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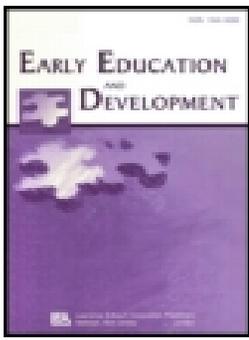
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Stability and Change in Early Social Skills Development in Relation to Early School Performance: A Longitudinal Study of A Swedish Cohort

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ABSTRACT

Research Findings: This study aimed to investigate the developmental path of social skills in early childhood, the associated predictors, and its impact on later school performance. This prospective longitudinal study included 2,121 children, ages 3–5 at baseline, from the general population in a mid-sized Swedish municipality. Results show both stability and change in social skills. Stable low social skills increased the risk for poor school performance, while stable high social skills increased the chance for good school performance in primary school. With some notable gender differences, both individual and family factors were significant predictors of stable low and stable high paths of social skills during early childhood. *Practice or Policy:* Whether the goal is to improve children’s social skills or their performance in school, this study provides important clues for prevention. We identified several potential targets for interventions to promote early social skills development, which may in turn promote positive school performance. It is also notable that there seem to be gender differences in which factors are important, indicating the need for gender-differentiated interventions.

Children’s ability to interact positively and adequately with other people has been shown to be a key factor for positive adjustment in a broad sense and over time, already from an early age (e.g., Domitrovich et al., 2017). Most importantly, children’s socio-emotional development tends to be associated with patterns of development across several other areas of life. Social competence and social skills are negatively related to short- and long-term internalizing problems and, later, to childhood externalizing problems (e.g., Bornstein et al., 2010; Burt et al., 2008). Interestingly, social skills at a young age have also been found to be related to school adjustment in childhood and adolescence, as well as work competence in adulthood (e.g., Bornstein et al., 2010; Masten et al., 2010), and interventions focusing on social skills have been successful for improving children’s academic performance (e.g., Domitrovich et al., 2017). Thus, it seems as if both poor social skills and academic underachievement coexist in the same realm of problem behaviors, which constitute adjustment problems concurrently and predict negative development over time. Not only are children’s social skills associated with a variety of potentially negative developmental outcomes, but research has also identified numerous factors that could influence the development of social skills itself (e.g., Spence, 2003). Thus, the aim of this study was to investigate whether patterns of stability and change in social skills could be identified during early childhood, what could contribute to the explanation of the different developmental paths of social skills, and if the paths were related to later school performance even when controlling for other well-documented risk and protective factors for school performance.

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The Development of Social Skills during Childhood

Social skills refer to the child's ability to act according to social expectations, i.e., to display care and empathy for others, to manage conflicts successfully, and to interact under social norms and values in general (Gresham et al., 2011; Walker & Rinaldi, 2020). Studies have shown that children's prosocial skills when rated by parents increase over the course of kindergarten and primary school (Berry & O'Connor, 2010; Chan et al., 2000; Vazsonyi & Huang, 2010). However, other studies suggest that children's social skills remain stable on different levels (i.e., low, moderate, or high) or slightly decrease through primary school when rated by teachers (Côté et al., 2002; Kokko et al., 2006). In general, much less is known when it comes to stability and change in social skills in early childhood, i.e., during preschool years, despite research showing that such behaviors emerge at an early age (see e.g., Briggs-Gowan et al., 2001; Brownell, 2013). Studies have shown that young children appear to display stability in social skills (McClelland & Morrison, 2003; Takahashi et al., 2015). It is, however, not impossible for young children to display declining or poor social skills early on as well, as it has also been shown that older children can show heterogeneity in social skills.

If we consider the development of positive and adequate social skills as a prerequisite for positive development in other areas of life, we need to understand how such a process can come about. Little is known of what characterizes different developmental paths of social skills during early childhood (see Takahashi et al., 2015). From a prevention point of view, understanding why children would not develop adequate social skills is equally important. The reasons are several. Many factors have been found to be related to a lack of social skills, within different domains of young children's lives: in the children themselves, in their families, as well as in preschool.

Child Factors and Social Skills

Children displaying emotional or behavioral disorders that imply attention-related issues and problematic peer-group interactions are at great risk for not developing adequate social skills, which in turn increases the risk for several negative outcomes, poor school performance being one (Gresham et al., 2011; Henricsson & Rydell, 2006; Walker & Rinaldi, 2020). Children displaying high levels of Hyperactivity-Impulsivity-Attention (HIA) problems are generally at greater risk for developing poor social skills than their peers (Hoza, 2007; Merrell & Wolfe, 1998). They are also more likely to be rejected by peers, and less likely to receive positive feedback from teachers, which has shown to limit their instruction time from teachers as well as increasing their off-task behavior (Shores & Wehby, 1999).

Callous-unemotional (CU) traits, i.e., lacking the ability to display empathy, guilt, and remorse (Frick & Ellis, 1999), are related to social cognitive and affective deficits. Children with high levels of CU traits have trouble identifying the emotions of others and thus also with offering adequate social responses (see e.g., Bandstra et al., 2011; Frick et al., 2014; Hare, 2003; Shamay-Tsoory et al., 2009), which are key functions in the development of general social skills. Children with high levels of CU traits also display an increased risk for concurrent and future behavior problems, such as poor peer-functioning and disruptive behavior in the (pre)school environment (Colins et al., 2014; Fontaine et al., 2011). More specifically, these children have been shown to view aggressive behavior as something positive (Pardini et al., 2003) and tend to rate bullying behavior highly (Muñoz et al., 2011).

Family Factors and Social Skills

Research has identified parenting practices to be important for social skills even among young children. Greater nurturing and a supportive approach toward independence and integration has shown to help children develop strong self-regulation and interactive skills (Hindman & Morrison, 2012; Stright et al., 2008). Positive parenting contributes to successful social adaptation by providing the child with guidance in social expectations and behavior management, as well as showing affection

and encouragement in everyday situations (Hindman & Morrison, 2012; Koblinsky et al., 2006). Positive parenting can even buffer effects of negative child factors (e.g., difficult temperament) in the development of self-regulation, while negative and/or authoritarian parenting styles increases the risk of poor social behavior (Roopnarine et al., 2006; Song et al., 2018).

Research has also linked parents' well-being to the development of social skills and behavior problems. More specifically, parents' emotional distress such as sadness and depressive symptoms has shown a substantial association to children's maladaptive social behavior, such as aggression and poor peer-relationships (Huhtala et al., 2014; Johnson & Flake, 2007).

Preschool Factors and Social Skills

The child's attachment to school (i.e., to the school environment and to teachers) is a central factor to the development of social skills (Whitaker et al., 2015). Positive teacher-child relationships have previously been linked to the development of positive social skills from preschool and up (Berry & O'Connor, 2010; Howes et al., 1994), and the quality of the teacher-child relationship seems to be associated with changes over time in social and academic skills (Pianta & Stuhlman, 2004; Powell, Son, File & San Juan, 2010). Furthermore, fostering social skills also tends to promote positive peer relations, which in turn constitute an important aspect of a positive attachment to school (Henricsson & Rydell, 2006; Walker & Rinaldi, 2020; Welsh et al., 2001). Additionally, the relationship between preschool teachers and parents has also proven to be important in the child's development of social skills during preschool (Henrich & Blackman-Jones, 2006). This is considered particularly important for enhancing child development, since there is a two-way communication between two essential systems in the child's life, i.e., the school and the home (Bronfenbrenner, 1979). Children whose parents actively and regularly seek and share information with teachers are more likely to display positive relationships with parents, teachers, and peers (Iruka et al., 2011; Owen et al., 2000). In fact, parent-school relationships have been argued to be especially beneficial in early childhood years for promoting early social skills (Powell et al., 2010). As such, teacher-parent collaboration can form important structures that enable and reinforce children's social abilities (Christenson, 2004).

Gender Differences in Social Skills

Even though disruptive behaviors are more prevalent among boys than girls (e.g., Demmer et al., 2017; Erskine et al., 2013; Wittchen et al., 2011), boys do not necessarily take a smaller role in prosocial interactions than girls do (Walker, 2010). Still, studies tend to show that girls score higher than boys on social skills, even early in life (Abdi, 2010; Gomes & Pereira, 2014). Furthermore, research has also shown that while girls commonly outperform boys in school, the relation between gender and performance is mediated by agreeableness, i.e., the extent to which the child is perceived as friendly, warm, and cooperative (Steinmayr & Spinath, 2008). As there seems to be a gender difference in the presentation of social skills, it is important to also investigate whether different factors, such as behavioral or relational aspects, are linked to the developmental paths of social skills in different ways for boys and girls.

Childhood Social Skills and School Performance

Social skills are often included as a part of the concept of school readiness, which incorporates several areas related to the child's educational setting, such as physical development, approach to learning (e.g., curiosity and creativity), cognition, language skills, emotional development, and social skills (Gullo, 2015). Social skills have repeatedly been linked to the child's ability to perform well in school (see e.g., Arnold et al., 2012; Doctoroff et al., 2016; McClelland et al., 2006; Quirk et al., 2017; Ray & Elliott, 2006; Rhoades Cooper et al., 2014; Sparapani et al., 2018; Webster-Stratton & Reid, 2004). Research on social skills and school performance among children points to the importance of early

positive development and stability in social skills (Welsh et al., 2001). The link between social skills and school performance has also been shown to be reciprocal, suggesting a close interaction between the two (Sparapani et al., 2018; Welsh et al., 2001). This reciprocity also seems to be consistent over time, with school performance predicting the quality of future peer relations, and social skills predicting later school performance. Thus, it is important to keep building knowledge regarding the relation between early childhood social skills and later school performance when controlling for other early childhood factors important for school performance.

Other Factors Important for School Performance

Research has identified a plethora of factors related to a child's school performance. Risk and protective factors for future school performance occur within several domains of a child's life, including individual, family, preschool/school, and social environment (see e.g., Borman & Overman, 2004; Brennan et al., 2012; Juvonen et al., 2011; Romano et al., 2010). This study includes a select few of these factors in order to examine to what extent early childhood social skills developmental paths are associated with later school performance when controlling for other well-documented factors important to school performance. On an individual level, Hyperactivity-Impulsivity-Attention (HIA) problems have repeatedly been identified as a substantial risk factor for school performance, even with control for other factors, possibly due to limited attention skills that hinder the child's ability to partake and be involved in learning activities (e.g., Daley & Birchwood, 2010; Duncan et al., 2007; Loe & Feldman, 2007). Family and home environment factors have also been found to bear an influence on school performance. Family socioeconomic status (SES) has been clearly linked to academic outcomes, where lower SES increases the risk for poor school performance (Borman & Overman, 2004; Breen et al., 2009; Buchmann & Hannum, 2001). Parent-child conflicts tend to increase the risk for poor school performance as well, while high-quality parent-child relationships appear to increase the child's chances for good school performance (Burchinal et al., 2002; Castro et al., 2015; Parker et al., 1999; Pianta et al., 1997). Furthermore, joint parent-child reading activities already from an early age appear to be associated to positive language and vocabulary development (Farrant & Zubrick, 2012; Park, 2008). Lastly, factors in the preschool or school environment are also essential to the child's academic success. Research shows that children subjected to peer victimization are at greater risk for poor school performance, as are children whose parents have a deficient interaction with (pre)school teachers (Juvonen et al., 2011; Nakamoto & Schwartz, 2010; Powell et al., 2010). Hence, a child's ability to perform well in school is a complex phenomenon depending on many conditions, where factors within several domains are likely to interact (NICHD Early Child Care Research Network, 2004; Whitney et al., 2010).

The Swedish Preschool

Preschool in Sweden is a voluntary educational activity that more than 85% of children between the ages of 1 and 5 years participate in (Swedish National Agency for Education, 2020). According to the curriculum (Swedish National Agency for Education, 2019), preschool should stimulate children's development and learning in a safe environment. The year children turn six years old they transfer from preschool to preschool class, which is part of the compulsory school system (Swedish National Agency for Education, 2018). The aim of the preschool class is to facilitate the transition between preschool and the compulsory school system. Municipalities supervise both the preschools run by them as well as private options, and they all follow the same curriculum and the same regulations concerning how their teaching should be implemented (Swedish National Agency for Education, 2019).

What is Missing in Research?

Previous studies have clearly demonstrated a link between social skills and positive adjustment over time in general, and between social skills and school performance in particular. However, most

research on this topic has focused on children five years of age and older (see e.g., Domitrovich et al., 2017). Studies have shown that it is possible to identify risk and protective factors for school performance, including social skills, already in early preschool, i.e., at age three (see e.g., Arnold et al., 2012; Hellfeldt et al., 2020; Webster-Stratton & Reid, 2004). Thus, it is important to look further into how preventive measures, such as social skills training, could possibly benefit children even at a very young age. Also, if we can gather further knowledge on how social skills develop during early childhood, as well as on what characteristics are associated with what developmental path, this could potentially guide the targeting and implementation of preventive interventions. We argue that it is important to consider the child in its context in order to understand his or her development in general, and in this case their development of social skills in particular. This is, for example, in line with a socioecological model of development, suggesting that several domains of an individual's life come together to form the conditions for developmental processes (Bronfenbrenner & Morris, 2006). Additionally, it is also important to know whether gender specific patterns in these aspects exist, in order to even further optimize interventions aiming to enhance social skills during early childhood.

The Present Study

The aim of the present study was to investigate potential stability and change in social skills in early childhood (i.e., during preschool), and to seek further understanding of factors that could explain the various developmental paths of social skills by examining associations between different paths and other potentially important risk and protective factors, i.e., HIA problems, CU traits, positive parenting, parents' well-being, positive teacher-parent relationship, and the child's attachment to preschool. Furthermore, we also aimed to examine whether and how various developmental paths of social skills during early years predict school performance in primary school, even when controlling for other important preschool factors for school performance.

The following questions were posed:

- (1) Can stability and/or change in levels of social skills during early childhood be identified, and can gender specific patterns be distinguished?
- (2) Which individual, family, and preschool factors show unique associations with different developmental paths of social skills during early childhood?
- (3) Are the different identified developmental paths of social skills during early childhood associated with positive or negative early school performance, and do these potential associations hold when controlling for other preschool factors potentially important to early school performance?

We hypothesize that different developmental paths of social skills can be identified. More specifically we hypothesize that development of social skills in early childhood follows at least four different paths: one with stable high levels of social skills, one with stable low levels, one with increasing levels of social skills, and one with decreasing levels. We also hypothesize that girls will be more likely to display stable high levels of social skills than boys. To address the second question, six different individual, family, and preschool factors in early preschool age were examined, based on their importance to social skills in previous research (see e.g., Frick et al., 2014; Hindman & Morrison, 2012; Hoza, 2007; Huhtala et al., 2014; Whitaker et al., 2015): HIA problems, CU traits, positive parenting, parents' well-being, and the child's attachment to preschool. We hypothesize that high levels of HIA problems and CU traits at baseline will be related to displaying poor social skills throughout early childhood, and that the other four factors will emerge as protective factors, i.e., high levels of positive parenting, parental well-being, good teacher-parent relationships, and positive school attachment will be related to displaying positive social skills throughout early childhood. Lastly, for the third question regarding social skills and school performance, we hypothesize that stable high and increasing early childhood levels of social skills are related to good school performance, and that stable low and decreasing early

childhood levels of social skills are related to poor school performance, even when controlling for other factors potentially important to early school performance.

Method

This study used data from the Social and Physical Development, Interventions and Adaptation (SOFIA) study, an ongoing prospective longitudinal study that aims to provide better understanding of children's behavior, social adjustment, and psychological and physical health. The target population consisted of all children attending preschool in a mid-sized Swedish municipality during the spring of 2010 (children born in 2005, 2006, and 2007; $n = 2,542$). The municipality had approximately 85,000 citizens and was, in term of proportions, demographically similar to the rest of Sweden considering age, sex, education level, level of employment, and the mixture of urban and rural areas. Primary caregivers (parents) of 2,121 children (49% girls) gave active consent to participation at baseline. Data collections were conducted between March and September in 2010 (baseline), 2011 (1-year follow-up), 2012 (2-year follow-up), 2015 (5-year follow-up), and 2018 (8-year follow-up). The present study aimed to investigate stability in preschool factors and early school performance; thus, data from the baseline data collection (2010), the 2-year follow-up (2012), and the 5-year follow-up (2015) were included.

Participants

At baseline, responses were received for 2,113 (99.6%) of the participating children from the teachers, and for 2,026 (95.5%) from the parents. The children were between the ages of three and five ($M = 3.86$ years, $SD = 0.86$) and were enrolled in preschool. At the 2-year follow-up, when the children were between the ages of five and seven, ratings for 1,934 (91.2%) children were completed by teachers, and 1,829 (86.2%) by parents. During the fall of 2011, children born in 2005 advanced to preschool class, and in 2012, children born in 2006 did the same, leaving only children born in 2007 in preschool for the 2-year follow-up. At the 5-year follow-up, responses were received for 1,829 (86.2%) of the originally participating children from teachers, and for 1,654 (78%) from parents. The children were at this time between ages 8 and 10, and were in either their first, second, or third year of primary school.

Non-Participants

About 16% of the target population declined participation in the study in 2010. A previous study using data from the SOFIA study examined whether non-participants differed from those who chose to partake in the study (Colins et al., 2014). The nonparticipating group did not differ significantly from participants regarding relevant characteristics, such as the parents' socio-economic status and origin, or the children's levels of conduct problems and internalizing problems.

Measures

Potential risk and protective factors at the individual, family, and preschool level were assessed at baseline and at the 2-year follow-up, when the children were enrolled in preschool or preschool class; early school performance was assessed at the 5-year follow up, when the children were attending primary school.

Social Skills

Both teachers and parents assessed the child's social skills through five items at both baseline and the 2-year follow-up. The items were developed for the SOFIA study aiming to assess prosocial skills that in previous research had shown protective abilities in developmental processes. The

included items were “He/she is very good at saying hello and goodbye”; “He/she is very good at responding in a nice manner when spoken to”; “He/she is very good at keeping eye contact when speaking to someone”; “He/she is very good at clearly and politely saying thank you (at meals, etc.)”; and “He/she is very good at helping out at the preschool/at home in different ways”. All items were rated on a 4-point Likert scale, ranging from 1 = *Does not apply at all*, to 4 = *Applies very well*. A baseline teacher-rated social skills scale was then created by calculating the mean score of at least three of the total five included teacher-rated items ($\alpha = .82$). A parent-rated social skills scale was created in the same way with parent-rated items ($\alpha = .59$). Lastly, a combined baseline social skills measure was created by using the mean score of the teacher- and parent-rated social skills scales calculated in the previous step. These steps were then repeated for social skills at the 2-year follow-up (teacher-rated social skills $\alpha = .87$ and parent-rated social skills $\alpha = .72$) to calculate the combined 2-year follow-up social skills scale. These scales have not previously been used in research, but they were chosen because they display adequate face validity and internal consistency reliability.

Hyperactivity-Impulsivity-Attention Problems

HIA problems were assessed by teachers using 18 items aimed to reflect the diagnostic criteria of ADHD of the DSM-IV-TR (American Psychiatric Association, 2000, 2013; DuPaul et al., 1998). Items such as “The child often has difficulties awaiting his/her turn” and “The child seems to get bored quickly” were assessed on a 5-point Likert scale, ranging from 1 = *Never* to 5 = *Very Often*. The HIA problems scale ($\alpha = .96$) was created using the mean score of at least 12 of the total 18 items, which is in line with the standard procedure for this scale (DuPaul et al., 1998).

Callous-Unemotional Traits

CU traits were assessed by teachers through ten items from the Child Problematic Traits Inventory (CPTI; Colins et al., 2014). Items such as “The child rarely expresses sympathy for others” and “The child never seems to have a guilty conscience for things that he/she has done” were rated on a 4-point Likert scale ranging from 1 = *Does not apply at all* to 4 = *Applies very well*. The CU scale ($\alpha = .95$) was created using the mean score of at least seven of the ten included items

Parents’ Wellbeing

Parents answered three questions regarding their mental health status. The first item was “To what extent have you enjoyed life during the past six months?” and was rated on a 4-point Likert scale ranging from 1 = *Very much* to 4 = *Not at all*. The second item was “Have you been sad or depressed for several weeks at a time during the past six months?” to which parents responded Yes or No. The third item was “Have you felt so stressed that you did not have time or energy for your child during the past six months?”, which was rated on a 4-point Likert scale ranging from 1 = *No* to 4 = *Yes, often*. All scales were reversed and standardized before computing the parents’ psychological well-being scale ($\alpha = .61$) by computing mean scores for at least two of the total four items.

Teacher-Parent Relationship

Preschool teachers rated four items regarding the relationship between them and the primary caregivers. Examples of items were “Describe your contact with the primary caregivers”, rated 1 = *Very good* to 4 = *Not good at all*, and “Are you satisfied with your dialogue with the primary caregiver?”, rated 1 = *No, I wish for a much better dialogue*, 2 = *No, I wish for a slightly better dialogue*, 3 = *It is good enough*, and 4 = *It is very good*. The teacher-parent relationship scale ($\alpha = .83$) was created by using the mean scores of ratings for at least two of the four included items.

Preschool Attachment

Teachers assessed the child’s attachment to preschool on two items: “He/she seems to like preschool very much” and “He/she seems to trust me as a teacher”. Both items were rated on a 4-point Likert

scale, ranging from 1 = *Does not apply at all* to 4 = *Applies well*. The preschool attachment scale ($\alpha = .80$) was created by using the mean scores of the two included items (rating on at least one item).

School Performance

As achievements in mathematics and Swedish language have been found to be feasible indicators of children's school performance (Stenhag, 2010, see also e.g., Brennan et al., 2012; Loe & Feldman, 2007), these two subjects were included in the school performance measure. Teachers rated two items regarding whether the child met set knowledge requirements in Swedish and mathematics, using the response scale 1 = *non-adequate knowledge*; 2 = *acceptable knowledge*; or 3 = *more than acceptable knowledge*. This response scale was used as grades are not given during the first three years in Swedish primary schools; thus, the teachers were asked to assess whether the child performs better than, worse than, or as expected with regards to learning objectives at their age (see e.g., Muszkat, 2017). The school performance scale ($\alpha = .75$) was created by using the mean score of the two items (at least one rating), which ranged between 1 and 3. This scale was then coded into three groups for comparison: 0 = *performance below knowledge requirements*, which included children with a maximum value of 1.9 on the combined scale; 1 = *performance in line with knowledge requirements*, which included children with combined ratings between 2 and 2.9; and 2 = *performance above knowledge requirements*, which included children with maximum ratings, i.e., 3.0.

Procedure

Before the start of each wave of data collection, the SOFIA study was approved by a Swedish research ethics committee (Waves 1–3, Dnr #2009/429; Wave 4, Dnr #2015/024). All stipulated ethical research principles, as stated by the Swedish Research Council and the Swedish Ethics Authority, have been followed throughout the project. The study was initiated in collaboration with the highest-level decision-makers in the Child and Adolescent Department of the municipality and all preschool principals. Both municipal and private preschools were invited to participate. Before each data collection, all school staff included in the study were invited to a comprehensive information session, where preschools received necessary information and materials, such as usernames and passwords for the web questionnaire. An active consent form was filled out by the parents and collected by the preschool/preschool class teachers, who then completed the questionnaires for children whose participation had been approved by parents. Preschool (baseline and the 2-year follow-up) and primary school teachers (the 5-year follow-up) and parents completed a questionnaire for each child. The parent questionnaire took about 30 minutes to complete, for which they received a gift certificate valued at 100 SEK. The teacher questionnaire took approximately 20 minutes to complete, and one teacher could answer the questionnaire for several children, as they answered for all children in their department/class with whom they were most familiar. Teachers answered the questionnaires for the participating children as part of their daily work and did not receive any personal gratifications. For more detailed information regarding the recruitment and start-up procedures of the SOFIA study, see Colins et al. (2014).

Statistical Analyses

To examine the stability and change in levels of social skills between baseline (ages 3–5) and the 2-year follow-up (ages 5–7), the combined teacher and parent ratings of social skills (see description above) from both of these data collections were combined into a stability measure. Thus, the children were categorized by their levels of social skills at baseline and at the 2-year follow-up in order to identify possible stability over this period (during preschool and preschool class). The categorization was achieved by applying two cutoffs, where ratings below $-.50$ standard deviation on the z -transformed combined teacher- and parent-rated social skills variable were defined as poor social skills, and ratings above $.50$ standard deviation were defined as good social skills. Sensitivity analyses were also

performed using stricter cutoffs (.75 and 1 standard deviation), which resulted in proportionally similar groups displaying high and low levels of social skills, respectively; these groups were, however, too small to include in further analyses. The categorizations for baseline and the 2-year follow-up ratings were then computed into a stability and change measure of social skills with four mutually exclusive paths: 1) Stable high levels of social skills including children displaying high levels of social skills at both baseline and the 2-year follow-up; 2) Increasing levels of social skills including children displaying low levels of social skills at baseline and high levels at the 2-year follow-up; 3) Decreasing levels of social skills including children with high levels of social skills at baseline and low levels at the 2-year follow-up; and 4) Stable low levels of social skills including children with low levels of social skills at both times. All children not fulfilling the criteria for any of the four groups ($n = 1,503$), i.e., those with ratings on social skills between $-.50$ standard deviation and $.50$ standard deviation, were not included in further analyses utilizing the stability variables, as they were not the focus of the research questions posed in this paper. Next, the mutually exclusive groups were coded into four separate dummy variables, coded 0 = not fulfilling criteria for group membership, and 1 = fulfilling criteria for group membership. This way, each child was assigned membership in only one group, e.g., inclusion in the stable high social skills group *or* in the increasing social skills group, etc. Chi-square tests of independence were performed to examine the relation between gender and the four respective social skills developmental paths.

Next, two binary logistic regression analyses were conducted with stable high social skills and stable low social skills, respectively, as outcome (dependent) variables. Six factors that have been shown to associate with social skills in previous research were entered as predictors: HIA problems, CU traits, positive parenting, parents' well-being, positive teacher-parent relationship, and child's attachment to preschool. All factors were assessed at baseline when children were 3–5 years old. These analyses were performed for boys and girls separately. The increasing social skills and decreasing social skills groups were removed from this step, as they were too small to render meaningful results. Lastly, the social skills developmental paths variables (stable low, stable high, increasing, and decreasing social skills) were entered into multinomial regressions, together with control variables, to predict school performance at the 5-year follow-up. Six control variables were chosen based on previous research and included: HIA problems, SES, parent-child conflicts, parents' reading to child, peer victimization, teacher-parent relation. For descriptive purposes, zero-order correlations between the main study variables among boys and girls separately were conducted as well. Both Pearson's and Spearman's correlations were calculated with results showing no noteworthy differences; thus, Pearson's r was used due to the large sample.

Results

To answer the first question of the study, whether stability and/or change in social skills could be identified throughout early childhood, the sample was divided into four groups using an arbitrary cutoff of $-.50$ standard deviation for "Low social skills", and above $.50$ standard deviation for "High social skills" at both baseline and the 2-year follow-up (see detailed description of categorizations and sensitivity analyses in the Method section). The groups were: Stable low social skills including 238 children (28% girls), Decreasing social skills including 69 children (51% girls), Increasing social skills including 50 (54% girls) children, and Stable high social skills including 261 children (63% girls). These results suggest that both stability and change occur in the development of social skills in early childhood. However, the groups that display change, i.e., increasing and decreasing levels, in social skills were the smallest. Displaying stable low (39%) and stable high (42%) levels of social skills was almost equally common. Chi-square tests of independence showed that boys and girls were equally likely to belong to the increasing ($\chi^2 [1, N = 618] = .95, p = .33$) and decreasing ($\chi^2 [1, N = 618] = .34, p = .56$) groups. Girls were, however, more likely to display stable high social skills ($\chi^2 [1, N = 618] = 45.28, p < .001$), and boys were more likely to display stable low social skills ($\chi^2 [1, N = 618] = 60.13, p < .001$).

Predictors of Social Skills Stability in Early Childhood

For descriptive purposes, zero-order correlations between the main study variables, including the social skills developmental paths, among boys and girls separately were conducted and are displayed in [Table 1](#). The majority of all variables were (weakly to moderately) significantly correlated with each other (boys $r_s = .07$ to $.45$, $p < .05$; girls $r_s = .05$ to $-.40$, $p < .05$).

To answer the second question of this study, i.e., what individual, family, and preschool factors show unique associations with different developmental paths of social skills, binary logistic regression models were estimated for each developmental path. The increasing and decreasing social skills paths were excluded from this step on account of being too small, which left analyses including stable low and stable high social skills as outcome variables. The predictors included baseline ratings of HIA problems, CU traits, positive parenting, parents' well-being, teacher-parent relationship, and preschool attachment. Analyses were conducted for boys and girls separately. Results are presented in [Table 2](#). The first analysis included the six predictors and stable low social skills as the outcome. For boys, results showed that high levels of HIA problems (145%) and CU traits (84%) uniquely increased the risk of belonging to the stable low social skills group. Among girls, HIA problems did not show a significant association to stable low social skills, while CU traits increased the risk of stable low social skills by 260%. Positive parenting decreased the risk for low social skills among both boys (64%) and girls (49%), as did high parental well-being, by 38% among boys and 45% among girls. Regarding preschool factors, a good relationship between the teacher and the parents and attachment to preschool decreased the risk of displaying stable low levels of social skills during preschool by 54% and 64%, respectively, among boys. No significant results were found regarding the association between preschool factors and stable low social skills among girls.

The second analysis included the same six predictors and stable high social skills as the outcome. Results showed that among boys, high levels of HIA problems (60%) and CU traits (62%) uniquely decreased the probability of displaying stable high levels of social skills during early childhood. Among girls, HIA problems were not associated with stable high levels of social skills, while CU traits decreased the probability of stable high social skills (73%). Positive parenting and parents reporting higher levels of well-being were associated with an increased probability of stable high social skills among boys by 177% and 85%, respectively. The same pattern was identified among girls, where positive parenting increased the probability of stable high social skills by 104%, and parents' well-being by 189%. Among boys, good preschool attachment increased the probability of stable high social skills by 175%. The teacher-parent relationship was not significantly associated to stable high social skills among boys. None of the preschool factors were significant predictors of stable high social skills among girls. Age was included as a control variable in both binary regression analyses. This was not a significant predictor of group membership among boys in these regression models. Among girls, age significantly increased the probability of stable high social skills by a modest 3%; it was not significantly associated with stable low social skills.

Social Skills and School Performance

To examine if and how the different developmental paths of social skills in early childhood were associated with school performance in primary school, and also if these potential associations held when controlling for other factors important for school performance, multinomial regression models were estimated; results are presented in [Table 3](#). In this step, six control factors (i.e. baseline HIA problems, SES, parent-child conflicts, parents reading to child, peer victimization, and teacher-parent relations) were entered simultaneously with the social skills stability measurements into the multinomial regression models. Results show that displaying stable low social skills increased the risk of poor school performance compared to average school performance by 95%, even when controlling for other potentially associated factors. It also decreased the probability of good school performance

Table 1. Pearson's correlations including all studied variables separately by gender with boys presented above the diagonal and girls below.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	–															
2	-.10***	–														
3	-.03	-.08**	–													
4	-.03	-.08**	-.03	–												
5	.14***	-.23***	-.05	-.04	–											
6	.07	.00	.03	.02	.08**	–										
7	-.04	.05	-.01	.06	.00	-.00	–									
8	-.07**	.12***	.00	-.04	-.09***	.04	.20***	–								
9	.08**	-.13***	-.01	-.04	.37***	.02	.05	-.03	–							
10	-.18***	.19***	.04	-.06	-.21***	-.00	.12***	.14***	-.14***	–						
11	-.39***	.45***	.10***	-.21***	-.27***	-.21***	.08*	.07	-.16***	.29***	–					
12	-.31***	.40***	-.23***	.11***	-.12***	-.19***	.12***	.11***	-.04	.12***	.40***	–				
13	.27***	-.27***	-.06	.05	.56***	.08**	-.03	-.08**	.42***	-.33***	-.40***	-.20***	–			
14	.06	.01	-.02	.03	.07**	-.07**	.12***	-.07**	.02	.02	.15***	.14***	.05	–		
15	-.01	.07**	.02	.01	-.05	-.31***	.15***	.08**	.01	.10***	.15***	.15***	-.08**	.08***	–	
16	-.16***	.16***	.07**	-.06	-.13***	-.01	.03	.04	-.24***	.31***	.33***	.06	-.30***	.03	-.00	–

1: Stable Low Social Skills; 2: Stable High Social Skills; 3: Decreasing Social Skills; 4: Increasing Social Skills; 5: HIA-problems; 6: Parent-Child Conflicts; 7: Reading at Home; 8: SES; 9: Peer Victimization;

10: Teacher-Parent Relationship; 11: Social Skills at age 3–5; 12: Social Skills at age 5–7; 13: CU-traits; 14: Positive Parenting; 15: Parents' Well-Being; 16: Preschool Attachment.

*p < .05. **p < .01. ***p < .00.

Table 2. Binary logistic regressions with the social skills developmental paths (Age 3–5 and Age 5–7), and child, family, and preschool predictors (Age 3–5).

Predictor	Boys		Girls	
	Stable Low Social Skills	Stable High Social Skills	Stable Low Social Skills	Stable High Social Skills
	OR (95% CI)		OR (95% CI)	
HIA-problems	2.45*** (1.51– 0.87)	0.40** (0.23– 0.70)	1.54 (0.89– 2.68)	0.87 (0.53– 1.45)
CU-traits	1.84** (1.09– 3.13)	0.38** (0.19– 0.76)	3.60** (1.72– 7.54)	0.27** (0.12– 0.58)
Positive Parenting	0.36*** (0.22– 0.59)	2.77*** (1.61– 4.76)	0.51** (0.30– 0.84)	2.04** (1.32– 3.15)
Parents’ Well-Being	0.62* (0.39– 0.97)	1.85* (1.08– 3.16)	0.55* (0.30– 0.98)	2.89*** (1.68– 4.96)
Teacher-Parent Relationship	0.46* (0.23– 0.94)	1.80 (0.74– 4.37)	0.61 (0.30– 1.23)	1.64 (0.82– 3.18)
Preschool Attachment	0.36** (0.19– 0.69)	2.75* (1.23– 6.13)	0.45 (0.20– 1.04)	1.68 (0.76– 3.65)
Nagelkerke R²	.43		.36	
Chi²(df)	123.64 (6)***		112.90 (6)***	
			78.25(6)***	
			83.39(6)***	

OR = Odds Ratio. 95% CI = 95% Confidence Interval

*p <.05. **p <.01. ***p <.00.

Table 3. Multinomial logistic regression predicting school performance from social skills developmental paths (Age 3–5 and Age 5–7), controlling for child, family, and preschool predictors (Age 3–5), among the total sample.

	Poor vs. Average School Performance age 8–10		Good vs. Average School Performance age 8–10		Good vs. Poor School Performance age 8–10	
	OR (95% CI)		OR (95% CI)		OR (95% CI)	
Social Skills Developmental Paths						
Stable Low Social Skills	1.95*	(1.11, 3.43)	.38	(0.10, 1.58)	.19*	(0.04,.87)
Decreasing Social Skills	2.39*	(1.02, 5.61)	.73	(0.26, 2.09)	.31	(0.08, 1.12)
Increasing Social Skills	.19	(0.10, 1.66)	.21	(0.03, 1.52)	1.06	(0.06, 17.67)
Stable High Social Skills	.26*	(0.03, 1.45)	1.63*	(1.09, 2.44)	6.39**	(1.88, 21.70)
Control variables (age 3–5)						
HIA-problems	1.74***	(1.36, 2.24)	.56***	(0.41, 0.76)	.33***	(0.22, 0.47)
Parent Child Conflicts	1.18	(0.90, 1.56)	.98	(0.75, 1.27)	.83	(0.57, 1.19)
Reading at Home	1.03	(0.83, 1.39)	1.30*	(1.03, 1.63)	1.26	(0.92, 1.71)
SES	.56***	(0.41, 0.74)	1.40*	(1.07, 1.83)	2.52***	(1.72, 3.70)
Peer Victimization	1.10	(0.87, 1.39)	1.09	(0.82, 1.45)	.99	(0.70, 1.42)
Teacher-Parent Relationship	.76	(0.52, 1.10)	.82	(0.54, 1.25)	1.09	(0.63, 1.86)
Nagelkerke R²	.14		.14		.14	
Chi²(df)	164.04(20)***		164.04(20)***		164.04(20)***	

OR = Odds Ratio. 95% CI = 95% Confidence Interval

*p <.05. **p <.01. ***p <.00.

compared to poor by 81%. Displaying stable high social skills during early childhood was found to increase the probability of good school performance compared to both average (63%) and poor (539%) school performance, over and above the included control variables. Stable high social skills also decreased the risk of poor school performance compared to average by 74%. Children with decreasing social skills had a higher risk of poor school performance compared to the average by 139%, even in the presence of the control variables. No significant results were found for the decreasing or increasing groups regarding good school performance. We additionally ran the same analyses separately by grade (i.e., first, second, or third year in primary school at the 5-year follow-up) to see whether the social skills developmental paths were still important in relation to school performance. These models, however, had problems with quasi-complete separation, likely due to the large number of predictors and the smaller groups investigated. Thus, valid results could not be attained.

As for the six included control variables results showed that HIA problems, family SES, and reading at home emerged as statistically significant predictors of school performance when entered into the same model as developmental paths of social skills. More specifically, high levels of HIA problems increased the risk of poor school performance compared to the average by 74% and decreased the

chance of good school performance compared to the average by 44%. HIA problems also decreased the chance for good school performance compared to poor by 67%. Children whose parents read to them at home had a 30% increased probability of good compared to average school performance. Higher family SES increased the probability of average school performance compared to poor school performance by 44% and increased the probability of good school performance compared to both average (40%) and poor (152%) school performance. Parent-child conflicts, peer victimization, and the teacher-parent relationship were not statistically significant predictors of school performance in this model. The multinomial logistic regression models were also run with control for the child's age and gender with similar results. However, gender was associated with school performance, showing that girls had an increased probability of good school performance compared to both poor and average school performance. No significant results were found regarding the child's age.

Discussion

The aim of this study was to try to identify stability and change in social skills during early childhood, and how various potential explanatory individual, family, and preschool factors were associated with the identified developmental paths of social skills during early childhood among boys and girls, separately. We also studied the associations between the resulting developmental paths of social skills and early school performance. In conclusion, both stability and change occurred in the development of social skills during early childhood. With some notable gender differences, both individual (e.g., HIA problems) and family factors (e.g., positive parenting) significantly predicted stability in social skills during early childhood for both boys and girls. Additionally, stable low social skills increased the risk for poor school performance, while stable high social skills increased the chance for good school performance in primary school. Furthermore, decreasing social skills predicted poor primary school performance. All of these findings held independently even when controlling for other individual, family, and preschool factors important for school performance. Our findings support previous work showing that social skills are related to school performance (see, e.g., Arnold et al., 2012; Domitrovich et al., 2017; Rhoades Cooper et al., 2014; Sparapani et al., 2018). The present study extends previous research by identifying groups of children displaying stable levels of social skills over time, already from age three, but also two groups of children displaying increasing and decreasing levels of social skills over the same period.

Stability and Change in Social Skills

The groups displaying increasing or decreasing social skills in this study were noticeably smaller than the stable groups, suggesting that changing levels of social skills are less common in early childhood, which supports previous research showing that school readiness already when starting preschool is crucial for future outcomes (McClelland & Morrison, 2003). However, these results also indicate that, as change does occur, there might be a possibility of working with preventive measures during early childhood, possibly in preschool, to promote a positive development of social skills. Importantly, because of group sizes, we were not able to look further into what factors separated the increasing and decreasing groups from the stable social skills groups, which remains an important question for future studies. Such knowledge would be of great importance to be able to identify possible targets for preventive interventions, especially for children entering preschool with poor social skills, in order to ameliorate their chances for better outcomes in school down the road.

We were also able to show that stability in social skills is potentially a product of influences of multiple domains in children's lives, already from an early age. Both factors relating to the child and to their family and preschool were uniquely associated with children being both stable high and stable low in social skills during early childhood. Overall, patterns were similar among boys and girls regarding how different factors were associated to their developmental paths of social skills. The main predictors of social skills stability during early childhood included HIA problems, CU traits,

positive parenting and parents' well-being for both boys and girls. There were however a few notable differences in what specific factors emerged as most important. Among boys, HIA problems stood out as the strongest predictor for development of social skills, while CU traits turned out to be the strongest predictor among girls. This could possibly be understood by looking at the link between HIA problems, CU traits, and behavior problems in young children. Poor social skills are likely to be related to the display of more or less dysfunctional interaction between the child and their peers, family and other adults, such as teachers, see, for example, diagnostic criteria for childhood oppositional defiance disorder (ODD) and conduct disorder (CD; American Psychiatric Association, 2013). Previous research has shown similar differences in the prediction of stable high levels of behavior problems in early childhood, where HIA problems had a stronger association with behavior problems among boys, and CU traits in combination with early behavior problems was a significant predictor of stable behavior problems over time to a larger extent among girls (Frogner et al., 2018). Thus, there seems to be something in the underlying mechanisms of problematic behaviors that might differ between boys and girls. Gender differences could indicate a potential need for gender specific measures of social training within the school system and should therefore be examined further.

Furthermore, a positive teacher-parent relationship and a good preschool attachment were associated with less likelihood to develop stable low social skills for boys but not for girls. Previous research has indicated that boys' relationships to teachers in general are characterized by conflict and distance, suggesting that they tend to experience conflicts with teachers to a greater extent than girls (Koepke & Harkins, 2008). Also, boys with insecure peer interactions, which is a part of everyday life in the school environment, have shown to display more disruptive behavior and even aggression (Turner, 1991). Our results suggest that boys indeed are influenced in a notable way by surrounding factors during early childhood when it comes to their social skills development. Positive parenting and parental well-being emerged as important predictors for social skills among both boys and girls, even when taking into account factors relating to both the child and the preschool. Thus, our findings suggest that a positive family environment makes an important contribution to young children's social skills development even at an early age. These results are somewhat in line with prior findings showing that parental emotional distress is associated with children's maladaptive social behavior (Huhtala et al., 2014; Johnson & Flake, 2007), and that parenting behaviors matter a great deal in children's social skills development (Roopnarine et al., 2006; Song et al., 2018).

Our findings support those who argue that social development in general, and social skills in particular, is shaped by the influences of multiple contexts, such as individual, family, and school factors (see Berry & O'Connor, 2010; Mashburn et al., 2008). Although research agrees on this, few studies have included factors on multiple levels when addressing the issue of development of social skills in early childhood, making these findings an important addition to existing studies. Furthermore, looking at gender-specific interventions or work routines in order to promote development of social skills might be relevant, as there are some differences in what influences the development of social skills for boys and girls, respectively.

Early Childhood Social Skills and Primary School Performance

As expected, displaying consistently good social skills was associated with good primary school performance, and displaying consistently poor social skills during early childhood was associated with poor school performance. However, we also show that a decreasing developmental path, i.e., going from good to poor social skills during early childhood, increased the risk of poor school performance compared to children displaying average levels of social skills. The stable high, stable low, and decreasing developmental pathways of social skills remained important predictors of early school performance, even when controlling for other important risk and protective factors for school performance. These results are important, since they show that both stability and change in social skills

has the potential to influence early school performance over and above other well-established risk and protective factors for school performance. Previous research has pointed to the importance of social skills in relation to school performance and the close link between the two, even over time (see e.g., Arnold et al., 2012; Domitrovich et al., 2017; McClelland & Morrison, 2003; Welsh et al., 2001). Results from the present study further highlight nuances in the development of social skills during early childhood and its relation to early school performance in competition with other previously identified risk and protective factors.

Furthermore, when controlling for other risk and protective factors, in addition to the developmental paths of social skills and in line with previous research, HIA problems, family SES, and reading at home emerged as statistically significant predictors of school performance. While hyperactivity, impulsivity, and attention problems (that constitute HIA problems) can increase the risk of developing poor social skills (Hoza, 2007; Merrell & Wolfe, 1998), one could also assume that such problems make learning difficult, implying that HIA problems affects school performance both indirectly and directly. Reading to children has been shown to be more common among high SES families (Aikens & Barbarin, 2008). However, so is having more books in the home, parents' being more knowledgeable, having a richer vocabulary, and parents speaking more often to their children – all of which are of possible value for children's school performance (Park, 2008; Willingham, 2012). Thus, family SES could affect children's school performance through different paths. These results suggest that several different mechanisms may be at play, some related to the child's prerequisites and abilities, and others related to their family environment, which warrants a need for additional exploration regarding the mechanisms behind young children's school performance.

Strengths and Limitations

The strengths of this study include its longitudinal design with a comparatively large sample, low attrition rates, and the use of previously validated measures. Also, combining both teacher and parent ratings to assess social skills can be considered a strength, as parents, on one hand, tend to have a limited frame of reference for assessing the child's behavior, and teachers, on the other hand, can be influenced by their level of education and experience (Wigelsworth et al., 2010). The findings in this study must, however, also be interpreted in the context of its limitations. One limitation concerns the social skills measurement, which was newly developed and thus not a validated scale. However, the items included reflect aspects commonly used to measure social skills in early childhood, and the scale shows adequate face validity and internal consistency reliability. Like many other studies measuring young children's social skills, this study used questions focusing on the empathetic and well-mannered behavior of children (see e.g., Goodman, 1997; Rydell et al., 1997). The school performance scale is limited in that it consists of only two items. Assessing school performance through the child's performance in mathematics and Swedish language is, however, common in research, and has been shown to be associated with performance in other subjects, suggesting that these main subjects are feasible indicators of school performance in a broader sense (see e.g., Brennan et al., 2012; Loe & Feldman, 2007; Stenhag, 2010). There is also a risk for subjective assessments since the study relied on teacher's assessments of the child's performance, rather than, for example, on official grades. This way of assessment was necessary in this study because children in Swedish schools do not receive official credentials until 6th grade. Other limitations concern the included control variables for examining the relation between social skills, other important factors, and early school performance. Particularly, children's learning abilities are based on both social and cognitive processes (Mercer & Howe, 2012), which were not specifically assessed or controlled for in the current study. Another limitation of the present study was that we were not able to do all analyses separate by gender because of sample restrictions. Lastly, we used arbitrary cutoffs of $-.05$ and $.50$ standard deviation to identify groups with high and low levels of social skills. We, however, performed sensitivity analyses with stricter cutoffs (i.e., $-0.75/0.75$ and $-1.0/1.0$ standard deviation) with results similar to those presented here.

Practical Implications and Future Research Directions

First, this study identified several important aspects of children's lives that might be relevant targets for interventions even at a young age to promote social skills development, which may improve the chances for school performance over time. Interventions within different contexts surrounding the child, such as preschool, school, healthcare, and community services, can and should, therefore, follow a socioecological model, targeting several domains, working with the children themselves, as well as with the surrounding contexts. However, there are also possible interactions between risk factors, which means that the overall risk can be reduced if one aspect is targeted in a successful way (the cumulative risk model). Either way, children's prerequisites for school performance need to be broadly assessed, even as early as age three. Thus, future research should also aim to include additional and other potential risk and protective factors in relation to school performance (e.g., various social and cognitive processes) to investigate whether the relation between early childhood social skills and early school performance still holds when controlling for such factors. On this note, future studies should also look further into age-appropriate indicators of both interpersonal and intrapersonal social skills (see Pellegrino & Hilton, 2012).

Second, our findings highlight the importance of paying special attention to boys' possibilities of performing well in primary school. Specifically, boys' social skills may benefit particularly well from a good preschool attachment. Social skills training has the potential to buffer detrimental influence of other life stressors, such as HIA problems, and to promote healthy peer relationships (Gresham et al., 2011; Webster-Stratton & Reid, 2004). As our study shows that HIA problems were related to stable low levels of social skills among boys in particular, social skills training could potentially be beneficial specifically for boys. It will also be important in future research to continue to study potential gender differences and similarities.

The results of this study provide promising implications for preschool teachers and others working to help children become equipped to perform well in school. This underscores the importance of early identification of factors that inhibit children's school performance. Education is one of the most important foundations for later life outcomes in several areas and can even be a way to overcome early disadvantages by creating a crucial opportunity for developing capabilities that enable social mobility (Buchmann & Hannum, 2001; Frønäs, 2016). Thus, early interventions have the possibility of not only improving school performance, but of preventing long-term negative social adjustment.

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