

# Emotional symptoms from kindergarten to middle childhood: associations with self- and other-oriented social skills

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**Abstract** The study investigated the interactive impact of different dimensions of social skills on children's emotional symptoms. We differentiate between self-oriented social skills which focus on considering own goals and needs in social interactions (assertiveness, social participation) and other-oriented social skills which focus on considering other's goals and needs (pro-social and cooperative behavior). 167 children participated in the study at the ages of 5, 6, and 9 years. A multi-informant approach (parents, teacher, and child) was employed to assess children's psychopathology. Teachers rated children's social skills. The study demonstrated the importance of deficits in self-oriented social skills for the development of emotional symptoms. Low levels of assertiveness predicted later emotional symptoms. In children with low levels of pro-social behavior, high assertiveness protected from emotional problems. In contrast, high levels of pro-social behavior emerged as a risk factor for later emotional symptoms, especially when it goes along with low levels of social participation.

**Keywords** Emotional symptoms · Social skills · Pro-social behavior · Assertiveness · Social participation · Middle childhood

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## Introduction

Previous research has shown that deficits in social skills are strongly related to the development of psychopathology in children [1, 2]. Most of the studies focussed on conduct problems and neglected emotional symptoms including anxiety and depression. Further they mostly investigated cross-sectional associations between social skills and emotional symptoms. Consequently there is still a lack of longitudinal research on social skills and their effect on emotional symptoms. This study aims at investigating the role of social skills for the development of emotional symptoms from kindergarten age to middle childhood.

If we understand social competence as the ability to use social interactions to satisfy one's own goals and needs while at the same time considering the needs and goals of others, we can differentiate between two dimensions: (a) self-oriented social skills which are aimed at satisfying one's own needs (e.g., assertiveness and social participation) and (b) other-oriented social skills which are aimed at satisfying another's goals and needs (e.g., pro-social, cooperative, and non-aggressive behavior) [3, 4]. In the current study, we investigate the overlapping and interactive effects of self- and other-oriented social skills as risk factors for emotional symptoms.

## Social skills and emotional symptoms

Previous research has shown that deficits in social skills are associated with emotional symptoms [5, 6]. In addition, deficits in social skills have been implicated as causes of emotional symptoms. Intervention studies have shown that training of social skills is an effective way to reduce depressive symptoms [7]. Several models exist to explain these mechanisms, especially for depressive symptoms:

according to a competency-based model of child depression, children internalize feedback from others about their performance in the social (and other) domain. That is, children learn to regard themselves in ways that reflect the ways that others regard them. If children receive aversive feedback from multiple sources across multiple domains, they become cognitively cornered into adopting relatively global, negative views of themselves. Such negative self-perceptions place the child at risk for low self-esteem and possibly depression [8].

For social skills, previous research has mainly investigated the role of observable problem behavior (withdrawal and aggressive behavior) rather than the absence of competent behavior. Withdrawal and aggressive behavior have repeatedly been discussed as predictors of both internalizing and externalizing disorders [9]. These two types of deficits in social interactions have often been treated as orthogonal dimensions: withdrawn behavior leading to internalizing and aggressive behavior to externalizing symptoms [10]. The interplay of different dimensions of social skills and their impact on psychopathology have so far been neglected. Consequently the specific role of other-oriented social skills (e.g., lack of pro-social and cooperative behavior) and the interplay with self-oriented social skills (e.g., lack of assertiveness and social participation) in the development of emotional symptoms are still unclear.

#### *Self-oriented social skills*

Social participation and assertiveness, including leadership skills and the ability to set limits to peers, are skills that are based on the consideration of own interests and benefits [11]. Social participation (or sociability) represents the motivation and capacity to initiate and maintain social interactions and relationships [12]. According to Baumeister and Leary [13] the need of belongingness is a fundamental human motivation; therefore, having the skills to initiate and maintain social interactions (i.e., social participation or sociability) is considered to be a self-oriented social skill. According to Asendorpf [14], sociable behavior is driven by the motive of approach in social situations, while unsociable behavior is often motivated by social avoidance. In fact it has been found that social participation is the opposite of withdrawn behavior [15]. Withdrawal is considered as one of the main predictors of depressive symptoms in children [10] and may even increase emotional symptoms [16]. Moreover, children with emotional symptoms have more difficulties in establishing and maintaining contact with other children [17, 18]. Research regarding the role of assertiveness on the development of emotional symptoms in children is rather scarce. Studies that included this variable in their research consistently showed negative associations: high levels of emotional symptoms are associated with low levels of

assertiveness in children [11, 19, 20] or high levels of submissiveness in adolescents [21]. Moreover, many clinical interventions include assertiveness training as one element of the treatment of depression in children and adolescents [22]. The links between assertiveness and depression has also been used to explain the higher prevalence of depression in adolescent girls versus boys; suggesting that girls are more depressive because they tend to be overly concerned for the welfare of others and to inhibit the expression of their own thoughts and preferences than boys [23].

#### *Other-oriented social skills*

Pro-social and cooperative behavior, including helping, caring, and taking responsibility for another tap children's attitudes and behaviors that are based on considering the interests and benefits of others in social interactions [11, 24]. Pro-social as well as cooperative children are sensitive to others' distress and needs, display concern for others, and tend to provide assistance to others [24]. Regarding the two aspects of other-oriented social skills and their associations with emotional symptoms, the results appear contradictory. On one hand it has been suggested that pro-social behavior is negatively associated with emotional symptoms [18, 25, 26]; on the other hand further research suggested that high levels of pro-social behavior might even be a risk factor in the development of emotional symptoms [24, 27, 28]. Cross-sectional and longitudinal studies have found that children who are overly concerned for the welfare of others, are highly cooperative or are over-friendly, have elevated levels of emotional symptoms [29–31]. Perren and collaborators [32] showed that at kindergarten age high levels of pro-social behavior predicted increases in emotional symptoms, but only in children who had already shown emotional symptoms 1 year earlier. These latter results show that an excess of other-oriented social skills can even have negative implications for children's emotional development. The authors suggested that highly pro-social children might be too considerate of the needs of others, and as a consequence neglect their own feelings and needs [32]. As high levels of pro-social behavior were only predictive of the development of emotional symptoms in children who already showed emotional symptoms 1 year earlier, and emotional symptoms are highly associated with deficits in self-oriented social skills; the question of whether high levels of pro-social behavior are only predictive of emotional symptoms in children with a lack of self-oriented social skills still needs to be clarified.

#### The present study

The purpose of the present study was to examine the unique contributions of self- and other-oriented social

skills to the development of emotional symptoms in children. The current paper extends the study of Perren and collaborators [32] of children of kindergarten age (5 and 6 years) to include another wave of assessment in primary school (age 9), and investigating different aspects of social skills. This study will help us to understand the complicated, multi-dimensional construct of social skills and its impact on children's emotional well-being. We suggest that self- and other-oriented social skills have differential impacts on the development of emotional symptoms. First, we propose that deficits in self- and other-oriented social skills are predictive of children's emotional symptoms. Further, we hypothesize that high levels of pro-social behavior are only predictive of emotional symptoms if the child also shows low levels of self-oriented social skills.

## Method

### Participants

The data come from a longitudinal study on developmental pathways of behavioral and emotional symptoms from kindergarten age to middle childhood. A total of 167 children (96 boys, 71 girls) participated in the study. The children were interviewed in their first (age 5; mean age 5.23, SD = 0.33) and second year (age 6;  $N = 162$ , mean age 6.2, SD = 0.34) of kindergarten, as well as in their third year of primary school (age 9;  $N = 123$ , mean age 9.2, SD = 0.21). The children were recruited from two different samples. 70 children were part of our longitudinal study on family relationships that began when the mothers of these children were pregnant (original  $N = 80$ ; [33]), while 97 children were part of a study of kindergarten children in Basel, a middle-sized Swiss city [34]. Sixteen kindergarten classes were selected from different city districts representing various socioeconomic and ethnic backgrounds characteristic of Basel. After the kindergarten teacher had agreed to participate, parents were informed at a parent meeting and given written information on the study; 74% of parents agreed to participate. The participating families were mainly white, German-speaking, and of European origin; 80% of these children had Swiss parents and 20% had a non-Swiss background, i.e., one or both parents were born outside Switzerland. 43 and 51% of the parents (mothers and fathers) had university degrees; 19% of fathers (25% of mothers) had higher education but no college degree; 21% of fathers (24% of mothers) had a professional degree (vocational training); 9% of fathers (9% of mothers) had basic education only (maximum: 9 years of schooling).

### Procedure

A multi-informant assessment of children's emotional symptoms was applied. Social skills scales were completed by teachers. At age 5 and 6, children were interviewed at kindergarten or at home. School-age children were interviewed at home. Both parents and teachers also completed questionnaires.

### Measures

#### *Emotional symptoms and conduct problems*

Parents and teachers completed the emotional symptoms scale (e.g., "many worries, often seems worried," "nervous or clingy in new situations, easily loses confidence") and the conduct problems scale (e.g., "often has temper tantrums or hot tempers," "often fights with other children or bullies them") of the Strengths and Difficulties Questionnaire [35] at all three assessment points. Both scales consist of five items that are rated on a 3-point scale (not true, somewhat true, and certainly true). Foreign language-speaking parents completed validated versions of the Strengths and Difficulties Questionnaire in their first language. Internal consistency of both scales were moderate (emotional symptoms:  $\alpha = 0.65$ – $0.76$ , conduct problems:  $\alpha = 0.52$ – $0.78$ ).

To assess the child's own report of emotional and behavioral difficulties at kindergarten (age 5 and age 6), the corresponding subscales of the Berkeley Puppet Interview were used. The Berkeley Puppet Interview, developed by Measelle and collaborators [36], blends structured and clinical interviewing techniques to elicit children's self-perceptions. The interview was carried out by means of two identical hand puppets that make two opposing statements on a topic. The child then gives his or her own statement. The interview was videotaped and afterwards scored by independent raters, who were blind to all other data. Each item was rated on a 7-point scale (1–3 = strong to mild agreement with the negative statement, 4 = neither positive nor negative, 5–7 = mild to strong agreement with the positive statement). Responses that the raters were unsure how to code (score 8) were treated as missing (<0.3% of all items). For the current analyses, the scores have been reversed. Our interviewers were trained by the authors of the instrument. Interrater reliability was first established with the authors of the instrument and then for the raters of the research group (average intraclass correlation = 0.97, range 0.79–1.00). To link child reports of behavioral/emotional difficulties with parent and teacher reports, we aggregated the original Berkeley Puppet Interview subscales. The emotional symptoms scale covers depression and overanxiousness (e.g., "I am not a happy child," "I worry bad things are going to happen";  $\alpha = 0.57$ – $0.68$ , 14

items). The conduct problems scale covers oppositionality/ defiance and overt aggression to peers (e.g., “When I get mad I lose my temper,” “I hit kids a lot”;  $\alpha = 0.64\text{--}0.76$ , 13 items). The interviews were conducted in Swiss German.

In primary school (age 9), children completed the emotional symptoms scale and the conduct problems scale of the self-report form of the SDQ [37], instead of using the Berkeley Puppet Interview [36], which was better suited to the younger study population. To ensure that all children were able to complete the form, items were presented on cards which children were supposed to sort into different boxes marked with “certainly true”, “somewhat true” and “not true”. Research assistants read the items aloud for the children as required. Both scales consist of five items that are rated on a 3-point scale (not true, somewhat true, and certainly true). Internal consistency of both scales was moderate (emotional symptoms:  $\alpha = 0.54$ , conduct problems:  $\alpha = 0.61$ ).

#### *Combining multi-informant data*

As recommended by Kraemer et al. [38] we aggregated child, parent, and teacher reports. The concordance between children’s and adults’ ratings were in the expected range (teacher:  $r = 0.13\text{--}0.23^*$ , parents:  $r = 0.12\text{--}0.15$ ), the correlation between parents and teacher ( $r = 0.28^{**}\text{--}0.52^{**}$ ) can be considered as being high [38]. Previous analyses of the cross-sectional data showed that the aggregation of the three informants yielded reliable and valid information on children’s symptoms [34]. To combine child, parent, and teacher reports on symptoms, the average scores of each informant were first z-standardized (difference of the individual raw scores and the sample mean is divided by the sample standard deviation,  $M = 0$ ,  $SD = 1$ ). Then scores were averaged across informants (mean scores). The scores were built when information from at least two different informants was available. Depending on assessment point one to seven teacher reports, one to six parents report, and five to eight child reports were missing. Missing values were not imputed.

#### *Social skills scales*

Teachers completed questionnaires concerning social skills (items are shown in the [Appendix](#)). Teachers rated every statement using a 3-point Likert scale (0 = not true to 3 = absolutely true). The two dimensions self- and other-oriented social skills were assessed using four subscales on social behavior patterns. The social participation subscale consists of four items ( $\alpha = 0.73\text{--}0.80$ ). The assertiveness subscale consists of six items tapping limit setting and leadership ( $\alpha = 0.81\text{--}0.84$ ). The pro-social behavior

subscale consists of five items including comforting, helping, and sharing behavior ( $\alpha = 0.76\text{--}0.82$ ). The cooperative behavior subscale consists of five items ( $\alpha = 0.73\text{--}0.83$ ).

The two-dimensionality (self- and other-oriented social skills) of these four subscales has already been confirmed by a second order principal component analysis in a previous study [3]. It has been shown that the four subscales included in the current paper can be assigned to the higher-order dimensions of self- and other-oriented social skills.

#### *Educational level*

Parent’s educational level was assessed by obtaining information about mothers’ and fathers’ highest education. Parents indicated what kind of level they had reached, ranging from 1 = basic education to 4 = university degree. The scale parent’s educational level is the mean of mother’s and father’s highest education.

#### *Attrition effects*

There was almost no attrition from age 5 ( $N = 167$ ) to age 6 ( $N = 162$ ), but a large attrition from age 6 to age 9 ( $N = 123$ ). This latter attrition rate was due to various reasons (e.g., time constraints, a global negative attitude to research projects, moving house and change of assessment procedure, as children were interviewed at home rather than at the kindergarten). Attrition rate was significantly higher in the sample recruited through public kindergarten (35%) than in the sample which took part in our longitudinal family study (15%). Children who did not participate at age 9 had shown a significantly higher level of emotional symptoms, and their parents a significantly lower educational level, when studied at age 5 and age 6. Additionally children who did not take part at age 9 showed significantly less pro-social behavior at age 5 and significantly less assertiveness at age 6 (all  $p < 0.01$ ).

## **Results**

The central question of this study was whether deficits in self- and other-oriented social skills are predictive of children’s emotional symptoms. First, we report descriptive statistics of sex, parent’s educational level and assessment point. Second, we calculated bivariate cross-sectional and longitudinal associations between emotional symptoms and the social skills scales. Third, to test the hypothesized interaction effects, multivariate analyses were conducted using generalized estimating equations (GEE, [39, 40]). This statistical procedure enabled us to include all available data and to avoid losing a large portion of the sample due

to the high attrition from age 6 to age 9. Fourth, to analyze the predictive value of social skills in kindergarten on later emotional symptoms, generalized linear models were used. For the statistical analyses, a significance level of  $p < 0.05$  was used. As it has already been shown that there is a substantial degree of overlap or comorbidity between emotional symptoms and conduct problems, including impulsiveness, disruptiveness, and aggression [41] we control for conduct problems in the analyses. We also control for sex and parental educational level.

### Descriptive results

First, several GEE were conducted to examine sex, parental educational level and assessment point differences in terms of social skills, emotional symptoms, and conduct problems. We included in the analyses the interaction terms of assessment point with sex and assessment point with parent's educational level.

### Time trends

As both symptoms scales (emotional symptoms and conduct problems) have to be z-standardized for each assessment point separately (change from BPI to SDQ) no general time trends for emotional symptoms and conduct problems can be computed. No significant changes over time of social skills were observed.

### Sex

The analyses yielded significant sex differences for pro-social behavior and conduct problems. Mean and standard deviation for boys and girls are shown in Table 1. Girls showed more pro-social behavior (Wald- $X^2 = 34.404$ ,  $p = 0.000$ ) than boys; and boys showed more conduct problems than girls (Wald- $X^2 = 6.41$ ,  $p = 0.011$ ). No sex differences could be found for cooperative behavior, self-oriented social skills or emotional symptoms, and in

addition we did not find any interaction effect with assessment point. This implies that the association patterns were the same across the three time points.

### Parental educational level

Parental educational level was significantly associated with emotional symptoms (Wald- $X^2 = 4.00$ ,  $p = 0.046$ ). The lower a parent's educational level, the higher the level of the child's emotional symptoms. Further the analyses yielded significant associations between parent's educational level and other-oriented social skills. The higher the parent's educational level the higher the pro-social behavior (Wald- $X^2 = 3.88$ ,  $p = 0.049$ ) and the cooperative behavior (Wald- $X^2 = 4.40$ ,  $p = 0.036$ ). Again we did not find any significant interaction effect with assessment point.

In further multivariate analyses, we control for the main effects of sex, parent's educational level, and assessment point.

### Bivariate associations

To assess associations and in particular the stability of self- and other-oriented social skills, emotional symptoms, and conduct problems, we computed bivariate Pearson correlations. As can be seen in Table 2 most study variables were significantly associated with each other. Both other-oriented social skills scales—pro-social and cooperative behavior—were significantly and moderately positively associated with each other. Social participation and assertiveness, the two self-oriented social skills scales, showed moderate to high positive associations. Furthermore, pro-social behavior was moderately positively associated with social participation and assertiveness. Cooperative behavior and the two self-oriented social skills scales were only weakly associated. Self-oriented social skills were significantly and moderately negatively associated with emotional symptoms (age 5 and age 6). Other-oriented social

**Table 1** Descriptive statistics of all social skills scales by sex and assessment point

	Age 5				Age 6				Age 9			
	Girls ( $N = 66$ )		Boys ( $N = 92$ )		Girls ( $N = 65$ )		Boys ( $N = 88$ )		Girls ( $N = 48$ )		Boys ( $N = 65$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Emotional symptoms	0.06	0.78	-0.08	0.66	0.05	0.73	-0.03	0.68	0.02	0.75	-0.04	0.71
Other-oriented social skills												
Pro-social behavior	1.63	0.38	1.27	0.47	1.77	0.32	1.30	0.47	1.61	0.35	1.29	0.44
Cooperative behavior	1.53	0.42	1.39	0.44	1.63	0.37	1.44	0.48	1.61	0.37	1.43	0.45
Self-oriented social skills												
Social participation	1.45	0.56	1.39	0.51	1.65	0.47	1.58	0.47	1.54	0.54	1.52	0.46
Assertiveness	1.15	0.52	1.17	0.50	1.54	0.46	1.41	0.45	1.45	0.47	1.27	0.51

**Table 2** Bivariate associations between emotional symptoms, conduct problems, and social skills (Pearson's correlation)

	Emo. sympt.			Conduct problems			Pro-social behavior			Cooperative behavior			Social participation			Assertiveness		
	Age 6	Age 9	Age 5	Age 6	Age 9	Age 5	Age 6	Age 9	Age 5	Age 6	Age 9	Age 5	Age 6	Age 9	Age 5	Age 6	Age 9	
Emo. symptoms [5]	0.54**	0.32**	0.35**	0.22**	0.25**	-0.26**	-0.04	0.01	-0.18*	-0.09	0.01	-0.31**	-0.17*	0.06	-0.28**	-0.15	0.04	
Emo. symptoms [6]		0.27**	0.20*	0.21**	0.16	-0.02	-0.07	0.11	-0.07	-0.15	-0.010	-0.09	-0.27**	0.07	-0.13	-0.20*	-0.06	
Emo. symptoms [9]			0.11	0.14	0.43**	0.03	0.04	-0.11	0.09	-0.04	-0.23*	-0.00	-0.11	-0.18	0.02	-0.02	-0.10	
Cond. problems [5]				0.59**	0.63**	-0.27**	-0.26**	-0.28**	-0.50**	-0.36**	-0.37*	0.01	-0.02	-0.09	0.17*	0.17*	0.10	
Cond. problems [6]					0.51**	-0.23**	-0.42**	-0.27**	-0.38**	-0.54**	-0.32**	0.10	-0.04	-0.08	0.31**	0.24**	-0.02	
Cond. problems [9]						-0.23*	-0.27**	-0.30**	-0.25**	-0.33**	-0.52**	-0.06	-0.15	-0.03	0.28**	0.10	0.13	
Pro. behavior [5]							0.65**	0.27**	0.42**	0.42**	0.10	0.38**	0.37**	0.14	0.28**	0.22**	0.14	
Pro. behavior [6]								0.31**	0.31**	0.65**	0.17	0.24**	0.37**	0.21*	0.05	0.23**	0.26**	
Pro. behavior [9]									0.10	0.14	0.40**	0.07	0.20*	0.35**	0.02	0.11	0.33**	
Coo. behavior [5]										0.48**	0.24*	0.10	0.04	-0.12	0.04	-0.14	-0.20	
Coo. behavior [6]											0.30**	0.09	0.25**	0.02	-0.12	-0.00	0.07	
Coo. behavior [9]												-0.11	-0.01	0.09	-0.29**	-0.11	-0.06	
Social participation [5]													0.59**	0.23*	0.69**	0.43**	0.20*	
Social participation [6]														0.21*	0.39**	0.58**	0.26**	
Social participation [9]															0.24*	0.33**	0.71**	
Assertiveness [5]																0.56**	0.33**	
Assertiveness [6]																	0.48**	

\*\* p &lt; 0.01, \* p &lt; 0.05 (two-tailed)

**Table 3** Results for the generalized estimating equations predicting emotional symptoms

Predictors	Emotional Symptoms								
	Step 1			Step 2			Step 3		
	$X^2$	<i>p</i>	<i>B</i>	$X^2$	<i>p</i>	<i>B</i>	$X^2$	<i>p</i>	<i>B</i>
Sex (girls = 1)	3.01	0.083	0.153	6.46	0.011	0.215	5.88	0.015	0.199
Parent's educational level	6.22	0.013	-0.121	4.37	0.037	-0.092	5.60	0.018	-0.098
Assessment point	1.71	0.191	0.023	1.43	0.233	0.019	0.57	0.449	0.012
Pro-social behavior	0.011	0.918	0.012	0.37	0.543	0.065	0.18	0.670	-0.148
Cooperative behavior	4.51	0.034	-0.219	0.06	0.806	0.025	1.23	0.267	0.338
Social participation	7.51	0.006	-0.270	6.52	0.011	-0.231	1.09	0.296	0.262
Assertiveness	1.18	0.278	-0.114	7.28	0.007	-0.257	4.54	0.033	-0.694
Conduct problems				31.62	0.000	0.369	29.47	0.000	0.354
Pro-social behavior × social participation							4.10	0.043	-0.472
Pro-social behavior × assertiveness							8.65	0.003	0.722
Cooperative behavior × social participation							0.17	0.680	0.099
Cooperative behavior × assertiveness							2.27	0.132	-0.377

$X^2 = \text{Wald}-X^2$

skills showed significant and moderate negative associations with emotional symptoms (age 5 and age 9) and moderate to high negative associations with conduct problems. Assertiveness was positively and moderately associated with conduct problems. No associations could be found between social participation and conduct problems. As expected, cross-sectional associations were stronger than longitudinal associations. Furthermore, emotional symptoms, conduct problems, and self- and other-oriented social skills were moderately stable over the three assessment points, while stability from age 5 to age 6 was higher than from age 6 to age 9.

#### Social skills predicting emotional symptoms across time

To answer the main research questions, GEE were used to compare the specific predictive value of each of the social skills scales on children's emotional symptoms. Repeated measures of emotional symptoms were used as dependent variables. Sex was used as categorical independent variable. Parent's educational level, repeated measures of social skills (social participation, assertiveness, cooperative behavior, pro-social behavior) and conduct problems were used as linear independent variables (covariates). Due to the unequally spaced time intervals, assessment point was coded as 1 for age 5, 2 for age 6 and 5 for age 9 [40] and used as a linear covariate. The results are shown in Table 3.

In a first step of the analysis all variables (main effects) except conduct problems were entered. Sex showed a trend toward significance, with girls showing higher levels of emotional symptoms. The analysis also yielded a significant main effect for parent's educational level. The lower

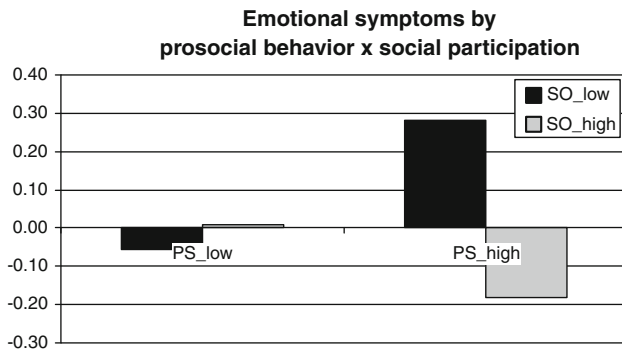
the educational level the higher the emotional symptoms. In terms of effects of other- and self-oriented social skills, we found a significant main effect for cooperative behavior and social participation. The less cooperative and sociable a child was, the higher the level of emotional symptoms the child showed.

In a second step conduct problems (main effect) were included as an additional variable in the analysis. We found a strong main effect; the more conduct problems a child showed, the more emotional symptoms the child had. Further the analyses yielded a significant sex difference in emotional symptoms, to girls' disadvantage and a significant main effect for parent's educational level as already found in the previous analyses. For the social skills scales, the effect of cooperative behavior was no longer significant, while in contrast both scales of self-oriented social skills became significant. The less assertive and sociable a child was the higher the level of emotional symptoms a child showed.

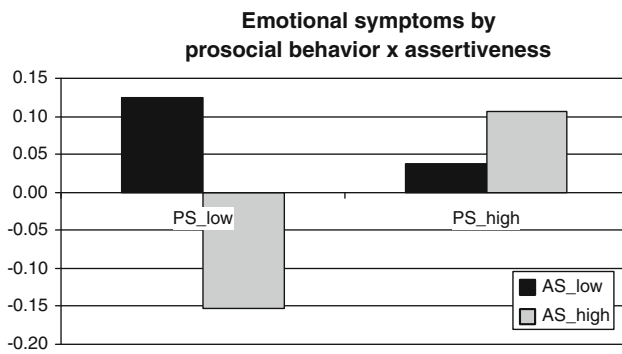
In the final step of the GEE, the interaction effects of the social skills scales were entered in the analyses. The main effects for sex, parent's educational level, and conduct problems remained significant. For the social skills scales, only the effect of assertiveness still showed significance.

Additionally we found significant interaction effects between other- and self-oriented social skills. The interaction effects between pro-social behavior and social participation, as well as between pro-social behavior and assertiveness, were significant in predicting the level of emotional symptoms.

For the interpretation of the significant interaction effects, the variables were dichotomized (above versus below the mean) and post-hoc tests were computed



**Fig. 1** Interaction effect between pro-social behavior and social participation in predicting emotional symptoms (marginal means)



**Fig. 2** Interaction effect between pro-social behavior and assertiveness in predicting emotional symptoms (marginal means)

(pairwise comparisons; effects of the linear covariates are controlled). Regarding the interaction between pro-social behavior and social participation we found that children with high levels of pro-social behavior and low levels of social participation showed significantly higher levels of emotional symptoms than all other groups ( $p < 0.05$ ). In addition, low pro-social and low sociable children had higher levels of emotional symptoms than highly pro-social and highly sociable children (see Fig. 1).

Regarding the interaction between pro-social behavior and assertiveness, the post-hoc test indicated that low pro-social and highly assertive children had significantly lower levels of emotional symptoms than low pro-social and low assertive children and than children with high pro-social and high assertive behavior ( $p < 0.05$ ; see Fig. 2).

#### Social skills in kindergarten predicting later emotional symptoms

To analyze whether social skills in kindergarten are also longitudinally predictive of emotional symptoms, generalized linear models were computed. First, we analyzed whether age 5 variables predict emotional symptoms at age

6. Second, we investigated associations between age 5 and age 9 and third, associations between age 6 to age 9. For each time period, we first analyzed the effect of former behavior on later symptoms, and second the effect of former behavior on changes in symptoms of time. To analyze changes in emotional symptoms, we control for the concurrent level of emotional symptoms. Identical main and interaction effects were tested as in the GEE-models reported above. Results of the GENLIN-models are shown in Table 4.

#### Age 5 predicting age 6

The analyses showed a significant effect of parental educational level and conduct problems. The lower parental education and the higher children's level of conduct problems at age 5, the higher the level of emotional symptoms at age 6. The analysis also showed a significant effect of assertiveness and an interaction effect of pro-social behavior X assertiveness.

As in the analyses above, for the interpretation of the significant interaction effects, the variables were dichotomized (above versus below the mean). The post-hoc comparison indicated that low pro-social and low assertive children have higher levels of emotional symptoms than low pro-social and highly assertive children (PS\_low and AS\_low:  $M = 0.180$ ; PS\_low and AS\_high:  $M = -0.162$ ; PS\_high and AS\_low:  $M = 0.100$ ; PS\_high and AS\_high:  $M = 0.078$ ). Thus the post-hoc comparison partly confirm the results of the above GEE-analyses which showed that low pro-social and highly assertive children show the lowest levels of emotional symptoms. In a next step we entered the level of emotional symptoms at age 5 to analyze the impact of the variables on changes in emotional symptoms. Emotional symptoms at age 5 reached significance ( $X^2 = 42.5$ ,  $p < 0.001$ ,  $B = 0.543$ ) indicating a rather high stability of emotional symptoms from age 5 to age 6. Educational level also predicted increases in emotional symptoms, but no other variable reached significance ( $X^2 = 4.9$ ,  $p = 0.027$ ,  $B = -0.119$ ).

#### Age 5 predicting age 9

The analysis yielded only a significant effect of conduct problems. Children with higher levels of conduct problems at age 5 showed higher levels of emotional symptoms at age 9. Furthermore the analysis regarding change indicated that higher levels of conduct problems at age 5 also predicted increases in emotional symptoms from age 5 to age 9 ( $X^2 = 7.6$ ,  $p = 0.005$ ,  $B = 0.299$ ). Emotional symptoms were moderately stable from age 5 to age 9 ( $X^2 = 6.9$ ,  $p = 0.009$ ,  $B = 0.300$ ).



**Table 4** Results of the generalized linear models predicting emotional symptoms from former social skills

Predictors	Longitudinal prediction of emotional symptoms								
	Age 5 > Age 6			Age 5 > Age 9			Age 6 > Age 9		
	$X^2$	$p$	$B$	$X^2$	$p$	$B$	$X^2$	$p$	$B$
Sex (girls = 1)	0.21	0.64	0.05	0.10	0.76	0.04	0.00	0.99	0.00
Parent's educational level	7.32	0.01	-0.16	2.15	0.14	-0.11	1.47	0.23	-0.09
Pro-social behavior	0.55	0.46	-0.27	0.24	0.62	0.22	5.50	0.02	1.98
Cooperative behavior	1.80	0.18	0.55	0.39	0.53	0.32	1.61	0.20	-1.19
Social participation	2.30	0.13	0.64	0.12	0.72	0.17	1.45	0.23	0.89
Assertiveness	4.27	0.04	-0.91	0.54	0.46	-0.40	1.36	0.24	-0.78
Conduct problems	5.63	0.02	0.21	12.92	0.00	0.38	1.24	0.26	0.14
Pro-social behavior $\times$ social participation	1.32	0.25	-0.38	0.98	0.32	-0.40	4.20	0.04	-1.15
Pro-social behavior $\times$ assertiveness	6.32	0.01	0.81	1.06	0.30	0.40	0.04	0.83	0.10
Cooperative behavior $\times$ social participation	0.13	0.72	-0.12	0.22	0.64	0.19	0.42	0.52	0.35
Cooperative behavior $\times$ assertiveness	0.56	0.45	-0.27	0.11	0.74	-0.13	0.66	0.42	0.38

$X^2 = \text{Wald-}X^2$

### Age 6 predicting age 9

The analysis indicated a significant effect of pro-social behavior and a significant interaction between pro-social behavior and social participation. The post-hoc analyses with the dichotomized variables yielded no significant differences between the groups. However, the means correspond to the results reported in the analyses above: children with high pro-social behavior and low social participation have the highest level of emotional symptoms (PS\_low and SO\_low:  $M = 0.056$ ; PS\_low and SO\_high:  $M = -0.048$ , PS\_high and SO\_low:  $M = 0.213$ , PS\_high and SO\_high:  $M = -0.019$ ).

In the analysis predicting changes of emotional symptoms, pro-social behavior also reached significance ( $X^2 = 4.38$ ,  $p = 0.036$ ,  $B = 1.75$ ), indicated that high levels of pro-social are predicting increases in emotional symptoms from age 6 to age 9. Emotional symptoms were moderately stable from age 6 to age 9 ( $X^2 = 4.02$ ,  $p = 0.045$ ,  $B = 0.206$ ).

### Discussion

The study demonstrated the importance of deficits in self-oriented social skills (lack of assertiveness and social participation) for the development of emotional symptoms. Further we found significant interaction effects between both self-oriented social skills (social participation and assertiveness) and pro-social behavior. Our study suggests that a low as well as a high level of pro-social behavior might be harmful for children's emotional well-being, depending on the level of self-oriented social skills.

### Self- versus other-oriented social skills

The results confirm our hypothesis that deficits in self-oriented social skills are predictive of emotional symptoms. The GEE-analyses showed that low social participation and low assertiveness were both significant predictors of emotional symptoms even when conduct problems were controlled for. This result could also partly be confirmed longitudinally as low assertiveness at age 5 predicted a higher level of emotional symptoms at age 6. Our results thus support and extend previous findings [3, 11, 18], as not only lack of social participation but also lack of assertiveness (leadership skills and the ability to set limits to peers) have an impact on the development of emotional symptoms.

The role of low social participation in the development of emotional symptoms has already been investigated [18]. It has been recognized that some children play alone because even though they would like to interact with others, they are too shy to initiate social interactions [14]). Our study clearly showed that assertiveness is—in addition to unsociable behavior—a risk factor for emotional symptoms. Deficits in assertiveness even predicted later emotional symptoms. Because of their personal characteristics these children might be unable to consider their own needs and goals and hence develop emotional symptoms.

Furthermore, we hypothesized that deficits in other-oriented social skills are predictive of emotional symptoms. The hypothesis received only partial support as we found only a main effect for cooperative behavior in predicting emotional symptoms. If controlled for conduct problems the effect no longer showed significance. As conduct problems are associated with cooperative behavior and

emotional symptoms, conduct problems seem to mediate the association between cooperative behavior and emotional symptoms. In addition, a longitudinal main effect (age 6 > age 9) could be found for the second dimension of other-oriented social skills, namely pro-social behavior, indicating that higher pro-social behavior—but not deficits—being predictive of later emotional symptoms. In sum, our results suggest that deficits in self-oriented social skills are stronger predictors for emotional symptoms than deficits in other-oriented social skills.

#### Interplay between self- and other-oriented social skills

We hypothesized further that high levels of pro-social behavior are only predictive of emotional symptoms if the child also shows low levels of self-oriented social skills. This hypothesis was partly confirmed. We found a significant interaction effect between pro-social behavior and social participation, showing that highly pro-social but unsociable children show the highest levels of emotional symptoms, whereas highly pro-social and highly sociable children show the lowest levels of emotional symptoms. Our study implied that a high level of pro-social behavior may not in itself be harmful for children's emotional well-being, as postulated in previous studies [32], but emphasizes the importance of social participation.

On the other hand, we found that high assertiveness seems to protect children with low pro-social behavior from emotional symptoms. This result might be related to findings in bullying research. "Pure" bullies (children who bully others but are not victimized themselves) have been found to have high leadership skills, tend to show low pro-social behavior, but show low levels of internalizing problems [42]. However, it has to be kept in mind that this result is controlled for children's conduct problems which in itself are predictive of later emotional symptoms. It has been suggested that the association between conduct problems and emotional symptoms is mediated by peer victimization [3, 11]. This result brings to mind that social skills are embedded in the peer context. Further research should include peer relationships in the analyses and investigate moderation and mediation effects.

It remains unclear which processes might be responsible for the interplay between self-oriented social skills, pro-social behavior, and emotional symptoms. Socio-cognitive processes are discussed in association with behavior in social situations [43, 44]. In one of the processes suggested, an excess of empathy might lead to the development of emotional symptoms [45]. The authors propose that empathic over-arousal, where the self becomes submerged in the problems of others, might be responsible for the development of emotional symptoms. As pro-social behavior and empathy are highly associated with each

other [24] we suggest that children, who are able to take other's perspectives, can recognize the negative consequences of their own self-interested behavior for other children. As they do not want to hurt others they act pro-socially and not assertively, and compromise on their own needs. As a consequence they develop emotional symptoms. Alternatively, children's behavior might also be driven by a fear of others, and a corresponding drive to please others and render oneself and one's social need as inconspicuous as possible. Further research is needed to support these suggestions.

#### Strengths and limitations of the study

In the current study we used a multi-informant approach to assess emotional and conduct problems, but for self- and other-oriented social skills we included only teacher reports. The integration of multiple informants yields more valid and reliable data [38]; and therefore, further studies should also assess social skills with the multi-informant approach and include parents and children as informants. The interviewing of peers could be of particular importance, because they interact daily with the children and could give important information about the child's social skills. The inclusion of children's self perception of their social skills would also give more information, as children have their own meaningful perspective [34]. Nevertheless, teachers might be able to give reliable and valid data about children's social behavior at school as they can observe it every day.

It is well known that deficits in social skills are not the only influences on children's emotional symptoms. Emotional symptoms are multi-determined, and a comprehensive analysis would have to include several biological as well as other socializing factors, such as a negative family climate and parental psychopathology [46]. One variable we controlled for was children's sex. Our study showed that sex is a predictor for emotional symptoms, but only if controlled for conduct problems. This means that girls show more purely emotional symptoms than boys, but that no sex differences exist if emotional symptoms and conduct problems are comorbid. This result is perfectly in line with previous results. It has been found that girls have a higher vulnerability toward internalizing problems [45, 47] and boys generally show more externalizing and aggressive behavior than girls [48]. In addition, the family context also seems to be important. In line with other studies [49, 50] low parental educational level is associated with children's social skills deficits and mental health problems. Children who had parents with a low educational level showed a lower level of other-oriented social skills and a higher level of emotional symptoms. For these children, deficits in pro-social-cooperative behavior might be related to peer

problems which in turn might lead to emotional problems [3, 11]. These latter findings highlight the importance of applying intervention strategies to high-risk families with a low educational level.

### Clinical implications

Our study underlines the important role of and interplay between self-oriented and other-oriented social skills for the development of emotional symptoms. On one hand our study confirmed previous findings that deficits in self-oriented social skills are more strongly associated with emotional symptoms, and deficits in other-oriented social skills are more strongly associated with conduct problems. Further our study explained the contradictory findings that low as well as high levels of pro-social behavior can be risk factors for emotional symptoms depending on the level of children's self-oriented social skills.

Most intervention and social skills training for children only focus on one deficit, e.g., the reduction of aggressive behavior and consequentially the promotion of other-oriented social skills, i.e., pro-social and cooperative behavior, or the improvement of self-oriented social skills, e.g., self-assertion and social approach [51]. There is a substantial degree of overlap or comorbidity between emotional symptoms and conduct problems [41]. This strong relationship between emotional symptoms and conduct problems is important for the association with social skills, as other-oriented social skills are also associated with emotional symptoms. Our study suggests that therapeutic interventions and social skills training should consider every child's specific deficit in social skills and problem behavior to provide an effective prevention or intervention, respectively. A focus on other-oriented social skills (e.g., pro-social behavior) while neglecting self-oriented social skills (e.g., social participation) can also provoke a contrary response and elevate the level of emotional symptoms, at least in some children. The non-specificity of existing social skills training might be one reason that meta-analyses and reviews of social skills training's efficacy [52, 53] found only weak effects and indicated a poor long-time effect of these therapeutic approaches. Therefore, training and interventions should provide a better balance of promoting self- and other-oriented social skills, both of which are important in emotional well-being and healthy development.

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## Appendix

### Items of the social skills scales

#### Self-oriented social skills

- Assertiveness
  - Refuses unreasonable requests from others
  - Able to set limits for peers
  - Able to defend him-/herself
  - Leader in peer group situations
  - Organizes, suggests play activities to peers
  - Initiates conversations with peers

#### Social participation

- Outgoing in peer group situations
- Converses with peers easily
- Withdraws from other children
- Watches rather than joins peer activities

#### Other-oriented social skills

##### Pro-social behavior

- Shares readily with other children (treats, toys, pencils, etc.)
- Helpful if someone is hurt, upset or feeling ill
- Friendly toward other children
- Often volunteers to help others (parents, teachers, other children)
- Shows empathy toward peers

##### Cooperative behavior

- Listens what classmates say
- Accepts peers ideas for group activities
- Willingly takes turns in peer activities
- Compromises in conflicts with peers
- Cooperative with peers

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