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## Longitudinal assessment of elementary school students' social self-concept in relation to social preference

### Abstract

*As part of a longitudinal research project, an instrument for assessing a multifaceted self-concept of social competence (contact, empathy, emotion regulation) of German elementary school children was investigated concerning its psychometric properties. Moreover, reciprocal effects between social preference and self-representation of one's own social skills were analyzed. From the spring of 2007 to the summer of 2010, 26 schools with 54 classes took part in the study that comprised four time points of measurement (T1–T4). A social self-concept questionnaire (SKSozKomp) with 15 items was administered as well as additional questions to assess the peer status.*

*Confirmatory factor analysis revealed unsatisfying results for the assumed three-dimensional structure of the SKSozKomp at T1. Including only contact and empathy items led to acceptable model fit indices at T1 to T4. Measurement invariance tested stepwise for a two-factor latent state (LS) model showed good model fit even for a model with strong factorial invariance though Chi-square difference testing argued for configural invariance. A cross-lagged panel model with 2nd order autoregressive paths revealed small but significant paths from social preference to self-concept (T1 to T2 and T3 to T4) but no significant paths from social self-concept to social preference. Results and limitations of the study are discussed.*

### Keywords

*Social competence; Social self-concept; SEM; Elementary school*

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## **Soziales Selbstkonzept und soziale Präferenz: Eine Längsschnittanalyse im Grundschulalter**

### **Zusammenfassung**

*Als Teil einer Längsschnittstudie werden psychometrische Eigenschaften eines Verfahrens zur Erfassung eines dreidimensionalen Selbstkonzepts sozialer Kompetenz (Kontakt, Empathie, Emotionsregulation) für Grundschüler des deutschen Schulsystems berichtet und mögliche Wechselwirkungen zwischen sozialer Präferenz und dem Selbstkonzept eigener sozialer Fertigkeiten analysiert. Vom Frühjahr 2007 bis Sommer 2010 nahmen 26 Schulen mit 54 Klassen an der vier Messzeitpunkte (T1–T4) umfassenden Studie teil. Ein Fragebogen zum sozialen Selbstkonzept (SKSozKomp) mit 15 Items und Fragen zur Erfassung des Peerstatus wurden verwendet.*

*Konfirmatorische Faktorenanalysen ergaben ungünstige Ergebnisse zur angenommenen Dreifaktorenstruktur des SKSozKomp zu T1. Die ausschließliche Verwendung der Kontakt- und Empathie-Items erbrachte akzeptable Anpassung zu T1 bis T4. Eine stufenweise Prüfung der Messinvarianz für ein zweifaktorielles Latent State Modell (LS) zeigte sogar bei starker faktorieller Invarianz gute Modellanpassung, dennoch legte ein  $\chi^2$ -Differenzentest konfigurale Invarianz nahe. Ein Cross-Lagged Panel-Modell mit autoregressiven Pfaden zweiter Ordnung ergab geringe, signifikante Pfade von sozialer Präferenz zum Selbstkonzept (T1 auf T2 und T3 auf T4), jedoch keine Pfade vom Selbstkonzept zur sozialen Präferenz. Die Ergebnisse und Grenzen der Studie werden diskutiert.*

### **Schlagworte**

*Soziale Kompetenz; Soziales Selbstkonzept; SEM; Grundschule*

## **1. Schooling as an opportunity to develop social competence**

Family environment as well as schooling can be seen as a major developmental and learning opportunity for social competence. In the first instance, social competence may function as precondition for school readiness (e.g., Hasselhorn & Lohaus, 2008) and academic achievement respectively (e.g., Welsh, Parke, Widaman, & O'Neil, 2001). Additionally, the school-age years of middle childhood and later on are influenced by various contacts and relationships with peers, especially of the same age (Hartup, 1992; Rubin, Bukowski, & Parker, 2006, p. 592 f.). Interacting in classrooms and receiving feedback on social behavior can foster students' development of social skills (Gresham, 2001), acquisition of social knowledge, social information processing (Crick & Dodge, 1994), and the development of self-concept of their respective abilities (e.g., Berndt & Burgoyne, 1996). Developing social competence is regarded as an important educational goal, in the long term referring to

self-development, psychosocial resilience, social as well as professional responsibility and the like (see overview of international and German educational guidelines concerning social competence by Brohm, 2009). From this perspective, it seems of major interest to take a closer look at relevant facets of social competence in the early school years, their measurement and development. In the present article, the self-perception of elementary school children concerning their social competence is focused – especially as regulation of behavior is attributed to self-conceptions (Markus & Wurf, 1987) and social self-concept (Measelle, Ablow, Cowan, & Cowan, 1998). As part of the larger research project KEIMS<sup>plus</sup>, this article reports psychometric properties of a new instrument for longitudinally assessing the self-concept of social competence of elementary school children and investigates reciprocal effects between social self-concept and peer preference throughout the elementary school years.

## 2. Social competence as a construct – definition and measurement

Focusing on social competence as a global construct involves a range of difficulties concerning construct definition and its distinction from related constructs like social intelligence or emotional competence (Rindermann, 2009; Süß, Weis, & Seidel, 2005).

First of all, the terminology “competence” carries a “wide variety of definitions” in the disciplines of the social sciences (Klieme & Hartig, 2007, p. 11; Weinert, 2001, p. 45). Weinert (2001) has preferred “some pragmatic conclusions” (p. 62) rather than a definition describing competence as precondition for successfully or effectively managing challenging demands (context specificity). Primarily cognitive components, but quite often also “motivational, ethical, volitional, and/or social components” (p. 62) – mostly acquired through learning processes – must be applied in order to deal with the demand in a sufficiently complex manner.

Accordingly, defining the term social competence refers to a variety of further constructs. At the top or “Theoretical Level” of her model, Rose-Krasnor (1997) has outlined social competence as “effectiveness in interaction” (p. 119 f.). The subordinate “Index Level” comprises self- and other-oriented aspects of social competence: Social self-efficacy, aspects of autonomy, and assertiveness belong to the “Self Domain”, various concepts of relatedness (sociometric status, friendship, attachment) represent the “Other Domain”. Thereby, these social competence aspects vary as a function of context (context specificity). The base, so called “Skills Level”, relies on skills like communication, perspective taking, empathy, social problem solving and also involves individual goals and values guiding one’s own social behavior. According to Rose-Krasnor (1997), four categories of operational definitions of social competence can be distinguished: “specific skills”, “sociometric status”, “relationships”, and “functional outcomes” (p. 112). Yet, “these approaches

show only moderate overlap, however, and they represent different levels of analysis” (p. 123).

With respect to the question how to assess the construct of social competence, various levels and approaches have to be taken into account. Social competence is also considered as a construct with two interacting parts, namely (a) perceptions of social skills of a person by others and (b) self-perception. Thereby, both perspectives on one’s own skills interact in cases of self-monitoring (Nowicki, 2003). In terms of measurement, the degree of concordance of different informants (self vs. others) has to be considered. For instance, meta-analytic work by Renk and Phares (2004) revealed small effect sizes when self-reports by children or adolescents were compared with the perspective of parents, teachers or peers. Moderate effect sizes were described for other cross-informant correspondences, with the strongest agreement between teacher and peers (Renk & Phares, 2004, see also Junttila, 2010 referring to the former authors). Hence, empirical relations between *different* measures of social competence might suffer even more from moderate to low concordance across informants.

Rubin et al. (2006) draw attention to the value of cross-informant differences in providing context specific measures. Similarly, Lösel (2002) has argued that low correlations (here especially viewed for problem behavior) partially “reflect valid differences in behavior between settings” (p. 41) and not just error. Recently, a variety of advanced statistical methods have been developed in order to adequately approach this issue (e.g., Geiser, Eid, Nussbeck, Courvoisier, & Cole, 2010).

### **3. Selected aspects of social competence of the present study**

Aiming at investigating self-perceptions of social competence and given the width of the social competence construct, relevant aspects were selected by the following considerations. First, a competence perspective was preferred, thus, social behavior deficits were of minor interest whereas skills and abilities to behave adaptively in social interactions were focused. Secondly, in order to analyze origins of and effects on social self-perceptions – above the question of structural composition of social self-concept – different approaches to social competence were integrated (e.g., skills and peer status approach). Social skills concerning contact, empathy and emotion regulation were assessed by the children themselves (self perspective), whereas peer status was derived from appraisals by his or her fellow pupils. In the next sections, central issues of the skills approach to social competence and the peer status approach are discussed. Ensuing, research on social self-concept and the relation of social self-concept and peer status is outlined.

### 3.1 Social skills and social competence

A major difficulty is to determine which specific behaviors constitute social competence. A common conceptualization labeled as “social validity definition” relates social skills to “specific behaviors or behavior patterns that predict or otherwise result in important social outcomes for children and youth” (Gresham, 2001, p. 327). Acceptance by peers, teachers, and parents as well as friendships and school adjustment are mentioned as examples. Yet, the problem remains that social skills are based on a series of other psychological constructs and abilities, e.g., personality, language, perception etc. Social skills can only be acquired and displayed in social situations, thereby depending on the kind of situation or task the desired social skills might vary. In other words, both related traits and the relation between situation and behavior contribute to the complexity of the definition (Merrell & Gimpel, 1998, p. 3). Rubin, Bukowski, and Parker (1998) stated that “it is probably impossible to compile a complete list of discrete social skills, as the tasks of social life and the avenues to social success can be expected to change with time, context, and culture” (p. 644). In order to assess social skills, taxonomies of maladaptive behaviors seem to have been developed quite often (Gresham, 2001, p. 329). An extensive search in the literature revealed that a considerable number of assessment instruments for children and adolescents refer to emotional or behavior problems, or include some social subscales and at the same time assess further aspects concerning adaptive behavior (“living skills”), school readiness, personality etc. (Arnold, Lindner-Müller, & Riemann, 2012). Frequently cited is “a taxonomy of positive behaviors” empirically developed by Caldarella and Merrell (1997); they have distinguished the following categories: (1) “Peer Relations Skills”, e.g., offers help, invites peers to play; (2) “Self Management Skills”, e.g., keeps calm in troubling situations, accepts and follows rules; (3) “Academic Skills” like appropriate study skills, listening to and accomplishing teacher directions; (4) “Compliance Skills”, e.g., following rules, sharing; (5) “Assertion Skills” referring to behavioral aspects like initiation of conversation, introduction of oneself, emotion expression when being treated unfair. All these categories can be regarded either as aspects of (a) adaptation/adjustment or (b) assertion (Kanning, 2003; Riemann, 1997), which are suggested as highly generalized conceptions of social competence respectively social skills.

### 3.2 Peer status and social competence

Sociometry has been classified as an indirect method of assessing social competence or social skills of a person (Bursuck & Asher, 1986; Kanning, 2003), however it allows for direct assessments of group dynamics, e.g., popularity, peer acceptance or rejection by peers (see overview by Merrell, 2008). Assessment of peer-status is important because both, difficulties in peer-relations and positive relationships (e.g., friendship) are regarded as relevant prerequisites for further developmental issues (Merrell, 2008). Correlations between sociometric status and behavior

turned out to be mostly moderate. Further characteristics of a person, e.g., academic achievement, may interact with social behavior and influence social competence measures (Bursuck & Asher, 1986). Coie, Dodge, and Coppotelli (1982) investigated behavioral correlates of sociometric status conceptualized as social preference and social impact: Social preference is defined by “a child’s liking score minus his or her disliking score” (p. 559) and social impact is due to the sum of the liking and disliking score of a child. Cooperative and supportive behavior as well as physical attractiveness was positively related to social preference, whereas disruptive and aggressive behavior showed negative relations, respectively. In contrast, social impact was related to notably positive as well as negative behavior. The authors also revealed distinct behavioral correlates of sociometric classifications (groups of popular, average, neglected, rejected and controversial individuals; see also Rubin et al., 1998; Jackson & Bracken, 1998). Besides traditional sociometric measures and classifications, the construct of “perceived popularity” (Parkhurst & Hopmeyer, 1998, p. 125; Cillessen & Mayeux, 2004; de Bruyn & van den Boom, 2005) has appealed to many researchers as well. As perceived popularity (of adolescents) is predominantly associated with being fashionable and “not being perceived as boring” (de Bruyn & van den Boom, 2005, p. 570), this was not the focus of the current study.

Concerning the question of stability, Rubin et al. (1998, p. 651) classified long-term stability of continuous sociometric variables for children as being “moderately stable”. Cillessen and Mayeux (2004) reported high one-year to at least moderate five-year stabilities of the social preference variable from grades 5 to 9. The meta-analysis by Jiang and Cillessen (2005) revealed good short-term stability and moderate to high long-term stability (average around .50 with considerable heterogeneity in the distribution of the effect sizes) for acceptance, rejection, social preference, and liking ratings; sociometric nominations appeared to be more stable for older than younger children.

### **3.3 Social self-concept from a skills perspective and relations to peer status**

Importance for studying the self-concept is given by its function as a mediating variable for specific adjustment outcomes (Markus & Wurf, 1987; Measelle et al., 1998) and concerning this function, investigating the sources of self-concept development is similarly demanding (e.g., overview by Harter, 2006). The frequently cited self-concept model by Shavelson, Hubner, and Stanton (1976; see Byrne & Shavelson, 1996) has defined self-concept as a multi-dimensional, hierarchically composed system comprising academic self-concept (with subordinate concepts referring to mathematics, language etc.) and non-academic self-concept which is further subdivided into physical, social and emotional self-concept. Thereby, research has been especially interested in academic self-concepts and reciprocity with aca-

demical achievement, while fewer empirical studies have focused the social self-concept (Filipp, 2006).

Both, social skills and peer acceptance constitute the basis of social self-concept which is defined as (a) the perception of social acceptance of one's own person or (b) the perception of one's own social competence or social skills (Berndt & Burgy, 1996, p. 171). Both authors have pointed to some overlapping of the two definitions, but social self-concept of acceptance implies reference to specific persons or groups whereas a social skills definition does presumably not. As the present study especially focused on social competence, the latter definition (b) was preferred.

Accounting for the development of cognitive abilities (self as "cognitive construction") and their interaction with the socializing environment, a variety of sources concerning experiences and interaction with significant others (self as a "social construction") are relevant to the development of self-representations (Harter, 2006, p. 506 ff.). With respect to elementary school children empirical results showed that, besides parental influences, teacher- and peer-support are of major importance. Leflot, Onghena, and Colpin (2010), for instance, reported significant positive contributions (small in magnitude) of teacher involvement and autonomy support especially to social self-concept, over and above the initial value of self-concept.

Concerning more egalitarian relationships, a child's interaction with, and social status among, peers (e.g., peer acceptance, rejection) is assumed to be related to self-representations (overview by Rubin et al., 2006, p. 615). In the review by Berndt and Burgy (1996), a number of significant correlations between social self-concept (defined as self-perceived acceptance) and actual acceptance were reported for elementary school children (Boivin, Vitaro, & Gagnon, 1992; Hymel, Rubin, Rowden, & LeMare, 1990), although this was not always the case (Harter & Pike, 1984; Kurdek & Krile, 1982) and age-dependent regularities were not continuously detected (all cited in Berndt & Burgy, 1996, p. 195). Referring to developmental issues of socio-emotional adjustment, Verschueren, Buyck, and Marcoen (2001) showed that children's positive self-concept at the age of 5 years had long-term influences on self-concept (social acceptance, physical appearance, and global self-worth), teacher-evaluations of school adjustment, and actual peer acceptance (the latter moderated by gender) 3 years later. Nelson, Rubin, and Fox (2005) expressed the need for longitudinal studies investigating nonsocial behavior (reticence; solitary-passive withdrawal) and peer acceptance respectively rejection ("actual experiences with peers"; p. 187) as origins of self-concept development. Referring only to some of their findings, influences of *observed* peer acceptance at the age of 4 years on self-perceived cognitive and physical competence at the age of 7 years could be shown only for girls however there were no effects on self-perceived peer acceptance.

Furthermore, questions concerning stability and change over time were taken into account. Due to enhancing cognitive abilities in conjunction with increasing social interactions (e.g., ability to make social comparisons, differentiation between real and idealistic self, perspective taking), Harter (e.g., 2006, p. 528; Harter



& Pike, 1984) as well as Marsh (e.g., Marsh, Craven, & Debus, 1998) has argued for more realistic self-evaluations with increasing age. For instance, Marsh, Barnes, Cairns, and Tidman (1984) found a decline in the peer relationship subscale from second to fourth grade (and an increase in fifth grade) and Marsh, Craven, and Debus (1991) showed lower scores for the 8-years-old in comparison to younger children. Yet, in their replication study Marsh et al. (1998) revealed no age differences (neither cross-sectional nor longitudinally) for this dimension but indicated that teacher ratings at time 1 were more strongly correlated with students' self-reports at time 2 than at time 1. In addition, teacher ratings predicted self-concept at time 2 over and above the contribution of time 1 self-concept. For older children Cole et al. (2001) reported an increase interpreted as "recovery" of self-concept in some but not all domains (academic competence, social acceptance, and sports competence) during grades 3 to 6 accounting for tendencies to maintain and enhance one's self-representation. They also indicated increasing stability in the five self-concept domains between grades 3 and 6; following Marsh et al. (1998) for instance, increasing stability of social self-concept (peer subscale) also appeared from kindergarten to second grade.

Empirical research concerning the relations between social self-concept and children's interactions within the social environment is viewed as insufficiently theory-driven (Berndt & Burgy, 1996, p. 190). Measurement problems are described in terms of limited discriminant validity when analyzing effects of self-concept on other self-reported characteristics. Therefore, investigating the relations between social self-concept as perceived social acceptance and actual acceptance (sociometry) may be preferable, but caution must be held as "researchers need to tailor the measure of the social self-concept to the group for which the measures of actual peer acceptance are available" (Berndt & Burgy, 1996, p. 203).

All in all, investigating a social skills perspective on social self-concept of elementary school children is rarely implemented and seems to be a demanding research question. In order to understand developmental issues of self-concept empirical studies should rely on longitudinal research designs controlling for initial values of the respective measures (e.g., Kistner, David, & Repper, 2007, p. 26).

#### **4. Research questions**

As part of a larger research project this article investigated psychometric properties and developmental issues of a new self-concept instrument developed to explicitly measure elementary school children's self-perception of social skills (Arnold & Levin, 2001; Arnold & Lindner-Müller, 2004; rev. 2007). We have chosen contact behavior, empathy-related skills and aspects of emotion regulation as relevant, partly interrelated skills dimensions referring to Petermann, Jugert, Rehder, Tänzler, and Verbeek's (1999) considerations of relevant and changeable issues of a social training (social perception, emotion identification and expression, asser-

tion, cooperation, empathy). We also referred to dimensions of the social skills taxonomy (especially peer relations and self management) by Caldarella and Merrell (1997). Empathy is defined diversely (Steins, 2005). Eisenberg and Fabes (1990) have described empathy as the ability to put oneself in the emotional state of another person, albeit being aware of some “differentiation between self and other” (p. 132), thereby “cognitively taking the perspective of another often leads to empathy” (p. 132). Accounting for limitations of children’s self-reports (e.g., reflection, differentiation, and communication of their own emotional states in conjunction with the problem of social desirability; Eisenberg & Fabes, 1990) we have preferred to assess self-perceptions concerning the identification of emotions of other individuals and one’s own emotion expression as empathy-related skills. The contact subscale was developed in order to comprise some aspects of the “Peer Relations Skills” dimension (Calderella & Merrell, 1997), which displays skills like making friends easily, inviting peers to play, etc. Deficits in emotion regulation are viewed as a barrier for developing friendships and dealing with conflicts in social interactions. It is assumed that, with the beginning of the school years, emotion regulation “becomes more *reflective*, guided by the child’s sense of self and the environment” (Webster-Stratton, 1999, p. 287). Referring to “Self Management Skills” (Calderella & Merrell, 1997) we developed items concerning mental strategies and knowledge about regulating negative emotions (overview by von Salisch, 2000). These items target strategies such as masking of emotion or detracting attention from one’s own negative emotions.

The following research questions comply with former research on self-concept of one’s own acceptance and the recommendations made by Möller and Trautwein (2009, referring to Mortimer, Finch, & Kumka, 1982) for studying self-concept. First, “structural stability” of the self-concept questionnaire within the elementary school years: Are elementary school children – even younger than 8 years – already able to differentiate their competencies with respect to different social skills? Harter (1999, 2006) has described development of self-concept as becoming increasingly abstract and differentiated during childhood. In middle to late childhood (age 8–11), individuals become able to characterize themselves as ‘helpful’, ‘smart’ or ‘popular’ etc. each representing “a hierarchically constructed concept that subsumes specific, relevant behaviors” (Harter, 1999, p. 49). Marsh and colleagues (1991, 1998) have argued for more defined self-concept factors even for younger children. Yet, Harter as well as Marsh refers to a multi-dimensional perspective looking for differentiation of various self-concept domains (e.g., academic, social, physical etc.). This issue has not been fully in the scope of our study as we asked for a differentiated self-conception of social competence. Therefore, contrary to several other instruments (see overview by Berndt & Burgy, 1996), our social self-concept questionnaire has pertained only the social dimension. As most social self-concept scales refer to peer-acceptance (Berndt & Burgy, 1996) our measure assessed self-perceptions of social skills. The self-concept questionnaire is developed according to a three-dimensional structure which has to be tested. Thereby, it will be analyzed whether younger children are already able to differentiate their social

self-concept within these three categories of social skills. From a longitudinal perspective, it is necessary to test whether this anticipated three-dimensional structure of the self-concept instrument held over the period of the elementary school years (“structural stability”).

Secondly, it has been shown in the literature that age-dependent changes of self-concept characteristics are sometimes divergent. Thereby, it has to be admitted that “young children’s scores on most self-concept measures are near ceiling” (Berndt & Burgy, 1996, p. 181). Some authors have argued for more realistic self-perceptions indicated by decreases of average scores of self-concept measures, but not all studies confirmed this view (e.g., see overview by Berndt & Burgy, 1996). Cole et al. (2001) even have argued for an increase of average scores in the later elementary school years following “the well documented decline during the early elementary school years” (p. 1724). Beyond examination of “level stability”, stability of inter-individual differences (“normative stability”; Möller & Trautwein, 2009) should also be proven. While applying our self-concept instrument over the elementary school years, decreases of average scores of social self-concept – reflecting more realistic self-evaluations – and an increase of “normative stability” were hypothesized.

Thirdly, self-concept is assumed to develop based on feedback and experiences from the social world of the children although actual self-concept should provide major influence on future self-concept (“normative stability”). As there is a variety of sources of self-representations and “people also learn about themselves from others, both through social comparisons and direct interactions” (Markus & Wurf, 1987, p. 305), we asked for influences of the social environment (measured by sociometry) on social self-concept. Self-representations are also expected to regulate behavior – although not exclusively (Markus & Wurf, 1987, p. 308 f.). This led us to the question whether self-representations of one’s own social skills can explain changes in peer preference, presumably mediated by one’s own social behavior toward peers. Thus, reciprocal effects between actual acceptance and self-representation of one’s own social skills were hypothesized in our study presumably low in magnitude accounting for prior self-concept (“normative stability”), divergent informants (self and peers), and mediating processes.

## 5. Method

### 5.1 Participants

The longitudinal study KEIMS<sup>plus</sup> had started in the spring of 2007 (grade 1) and was completed in the summer of 2010 at the end of grade 4. The study consisted of four times of measurement. Due to a large amount of assessments (social, academic, and linguistic competencies) two waves of data collection were carried out (wave 1 from spring to summer, wave 2 in the autumn) at each time. Therefore a refer-

ence date (see Table 1) was chosen to describe participation rate, gender ratio, age, and drop-out rate.

Summing up all waves of measurement, a total of 1,169 children (561 girls, 608 boys) participated in the study but at each time point the number of participants is accordingly lower.

**Table 1:** Sample size, sex, age, non-participants, and dropout, times T1–T4

	T1 (reference date 01/09/2007 start of grade 2)	T2 (reference date 01/09/2008 start of grade 3)	T3 (reference date 01/09/2009 start of grade 4)	T4 (reference date 01/04/2010 end of grade 4)
<i>N</i>	1002	962	955	938
Sex	47.6 % (f) 52.4 % (m)	48.0 % (f) 52.0 % (m)	48.2 % (f) 51.8 % (m)	47.8 % (f) 52.2 % (m)
Age	7.70 ( <i>SD</i> = .47)	8.69 ( <i>SD</i> = .48)	9.70 ( <i>SD</i> = .50)	10.37 ( <i>SD</i> = .51)
Non-participants	188 (15.8 %)	200 (17.2 %)	193 (16.8 %)	191 (16.9 %)
Dropout	56	90 (total of 146)	59 (total of 205)	25 (total of 230)

The study was conducted in 26 elementary schools in Lower Saxony/Germany in the cities and rural districts of Brunswick, Hanover, Hildesheim, and Salzgitter. In most schools two classes participated; 54 classes took part in the study. Parental permission was obtained for children participating in the study at grade 1 and for those children who entered the classes during the study parents were asked for their permission as well. Several children were not allowed to participate in the study and over the years some children also left the study for miscellaneous reasons. Percentage of non-attending children ranged between 15.8 % and 17.2 %. As we were not allowed to collect data about non-participating children and were not informed about the reasons why children left classes, only some “speculations” about possible systematical effects of missing data are feasible. Missing data are taken into account by statistical procedures (see data analysis section of this article).

## 5.2 Measures

### 5.2.1 Social preference

Peer status was measured by two questions: With whom do you like to work together most and with whom do you like to work together least, if you were free to choose. Nominations were not limited. Only the nominations of same-sex children were included in the analysis assuming relationships in this age-group being predominantly the same-gender (see Hartup, 1992). Positive and negative nomi-

nations were singly counted, added up, and standardized for each class (reference group). The construct of social preference (see Coie et al., 1982) builds on these two indicators (standardized positive and negative nominations).

### **5.2.2 Social self-concept**

Social self-concept was measured by the “Self-Concept of Social Competence” questionnaire (SKSozKomp; Arnold & Lindner-Müller, 2004; rev. 2007), which consists of three subscales (each enclosing 5 items) referring to contact, empathy, and emotion regulation. The contact subscale partly addresses the “Peer Relations Skills”-dimension by Caldarella and Merrell (1997) with items like asking for help, inviting peer to play, sharing, and making friends. The empathy-related subscale refers to the issue of “identification and expression of emotions” (Petermann et al., 1999). Our items are concerned with children’s ability to identify the emotions of their peers, to express their own emotions and to listen to other children. The emotion regulation subscale consists of items referring to skills and mental strategies in order to deal with own negative emotional states. Referring to the “Self Management” dimension by Caldarella & Merrell (1997) and the overview by von Salisch (2000), the content of our items comprise masking one’s own emotions as well as drawing off attention when one is angry or disappointed, for instance.

The questionnaire has used the “structure alternative format” proposed by Harter (1982) and specific illustrations were applied to reduce social desirability (see procedure in the next section). The answers were scored from 1 to 4 and added up for each subscale.

## **5.3 Procedures**

Due to the large amount of assessments in the study the first measurement started at the end of grade 1 for sociometry and at the beginning of grade 2 for social self-concept. In the early elementary school years assessments demand oral interview techniques due to the fact that in the German school system these children are only elementary readers. In addition, comprehension of the questions could be ensured by this procedure. Therefore, research assistants and qualified students from University of Hildesheim interviewed the children individually outside of the classroom environment.

Children answered the two sociometric questions in a standardized interview-setting using a questionnaire, which also contained further questions concerning the language spoken in the family, interest in school subjects, etc. The interviewers filled out the questionnaire. At time 3 and 4 the children completed this questionnaire on their own. This was accompanied by reading aloud the questions from the questionnaire by the research assistant or student interviewer in order to support children’s comprehension.

The self-concept instrument SKSozKomp relied on the “structure alternative format” proposed by Harter (1982). Concerning each item, two statements were read aloud and the child was asked to choose the statement he or she preferred (example: “Some children like to share their toys” vs. “Some children do not like to share their toys”). Following this first decision, the child is requested to think about the chosen answer and to indicate whether he or she fully or partly agrees with this answer (For instance, if the child has chosen the first statement the following question was applied: “Do you like to share your toys or do you like to share your toys a lot?”). Cards with pictures of four children were displayed to the child in order to reduce social desirability. All illustrations were very similar and should suggest that there are equivalent children belonging to each answer. At any one time two cards were randomly selected out of a pool of six cards and were assigned to the first two statements. At the first three time points the questionnaire was administered individually and was filled out by the interviewers, at time 4 the children completed the questionnaire on their own.

## 5.4 Data analysis

Analysis with structural equation models were computed using the software Mplus 6.0 (Muthén & Muthén, 1998–2010). The hierarchical structure of the sample and non-normal multivariate distributions was taken into account by applying MLR (Maximum Likelihood Robust) and TYPE = COMPLEX in model estimation; missing data were considered by using the Full Information Maximum Likelihood (FIML) method (Lüdtke, Robitzsch, Trautwein, & Köller, 2007). Therefore, chi-square difference tests were carried out by using the Satorra-Bentler correction (CDC Version 3, Crayen, 2010). Schermelleh-Engel, Moosbrugger, and Müller (2003) have provided recommendations for evaluating the model fit.

Due to repeated measurements with the same instrument, it is recommended to allow for residual correlations of the same indicators over time (e.g., Marsh & Hau, 1996). Geiser (2010) suggests that LS-models with indicator-specific factors (IS) differentiate between residual variance and systematic influences due to the longitudinal use of the same indicators. Thereby, reliability of the indicators is estimated more precisely. The present study followed the latter suggestion.

Confirmatory factor analyses, latent state models and latent autoregressive models were computed, the latter to evaluate normative stability and reciprocal influences of social self-concept and social preference over time (Hertzog & Nesselroade, 1987; Reinders, 2006).

## 6. Results

### 6.1 Structure and structural stability

Confirmatory factor analyses (CFA) using the 15 items of the social self-concept questionnaire (SKSozKomp) produced unsatisfying results at time T1. Model fit for the postulated factorial structure with the three factors empathy, contact, and emotion regulation was not acceptable ( $\chi^2 = 311.89$ ;  $p < .001$ ;  $df = 87$ ; CFI = .793; RMSEA = .051; SRMR = .052) as well as for a model with only one global factor ( $\chi^2 = 356.00$ ;  $p < .001$ ;  $df = 90$ ; CFI = .755; RMSEA = .055; SRMR = .052). This seems to be due to insufficient reliability of the subscale emotion regulation ( $\alpha = .31$ ). The items of this subscale may be too heterogeneous because they refer to various kinds of emotion management, for instance masking emotions or knowledge, use of time-dependent attenuation of emotions. Therefore, this subscale has to be further investigated in detail (see discussion) and was omitted in the following analyses. A confirmatory factor analysis (T1) including only contact and empathy items (see Figure 1) led to acceptable model fit indices ( $\chi^2 = 84.18$ ;  $p < .001$ ;  $df = 34$ ; CFI = .926; RMSEA = .039; SRMR = .033) with exception of somewhat lowered CFI regarding the strict norms recommended by Hu and Bentler (1999; as cited in Schermelleh-Engel et al., 2003). This model provided a significant better fit than a model with one global self-concept factor ( $\chi^2 = 92.03$ ;  $p < .001$ ;  $df = 35$ ; CFI = .916; RMSEA = .041; SRMR = .034).

Figure 1: Two-factor model of contact and empathy, 5 contact and 5 empathy indicators (items)

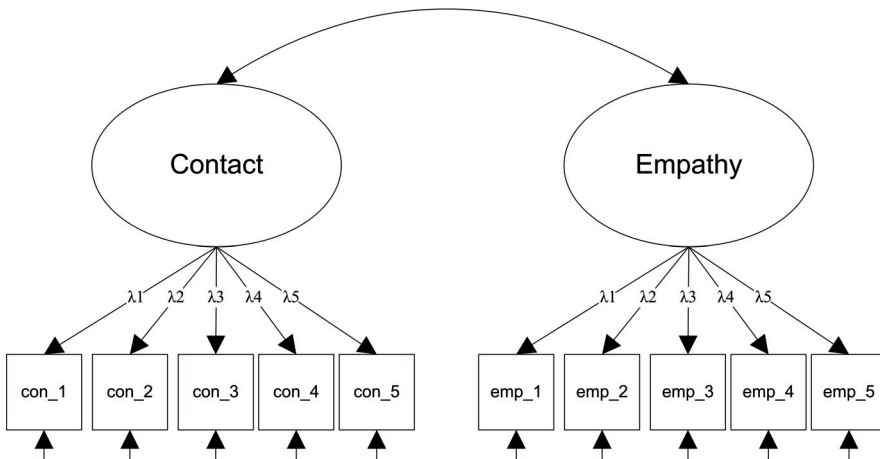


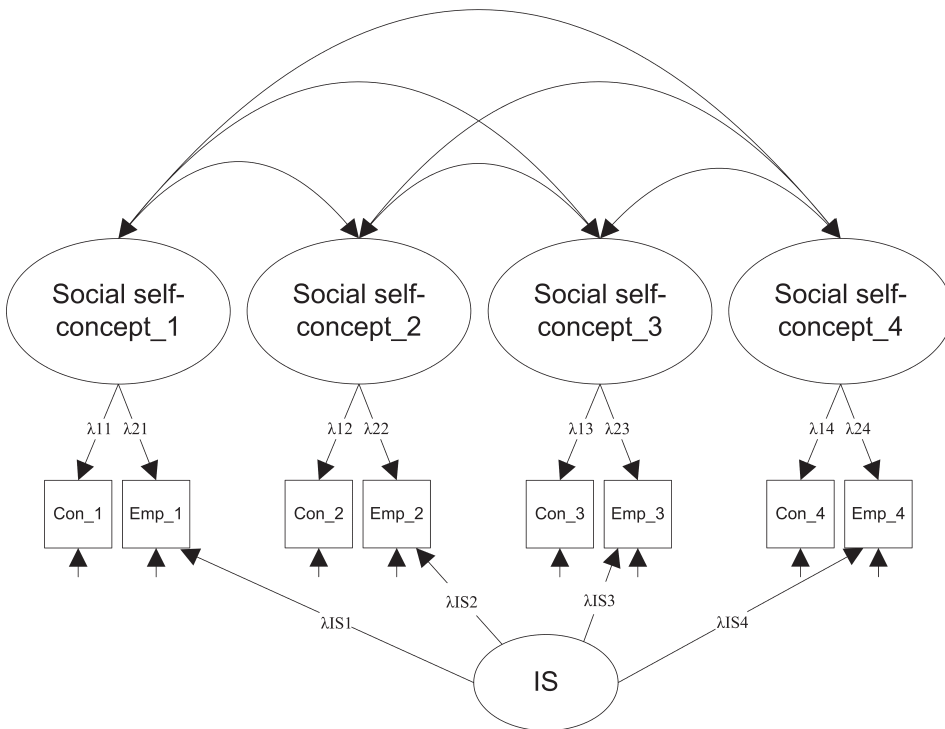
Table 2 presents fit indices for the two-factor models of social self-concept indicating acceptable model fit at each point in time (T1–T4). Latent correlations between the two subscales empathy and contact ranged between .85 (T1) to .65 (T4). However, the residual variances of the indicators are relatively large. Each model was tested against a one-factor model; chi-square difference testing ( $\chi^2_{diff}$ ) always revealed significant differences preferring the two-factor model.

Table 2: Fit indices of two-factor CFA models of the social self-concept questionnaire (SKSozKomp; using contact and empathy items) and  $\chi^2$ -difference testing against one-factor CFA models, times T1–T4

SKSozKomp	$\chi^2$	df	CFI	RMSEA	SRMR	$\chi^2_{diff}$
T1	84.18***	34	.926	.039	.033	5.61*
T2	93.38***	34	.929	.043	.039	17.32***
T3	68.37***	34	.953	.033	.033	13.33***
T4	96.64***	34	.927	.045	.041	124.30***

\*  $p < .05$ , \*\*\*  $p < .001$ .

Figure 2: Latent-state (LS) model for testing measurement invariance (T1–T4) with indicator-specific factor referred to empathy





Referring to the acceptable model fit of the two-factor models for each time point, measurement invariance over time for a two-factor latent state (LS) model (see Figure 2) was investigated.

Longitudinal studies require measurement invariance; the relation between observed variables and their underlying latent construct must remain constant over time. Measurement invariance was proven stepwise; Geiser (2010, p. 107 ff.) suggests this procedure based on Widaman and Reise (1997). Results are shown in Table 3.

**Table 3:** Tests of measurement invariance for the two-factor latent state (LS) model of social self-concept (SKSozKomp; time T1–T4) and stepwise  $\chi^2$ -difference testing

Social self-concept	$\chi^2$	<i>df</i>	CFI	RMSEA	SRMR	$\chi^2_{diff}$
Configural invariance	17.20 n.s.	10	.995	.026	.014	
Weak factorial invariance	33.06 **	16	.989	.031	.024	15.70 *
Strong factorial invariance	44.44 ***	19	.984	.035	.029	11.37 *
Strict factorial invariance	84.08 ***	25	.962	.046	.123	36.99 ***

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

A model with configural invariance showed good model fit indices; except for the significant chi-square values the same was true for the models with weak- and strong factorial invariance. Chi-square difference testing indicated that configural invariance (with IS, factor loadings set free over time) should be preferred in comparison to weak factorial invariance (with IS, factor loadings set equal over time). By virtue of acceptable fit of a model with weak factorial invariance, this model was used in the following cross-lagged panel analysis.

Concerning the construct of social preference, strict factorial invariance (modeling with IS for standardized positive nominations) can be stated (see Table 4).

**Table 4:** Tests of measurement invariance for the latent state (LS) model of social preference (time T1–T4) and stepwise  $\chi^2$ -difference testing

Social preference	$\chi^2$	<i>df</i>	CFI	RMSEA	SRMR	$\chi^2_{diff}$
Configural invariance	30.48 ***	10	.983	.042	.022	
Weak factorial invariance	37.61 ***	16	.982	.034	.034	7.39 n.s.
Strong factorial invariance	44.55 ***	19	.979	.034	.035	6.39 n.s.
Strict factorial invariance	45.18 **	25	.983	.026	.055	7.85 n.s.

\*\*  $p < .01$ , \*\*\*  $p < .001$ .

## 6.2 Level stability of social self-concept

Latent modeling of the mean structure requires strong factorial invariance. This prerequisite was not fully achieved (see Table 3) though relatively good model fit was given. Computing manifest means suffers from other weaknesses, for instance only the reduced dataset comprising participants with complete data for all times of measurement could be used. Therefore, we tested change over time for both manifest and latent means. For the manifest means (Table 5) change over the four time points cannot be revealed ( $F_{(3, 713)} = .87, p = .873, \eta^2 = .001$ ).

Table 5: Manifest means of SKSozKomp (times T1–T4,  $N = 713$ , theoretical range 10–40)

	T1	T2	T3	T4
<i>M</i>	32.42	32.19	32.30	32.22
<i>SD</i>	4.19	4.08	3.72	4.07

Comparing a latent state model with means set to be free with a more restricted model with means set to be equal showed no significant Chi-square difference (Table 6). This result supports the former findings; neither an increase nor a decrease of the self-concept scores existed.

Table 6: Tests of measurement LS-Model with and without equal latent means of social self-concept (SKSozKomp)

Social self-concept	$\chi^2$	<i>df</i>	CFI	RMSEA	SRMR	$\chi^2_{diff}$
Strong factorial invariance (latent means set to be free)	44.44***	19	.984	.035	.029	
Strong factorial invariance (latent means set to be equal)	48.66***	22	.983	.033	.032	4.47 n.s.

\*\*\*  $p < .001$ .

## 6.3 Normative stability and reciprocal effects of social self-concept and social preference

The following analysis refers to stability or change of inter-individual differences of social self-concept and social preference as well as reciprocal effects of the two constructs. After testing for invariance over time separately (see Tables 3 and 4), a measurement model for the two constructs was specified over four time points which showed good model fit indices ( $\chi^2 = 115.18; p < .01; df = 80; CFI = .990; RMSEA = .019; SRMR = .034$ ). Latent correlations of this model are presented in Table 7 indicating low correlations between social self-concept and social preference for time T2 to T4.

Table 7: Latent correlations of the measurement models of social self-concept and social preference, time T1–T4

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Social self-concept T1							
(2) Social self-concept T2	.55***						
(3) Social self-concept T3	.51***	.66***					
(4) Social self-concept T4	.36***	.43***	.73***				
(5) Social preference T1	.07	.15**	.15**	.20***			
(6) Social preference T2	.06	.08	.12	.23***	.91***		
(7) Social preference T3	.04	.09*	.15**	.21***	.71***	.80***	
(8) Social preference T4	.03	.13**	.13**	.21***	.66***	.75***	.74***

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

Stepwise testing cross-lagged models (see Table 8: I vs. 0; II vs. I; III vs. II) revealed that the more restrictive cross-lagged model with 2nd order autoregressive paths (II) should be preferred in comparison to the measurement model and a cross-lagged model with 3rd order autoregressive paths. Due to non-existing latent correlations at time 1 and low latent correlations (T2–T4) in the measurement model, the cross-lagged model (II) had to be tested against a baseline model with only autoregressive paths (2nd order are allowed; IIa). Chi-square difference testing showed a significant result indicating the necessity to implement reciprocal paths.

Table 8: Measurement model and autoregressive models of social self-concept and social preference

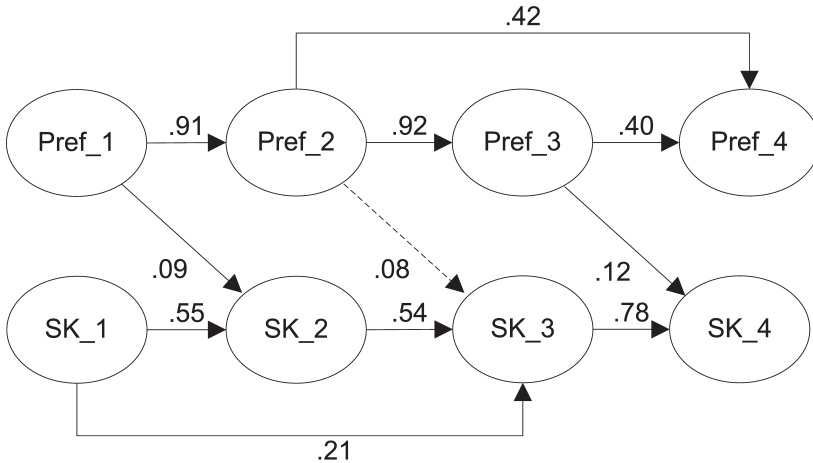
No	Name	$\chi^2$	$df$	CFI	RMSEA	SRMR	$\chi^2_{diff}$
0	Measurement model	115.18**	80	.990	.019	.034	
I	Cross-lagged model (with 3rd order autoregr. paths)	128.71**	89	.989	.020	.034	13.82 n.s.
II	Cross-lagged model (with 2nd order autoregr. paths)	128.10**	91	.989	.019	.034	.11 n.s.
III	Cross-lagged model (with 1st order autoregr. paths)	160.85***	95	.981	.024	.041	29.97 ***
IIa	Baseline model (with 2nd order autoregr. paths)	148.85***	97	.985	.021	.049	21.91 **

\*\*  $p < .01$ , \*\*\*  $p < .001$ .

The cross-lagged model with 2nd order autoregressive paths (II) is presented in Figure 3. It reveals small but significant paths from social preference (T1) to self-concept (T2) and social preference (T3) to self-concept (T4), the path from social preference (T2) to self-concept (T3) only reaches  $p < .10$ . No significant paths from social self-concept to social preference could be found.

Concerning normative stability, the model demonstrated large autoregressive paths for social preference especially for the first three times indicating high stability of inter-individual differences. From T3 to T4, stability of social preference appeared to be medium in size indicating some change of the inter-individual differences. Autoregressive paths for the self-concept construct from T1 to T3 were also medium in size, whereas stability from T3 to T4 was relatively large.

Figure 3: Cross-lagged panel model referring to social self-concept (SK) and social preference (Pref), standardized solution (paths with continuous line:  $p < .05$ ; path with dotted line:  $p < .10$ ), time T1–T4



## 7. Discussion

The article presented psychometric properties as well as results concerning the structural stability over time of a new instrument for assessing the social self-concept and investigated reciprocal effects between social self-concept and social preference in elementary school children. The data is part of the larger research project KEIMS<sup>plus</sup>.

## 7.1 Major results

In conclusion, confirmatory factor analysis did not confirm the three-dimensional structure of the self-concept instrument for elementary school children at the beginning of the second grade (time 1), but a two-factor model restricted to contact and empathy items revealed acceptable model fit indices for each of the four time points. Thereby, the latent correlations between empathy and contact turned out to be relatively high at time 1, but showed a declining tendency over time suggesting an increasing differentiation of the two skill-based facets of social competence. Based on a cross-sectional perspective, each of the two-factor models (times 1 to 4) was tested against a more restrictive global one-factor model. Chi-square difference tests were always significant indicating that a two-factor model represented the structure more precisely than a one-factor model at the respective times. These results could be interpreted as evidence for the emerging ability of elementary school children to reflect and differentiate at least these two aspects of their own social competence. Yet, some characteristics of our instrument have to be considered in comparison to other self-concept measures. The “Self-Concept of Social Competence” questionnaire (SKSozKomp) did not assess aspects of peer acceptance (see overview by Berndt & Burgy, 1996) but intended to evaluate the self-perspective on social skills applied in peer group interaction. Additionally, the instrument neither assessed various facets of self-concept in general (e.g., academic, physical, social and emotional self-concept, Shavelson et al., 1976) nor distinguished context-specific aspects of social self-concept (e.g., “peers” vs. “significant others”, see Byrne & Shavelson, 1996). Accordingly, results from the literature concerning the development and differentiation of self-concept (Harter, 2006) could not directly be compared with the present results of our study. However, the latter supports the assumption that children at the beginning of grade 2 are able to distinguish between contact and empathy.

The subscale emotion regulation of our instrument did not provide the expected psychometric qualities. We assume that the items of this subscale are too heterogeneous because they refer to various strategies of emotion management, for instance, masking of emotions or drawing off attention when one is angry or disappointed. Therefore, we included some additional items on emotion regulation at the beginning and the end of grade 4 for further investigation of this subscale. These data will be analyzed to answer the question whether a three-dimensional structure of the social self-concept could be revealed at least in fourth grade.

In a second step, testing for measurement invariance was carried out. This is claimed as a central standard for modeling longitudinal data, because it has to be proven that the structure and meaning of the construct remains the same over time (for instance Geiser, 2010). Configural invariance was confirmed for the two-factor model; structure and pattern of factor loadings did not change over time. Testing for weak factorial invariance showed acceptable model fit indices but significant chi-square difference testing rejected this more restrictive model. However, given acceptable model fit, weak factorial invariance was taken as a basis for further

analysis. Concerning the construct of social preference, which was included in this study to evaluate effects and origins of social self-concept, strict factorial invariance was demonstrated.

In related literature, mixed results have been found concerning the question of change or stability of the mean scores over the elementary school years ("level stability"). In our study a decline over time did not occur. Marsh reported age-dependent decreases for the peer relationship subscale of his instrument but not all of his studies confirmed such a decrease for this subscale (see Marsh et al., 1998). As the mean scores were quite high in our study (see also Marsh et al., 1998), it could be assumed that children tended not to develop a more realistic view of the self. Berndt and Burgoyne (1996) raised the question whether differences in the response format could account for some of the inconsistent findings. As children grow older they may use the extremes of a rating scale to a lesser extent. This could lead to moderately lower scores in case of "traditional" ratings but not when applying the "nontraditional" (p. 181) response format developed by Harter, which was also used in our study. As another point, it could be assumed that experiences and feedback in the social environment could probably be less focused and less salient than for instance in academic domains (see discussion by Harter & Pike, 1984).

In addition to level stability, questions of self-concept development could be answered by investigating inter-individual differences ("normative stability") as well as influences on changes of self-concept, over and above the initial value of self-concept. Self-representations are assumed to develop in dependency of various social experiences and also are expected to regulate or guide behavior at least moderately, both especially referring to same-aged peers. Therefore, an autoregressive model integrating social self-concept and social preference was applied. Autoregressive paths for social preference were large in size especially from time 1 to 3, indicating barely inter-individual differences. In contrast, social self-concept revealed stability of inter-individual differences to a lesser extent. Therefore, some developmental change referring to inter-individual differences can be assumed for time 1 to 3 (beginning of grade 2 to the beginning of grade 4), whereas stability increases for older children, which is in line with findings in literature. In order to test for valid or unspecific changes over time, a cross-lagged panel model controlling the substantial stability paths for the two latent constructs demonstrated two small but significant paths from social preference (time 1 and 3) to social self-concept (time 2 and 4). The paths from social preference at time 2 to social self-concept at time 3 could only be interpreted as a tendency. It can be concluded that if there is any inter-individual change of self-representations concerning social competence, this is partially influenced by social integration as reflected by the social preference construct.

The assumption that social self-concept might have influences on social preference could not be confirmed and has to be discussed along with further limitations of the study.

## 7.2 Limitations and perspectives

The first constraint of our study is related to the result that a three-dimensional structure of the self-concept instrument could not be confirmed. Some of the possible reasons have already been mentioned. Hence, a two-factor model represented by contact and empathy revealed acceptable fit indices although the residual variances of the indicators were relatively large. Furthermore, configural invariance over time could be demonstrated, but weak respectively strong measurement invariance could not be fully confirmed. In fact, the fit indices of model testing with weak and strong measurement invariance were acceptable but chi-square difference testing did not support these more restricted models. Geiser et al. (2010) have pointed out that “variation in the intercepts over time would indicate changes in the difficulty of a scale, and variation in the factor loadings would indicate that the discrimination of a scale has changed over time” (p. 33). Waters and Sroufe (1983) have discussed the problem of assessing (social) competence in an age-appropriately fashion. Our difficulties in achieving appropriate weak and strong measurement invariance possibly mirror the issue of ongoing differentiation of self-concept of this age-group.

Concerning our cross-lagged panel model, two related problems could be considered. First, the time lag between the measurements was quite large, approximately 1.5 years time difference between the assessment of social preference on time T and the assessment of self-concept on time T+1, respectively. Shorter time intervals might lead to influences more substantial in size. Having a look on the inverted direction from self-concept to social preference, it has to be considered that the time interval between the two time points (T+1) covered less than one year. Although a cross-lagged panel design calls for equal time lags (Reinders, 2006), our results did not seem to be affected because cross-lagged effects arose only for the longer time intervals. Secondly, due to our extensive assessment during the whole study (social competence and various achievement aspects) as well as the growing age of our participants, it was necessary to change some assessment techniques. Initially, children were individually interviewed for both measures, but later on they filled out the sociometric questions (time 3 and 4) and the self-concept questionnaire (time 4) themselves. It is not clearly identifiable whether these alterations have affected some results (for instance, the magnitude of stability paths for social preference from time 3 to 4).

In our research questions, cross-lagged paths were assumed to be only small in magnitude for the following reasons: Limited concordance of different informants is described in the literature (e.g., Renk & Phares, 2004). This issue is not addressed in our design but it could be expected that empirical relations between self-concept measures and social preference measured by peer nominations are weaker than empirical relations between self-concept measures and self-perceived social acceptance. The perception of one’s own social position in a peer group could differ from the peer-evaluated social position and behavioral responding to issues of peer acceptance must rely on or be mediated by cognitive representations of one’s own

social status. Therefore, our study is limited in the way that self-perceived peer status is not assessed additionally in order to test for mediating influences.

In summary, our study revealed a two-factorial structure of a social self-concept measure referring to contact and empathy-related skills with structural stability (configural invariance) over the elementary school years (beginning of second grade to the end of fourth grade). Social self-concept was influenced partly by social preference but social self-concept did not affect social preference as was shown in a cross-lagged panel model.

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