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The relationship of classmates-perceived teacher feedback and the social acceptance of second, third and fourth graders

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ABSTRACT

In the past, some field studies have shown that in addition to student characteristics teacher feedback can influence the social acceptance of students. However, research gaps still exist: for example, most field studies use ratings by adult observers to measure feedback, even though following social referencing theory how students perceive feedback is more relevant. Furthermore, most field studies have not investigated whether the impact of teacher feedback on social acceptance is moderated by student development. The present study addresses two research questions: 1. Is classmates-perceived teacher feedback related with the social acceptance of students? 2. Does the relationship between teacher feedback and social acceptance increase according to the development of elementary-aged students? A cross-sectional survey was performed with $n = 960$ students from $n = 16$ second, $n = 16$ third and $n = 16$ fourth grade classes at $n = 13$ schools in Germany. The results of the multi-level analysis confirm the first hypothesis. By statistically controlling for gender and challenging behaviour, positive or negative teacher feedback clarified 3% (negative feedback) and 11-12% (positive feedback) more variance. With regard to research question 2, the relationship between positive teacher feedback and social acceptance increased according to the grade level.

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Introduction

Being socially included is one of the basic psychological needs of human beings (Deci and Ryan 1985; Maslow 1943), and highly relevant to students' subjective well-being at school (Deci and Ryan 2000). Longitudinal studies confirm that significant friendships at school weaken the impact of low academic achievement on depressive symptoms during middle childhood (Schwartz et al. 2008), and lead to higher levels of general self-worth in adulthood (Bagwell, Newcomb, and Bukowski 1998). Furthermore, the presence of friendships correlates positively to academic success (Schmitt and Sixt 2014; Bagwell,

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Newcomb, and Bukowski 1998). Therefore, peer relations are seen as a key factor in child development (Hay, Payne, and Chadwick 2004).

However, international investigations reveal that not all students have positive relationships with their classmates. In mainstream education settings in particular, students with special educational needs seem to be less socially included than their classmates who do not have special educational needs (e.g. Krull, Wilbert, and Hennemann 2014; Lindsay 2007), which is especially the case for children and young people with behavioural problems (e.g. Chang 2004; Krull, Wilbert, and Hennemann 2018; Weber, Nicolay, and Huber 2021).

While a lot of research emphasises the role of individual characteristics (e.g. aggressive behaviour, social skills) in explaining differences in social inclusion, there is growing evidence for the importance of teachers' behaviour in shaping their classroom's social dynamics. In this context, several studies over the last years have found that (public) teacher feedback (TF) might be an important aspect that influences how students are accepted by their peers (Wullschleger et al. 2020).

Social participation, integration, and inclusion

A considerable amount of international research has been conducted in the field of peer relations at school in recent decades, which has led to a great ambiguity of the definitions used by researchers. In a systematic review of 62 articles published in international scientific journals, Koster et al. (2009) identify three concepts that are frequently used, namely, social participation, social integration and social inclusion. Koster et al. (2009) recommend using the concept of 'social participation', which is described as the 'presence of positive social contact/interaction between them [students with special educational needs] and their classmates; acceptance of them by their classmates; social relationships/friendships between them and their classmates, and the students' perception that they are accepted by their classmates' (Koster et al. 2009, 135).

Publications on social participation offer complex explanations on the reasons why or why not an individual might interact with someone else. Recent studies take various socio-psychological theories into account. Huber (2019) highlights three central approaches: the intergroup contact theory (IC theory; Allport 1954), the social skills deficit model (SSD model; Asher, Renshaw, and Hymel 1982), and the social referencing theory (SR theory; Feinman 1992).

The IC theory underlines the importance of specific criteria that support positive social contact (e.g. quality, length or intimacy) between two people. Such positive contact can then lead to the reduction of prejudice against the social group to which the individual is perceived to belong Huber (2019). Therefore, a lack of social participation might be explained by a lack of positive contacts between two social groups (in terms of the school setting, students with and without special needs can be considered as two separate groups). Evidence for the IC theory can be derived from the early work of Allport (1954), but also from more recently conducted studies (Pettigrew and Tropp 2006). However, most studies in the context of the IC theory focus on contact between representatives of different countries. Regarding school settings, the effects of intergroup contacts on social participation are derived from intervention studies. Some publications also support a positive effect of peer tutoring, or cooperative learning,

on certain aspects of social participation, but the evidence is rather weak, especially for students with behavioural problems (Spilles, Hagen, and Hennemann 2018).

The SSD model postulates that social exclusion is caused by a lack of social skills on the part of the person affected (Huber 2019). In their meta-analysis, Newcomb, Bukowski, and Pattee (1993) point out that socially rejected students in particular show significantly more disruptive behaviour than students with an average sociometric status do ($d = 0.64$). The fact that students with behavioural problems are socially rejected in mainstream education is supported by a number of studies worldwide (e.g. Krull et al. 2018; Chang 2004; de Monchy, Pijl, and Zandberg 2004), and has been so for many decades (Asher and Coie 1990). Also, other individual characteristics such as cognitive abilities, sociability or social withdrawal seem to correlate negatively with social participation, but not as much as aggressive behaviour (Newcomb, Bukowski, and Pattee 1993).

The SR theory focusses on the latter aspect, and discusses whether TF influences classmates' attitudes towards the student receiving the feedback (Huber 2019). As regards the definition of social participation by Koster et al. (2009), negative TF could initially lead to reduced social acceptance (SA) by classmates. This might have a secondary effect on the presence of positive social interactions, social relationships and the students' perception of being socially accepted. Therefore, publication focuses on the effects of classmates-perceived TF on the SA of students in terms of the SR theory. This theory is explained in more detail in the following section.

Social referencing and social acceptance

According to Walle, Reschke, and Knothe (2017, 245), SR occurs 'when an individual's appreciation of a social partner's emotional communication towards a shared referent functions to disambiguate the relational significance of the individual with the referent and regulate the individual's subsequent behaviour in relation to the referent'. This ability to appreciate and utilise the emotional communication of other individuals has been comprehensively documented in the field of developmental psychology. At just five and a half months of age, children are already able to use the audiovisual emotional expressions of adults as a reference (Vaillant-Molina and Bahrick 2012). In adulthood, SR also regulates behaviour, and is commonly referred to as social appraisal in research on adults (Walle, Reschke, and Knothe 2017). According to Webster and Foschi (1992), SR can also be transferred to the school setting. To children, the teacher is the most important social reference in the classroom (Weinstein 2002). In terms of SA, the teacher's emotional communication towards a student might regulate the classmates' perception of the specific student.

In the last 20 years, several experimental studies with elementary-aged students (White and Jones 2000; Huber 2013; Huber, Gebhardt, and Schwab 2015; Huber et al. 2018) have shown that positive or negative TF on a fictional student's academic performance or social behaviour influences the participants' SA of that fictional student. Field studies have also investigated the SR-theory in the context of teacher behaviour and SA. In a sample of 4,650 Chinese students (age 13–16) Chang (2003), it was found that teachers' aversive attitudes towards aggression significantly strengthened the negative association between students' aggression and SA. The results indicate that students' acceptance of aggressive classmates depends on their perception of their teacher's

emotional communication towards aggressive students. In this study, the direct interaction between teachers and students was not considered, however.

McAuliffe, Hubbard, and Romano (2009) explored the role of teachers with regard to SA with 127 second graders in the US. In contrast to the study by Chang (2003), the data on the teacher-student interactions were collected through natural classroom observations. The results indicate that TF towards children mediates the relationship between aggressive and prosocial behaviour and peer disliking.

A longitudinal study was conducted by Hendrickx et al. (2017), in which 1,420 fifth graders in the Netherlands completed sociometric questionnaires using three measurement points within one school year. Firstly, the observed teacher behaviour towards specific students was coded. Three months later, negative teacher behaviour towards a student (at measurement point 1) was associated with peer-perceived aversion of the teacher towards that student, which predicted the peers' disliking of the student at the third measurement point six months later.

Most recently, Wullschleger et al. (2020) examined the SR theory with a sample of 546 first to third grade students in Switzerland. TF behaviour was videotaped in a non-standardized maths lesson three months after the beginning of the school year in each classroom. Then, at the end of the school year, the peer acceptance was measured by peer nominations. The results reveal that TF on incorrect social behaviour and on correct and incorrect academic performance predicted how the students were accepted at the end of the school year by their peers during classroom activities, but not during recess. In this study, the analysis only included the classroom level (overall presence of positive and negative TF), resulting in a lack of information on how TF is linked to SA at an individual level.

Overall, experimental and field studies support the theory that students use their class teacher's feedback towards other students as a reference. These findings strengthen the assumption that the challenging behaviour of a student is not the only source of their (poor) social participation in class (the SSD model).

However, there are still several gaps in this field of research. Firstly, some studies only consider teacher attitudes (Chang 2003) or TF (Wullschleger et al. 2020) as a variable at the classroom level, although the SR theory focuses on the teacher's behaviour towards an individual. Accordingly, further studies are needed that consider TF as a variable at the individual level. Secondly, in the context of SR, it is debateable as to whether or not feedback is an objectively measurable phenomenon. To our knowledge, most studies focus on the effect of objectively measured feedback from adult observers. Even if direct observation by trained observers with a high interrater reliability is considered the gold standard in research, its significance for investigating SR processes in classrooms is questionable. From a more theoretical perspective, the objectively measured feedback of an adult person who is not familiar with the interaction habits between students and teacher is less important for SR processes than its subjective perception by the students themselves. Therefore, from our point of view, there is a lack of studies that investigate the influence of TF on SA from a (subjective) student's perspective. Thirdly, the aforementioned studies failed to investigate whether the impact of TF on SA is moderated by student development. To date, it is unclear as to whether the impact of TF on SA changes with increasing age of the students. Fourthly, in Germany as the study country,

only experimental studies (e.g. Huber et al. 2015) – and no representative field studies – underline the effect of TF on the SA.

Research questions

Due to these limitations, the present study addresses two main research questions.

First, following the results of previous experimental (e.g. Huber et al. 2015) and field (e.g. Hendrickx et al. 2017) studies, we assume that the classmates' subjective perception of TF towards a student is linked to the considered student's SA. Furthermore, we hypothesise that this effect is also significant when controlling for behavioural problems. Moreover, negative TF is expected to explain the variance in SA more adequately than positive TF. In a computer-based study, it was found that negative TF had a stronger effect on SA than positive TF (Huber et al. 2015). In the field study by Hendrickx et al. (2017), negative teacher-student interactions had a significant influence on the peer perception of the teacher disliking the child, while positive interactions had no influence.

Research question 1: Is classmates-perceived teacher feedback related with the social acceptance of students?

Second, by the time they are five years of age, children are able to recognise the emotions in others, while their ability to reason about mental states (theory of mind) also increases rapidly during elementary school (Janke 2008; Pons, Harris, and de Rosnay 2004). It can be assumed that older children might be more likely to theorise about the attitude of their class teacher towards a student based on the perceived TF. Furthermore, children seem to be affected more by adults than by peers, while the opposite is true for adolescents (e.g. Ruggeri et al. 2018). The present study only included elementary-aged students. Therefore, the influence of TF on SA might be expected to increase according to grade level. Otherwise, increasing social security during elementary school might also prevent children to be influenced by their teacher. Overall, we do not assume a directed hypothesis regarding research question 2.

Research question 2: Does the relationship of between teacher feedback on and social acceptance increase according to the development of elementary-aged students?

Method

Participants and procedure

The collected data originated from the research project PARTI (Grosche et al. 2019). The project was funded by the Federal Ministry of Education and Research of Germany. Schools participated in the project on the basis of their own interest. The data were collected in the summer of 2019.

The full sample includes $n = 2,932$ students from $n = 125$ classes and $n = 21$ elementary schools in Germany. For the present study, a specific subsample was selected on the basis of following criteria: students without missing data in the considered variables, classes with at least 75% complete student data, no mixed-grade classes (e.g. grade 3–4). The

resulting sample includes $n = 960$ students from $n = 16$ second, $n = 16$ third and $n = 16$ fourth grade classes of $n = 13$ schools. Descriptive characteristics are provided in Table 1.

Measures

Behavioural problems

To control for behavioural problems, classroom teachers rated each student in their class using a Likert-scaled item (0 = very low, 1 = low, 2 = average, 3 = high, 4 = very high).

Perceived teacher feedback

The SR theory refers to how students perceive the social communication of their teacher towards a classmate. Therefore, we assumed that the students' subjective perception of TF towards their classmates is an adequate assessment method. Positive and negative TF was rated for each student by his or her classmates on two Likert-scaled items (How often does your teacher praise/blame your classmate? 0 = seldom, 1 = sometimes, 2 = often, 3 = very often). All the peer ratings in a class were summarised to an individual mean for each student.

Social acceptance (level 1)

SA was assessed using a sociometric questionnaire (Moreno 1934). Students were asked to indicate on a list with their classmates' names as to whether they wanted to sit next to each individual (yes/no/don't mind). All the sociometric choices (yes) that a student received were summarised and divided by the class size minus 1, resulting in a value between 0 and 1 that can also be interpreted as the percentage of all potential sociometric choices in a class. In doing so, the SA was standardised with respect to the different numbers of students in each class.

Student development

To evaluate whether the relationship between TF and SA depends on the student development, the grade level (2, 3, 4) was included as a level 2 variable. The grade level is an indicator of the individual student's school career. It therefore represents the length of time for which students have been confronted with social interactions between their teachers and classmates.

Table 1. Descriptive characteristics of the sample.

	Grade 2	Grade 3	Grade 4	Total
Students (n)	350	303	307	960
Classes (n)	16	16	16	48
Female (%)	55.4	50.2	50.2	52.1
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Age	7.58 (0.42)	8.67 (0.51)	9.62 (0.53)	8.55 (0.97)
Sociometric choices	0.31 (0.18)	0.29 (0.18)	0.26 (0.15)	0.29 (0.17)
Behavioural problems	1.48 (1.19)	1.29 (1.27)	1.27 (1.30)	1.35 (1.25)
Positive TF	1.83 (0.44)	1.58 (0.46)	1.57 (0.51)	1.67 (0.48)
Negative TF	0.98 (0.43)	0.78 (0.49)	0.79 (0.58)	0.86 (0.51)

Note: The sociometric choices that a student received were summarised and divided by the class size minus 1, resulting in a value between 0 and 1. Behavioural problems (class teacher's rating): 0 = very low, 1 = low, 2 = average, 3 = high, 4 = very high. Positive/negative TF (average classmates' rating of the teacher praising/blaming the student in class: 0 = infrequent, 1 = sometimes, 2 = often, 3 = very often).

Statistical analysis

Since the data of the present study is hierarchically structured (students nested in classes), multi-level models were calculated using the restricted maximum likelihood estimation method. All the predictors at level 1 and 2 (see below) were included in the models as fixed effects. Random effects at level 1 (students) and 2 (classes) are also reported. Analyses were conducted using the R packages *lme4* (Bates et al. 2015) and *lmerTest* (Kuznetsova, Brockhoff, and Christensen 2017).

To correct for classroom-level tendencies, all level 1 predictors, including gender (0 = female, 1 = male), were group-mean centred (Enders and Tofghi 2007). Only grade level (level 2) was grand-mean centred.

Due to the strong correlation between positive and negative TF ($r = -.61, p < .01$), two independent sets of hierarchical models were calculated for each category. Model 0 (random intercept for SA only) and model 1 (regression of SA on gender and behavioural problems) are equivalent for both categories. After that, the impact of positive or negative TF is considered in model 2, controlling for gender and behavioural problems (research question 1). Model 3 additionally contains the interaction between positive or negative TF and grade level (research question 2).

Results

With regard to SA (dependent variable), there was a significant difference between all 48 classes; $F(47, 912) = 8.27, p < .001$. The intraclass correlation coefficient ICC (1) showed that these differences explain 26% of the total variance. The results of the random intercept models are provided in Table 2 (Positive TF) and Table 3 (negative TF). On average, children received 29% of the possible sociometric choices in a class (approximately five to six choices in an average class of 20 students). Since all level 1 variables (including gender: originally 0 = female, 1 = male) were group-mean centred and the grade level (level 2) was grand-mean centred, the intercept in all models does not change. In addition to model 0 (intercept of SA only), model 1 contains the predictors of gender and behavioural problems. In contrast to behavioural problems (negative relationship), gender was not significant related to SA. Model 1 fits significantly better than model 0, and clarifies about 8% more of the overall variance.

Relationship between perceived teacher feedback and social acceptance (research question 1)

In Table 2, model 2 shows the relationship between positive TF and SA. Controlling for gender and behavioural aspects, positive TF had a significant positive relationship with SA, whereas the significant correlation between behavioural problems and SA no longer remains. In clear terms, this describes that when the average peer rating of the teacher praising a classmate (rated on a 4-point-likert-item) rises by one unit, the SA rises by 17% (which is comparable to about three more sociometric choices in an average class of 20 students). Model 2 fits significantly better than model 1, and clarifies about 11% more of the overall variance.

Table 2. Positive teacher feedback.

Predictors	Model 0				Model 1				Model 2				Model 3			
	B	CI	p		B	CI	p		B	CI	p		B	CI	p	
Intercept	0.29	0.26 0.31	<.001		0.29	0.26 0.31	<.001		0.29	0.26 0.31	<.001		0.29	0.26 0.31	<.001	
Sex					0.01	-0.01 0.03	.373		0.02	0.01 0.04	<.01		0.02	0.01 0.04	<.01	
Behavioural problems					-0.04	-0.05 -0.03	<.001		-0.01	-0.01 0.00	.166		-0.01	-0.02 0.00	.157	
Positive TF									0.17	0.14 0.19	<.001		0.16	0.14 0.19	<.001	
Positive TF x Grade level													0.02	0.00 0.05	<.033	
Random part																
σ^2 (individuals)	.02				.02				.02				.02			
σ^2 (classes)	.01				.01				.01				.01			
ICC	.26				.29				.34				.34			
Model comparison																
R^2m/R^2c	.000/.265				.075/.344				.186/.460				.189/.463			
AIC/BIC/deviance	-854.04/-839.44/-860.04				-954.14/-929.81/-964.14				-1131.55/-1102.35/-1143.55				-1134.12/-1100.06/-1148.12			
p (Chi-Square-Test)					<.001				<.001				<.05			

Note: The sociometric choices that a student received were summarised and divided by the class size minus 1, resulting in a value between 0 and 1. Behavioural problems (class teacher's rating): 0 = very low, 1 = low, 2 = average, 3 = high, 4 = very high. Positive/negative TF (average classmates' rating of the teacher praising/blaming the student in class: 0 = infrequent, 1 = sometimes, 2 = often, 3 = very often. To correct for classroom-level tendencies, all level-1-predictors, including gender (0 = female, 1 = male), were group-mean centred (Enders and Tofghi 2007). Only grade level (level 2) was grand-mean centred (taking different class sizes into account).

Table 3. Negative teacher feedback.

Predictors	Model 0			Model 1			Model 2			Model 3		
	<i>B</i>	<i>CI</i>	<i>p</i>	<i>B</i>	<i>CI</i>	<i>p</i>	<i>B</i>	<i>CI</i>	<i>p</i>	<i>B</i>	<i>CI</i>	<i>p</i>
Intercept	0.29	0.26 0.31	<.001	0.29	0.26 0.31	<.001	0.29	0.26 0.31	<.001	0.29	0.26 0.31	<.001
Sex				0.01	-0.01 0.03	.373	0.02	0.01 0.04	<.01	0.02	0.01 0.04	<.01
Behavioural problems				-0.04	-0.05 -0.03	<.001	-0.02	-0.03 -0.01	<.001	-0.02	-0.03 -0.01	<.001
Negative TF							-0.09	-0.11 -0.06	<.001	-0.08	-0.11 -0.05	<.001
Negative TF x grade level										-0.02	-0.05 0.00	.057
Random part												
σ^2 (individuals)	.02			.02			.02			.02		
σ^2 (classes)	.01			.01			.01			.01		
<i>ICC</i>	.26			.29			.30			.30		
Model comparison												
R^2m/R^2c	.000/.265			.075/.344			.104/.374			.107/.376		
AIC/BIC/deviance	-854.04/-839.44/-860.04			-954.14/-929.81/-964.14			-995.76/-966.56/-1007.76			-997.38/-963.31/-1011.38		
<i>p</i> (Chi-Square-Test)				<.001			<.001			=.057		

Note: The sociometric choices that a student received were summarised and divided by the class size minus 1, resulting in a value between 0 and 1. Behavioural problems (class teacher's rating): 0 = very low, 1 = low, 2 = average, 3 = high, 4 = very high. Positive/negative TF (average classmates' rating of the teacher praising/blaming the student in class: 0 = infrequent, 1 = sometimes, 2 = often, 3 = very often). To correct for classroom-level tendencies, all level-1-predictors, including gender (0 = female, 1 = male), were group-mean centred (Enders and Tofghi 2007). Only grade level (level 2) was grand-mean centred (taking different class sizes into account).

Model 2 in Table 3 confirms that negative TF had a negative (−9%) and significant relationship with SA (about one to two fewer sociometric choices when peer rating on teacher blaming a classmate rises by one unit). Here, model 2 also fits significantly better than model 1, and clarifies about 3% more of the overall variance.

Comparing both TF slopes in Tables 2 and 3, the correlation of negative TF and SA seems to be smaller than the correlation of positive TF and SA. Additionally, the Akaike Information Criterion (AIC) of model 3 in Table 2 (−1131.55) is smaller than in Table 3 (−995.76), and confirms that the model including the positive TF fits better than the model including the negative TF.

Moderation of grade level (research question 2)

Model 3 in Table 2 additionally contains the interaction of positive TF and the grade level of the classes. The higher the grade level was, the higher the positive relationship of positive TF and SA (significant effect). Model 3 fits significantly better than model 2 (about 0.3% more clarified overall variance).

It also seems that the higher the grade level was, the higher the negative relationship of negative TF and SA (Table 3). However, this effect was not significant. Here, model 3 does not fit significantly better than model 2.

Also, with regard to model 3, the AIC in Table 2 (−1134.12) is smaller than in Table 3 (−997.38), and confirms that the model including positive TF as well as the interaction of positive TF and grade level fits better than the model including negative TF and the interaction with grade level.

Discussion

Summary and interpretation

Significant peer relations in school are considered a key factor in child development (Hay, Payne, and Chadwick 2004). They are important for students' subjective well-being (Deci and Ryan 2000; Schwartz et al. 2008; Bagwell, Newcomb, and Bukowski 1998) and academic success (Schmitt and Sixt. 2014; Bagwell, Newcomb, and Bukowski 1998). Previous international field studies have shown that SA is affected by public TF on students in a class (Wullschleger et al. 2020; Hendrickx et al. 2017). In Germany, the influence of TF is primarily evaluated by experimental studies (e.g. source Huber et al. 2015). Therefore, the objective of the present field study was to assess whether SA is not just related to student characteristics (like behavioural problems) (Krull et al. 2018), but whether it is related to TF as well. For this purpose, the SA of 960 children from 48 second, third and fourth grade classes were assessed using a sociometric questionnaire. The positive and negative TF towards a student was rated by his or her classmates.

In terms of research question 1, the hypothesis that classmates' perceived TF is related to SA of students can be maintained. By controlling for gender and behavioural problems, both positive and negative TF was significantly linked to SA. By adding positive or negative TF to a model that only has gender and behavioural problems as predictors, the clarified variance increased by 3% (negative) and/or 11–12% (positive), what can be

interpreted as a weak (negative) to moderate (positive) additional variance clarification (Cohen 1988). The AIC comparison of both models also underlined that the positive TF model fit was better than the negative TF model fit. Generally, these results confirm the findings of previous experimental (Huber et al. 2015) or field (Hendrickx et al. 2017) studies promoting a significant effect of TF on SA.

However, in contrast to our findings, in the studies by (Huber et al. 2018) and Hendrickx et al. (2017), negative TF was found to have a stronger effect on SA or peer perceptions of the teacher's dislike of the student than positive TF. An explanation for this might be the fact that negative TF was perceived to occur less frequently than positive TF (see Table 1). Since SR occurs when 'an individual's appreciation of a social partner's emotional communication towards a shared referent functions to disambiguate the relational significance' (Walle, Reschke, and Knothe 2017, 245), it is only possible for information that is actually presented to influence the individual's attitude towards the referent. Therefore, when positive TF is given more often than negative TF, it seems probable that the classmates are more affected by the teachers' positive feedback behaviour. In the study by Hendrickx et al. (2017), in both domains (affective and cognitive), negative, but not positive TF (assessed by behavioural observations) influenced the peer perceptions of the teacher's dislike of a student. However, it seems that in the affective domain, negative TF occurred more frequently than positive TF, while the opposite was true in the cognitive domain. In our study, TF was rated by peers, but not domain-specific. Furthermore, the direct correlation with SA was investigated. Therefore, it is not possible to compare both findings. In future studies, behavioural observations as well as peer ratings (and perhaps also teacher ratings) of TF should be assessed on a domain-specific basis in order to analyse differences in the results of the various survey methods, and to figure out which indicator is more predictive for SA.

In our second research question, we assumed that the relationship of TF and SA depends on the grade level of the elementary-aged students. Indeed, the statistical interaction of positive TF and grade level was significant, which confirms the hypothesis that the association of TF and SA increases according to the grade level of the students. However, the interaction between negative TF and grade level was not significant. Furthermore, the increased clarified overall variance can be neglected in both domains. Thus, the results concerning our second research question seem inconclusive. This could be explained by the fact that interindividual differences in students' development are larger within than between grade levels. Accordingly using grade level as a proxy for students' development might be inadequate considering the small range of grade levels in this study.

Therefore, future studies should explicitly assess the social-emotional knowledge and the perception and interpretation of TF by the students to investigate whether these aspects moderate the impact of TF on SA within different age groups.

Limitations and future research

Certain limitations weaken the findings of the present study. Firstly, TF was only assessed by peer ratings, and not on a domain-specific basis (behaviour vs. cognition). As stated, it seems appropriate to prospectively take various survey methods into account when measuring TF (e.g. peer and teacher ratings and behaviour observations) in different areas (e.g. cognitive and affective) so as to evaluate the effect of SR processes on SA

Table 4. Correlations.

		2	3	4
1	Sociometric choices	-0.23***	0.39***	-0.28***
2	Behavioural problems		-0.46***	0.54***
3	Positive TF			-0.61***
4	Negative TF			

Note: Correlations were calculated before centering. The sociometric choices that a student received were summarised and divided by the class size minus 1, resulting in a value between 0 and 1. Behavioural problems (class teacher's rating): 0 = very low, 1 = low, 2 = average, 3 = high, 4 = very high. Positive/negative TF (average classmates' rating of the teacher praising/blaming the student in class: 0 = infrequent, 1 = sometimes, 2 = often, 3 = very often).

*** $p < .001$.

more adequately. Nevertheless, our results strengthen the results of previous field studies that have used behaviour observations (e.g. Wullschleger et al. 2020; Hendrickx et al. 2017).

Secondly, we only used aggregated peer ratings to evaluate the impact of perceived TF on SA. A more precise approach would be the use of cross-classified multi-level models that include dyadic student relations. This way, statements about the influence of student's perceived TF towards a student on the sociometric rating of this very student are possible.

Thirdly, student development was only considered by taking the grade level into account. As our hypothesis that student development moderates the impact of TF on SA is mainly supported by increasing social-emotional skills in elementary school (e.g. Janke 2008) and by the significance of an adults' behaviour for children (e.g. Ruggeri et al. 2018), both aspects should be assessed in future. Also, analysing a greater range of grade levels might be interesting. After adolescence, children seem to be more affected by peers than by adults (Ruggeri et al. 2018). It might be possible that the importance of TF for the SA of students decreases during adolescence. In this respect, a longitudinal design seems more appropriate than analysing distinct groups such as we did in the present study.

Prospectively, reasons for positive and negative TF also have to be analysed. It is naturally the case that student characteristics such as behavioural problems correlate with negative and positive TF (see Table 4). However, teacher characteristics might also be relevant in this context, along with starting points for intervention studies focusing on TF. Furthermore, at present, there is limited evidence of concepts that enhance social participation, especially of students with special educational needs, in mainstream schools effectively. In a systematic review of school-based interventions, Garrote, Sermier Dessemontet, and Moser Opitz (2017) found that teaching interaction strategies to typically-developing students, group activities in the academic context (e.g. cooperative learning), support groups for students with special educational needs, and training para-professionals to facilitate social interactions might improve social participation. However, it seems necessary that effective approaches take various social-psychological theories into account (Huber 2019).

Conclusion

Our investigation supports the findings of previous international field studies on TF and its effects on SA with a large sample of German elementary-aged students. These results strengthen the fact that SA is not only predicted by student characteristics, but also by the behaviour of classroom teachers towards these children. We also found some clues that

the relationship between positive TF and SA is moderated by grade level. This might be related to the ability to reason about mental states (theory of mind). Further studies should follow up on these indications by explicitly assessing the social-emotional competencies.

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Author's note

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