084, p > .05$. Ratings of the learning-related skills scales also did not statistically significantly improve from Time 1 to Time 2: self-control $F(1, 66) = 0.011, p > .05$; cooperation $F(1, 66) = 0.178, p > .05$; assertion $F(1, 66) = 0.078, p > .05$; mastery behaviors $F(1, 66) = 0.247, p > .05$. These results suggest that teacher ratings of children’s learning-related skills remained stable in terms of the mean change in ratings and did not statistically significantly improve from ages 3–4 to 4–5 years.

The second type of stability examined was relative ranking stability. It was expected that children’s ratings of learning-related skills at Time 1 would predict their ratings at Time 2.
Results of correlations and hierarchical multiple regressions indicated that ratings of children’s learning-related skills were stable over time, even though 56 out of the 68 children had different teachers between Time 1 and Time 2.

To examine the stability of teacher ratings between Time 1 and Time 2, an ANOVA was run comparing the change in children’s learning-related skills from Time 1 to Time 2 for children who had the same teacher at both time points \((n = 12)\) to those that had different teachers between Time 1 and Time 2 \((n = 56)\). Preliminary results found no statistically significant difference in children’s learning-related skills change score for those who had the same or different teachers at Time 1 and Time 2. In other words, ratings of children with different teachers at Time 1 and Time 2 were no less stable than the ratings of teachers that were the same at both time points. A similar ANOVA was run comparing the change in children’s learning-related skills for those who changed schools \((n = 5)\) to those who stayed in the same school at Time 2 \((n = 63)\). Preliminary analyses found no statistically significant difference in the change in children’s ratings for those who stayed in the same school \((M = 0.062)\) or changed schools \((M = -0.013)\) \(F(1, 60) = 0.204, p > .05\). Further, the size of the mean difference for the change in children’s ratings from Time 1 to Time 2 was less for children who changed schools than for children who stayed in the same school.

To examine relative ranking stability, correlations showed that learning-related skills at Time 1 were statistically significantly related to learning-related skills at Time 2 \((r = .59, r^2 = .35)\). In addition, hierarchical multiple regressions indicated that ratings of learning-related skills at Time 1 statistically significantly predicted 30% of the variance in ratings of learning-related skills at Time 2, whereas the background variables (child age, preschool experience, family learning environment, parent education level, and ethnicity) accounted for 9% of the variance in ratings of learning-related skills at Time 2 (see Table 2). These results suggest that ratings of children’s learning-related skills remained fairly stable between Time 1 when children were 3–4 years and 1 year later.

Taken together, results regarding the nature and stability of teacher ratings of early learning-related skills revealed a learning-related skills construct in 3–4-year-old children. Specifically, data from ratings of self-control, cooperation, assertion, and mastery behaviors formed

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Valid \(N = 72\). \(R^2 = .09\) for Step 1 \((p > .05)\); \(\Delta R^2 = .30\) for Step 2 \((p < .05)\).

*** \(p < .001\).
a learning-related skills construct in preschool children. In addition, moderate individual differences were found in teacher ratings of these skills at 3–4 years 1 year later indicating that variation in children’s learning-related skills emerges early.

Ratings of learning-related skills were also stable over time in terms of mean change stability and relative ranking stability. Although ratings of learning-related skills were expected to statistically significantly improve over time, there was no statistically significantly difference in children’s ratings at Time 1 and Time 2. However, as expected, learning-related skills demonstrated relative ranking stability where ratings of learning-related skills at Time 1 statistically significantly predicted ratings of learning-related skills at Time 2, even though 56 of the 68 children at Time 2 had different teachers. These results suggest that teacher ratings of learning-related social skills are present in children as young as 3 years and demonstrate variability and stability between the ages of 3 and 5 years.

8. Discussion

The present study examined the nature of early learning-related social skills (based on teacher ratings), the extent of individual differences in ratings of learning-related social skills, and the stability of these skills in terms of mean change over time and relative ranking stability in preschool children. A coherent construct was revealed that varied across preschool children and showed stability over a 1-year period.

8.1. Nature of learning-related skills in preschool children

Results of this study revealed a learning-related skills construct based on teacher ratings in 3–4-year-old children. Specifically, data from the teacher rated scales of self-control, cooperation, assertion, and mastery behaviors formed a learning-related skills construct in preschool children that was similar to learning-related skills found with school-age children. In addition, individual differences were found in ratings of these skills at 3–4 years and 1 year later indicating that children are acquiring varying levels of these skills in preschool. This suggests that while many children were rated as having high levels of learning-related skills, some children were rated as having lower levels of learning-related skills, which have been related to early school success (Cooper & Farran, 1988; McClelland et al., 2000).

8.2. Stability of learning-related skills between the ages of 3–4 and 4–5

Learning-related skills were fairly stable in terms of the mean change over time and the relative ranking of these skills between 3–4 and 4–5 years. While we expected that children’s learning-related skills ratings would improve between 3–4 years and 1 year later, there was not a statistically significant change in skill ratings between Time 1 and Time 2.

In addition, relative ranking stability was found where teacher ratings of learning-related skills at Time 1 statistically significantly predicted ratings of learning-related skills at Time 2, even though most ($n = 56$) children had different teachers. In other words, a child’s learning-related skill score at 3–4 years predicted that child’s score 1 year later. Together, these results
suggest that the learning-related skills construct, as rated by teachers, demonstrated stability in terms of mean change over time and relative ranking as children moved through the preschool years.

8.3. Practical implications

8.3.1. Nature of learning-related skills in preschool children

Findings from the present study have a number of practical implications. In general, results demonstrate that learning-related skills, as rated by teachers, are present in children as young as 3 years. In addition, findings indicate that variability exists in children’s learning-related skills signifying that while many children were being rated as having good learning-related skills, some children were being rated as having lower levels of these skills in the preschool years. Based on previous research documenting the relation between learning-related skills and academic achievement, it seems important for children to develop strong learning-related social skills as they make the transition to formal schooling.

However, the results of this study also suggest that the responsibility of ensuring that children have a successful transition to kindergarten falls on both parents and schools. While it is important for teachers and parents to promote learning-related social skills prior to formal entry to school, schools and teachers must also be able to adapt expectations and curriculum to fit the differing needs of children. Increased recognition of the individual characteristics and abilities of children can help provide a better match between teacher expectations and children’s abilities. In addition, although the children and families in the current study were predominantly Caucasian with well-educated parents, it is important for teachers to promote early learning-related social skills in ways that respect each child’s background and emphasize each child’s strengths, rather than focusing on perceived or real weaknesses.

8.4. Stability of learning-related skills between the ages of 3–4 and 4–5

Results also found that children’s learning-related skills were fairly stable in the 2 years prior to kindergarten in terms of the mean change over time and relative ranking. Teacher ratings of children’s skills did not statistically significantly improve over time and children’s learning-related skills at Time 1 predicted their skills at Time 2.

It is not clear why children’s ratings were stable over time. It may be that teachers at Time 1 and Time 2 shared information about children or had similar expectations for children, although no statistically significant differences were found in children’s scores from Time 1 to Time 2 for the children who changed schools or stayed in the same schools or for those children who had the same or different teachers (see Section 8.5). However, because the sample was mostly Caucasian and well-educated, the stability found between Time 1 and Time 2 may also be due to preschools having similar expectations for behavior.

In addition, it is possible that teachers may have adjusted their expectations of behavior when children were aged 4–5 years compared to rating younger children’s behavior. In other words, it is possible that teachers rated children’s behavior according to a different metric at 3–4 years than at 4–5 years of age, and this could be the reason for the lack of improvement in teachers’ ratings between Time 1 and Time 2. In any event, it is important to note that the stability found
in the present study may be due to other factors such as having similar expectations for behavior or because teachers used a different metric to rate children’s behavior at Time 1 and Time 2. Future research will incorporate observations of children’s behavior to augment teacher ratings and better determine the meaning of the stability of ratings over time. Overall, the findings from the present study suggest that it is important to identify factors (e.g., child, parenting, and teacher influences) that are affecting these skills and is a topic of future research.

8.5. Limitations of the study

Although this study revealed important information about the nature and sources related to the development of children’s learning-related skills, there were a number of limitations. First, the sample was fairly small (N = 72 at Time 1 and N = 68 at Time 2), homogeneous, (with 81% of the sample Caucasian), and well educated (the mean parent education level was 16.79 years). The select and fairly small sample limits the generalizability and power of the results. Thus, caution should be taken when applying these results to different populations of children (e.g., low-income or minority children). In addition, the subject to item ratio for the CFA was low (72:9) suggesting that the results of the CFA may be underpowered for rejecting the null model. However, although the sample size was small, all path coefficients in the CFA were statistically significant which strengthens the finding that they fit a learning-related social skills construct in preschool children.

Second, it is important to note that children’s learning-related social skills were based on teacher ratings and may reflect teacher perceptions rather than actual child behavior. Recent research has found that teacher’s own characteristics such as ethnicity are related to their ratings of children’s behavior. For example, research by Rimm-Kaufman et al. (2000) found that non-minority teachers rate minority children as having more difficulties in the transition to kindergarten than non-minority children. In the present study, information was not collected on the teacher’s background so it was not possible to examine how characteristics of teachers may have been related to their ratings of children’s learning-related skills.

A related concern is that teacher and school expectations about school success and learning-related skills may not take into account a child’s background characteristics such as culture and income level. Because data were not collected on teacher education level or ethnicity, it is not possible to adequately examine to what degree teacher and school expectations created a mismatch between child’s background and expectations for doing well in school. However, recent research suggests that standards for school success reflect perceptions and priorities of the dominant culture (typically Caucasian and/or middle and upper income levels) and may not show an understanding of priorities and characteristics of minority cultures (such as African-American or lower income level; Delpit, 1993, 1995). Thus, teacher ratings may reflect norms of the dominant culture and could misidentify children’s behavior as being problematic. Since the majority of the families in the present study were Caucasian and well educated, it was not possible to examine this issue but is a direction of future research.

Two other limitations are the nested nature of the data and independence in the teacher ratings of learning-related skills at Time 1 and Time 2. In terms of nestedness, at both time points, ratings of the children were not independent because the same teacher completed them
and the teacher’s ratings were not independent because they were in the same preschools. This meant that at Time 1 and Time 2, children were nested within classrooms and teachers were nested within preschools. An appropriate way to disentangle this issue would be to use hierarchical linear modeling (HLM) which allows for analysis of nested data, but sample size limits prevented the use of this statistical method in the present study.

In addition, it is possible that the teacher ratings at Time 1 and Time 2 were not independent. Although 56 out of 68 children were rated by different teachers at Time 1 and Time 2, it is possible that the ratings were not independent because 25 of the 30 teachers at Time 2 were in the same school as they were at Time 1. Thus, their ratings may have reflected similar approaches to teaching, or shared impressions of a child. Unfortunately, without randomly assigning teachers to children, or having independent observational ratings of child behavior, it is impossible to completely disentangle this issue. However, additional analyses did find that ratings of learning-related skills did not statistically significantly differ between Time 1 and Time 2 based on whether children had the same or different teacher or whether children were in the same or different school at Time 2. Future research will incorporate larger sample sizes, more information on teachers, and observational ratings in order to more effectively deal with the issue of nestedness and independence in repeated measurement.

Finally, there was a restricted range in the scales in the SSRS which could have limited the variability in the responses from raters (teachers). The Likert scale used in the SSRS is a 0–2 scale, whereas the Likert scale in the CBRS is a 1–5 scale. However, descriptive results at Time 1 and Time 2 indicated an adequate amount of variability as shown in the standard deviations in Table 1. In addition, the standard deviations for scores on the SSRS were generally similar to the standard deviation for scores in the CBRS.

Notwithstanding these limitations, the present findings demonstrate that learning-related social skills (as rated by teachers) are present in children as young as 3 years, and show variability and stability over the preschool years.

Notes

1. Although much of the research regarding learning-related social skills has been performed using the Cooper-Farran Behavioral Rating Scales (1991), the measure was not appropriate for preschool children (D. C. Farran, personal communication, March 11, 1999). Thus, in the current study, we found measures that could be used with 3- and 4-year-old children such as the SSRS and CBRS.

2. All analyses were also run using listwise deletion with missing data excluded. Results of analyses excluding missing data showed the same pattern of results as the analyses with missing data estimated. This gave us more confidence in the robustness of the results and in the decision to estimate missing values using the estimation maximization procedure.

3. Following the suggestion of a reviewer, we also re-ran the CFA after dropping the cooperation scale from the model. However, results of the CFA indicated that the model was saturated and did not provide any fit indices. Because one of the goals of the study was to determine the extent to which the variables formed a learning-related skills construct, we kept all the variables in the model.
Acknowledgments

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References


