

The role of the teacher in classroom peer relations

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The role of the teacher in classroom peer relations

De rol van de leerkracht in peer-relaties in de klas
(met een samenvatting in het Nederlands)

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CONTENTS

9	Chapter 1—General introduction
10	Classroom peer relations
14	The role of the teacher in classroom peer relations
17	Project overview
19	Outline of the dissertation
25	Chapter 2—Social dynamics in the classroom: Teacher support and conflict and the peer ecology
26	Introduction
35	Method
42	Results
47	Discussion
55	Chapter 3—Teacher behavior and peer liking and disliking: The teacher as a social referent for peer status
56	Introduction
63	Method
69	Results
76	Discussion
85	Chapter 4—Our teacher likes you, so I like you: A social network approach to social referencing
86	Introduction
94	Method
101	Results
109	Discussion
117	Chapter 5—Teacher liking for a student as an affective filter for peer acceptance of student behavior
118	Introduction
124	Method
127	Results
139	Discussion

Chapter 6—The role of the teacher in students’ social isolation	147
Introduction	148
Method	155
Results	164
Discussion	173
Chapter 7—General discussion	181
Teacher Practices and Peer Relations	181
Overview of the findings	182
Considerations for future research	190
Practical implications	197
The role of the teacher in classroom peer relations	200
References	303
Nederlandse samenvatting (summary in Dutch)	231
About the author	245
List of publications	247
Dankwoord	250

GENERAL INTRODUCTION

The classroom is a fundamentally social setting, in which students are for a large part of the time involved in social interaction with their teacher and peers. The teacher, as the primary architect of the classroom context that surrounds and regulates interactions within it (see Pianta & Walsh, 1996; Wentzel, 2002), is in a unique position to overlook and shape peer social dynamics (Farmer, McAuliffe Lines, & Hamm, 2011). To examine the extent to which teachers indeed shape peer relations, this dissertation focuses on *the role of the teacher in peer relations*. For teachers, gaining knowledge on how they can affect peer relations has the potential to boost students' social as well as academic development. That is, when students experience positive relationships with their peers, they have more opportunities for meaningful and enjoyable interaction with their classmates and to develop their social competence than when they have difficulty building pleasant relationships or face rejection when trying to interact with peers (Ladd, 2006; Ladd, Kochenderfer-Ladd, Visconti, & Ettekal, 2012). Students' social experiences are deeply intertwined with their academic engagement, motivation, classroom participation, and, ultimately, their achievement (Flook, Repetti, & Ullman, 2005; Hanish et al., 2016; Wentzel, 2005; Wentzel & Caldwell, 1997). Moreover, in a classroom context that is characterized by positive rather than negative peer relations, behavioral disruptions are minimized and instructional practices are optimized (Hamm & Hoffman, 2016).

Although the impact of peer relations on students' adjustment has been widely acknowledged and peer relations are often investigated within the classroom context, the possible impact of the teacher on peer relations remains relatively underexposed. Farmer et al. (2011) described the impact the teacher may have on peer relations as "the invisible hand of the teacher", because it is a relatively understudied phenomenon and hence an invisible aspect of school life. Despite the progress that has been made in understanding the role of teachers in peer relations (see, for

a recent review, Hamm & Hoffman, 2016), still very little is known about the mechanisms that underlie the associations between teacher practices and classroom peer relations. The main goal of this dissertation therefore is to further reveal the teacher's invisible hand by contributing to knowledge on how what teachers do in the classroom is associated with how students relate to each other. The general research question that guided the studies in this dissertation is: *How does the teacher affect classroom peer relations?*

In this general introduction, a conceptualization of peer relations is provided and the facets of peer relations that are examined in this dissertation are illuminated. Next, the aspects of teacher practices that are the focus of this dissertation are described and the mechanisms that are hypothesized to connect teacher practices to peer relations are explicated. Finally, an overview of the design of the project on which the empirical chapters are based, as well as the content of the chapters, is provided.

Classroom Peer Relations

To effectively discuss the role of the teacher in classroom peer relations, it is necessary to first define peer relations. The term "peer relations" refers to the social relationships and interpersonal interaction processes that take place between peers, in this dissertation between classroom peers. By definition, the teacher is not part of peer relations. Peer relations can be described on multiple levels of social complexity, including the classroom group or peer ecology, dyadic ties between two peers, and the position or status an individual student occupies with his or her peers (Rubin, Bukowski, & Parker, 2006). To elucidate this distinction, I present a class consisting of only four students: Ann, Beth, Chris, and Dan. Each of them has a certain connection, or relationship, with every peer, as can be seen in Figure 1.1. These connections may be positive in nature, when characterized by positive affect and prosocial behavior; may have a negative tone, when characterized by negative affect, conflict, and aggressive behavior; or may be neutral, when students interact as classmates but do not particularly share positive or negative affect (see Fabes, Martin, & Hanish, 2009). The entire system or structure of

peer relations, as indicated by the dashed circle, represents the classroom peer ecology. The doubly lined circle reflects how Beth, Chris, and Dan all relate to Ann, which thus represents Ann's social standing with her classroom peers and which is often termed Ann's peer status or reputation. The single line demarcates the dyadic tie between Beth and Ann and reflects how Beth relates to Ann. In this dissertation peer relations are investigated at each of these levels, including different elements and dimensions of peer relations, which are outlined below.

The classroom peer ecology. The peer ecology reflects the classroom-level of peer relations (Gest & Rodkin, 2011; Hamm & Hoffman, 2016). The concept of peer ecology is rooted in ecological systems theory (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006), which describes how an individual is nested within social settings, such as families or classrooms, that influence and socialize the individual. The classroom peer ecology is defined by the structure, types, and diversity of relations and interactions students have, and can be characterized in terms of the degree of cohesion or connectedness, the hierarchy in the group, or classroom norms of what constitutes normal behavior (Gest & Rodkin, 2011; Hamm & Hoffman, 2016). Some of the properties of the peer ecology, such as its hierarchical structure, are necessarily connected to the peer ecology as a whole and do not exist at the individual or dyadic level (Rubin et al., 2006). In tightly connected, egalitarian peer ecologies in which prosocial behaviors are the norm, students are more likely to feel secure and accepted, are more academically engaged, and show less negative behaviors such as bullying than in peer ecologies that are more loosely connected, hierarchically oriented, and in which aggression is more normative (Cappella, Kim, Neal, & Jackson, 2013; Espelage, Holt, & Henkel, 2003; Roland & Galloway, 2002; Schäfer, Korn, Brodbeck, Wolke, & Schulz, 2005; Wentzel & Caldwell, 1997). Chapter 2 of this dissertation investigates how teacher practices are associated with the peer relations in terms of the classroom peer ecology.

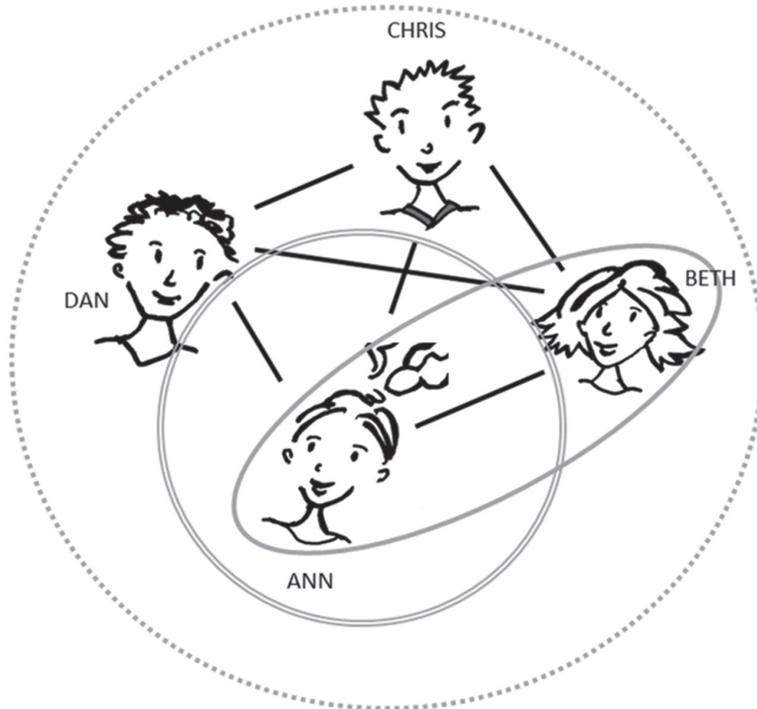


Figure 1.1. Peer relations in terms of peer ecology (dashed line), peer status (double line), and dyadic tie (single line). The classroom system of peer relations is labeled the classroom peer ecology and represents how every student relates to every peer. Ann's position in the peer ecology, her peer status, is reflected by how all her peers relate to her. The dyadic tie between Beth and Ann represents their unique relationship.

Peer status: Peer relations of an individual within the classroom. At the individual student-level, peer relations can be described in terms of the social position, status, or reputation a student has within the classroom peer group (Rubin et al., 2006). A student's peer status reflects how he or she is valued by the peer group as a collective, so it indicates an aggregated evaluation of the student from the point of view of all classroom peers together. Status can be grasped by different dimensions. Two central dimensions of students' social status within the peer group that are examined in this dissertation are peer liking and disliking. Peer liking and disliking status, also referred to as acceptance and rejection, are investigated in Chapters 3 and 5. Research has repeatedly shown how peer liking and disliking are important for students' social and academic development; higher levels of peer liking are associated with more emotional well-being (Ladd,

2006), and motivation and academic competence (Flook, Repetti, & Ullman, 2005; Wentzel, 2005). In contrast, higher levels of disliking are associated with more internalizing and externalizing behavior (Ladd & Troop-Gordon, 2003), academic disengagement (Buhs, Ladd, & Herald, 2006), and school dropout (French & Conrad, 2001). Peer liking and disliking status are often investigated together, when the difference between the two is studied as an indication of a student's social preference (Coie, Dodge, & Coppotelli, 1982). However, peer liking and disliking are generally only moderately correlated (e.g., Coie et al., 1982; see also Cillessen, 2009), have different antecedents and consequences (Crick, Murray-Close, Marks, & Mohajeri-Nelson, 2009; Ladd et al., 2012), and there are initial indications that the two are differently associated with teacher practices (Hughes & Im, 2016; McAuliffe, Hubbard, & Romano, 2009). Therefore, to provide an understanding of the specific facets of peer status that are affected by teacher practices, in this dissertation, peer liking and disliking status are examined as separate outcomes.

A third dimension of students' peer status, which is examined in Chapter 6 of the current dissertation, is students' isolation from the peer group. Some students rarely engage in social interaction with their classmates. Isolation is qualitatively different from liking versus disliking status, in the sense that it does not refer to positive or negative peer relations, but the absence of relations between a student and his or her classroom peers (Rubin, Coplan, & Bowker, 2009). Being engaged with peers is essential for students to develop social skills (Rubin et al., 2006, 2009), but also gives them opportunities to take part in activities, such as collaborative learning, that boost academic skills (Ladd, 2005; Wentzel, 2005). Isolated students are often the target of teasing, harassment, and bullying, which is related to a limited sense of belonging (Wormington, Anderson, Schneider, Tomlinson, & Brown, 2016) and poor academic functioning (Lee & Cornell, 2009). Although isolated students are often also rejected by their peers, isolation and rejection do not necessarily go together and thus reflect distinct dimensions of peer status or a student's social position in the classroom group (Gest, Graham-Bermann, & Hartup, 2001; Gifford-Smith & Brownell, 2003).

Ties between individuals: Dyadic peer relationships. Finally, at the dyadic level, the focus is on the connections or ties between each set of two students within a classroom (Rubin et al., 2006). At this level, relationships can be described in terms of ties of any kind that exist between two individuals (Borgatti, Everett, & Johnson, 2013), for instance in terms of friendship and liking, but also in terms of hostility and disliking. These ties can be viewed as unidirectional, when a student relates in a certain manner to a peer, or bidirectional, when two students, for instance, are each other's best friend. In Chapter 4 of this dissertation, dyadic liking and disliking ties are investigated in terms of unidirectional ties. Having a positive relationship with a single peer may function as a protective factor for a student, for example, by buffering against the detrimental effects of victimization (Hodges, Boivin, & Vitaro, 1999).

The Role of the Teacher in Classroom Peer Relations

Teachers can, unwillingly or deliberately, affect individual students' peer status in the classroom, dyadic ties, or the entire peer ecology in multiple ways. First, teachers can engage in network-related practices that are consciously implemented to affect peer relations, such as anti-bullying interventions or creating study groups to stimulate peer relations. In addition, teachers can also affect peer relations through their everyday interactions with students that primarily serve other purposes than affecting peer relations, such as instruction or classroom management (e.g., Farmer et al., 2011; Gest & Rodkin, 2011; Hamm & Hoffman, 2016). In this dissertation the focus is on the nature and general patterns of such everyday practices and interactions that teachers have with their students, mostly without the deliberate intent to affect peer relations.

Consistent with the multi-leveled structure of peer relations, everyday teacher practices can be identified and measured at the classroom and individual level. That is, teachers interact both with the classroom group as a whole and with individual students, and characteristics of whole-class interaction may differ from teacher interaction with a specific student (Wubbels et al., 2015). In this dissertation, the focus at the classroom level is general levels of teacher

support versus conflict and on the differential distribution of teacher support and conflict across students. At the individual level, teacher practices towards each student are investigated in terms of positive and negative teacher behavior as well as the teacher's liking and disliking for a student. Below, modeling and social referencing are explained as the main mechanisms that are hypothesized to connect teacher practices in general and in interaction with an individual student to classroom peer relations.

The teacher as a model for peer relations. Teachers' general practices in the classroom can be framed as serving as a model for peer interactions and relationships (Farmer et al., 2011; Gest & Rodkin, 2011). In this view, teacher practices establish the social climate of the classroom, creating norms and expectations for how students are supposed to interact with and relate to each other (Hughes, 2012; Wentzel, 2005). Teachers thus set the example for peer interactions. When teachers show support and are positive when interacting with their students, the modeling perspective assumes that students are likely to emulate this behavior, that is, to show warmth to each other and engage in positive interactions with peers as well. Likewise, teachers who in their everyday interactions with students show much conflict and negative affect may stimulate conflicted contact among students as well (Farmer et al., 2011; Mikami, Griggs, Reuland, & Gregory, 2012). In addition to setting the tone for overall positive versus negative interpersonal behavior and relationships, teachers also model differential treatment of students. For example, when the teacher supports Ann but has conflicted interactions with the other students, the teacher informs the class of the differential value of Ann versus Beth, Chris, and Dan (Hughes et al., 2014). Chapter 2 of this dissertation further elaborates on the modeling perspective and connects general teacher practices with the classroom peer ecology. Finally, teachers can model specific behavior in interaction with an individual student. In Chapter 6 of this dissertation, the focus is on teacher modeling of behavior with individual students.

The teacher as a social referent for peer relations. A major hypothesis that guided our studies of individual level peer relations is that the teacher functions as a social referent for

peer evaluations of a student (Hughes et al., 2001). Social referencing theory stems from research on parent-child interaction and describes how infants use cues provided by a parent when evaluating ambiguous or startling situations (Freiman, 1981; Walden & Ogan, 1988). For instance, when a parent acts scared when confronted with a spider, the infant takes this as a cue that spiders are animals that are to be feared. Translating this mechanism to the classroom setting, Hughes et al. (2001) argued that teachers can shape classmates' views of each other, as peers look for cues from the teacher on how to evaluate a student. That is, when the teacher often yells at Ann, her peers may infer from this negative interaction that the teacher dislikes Ann, and that it is reasonable to dislike her themselves (McAuliffe et al., 2009). Teachers are the main focal point of students' attention during a large part of their time in the classroom. Thus, even if Dan hardly interacts with Ann, he has ample opportunity to witness and be affected by the teacher's interactions with her (Hughes, Im, & Wehrly, 2014).

An important aspect of social referencing is that it emphasizes an active role of peers who search for, or pick up, cues in the teacher's behavior (see Hughes et al., 2001, 2014). Peer perceptions are key in the translation of teacher behavior with a student to peers' evaluations of that student. Therefore, in this dissertation, peers' perceptions of teacher (dis)liking of a student have an important role.

Social referencing can be viewed as a specific type of modeling, particularly affective modeling (Bandura, 1992), as peers deduce the teacher's affective evaluation of a student from the teacher's behavior, so the teacher models how a peer can feel about a student. The modeling perspective as described above is broader and has a stronger focus on modeling behavior, in the sense that ways of interacting with each other are modeled. In Chapters 3 and 4, social referencing theory has a central role, and effects of teacher positive and negative behavior as observed in class, as well as peer perceptions of teacher liking and disliking for a student, are connected to peer liking and disliking relations, in terms of peer status and dyadic relationships.

Project Overview

All studies in this dissertation are based on a dataset that was built in the context of the project "Social competence and social climate in the classroom" (NWO-PROO project # 411-10-915). This project had two part-projects; one on the classroom peer context as a setting in which students relate to each other and develop their social competence, and one on teacher effects on peer relations. This dissertation addresses the second part-project. A three-wave short-term longitudinal design over the course of one school-year was employed, which allowed us to examine concurrent as well as prospective associations between teacher practices and peer relations.

Students and their teachers in 59 fifth-grade classrooms from 41 schools in the south and east of the Netherlands participated. Of the 1570 students in these classes, 1548 (98.6%) had parental consent to participate. At Time 1, the sample contained 1560 students (10 students had not yet entered the schools). At Time 2, 1557 students were part of the sample (10 students had left the schools and three had not yet entered). At Time 3, the classes included 1555 students (15 had left). On average, students were 10.60 years old at Time 1 ($SD = 0.49$), and 47.2% of the participating students were girls. Ethnic background was based on the classification by Statistics Netherlands (2012b), which uses parents' country of birth as a basis for classification. Ethnic background was Dutch for 83.4% of the children, western immigrant for 5.6%, and non-western immigrant for 10.9%. This distribution was representative for the area in which the schools were situated (Statistics Netherlands, 2012a).

Classes had an average size of 26.34 students, with a range of 18 to 42. When a classroom had two teachers, the teacher who spent most hours in the classroom participated in the study (60.3% of the participating teachers spent at least 4 days a week with the class). Teachers were on average 41.25 years old (range 24.51 to 62.47, $SD = 11.91$); teachers' mean years of teaching experience was 15.17 years (range 1 to 39, $SD = 10.99$) and 37 teachers were women (63.8%).

Instruments. At the three waves, a wide variety of data regarding teacher practices and peer relations (in terms of the peer ecology, peer status, and dyadic ties) was collected. Students completed questionnaires regarding their teachers, peers, and themselves. Teachers also completed questionnaires about their students and themselves. Moreover, teacher behavior was observed using two hours of video recordings collected at each time point.

The majority of constructs studied in this dissertation was measured using peer nominations. This method entails that participants receive descriptions or characteristics of a person, such as helpful, popular, your friend, or a person you dislike, and are asked to nominate those classmates who best fit each description. Asking a group of students to indicate who fits a certain description results in a matrix of size $n \times n$, where n is the class size, in which each row represents a student nominator and each column represents a student nominee. The cells indicate whether or not a nominator has chosen a nominee. Sociometry is very suitable to measure different types of peer relations at the individual, dyadic, and group levels (Cillessen, 2009). When the peer ecology, or the structure of relations in the group, is of interest, the structure of the matrix as a whole can be analyzed, as is done in Chapter 2. For a study on the status or reputation of individual students in the classroom, the student's row or column, that is, the number of nominations given or received by the student are used. The number of nominations received was used in Chapters 3, 5, and 6. Finally, peer relations at the dyadic level, see Chapter 4 of this dissertation, are represented by the single cells in the matrix, that is, whether or not a certain student nominated a certain peer.

Procedure. The data on which this dissertation is based were collected in the fall, winter, and spring of the 2012-2013 school year. At each measurement occasion, teachers and students completed questionnaires digitally on netbook computers and videotapes were made of two hours of classroom interaction. Furthermore, teachers provided additional information regarding the seating chart, students' background, and achievement on standardized tests.

Particularly for the sociometric questionnaires, compared to paper-and-pencil questionnaires, computerized assessment has been shown to yield more nominations given and received and higher internal consistency for several sociometric and peer assessment constructs (van den Berg & Cillessen, 2013). Moreover, as students were prompted to answer every question, this procedure results in lower levels of missingness than a paper-and-pencil approach.

Outline of the Dissertation

In this dissertation, five empirical studies are presented for which the overarching research question was: "How does the teacher affect classroom peer relations?" The studies share a focus on how teachers, through their everyday interactions with students, model for peers how to interact with each other in general, how to interact with a specific student, and how to affectively evaluate a certain student. A wide array of analytical approaches was employed to accommodate the examination of peer relations at the level of the peer ecology, individual students' peer status, and dyadic ties. In the following the content of each chapter is outlined, starting with associations between teacher practices and the classroom peer ecology, and from there zooming in on peer status and dyadic relationships. Table 1.1 provides an overview of the research questions, teacher practices, and peer relations outcomes that were the focus of each chapter.

Chapter 2 focuses on the associations between interpersonal aspects of teaching and the nature of the classroom peer ecology. This chapter describes a study on the social dynamics that connect the teacher with the classroom peer ecology at the first wave of data collection. Teachers are reasoned to model general as well as student-specific positive or negative social behavior and relationships. General and student-specific teacher support and conflict and the amount of differentiation in the teacher's treatment of individuals students are connected with the peer ecology in terms of the total number of positive and negative ties among students, status hierarchy of liking and popularity, and the occurrence of prosocial and aggressive student behaviors.

Chapters 3 to 6 zoom in on peer relations at the individual and dyadic level, and connect these to individual-level teacher variables. First, in Chapters 3 and 4, two gaps in existing research on the teacher as a social referent are addressed. **Chapter 3** presents the first study in this field of research that connected all three steps of the social referencing mechanism over time: (a) observed teacher behavior towards a student, (b) peer perceptions of the teacher's liking and disliking for the student, and (c) the student's peer liking and disliking status. Using a path model controlling for the nestedness of the data, peer perceptions of teacher liking and disliking are investigated as a mediator of the association between teacher behavior and peer status. Hereby, the study explicitly addresses the entire chain of the social referencing mechanism, that previously has only been tested implicitly, by investigating only two of these three elements and assuming the third to exist (e.g., studying teacher behavior and peer status without examining peer-perceived teacher (dis)liking; McAuliffe et al., 2009, or studying peer-perceived teacher liking and peer status without investigating actual teacher behavior; Hughes et al., 2001, 2014).

Chapter 4 starts from the observation that social referencing research so far has only investigated students' peer liking and disliking status. As social referencing relies on individual students to develop an idea about teacher liking for a peer, and then to adapt their own view of the peer accordingly (Hughes et al., 2001) it implies an intra-individual or dyadic process. Examining peer status (an average view of all classmates) does not justice to this dyadic process. To address this gap, an individual (nominator) student's social cognitions and judgments of a single classmate are investigated, rather than students' general reputation or status with all peers. That is, the hypothesis is tested that individual students change their own view of a single classmate based on their own views of the teacher's affective evaluation of that classmate. Using longitudinal social network analysis based on stochastic actor oriented modeling (Snijders, 2001), we studied the development of dyadic liking and disliking ties over time, as predicted by students' (dyadic) views of teacher liking and disliking for a specific classmate.

Chapter 5 treats teacher liking and disliking as a context within which students' social behaviors are evaluated by their peers, instead of the teacher having a direct influence on peer status. It is reasoned that peers' perceptions of the teacher's liking and disliking of classmates function as an affective filter through which peers evaluate student behavior (see Chang et al., 2007; Hughes, 2012). Thus, the question is whether the same student behavior is differentially related to peer liking and disliking status, depending on peers' perceptions of teacher liking and disliking. To answer this question, the moderating role of peer-perceived teacher liking and disliking on the association between prosocial and aggressive behavior on the one hand and peer liking and disliking status on the other is investigated. In addition to the affective filter that teacher (dis)liking for an individual student may be, this study also takes into account classroom contextual effects, by examining the moderating role of classroom norms of teacher liking and disliking.

In **Chapter 6** the focus is shifted from teacher effects on peer liking and disliking status to a type of peer outcome that is less often studied in research on teacher effects on peer relations: a student's isolated position in the social network. Yet, social isolation is a pressing issue that may also hamper students' social and academic adjustment (Rubin et al., 2009; Wentzel, 2005), and therefore also deserves teacher attention. This chapter explores how teachers interact with isolated versus non-isolated students, using multilevel process analysis for an optimal use of the three measurement occasions. Second, growth-curve modeling is applied to examine how teacher interaction affects isolated students' social participation over time. The modeling mechanism is used to explain how isolated students might benefit from teacher-student interaction. Applying this mechanism to a different dimension of peer relations shows its versatility and importance in thinking about teachers' effects on peer relations.

Together, these studies provide insight into how everyday teacher practices, that often take place with a purpose beyond affecting peer relations, are related to the

multiple levels and dimensions of peer relations. **Chapter 7** summarizes these insights, and provides an integrated perspective on the impact of teacher practices on peer relations. Moreover, in this final chapter, suggestions for research to further reveal the invisible hand of the teacher are provided. Finally, implications for educational practice and teacher education are outlined.

Table 1.1

Schematic Overview of the Studies Presented in Chapters 2 to 6

Ch	Research questions	Teacher practice(s)	Peer relations outcome(s)	Main mechanism	Analytical approach
2	How are teacher support and conflict related to the classroom peer ecology?	<ul style="list-style-type: none"> ◆ Teacher support/conflict ◆ Teacher differential behavior 	<ul style="list-style-type: none"> ◆ Classroom norms of positive relations and social behavior ◆ Classroom hierarchy in peer status 	Modeling	Multiple regression
3	How is teacher behavior with an individual student related to the student's peer status, mediated by peer reputation of teacher liking and disliking?	<ul style="list-style-type: none"> ◆ Teacher behavior with individual students ◆ Peer reputation of teacher liking/disliking 	Individual peer liking/disliking status	Social referencing	Path analysis
4	To what extent does social referencing take place as an intra-individual process?	Dyadic peer perceptions of teacher liking/disliking	Dyadic liking/disliking ties	Social referencing	Longitudinal social network analysis
5	To what extent do peer reputation of teacher liking and disliking affect the association between peer perceptions of student behavior and peer liking and disliking?	Peer reputation of teacher liking/disliking	Individual peer liking/disliking status	Affective filter	Multilevel analysis with cross-level interactions
6	<ul style="list-style-type: none"> ◆ How do teachers interact with isolated students? ◆ How is teacher behavior associated with social isolation over time? 	<ul style="list-style-type: none"> ◆ Teacher behavior with individual students ◆ Peer reputation of teacher behavior 	Individual peer status of social isolation	Modeling	<ul style="list-style-type: none"> ◆ Multilevel process analysis ◆ Growth curve modeling

SOCIAL DYNAMICS IN THE CLASSROOM: TEACHER SUPPORT AND CONFLICT AND THE PEER ECOLOGY ^{1, 2}

ABSTRACT

By showing support and conflict, teachers may function as a model for students regarding how to interact and how to evaluate each other, thereby shaping the classroom peer ecology. Associations of general and student-specific levels and differential provision of teacher support and conflict with the classroom peer ecology were investigated. Multivariate multiple regression analyses were performed with a sample of 58 Dutch fifth-grade classrooms (1454 students). In particular student perceptions of teacher support and conflict, rather than teacher perceptions or observations, explained peer liking and disliking, the degree of social hierarchy, and how prosocial versus aggressive the peer ecology was.

1 This chapter is based on:

*Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., Cillessen, A. H. N., & Brekelmans, M. (2016). Social dynamics in the classroom: Teacher support and conflict and the peer ecology. *Teaching and Teacher Education*, 53, 30-40.*

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INTRODUCTION

The classroom peer ecology, or the social environment of classroom peers in interaction with each other, is one of the most important proximal environments for students' social (Ahn, Rodkin, & Garandau, 2010; Farmer & Xie 2007; Hodges, Boivin, Vitaro, & Bukowski, 1999; Roland & Galloway, 2002) and academic development (Kindermann, 2007; Roseth, Johnson, & Johnson, 2008; Wentzel & Caldwell, 1997). Teachers, as professionals in a position very close to the peer group, may have a role in shaping the nature of their classroom's peer ecology. Affecting the peer ecology deliberately may even be a strategy for teachers to foster students' development (Gest & Rodkin, 2011; Rodkin & Hodges, 2003). Nonetheless, there has been little research on associations between teacher behavior and peer relations. Because of this relative lack of research, Farmer, McAuliffe Lines, and Hamm (2011) referred to the teacher's influence on peer relations as "the invisible hand" of the teacher. The few studies conducted so far (e.g., Hughes, Cavell, & Willson, 2001; McAuliffe, Hubbard, & Romano, 2009) have mainly examined how teacher-student interactions and relationships are associated with the position of specific students within the classroom group, and have not investigated how teachers may influence the classroom peer ecology as such. Some characteristics of the peer ecology, such as the social structure or status hierarchy, only exist at this classroom-level and cannot be grasped when focusing on student-level outcomes. In only one study, Gest and Rodkin (2011) examined associations between general teacher practices and the peer ecology of the entire classroom group. In the present study, we aim to further reveal the teacher's invisible hand by examining how teacher support and conflict are related to the nature of the classroom peer ecology.

To study the complexity of peer relations within the social system of a class, we employed a social network approach. Social network analysis is used not just to count the number of ties between peers in a class, but also to examine in more detail patterns or structures of relationships (e.g., hierarchy) among individuals in a group (Borgatti, Everett, & Johnson, 2013).

Classroom Peer Ecology

The concept of peer ecology is rooted in ecological systems theory (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006), which describes how an individual is nested within social settings, like families or classrooms. Interactions the child has within a setting, called proximal processes, are considered to be "primary mechanisms producing human development" (Bronfenbrenner & Morris, 2006, p. 795). Thus, by interacting with each other, children influence and socialize each other. A set of individuals in interaction is referred to as a social microsystem (Neal & Neal, 2013), within which Bronfenbrenner and Morris (2006) further distinguished between patterns of interpersonal relations, social roles, and activities. This distinction was used in research on peer relationships (Gest & Rodkin, 2011) to describe the classroom peer ecology as encompassing (a) the richness of interpersonal ties, (b) social structure or status hierarchy, and (c) patterns of social behaviors exhibited by classroom peers (see also Rubin, Bukowski, & Parker, 2006). In the present study, we examine these three aspects of classroom peer ecologies.

Richness of interpersonal ties. The richness of interpersonal ties indicates how many positive and how few negative relationships are present among students in a classroom. Following a long history of research on peer relationships (e.g., Coie, Dodge, & Coppotelli, 1982; Rubin et al., 2006), we focus on liking and disliking. In classrooms where many students like each other well, students are more likely to feel secure and accepted, which in turn positively affects academic adjustment (Roseth et al., 2008; Wentzel & Caldwell, 1997). Larger numbers of positive ties in a classroom also imply less negative behavior like bullying (Roland & Galloway, 2002).

Status hierarchy. The status hierarchy refers to the degree to which social status in the classroom peer ecology is structured in an egalitarian versus hierarchical manner. In the case of an egalitarian distribution, each student has a similar status, whereas in a hierarchical peer group a small number of students has a relatively high peer status and is in that sense more socially dominant (Brown, 2011). At the

student level, likeability and popularity reflect two aspects of peer status (Cillessen, 2011). Whereas likeability is a combination of how well a student is liked by every other individual in the classroom, popularity refers to a student's visibility, dominance, or prestige and thus more directly reflects a position in the peer ecology (Cillessen, 2011). When likeability or popularity is distributed highly hierarchically in the class, only some students are liked by the majority of their peers or are considered to be highly popular. Schäfer, Korn, Brodbeck, Wolke, and Schulz (2005) found that with a more pronounced status hierarchy, there was more negative behavior – in their study tapped by bullying and victimization – than in classrooms where social status was distributed more equally. Furthermore, a study by Cappella, Kim, Neal, and Jackson (2013) showed that students in classes with a more egalitarian structure were more behaviorally engaged than students in classes with less network equity.

Social behavior. A third aspect of the peer ecology is the nature of the social behaviors that characterize daily interactions among peers. In the current study we focus on both positive (prosocial) and negative (aggressive) behaviors. Two of the most basic prosocial behaviors are cooperating and helping (Rubin et al., 2006). Aggression has often been sub-divided into overt aggression (hitting, calling each other names) and relational aggression (gossiping, excluding others; Crick & Grotpeter, 1995). We investigate the *descriptive norms* of prosocial and aggressive behavior, referring to the prevalence or commonness of such behavior, which describes what is currently normal behavior in a group (see Chang, 2004; Lapinski & Rimal, 2005). Next to current commonness of behaviors, classroom descriptive norms are associated with future prevalence of behaviors, as social behaviors tend to be contagious (Dishion & Piehler, 2009); in classrooms where aggression is the norm, students tend to conform to this norm and become more aggressive themselves (Espelage, Holt, & Henkel, 2003; Thomas, Bierman, & the Conduct Problems Prevention Research Group, 2006). Furthermore, descriptive norms predict how strongly behaviors are associated with acceptance or rejection (Chang, 2004).

Teacher Support and Conflict

Given the importance of the classroom peer ecology as a social context for students' development, it is necessary for teachers to understand how they may, unwillingly or deliberately, affect these ecologies. Gest and Rodkin (2011) suggested that the teacher, who has a position close to the peer group, is the one professional who has the opportunity to oversee and affect the classroom peer ecology. Gest and Rodkin developed a model of how teacher practices affect students' individual development, partly through affecting the classroom peer ecology. They described how the peer ecology is impacted both by everyday teacher-student interactions and by "network-related teaching", that is, conscious teaching strategies directly aimed at affecting peer relationships. In the present study the focus is on everyday teacher-student interaction, and more specifically on the amount of support and conflict in teacher-student relationships and interactions. Teacher support, or warmth, fosters individual students' social (e.g., Luckner & Pianta, 2011; Verschueren, Doumen, & Buyse, 2012) and academic adjustment (e.g., Cornelius-White, 2007; Den Brok, Brekelmans, & Wubbels, 2004), whereas teacher conflict amplifies externalizing behavior (e.g., Doumen et al., 2008; Runions, 2014) and is negatively related to academic achievement (e.g., Ladd, Birch, & Buhs, 1999; Mantzicopoulos, 2005).

In daily classroom practice, teachers interact both with individual students and with the classroom group as a whole. Wubbels et al. (2015) argued that teachers differ in the extent to which they establish warm, supportive relationships at these two levels. A teacher who shows much support to individual students may not be able to establish supportive interactions during whole-class teaching. Another teacher may convey much warmth or support when teaching the class as a whole, but may keep individual interaction formal and less supportive. Corresponding to these conceptually different levels, studies have either investigated teacher support and conflict with a specific student as the object (e.g., Hughes et al., 2001; Verschueren et al., 2012) or as more general – in the sense of not student-specific – teacher or classroom

characteristics (e.g., Mainhard, Brekelmans, & Wubbels, 2011; Luckner & Pianta, 2011). A study by Den Brok, Brekelmans, and Wubbels (2006) illustrates the relevance of distinguishing student-specific from general teacher support and conflict; Den Brok et al. found qualitative differences in teacher support, depending on whether the class as a whole or individual students were the focus in otherwise similar items.

The present study adopts this distinction between general and student-specific teacher support and conflict. Although student-specific teacher support and conflict are first and foremost oriented at the individual student, these can be informative about a teacher's classroom practices in interactions with their students in (at least) two different ways. First, classroom-average measures of student-specific support and conflict indicate how a teacher generally behaves with students in dyadic interaction (e.g., Buyse, Verschueren, Verachtert, & Van Damme, 2009; Hughes, Zhang, & Hill, 2006). Hughes et al. (2006) referred to this aggregate as the classroom norm of support and conflict, which resonates with the classroom descriptive norms of student behaviors as discussed in section 1.1.3. Second, it may also be worthwhile to examine the extent of teachers' *differential* provision of support and conflict. Research on teacher differential behavior has its origins in studies on the teacher-expectancy effect (Rosenthal & Jacobsen, 1968), which states that some teachers treat students differently based on the level of achievement they expect of the student (see Babad, 2009). One aspect of teacher-student interaction in which teachers treat students differentially is the amount of support or affect they show, which is typically higher for high-expectancy students (Babad, 2009) and also for students whom teachers feel closer to (Newberry & Davis, 2008). So, in the present study, student-specific teacher support and conflict are used as the building blocks of classroom norms of support and conflict and of teacher differential behavior.

Teacher Support and Conflict and the Peer Ecology

Two mechanisms describe how teachers' general and student-specific support and conflict may relate to the peer

ecology, being *modeling* and *social referencing*. We first elaborate on these mechanisms and then relate them to the three aspects of peer ecologies as introduced above. First, teachers' general social practices in class can be a *model* for peer interactions and peer relationships). In this view, teacher support or conflict set the tone for, or model, peer interactions in the classroom and communicate information about the types of interactions and relationships that students are expected to establish with each other (Farmer et al., 2011; Gest & Rodkin, 2011). When teachers generally show support and have positive interactions, the modeling perspective assumes that students are likely to emulate this behavior, that is, to show warmth to each other and engage in positive interactions with peers as well. Likewise, teachers who generally show much conflict and negative affect may stimulate conflicted contact among students as well (Farmer et al., 2011; Mikami, Griggs, Reuland, & Gregory, 2012).

Whereas the modeling perspective emphasizes how students take in their teachers' general support and conflict as implicit lessons for how to behave themselves, the *social referencing* perspective focuses on how students implicitly learn how to evaluate and approach a specific student, depending on the teacher's student-specific provision of support and conflict (Buyse et al., 2009; Hughes & Chen, 2011). Hughes et al. (2001) were the first to reason that the teacher functions as a social referent in the classroom, that is, that "classmates make inferences about children's attributes and likeability based, in part, on their observations of teacher-student interactions" (p. 289). The social referencing principle applies to both norms of teacher support and conflict and teacher differential behavior. That is, when a teacher shows support to many individual students and thereby sheds a positive light on each of them, this may result in peers learning how to view specific students more positively, which in turn may lead to a more pleasant peer ecology. When teachers differentially treat students and focus their positive (or negative) comments on only a few students, they inform the classroom group on their peers' differential value (Mikami, Lerner, & Lun, 2010), which may result in a more hierarchical peer ecology.

Richness of interpersonal ties. Through general support versus conflict, teachers may model positive versus negative interpersonal relationships. As a result, students in classes with relatively higher levels of general teacher support are expected to form more liking and less disliking relationships. In line with this notion, Gest and Rodkin (2011), in a U.S. sample of first, third and fifth-grade classes, found that teachers who showed high levels of general emotional support had classrooms with more reciprocated friendships.

Classroom norms of student-specific support are also expected to result in a peer ecology that is richer in positive ties, since students are more likely to be viewed by their peers in a positive light. Similarly, in a classroom in which a teacher has many conflicted relationships with individual students, the peer ecology is likely to be characterized by more negative ties as students learn to approach many students negatively. In a Belgian study, Buyse et al. (2009) indeed found that first-grade classroom norms of student-specific teacher support were positively related to third-grade peer liking, whereas first-grade classroom norms of student-specific teacher conflict were negatively associated with third-grade peer liking. In the same vein, Hughes et al. (2006) showed that the classroom norm of supportive relationships was positively related to the average amount of peer liking in the classroom group in first and second grade in the U.S.

Status hierarchy. We expect social status hierarchy to be mainly related to teachers' differential behavior; when teacher support or conflict is highly focused on a small group of students, the teacher informs the students on the differential value of these peers. Hughes, Im, and Wehrly (2014) have studied the impact of teacher differential provision of support on peer experiences in third and fourth grade in the U.S. They reasoned that when the provision of support is more egalitarian, more students have the opportunity to be perceived positively by their peers, leading to less hierarchy in the peer-ecology. Hughes et al. found that when supportive relationships were concentrated on just a few students, also more status hierarchy in peer relations occurred. This was true however, specifically for students' academic reputation as an outcome rather than for peer liking.

Next to differential provision of individual teacher support and conflict, general teacher support may also be related to the hierarchy in ties. Chang (2003) showed that in Chinese middle-school classrooms where teachers rated themselves as showing relatively more warmth, peers disliked withdrawn and especially aggressive students less than in classrooms where teachers deemed themselves as being less warm. A study by Cappella and Neal (2012), with second to fourth-grade students, also showed that general teacher support can buffer negative relationships of victims of bullying. A generally supportive teacher may thus relieve negative peer evaluations of neglected or rejected students, and thereby foster a more egalitarian peer ecology.

Social behavior. By modeling supportive interactions in general, teachers communicate to their students the social value of prosocial interaction (Farmer et al., 2011). Luckner and Pianta (2011) have found that general teacher support was positively related to students' prosocial behaviors in a sample of fifth-grade students in U.S. elementary schools. Similarly, teacher conflict may function as a model for students' antisocial, aggressive behaviors. Furthermore, we expect that in a classroom with a higher classroom norm of student-specific support, prosocial behavior receives more attention, whereas in classrooms with a higher norm of student-specific conflict, aggressive behaviors are addressed more. This may add to the students' perception of the degree to which these behaviors are normative, and as a result to their own exhibition of the behavior. In the study by Buyse et al. (2009), first-grade classroom normative conflict was indeed positively associated with aggressive student behaviors.

The Present Study

In the present study associations between teacher support and conflict and the classroom peer ecology are examined. By focusing on these class-level constructs, we aimed to investigate the social structures that define the setting within which students develop. More specifically, we examined three aspects of teacher support and conflict, being (a) the level of *general* support and conflict, (b) classroom norms of *student-specific* teacher support and

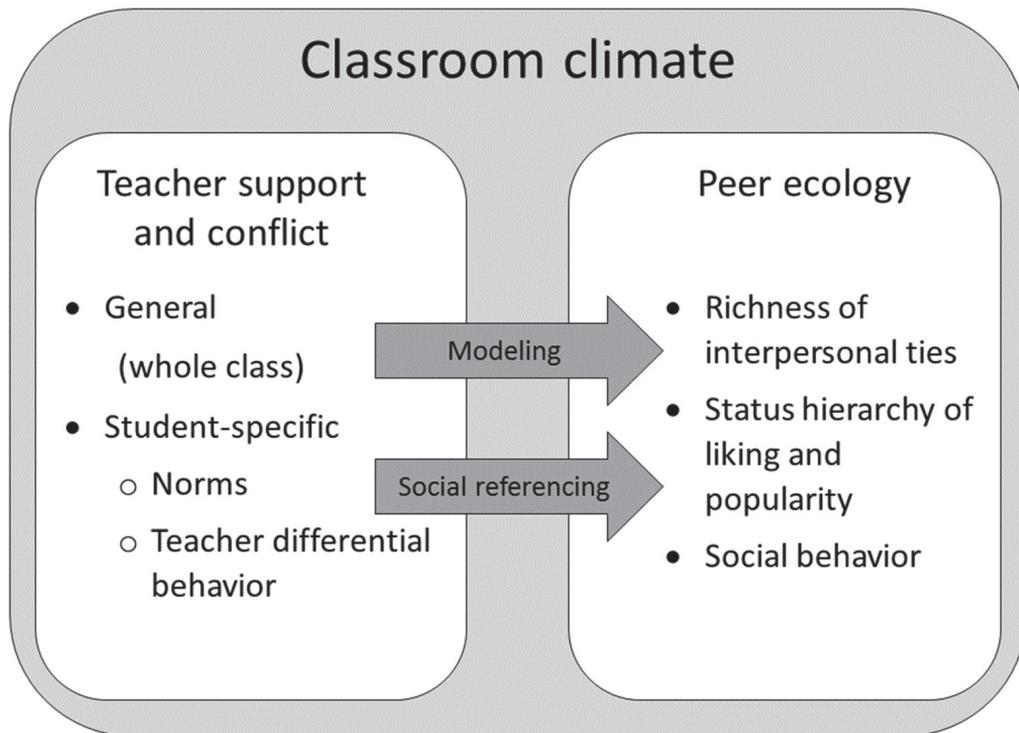


Figure 2.1. Overview of the study constructs. General, classroom-based teacher support and conflict are hypothesized to function as a model for the relationships and interactions students have in the classroom peer ecology. Student-specific teacher support and conflict, both the average level and the differential behavior of the teacher, are expected to function as a social referent, providing information about students within the peer ecology.

conflict, and (c) teachers' *differential* provision of student-specific support and conflict. Also three aspects of peer ecologies were examined, being (a) *richness* of interpersonal ties, (b) *hierarchy* of these ties, and (c) classroom norms of social behaviors. An overview of these constructs is provided in Figure 2.1.

Both when a teacher models support or conflict in general (Farmer et al., 2011; Gest & Rodkin, 2011) and when the teacher is a social referent for the social evaluation of specific students by peers (Hughes et al., 2001), the teacher's influence on the peer ecology seems to depend on the students' intake of teacher behavior. Therefore, we made sure to incorporate the students' views on all aspects of teacher support and conflict. For triangulation purposes, a multiple informants design was used, including the students'

as well as the teacher's or an external observer's perspective for each of the three aspects of teacher support and conflict. The overarching research question was: *How are teacher support and conflict associated with the classroom peer ecology?*

Given what we discussed so far, we expected that teachers would model peer interactions and relationships in general but would also be a social referent for the evaluation of specific students. We expected that the more support and the less conflict teachers showed in general and to specific students, (a) the more classrooms would be characterized by positive rather than negative ties, and (b) the more prosocial behaviors would prevail over aggressive behaviors. Furthermore, more differential provision of teacher support was expected to be related to more status hierarchy in classrooms, since then the teacher would specifically highlight differences between students. Also, we expected that the more general support a teacher would show, the more egalitarian the classroom distribution of ties would be.

METHOD

Participants

Teachers and their students in 58 fifth grade classrooms in 40 Dutch primary schools participated in this study, which was part of a larger research project on the classroom climate in fifth grade of elementary school³. In the Netherlands, elementary school students have the same teacher for every lesson (approximately 25 hours a week), or two teachers who each work part-time. When a class had two teachers, the teacher who spent most hours in the classroom participated in the study (60.3% of the participating teachers spent at least 4 days a week with the class). Teachers were on average 41.25 years old (range 24.51 to 62.47, $SD = 11.91$); teachers' mean experience was 15.17 years (range 1 to 39, $SD = 10.99$) and 37 teachers were women (63.8%).

Class size ranged from 18 to 34 students ($M = 26.17$, $SD = 3.72$). Only students for whom informed parental consent was obtained participated (1496 out of 1518, participation rate 98.6%). On the day of data collection, 42 students were absent, resulting in a sample size of 1454. Of the 1496

3 One classroom participating in the larger study was excluded from these results, because of a diverting teaching approach with two teachers in the class at all times.

consented students, 47.2% were girls, and classrooms contained 30.4% to 66.7% girls. Students' mean age was 10.60 years ($SD = 0.50$). Based on the classification by Statistics Netherlands (2012b), 84.4% of the students were Dutch (both parents were born in The Netherlands) and classes had 0% to 78.9% students who were not Dutch (at least one parent was not born in The Netherlands). This distribution was representative for the areas in which the schools were located (Statistics Netherlands, 2012a).

Measures of Peer Ecology

Peer ecology measures were based on peer nominations of likeability and popularity status and social behaviors. Participants answered several questions about which of their classmates best fitted a certain description. With a minimum of one, they could nominate as many classmates as they wanted, whether or not present and whether or not consented. We excluded nominations of non-consented students from the dataset. To avoid sequence effects (Poulin & Dishion, 2008), the order of the classmates' names from which participants could choose was different for each participant.

Richness of interpersonal ties. Students completed nominations about peers whom they liked most ("Which classmates do you like most?"), and peers whom they liked least ("Which classmates do you like least"). To indicate to what degree liking and disliking ties were present in the classroom, density of both types of ties was calculated. That is, we divided the total number of nominations within the classroom by the maximum possible nominations, being $m*(n-1)$, where m is the number of individuals who providing ratings and n is the number of consented students in the classroom (Wasserman & Faust, 1994). The resulting density scores lie between 0 and 1 and represent the degree to which liking and disliking ties are present in the classroom. A liking density score close to 0 means that very few students indicated that they liked others, whereas a score of 1 indicates that all students indicated that they liked all of their peers.

Status hierarchy. The degree to which social status was hierarchically distributed in a classroom was based on

the distribution of nominations for the sociometric item measuring liking and an item measuring popularity: "Which classmates are most popular?". We calculated in-degree centralization for each of the status items to represent how hierarchically versus equally nominations were distributed. In-degree refers to the number of nominations received by an individual, and centralization refers to the level of concentration of these nominations on one or a few students. In-degree centralization is the difference in number of received nominations between the most nominated student and all the others. The formula presented by Wasserman and Faust (1994) was used: In-degree centralization = $\frac{\sum[\max(\text{Pi}) - \text{Pi}]}{((m-1) * (n-1))^2}$, where $\max(\text{Pi})$ is the largest number of nominations received by anyone in the classroom, Pi is the number of nominations received by an individual, m is the number of individuals providing ratings and n is the number of consented students in the classroom. The centralization scores lie between 0 and 1, with a higher score representing a higher degree of status hierarchy. The lowest score of 0 means that all classmates have equal status. The highest score of 1 indicates that only one classmate has very high status, whereas all the others have very low status.

4 Because we asked students to nominate at least one other student, for the computation of centralization scores in the present study the denominator was reduced by 1.

Social behavior. For every classroom, we calculated the descriptive norms of prosocial behavior and aggression as the density of peer nominations for each of the behaviors. The prosocial items were "Which classmates cooperate well?", and "Which classmates help other children?" (Cronbach's $\alpha = .86, p < .001$). Aggression comprised both overt aggression: "Which classmates call other children names?", and "Which classmates hit or kick other children?", and relational aggression: "Which classmates gossip about other children?" and "Which classmates exclude other children?". The Cronbach's alpha for these four items was .86. For each student composite scores were calculated for each type of behavior as the average number of received nominations on the relevant items. Next, as an indicator of the commonness of each type of behavior in a class (i.e., the classroom norm) density scores were computed using the formula that was presented above.

Measures of Teacher Support and Conflict

General teacher support and conflict. Both teachers and students completed the Questionnaire on Teacher Interaction for Primary Education (QTI-PE), a measure that targets teacher support and conflict in general and combines the two as opposite ends of a single dimension: communion. The QTI-PE is an adaptation of the QTI as developed for secondary education (Wubbels et al., 2006). For this younger population, the questionnaire contained shortened items, and words that had proven to be difficult to read or understand were replaced with synonyms. The questionnaire consists of 16 items which each reflect a certain degree of communion. The item "This teacher is friendly", for example, reflects a high degree of communion (i.e., support), and items such as "This teacher yells" and "This teacher is impatient" reflect a low level of communion (i.e., conflict). A 5-point Likert-scale was used, ranging from 1 (*almost never*) to 5 (*almost always*). Students completed the questions about their teacher, and teachers indicated how they perceived their own teaching in this class. For every class, items stated the name of the teacher involved. Following standard procedures (Wubbels, Brekelmans, Den Brok, & Van Tartwijk, 2006) each item was weighted for the degree of communion and the sixteen weighted item scores were averaged, resulting in a single score for each teacher, ranging between minus 1 and plus 1. For the student version, the Cronbach's alpha was .81. Individual students' reports of teacher support were averaged per classroom. The intra-class correlation (ICC1), or the average agreement between a pair of students within the same class, was .21. To assess the reliability of the group averages, we computed the ICC2 (see Lüdtke, Robitzsch, Trautwein, & Kunter, 2009), which was .87, indicating a highly reliable class-mean rating. For the teachers' self-perception, the Cronbach's alpha was .77.

Classroom norms of student-specific teacher support and conflict. Sociometric items were used to tap peer teacher relationship reputation (cf. Hughes et al., 2001), a measure for student-specific teacher-student relationships from a peer perspective. We used two items measuring peer reputation of teacher support ("Which classmates are liked most by the teacher?" and "Which classmates are praised a lot by the teacher?", Cronbach's $\alpha = .83$) and two items to tap peer

reputation of teacher conflict ("Which classmates are liked least by the teacher?" and "At which classmates does the teacher often get angry?", Cronbach's $\alpha = .94$). For each student a score for peer reputation of teacher support as well as conflict was calculated as the average number of received nominations for the two items. To obtain classroom norms of student-specific teacher support and conflict as perceived by peers, we calculated density scores for each of the composite scores in the same manner as the peer ecology density scores were calculated.

Video observations were used to measure normative student-specific teacher support and conflict from an observer's perspective. We coded all public dyadic teacher-student interactions for the amount of support and conflict as expressed by the teacher. Public dyadic teacher-student interactions were those interactions noticeable for at least half the classroom and as expressed to or about a single student or a small group, that is, those students whose name was called or a small group of collaborating students (maximum four students, e.g., "the group over there", "the green group"). Each occurrence received a code that represented the amount of support or conflict, ranging from -2 (very low, i.e., conflict) to +2 (very high, i.e., support). The classroom norm of student-specific teacher support was calculated as the mean score of all instances of teacher-student interaction throughout the video.

Table 2.1 shows an overview of the operationalization and examples for each score. The first author and two trained research assistants scored the videos. Inter-observer agreement was first checked for video segmentation; agreement that an event had occurred ranged from 81% to 87% for the pairs of observers. Next, a set of 1624 occurrences of teacher-student interaction (9% of the total number of fragments) was coded by all three coders to test for inter-observer agreement. Weighted Cohen's kappa ranged from .69 to .76 for the pairs of observers, which can be considered substantial agreement (Landis & Koch, 1977).

Differential teacher behavior. As an indication of differential teacher behavior as perceived by the students, we calculated

Table 2.1

Operationalization of Observed Student-specific Teacher Support

Score	Level of teacher support	Indicators
-2	Very low (i.e., conflict)	Angry or hostile, sarcasm "Stop that!" "You are being really annoying right now!"
-1	Low	Voice is not louder than normal "Please stop that" "Could you sit normally?"
0	Intermediate/no information	Organizational comments "What is the answer to question 8?" "Sally will work with Ellen"
1	High	Showing compassion "That's nice of you" "Thank you"
2	Very high (i.e., support)	Words of affection, like sweetheart, darling, dear "That is very nice of you!" "Thank you very much!"

in-degree centralization of the peer reputation of teacher support and conflict nominations in the same manner as for the status hierarchy scores. A higher score represented a higher degree of differential behavior. The lowest score of 0, for example for centralization of nominations for teacher support, means that all classmates are perceived by their peers to receive an equal amount of support. The highest score of 1 indicates that only one classmate is perceived to receive teacher support.

To measure differential teacher behavior from an observer's perspective, first per student the mean support score in all the observed interactions the teacher had with that student was computed. The standard deviation of the classroom mean of these individual scores represented the degree of teacher differential behavior.

Procedure

Data were collected in the fall semester of 2012/2013, at least one month after the start of the school year. Schools located in the middle, south, and east of the Netherlands were recruited to participate. After a school's principal and the classroom teacher agreed to participate, parents received information about the goals of the study and were asked for their consent regarding the participation of their child. All students for whom consent was granted completed the questionnaires on netbook computers in their own classrooms. Students could not skip questions themselves. Yet, if they wanted to pass over a question or stop participating, they could inform the researcher and were allowed to do so. Students sat separately and had partition screens flanking the netbooks to prevent distraction and to increase students' privacy. A standard instruction was given concerning the content of the questions and confidential data handling. Teachers also completed their questionnaires on a netbook. In addition, two hours of video were recorded on the same day the questionnaires were completed. During the observation teachers were free to follow their normal lesson plans. We did ask them not to schedule tests, because generally hardly any interaction takes place during tests, and individual presentations, because interaction then typically revolves around the presenting student, resulting in an unrepresentative amount of differential behavior. After all data were collected, teachers received a summary of the findings for their classrooms.

Analysis

First, we checked the data for normality, multicollinearity and (multivariate) outliers and found no violations.. Data were then analyzed using multivariate multiple regression analysis in MPlus version 7.2 (Muthén & Muthén, 2014). Because of the limited sample size, not all peer ecology measures could be tested within a single model. Instead, three separate models were tested, one for each of the peer ecology measures. These models included all correlations among teacher support and conflict measures. Finally, we controlled for class size, since density and centralization measures are not completely independent of the number of students providing nominations (cf. Gest & Rodkin, 2011).

RESULTS

Peer Ecology

Table 2.2 shows the descriptive statistics for the peer ecology variables. Peer ecologies on average were more positive than negative in nature; density for liking was higher than for disliking, $t(57) = 8.78, p < .001$, and prosocial behavior nominations were more common than nominations of aggression, $t(57) = 17.62, p < .001$. Popularity was to a higher degree centralized than liking, $t(57) = 20.47, p < .001$.

There was a positive association between liking and disliking density, $r = .52, p < .001$. This correlation was less strong but still apparent when controlling for class size, $r = .46, p < .001$. Apparently, in classrooms where students indicated liking for more peers, students also indicated disliking for more peers. Hierarchy in likeability and popularity were positively correlated, $r = .47, p < .001$. Furthermore, liking hierarchy was positively related to liking density, $r = .32, p = .013$. So, in classrooms where students indicated that they liked more peers, these nominations were more strongly focused on a small group of students. Finally, norms of prosocial behavior and aggression were uncorrelated when class size was controlled for, $r = .15, p = .280$.

Teacher Support and Conflict

Table 2.3 shows the descriptive statistics for the teacher support and conflict variables. Teachers perceived themselves as generally less supportive than their students did, $t(57) = -6.25, p < .001$. Both teachers and students saw more general teacher support than conflict, as both values were above 0, $t(57) = 14.82, p < .001$ and $t(57) = 28.48, p < .001$ for teachers and students, respectively. Consistently, student-specific teacher support was perceived by the students to be more common than teacher conflict, $t(57) = 13.97, p < .001$. However, the average observed support score was below 0, $t(56) = -2.22, p = .030$, so according to the coders teachers expressed somewhat more conflict than support in their student-specific interactions. Finally, support was less centralized on a small group of students than conflict, $t(57) = 13.76, p < .001$.

Table 2.2

Descriptive Statistics for Peer Ecology Measures

	1	2	3	4	5	<i>M</i>	<i>SD</i>	Min	Max
Richness of ties									
1. Liking density	--					.14	.04	.06	.29
2. Disliking density	.52**	--				.10	.03	.04	.17
Status hierarchy									
3. Liking hierarchy	.32*	.03	--			.19	.05	.11	.34
4. Popularity hierarchy	.11	-.03	.47**	--		.55	.15	.20	.84
Social behavior									
5. Prosocial behavior	.60**	.36**	.26*	.09	--	.27	.07	.13	.44
6. Aggressive behavior	.24	.72**	-.15	-.13	.34**	.12	.04	.06	.26

* $p < .05$. ** $p < .01$.

Moderate positive correlations were found between the teachers' and students' perception of the amount of general teacher support, $r = .46$ $p < .001$ and between observations and student ratings of student-specific teacher support, $r = .32$ $p = .015$. General and student-specific teacher support and conflict were also correlated in the expected directions; the more supportive the students perceived the teacher to be in general, the more student-specific teacher support they reported, $r = .34$ $p = .009$, and the more student-specific supportive interactions were observed, $r = .35$ $p = .007$. Furthermore, teacher-perceived general support was negatively related to classroom norms of peer-perceived teacher conflict, $r = -.26$ $p = .046$. The measures of differential teacher behavior were not related to one another or to the measures of general or normative teacher support.

Teacher Support and Conflict and the Classroom Peer Ecology

Finally, the multivariate multiple regression analyses were performed, one for each aspect of the peer ecology.

Richness of interpersonal ties. The left part of Table 2.4 shows the results for the measures of richness of interpersonal ties. As expected, in classrooms where students nominated more peers to receive teacher support, students also indicated liking for more peers, $\beta = .66, p < .001$. Also as expected, in classrooms where students indicated more student-specific teacher conflict, students reported disliking for more of their peers, $\beta = .43, p = .001$. Surprisingly, disliking density was also positively associated with classroom norms of student-specific support, $\beta = .33, p = .006$. The overall model explained 37.5%, and 45.0% of the variance in liking density and disliking density, respectively.

Status hierarchy. The middle section of Table 2.4 shows the results for the status hierarchy variables. Classrooms where students perceived more general teacher support had a more egalitarian liking structure, $\beta = -.32, p = .046$. Contrary to this finding and to the expectations, also in classes with higher norms of student-specific teacher conflict liking nominations tended to be distributed more equally, $\beta = -.33, p = .032$. Furthermore, as expected, when teachers according to students provided support more differentially, liking nominations were more hierarchically distributed, $\beta = .32, p = .018$. Surprisingly, hierarchy in popularity was not associated with any of the teacher support measures. The model explained 19.0% and 5.5% of the variance in hierarchy in liking and popularity, respectively.

Social behaviors. As shown in the right part of Table 2.4, in classrooms with higher norms of student-specific teacher support, significantly more prosocial behavior was reported by students, $\beta = .63, p < .001$. Surprisingly, also when teacher support was provided more differentially (i.e., to a larger extent centralized on only a few students) more prosocial behavior was reported, $\beta = .22, p = .026$. In classrooms where students reported higher norms of student-specific teacher conflict, students reported more aggressive behavior, $\beta = .43, p < .001$. Contrary to our

Table 2.3

Descriptive Statistics for Teacher Support and Conflict Measures

	1	2	3	4	5	6	7	M	SD	Min	Max
General											
1. Student perspective	--							.47	.13	.15	.69
2. Teacher perspective	.46**	--						.34	.18	-.25	.72
Student-specific											
3. Support norm	.34**	.19	--					.29	.09	.11	.56
4. Conflict norm	-.24	-.26*	.11	--				.12	.03	.06	.20
5. Observed support norm	.35**	.22	.32*	-.09	--			-.05	.17	-.47	.37
Differential behavior											
6. Differential support	.09	-.23	-.07	.23	.12	--		.29	.08	.10	.50
7. Differential conflict	.02	-.20	-.06	-.00	-.08	-.02	--	.61	.15	.25	.92
8. Differentially observed	-.25	-.01	-.20	-.03	-.08	.04	.06	.30	.15	.05	.85

* $p < .05$. ** $p < .01$.

Table 2.4

Richness of Interpersonal Ties, Status Hierarchy, and Social Behavior as Explained by Teacher Support and Conflict

	Richness of interpersonal ties				Status hierarchy			Social behavior				
	Liking density		Disliking density		Liking hierarchy		Popularity hierarchy		Prosocial behavior		Aggression	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β		
General												
1. Student perspective	-.06 (.05)	-.18	.01 (.03)	.03	-.13 (.07)*	-.32	.01 (.20)	.01	-.12 (.06)	-.22	.07 (.04)*	.25
2. Teacher perspective	-.00 (.03)	-.02	-.03 (.02)	-.14	.02 (.05)	.07	-.09 (.14)	-.10	.03 (.04)	.08	-.04 (.02)	-.17
Student-specific												
3. Support norm	.30 (.06)**	.66	.11 (.04)**	.33	.13 (.08)	.24	.16 (.25)	.10	.46 (.08)**	.63	.08 (.04)	.20
4. Conflict norm	-.17 (.20)	-.12	.45 (.14)**	.43	-.60 (.28)*	-.33	-.91 (.86)	-.18	.01 (.27)	.01	.53 (.15)**	.43
5. Obs. support norm	-.04 (.03)	-.17	.00 (.02)	.02	.02 (.04)	.06	.04 (.13)	.05	.01 (.04)	.03	.01 (.02)	.02
Differential behavior												
6. Differential support	.03 (.06)	.06	.01 (.04)	.03	.20 (.09)*	.32	-.00 (.26)	-.00	.18 (.08)*	.22	.02 (.05)	.04
7. Differential conflict	.00 (.03)	.00	-.00 (.02)	-.02	-.00 (.04)	-.01	-.14 (.13)	-.15	-.02 (.04)	-.05	.02 (.02)	.09
8. Differentialty obs.	.02 (.03)	.08	-.02 (.02)	-.08	-.06 (.05)	-.18	.03 (.14)	.03	-.02 (.04)	-.03	.01 (.03)	.02
R^2	.38**		.45**		.19*		.06		.55**		.49**	

Note. All analyses were performed while controlling for class size. obs. = observed.

* $p < .05$. ** $p < .01$.

expectations, students' perceptions of teacher support were positively associated with norms of aggression, $\beta = .25, p = .048$. The model explained 55.2% and 48.7% of the variance in prosocial behavior and aggression, respectively.

DISCUSSION

In the present study associations between teacher support and conflict and the classroom peer ecology were examined. By focusing at the peer ecology at the classroom level, we had the opportunity to investigate how teacher support and conflict are related to the social structure of a class within which student learning and development occur (Bronfenbrenner & Morris, 2006). General and student-specific teacher support and conflict were expected to function as a model (see Farmer et al., 2011) and a social referent for peer relationships (see Hughes et al., 2001), showing students how to behave in social interaction in general and how to evaluate and approach specific peers. Next to overall levels of support and conflict, we included differential behavior in our models, in order to tap how equally teachers divided their attention, both positive and negative, over their students. Indeed, teachers seemed to exert an invisible hand, as their provision of support and conflict was associated with all of the three aspects of peer ecologies: richness of interpersonal ties, status hierarchy, and social behaviors.

Richness of Interpersonal Ties

When a teacher was perceived by students to show support to more students, students reported more liking for each other, whereas when a teacher was perceived to show more conflict, students reported more disliking for each other. These findings support the notion of student-specific teacher support and conflict as a social referent for peer relationships (Hughes et al., 2001; McAuliffe et al., 2009). However, contrary to our expectations, student-specific teacher support was also positively related to peer disliking. This could be due to a teacher's pet effect (Babad, 1995; 2009), when some students are seen by their peers as the teacher's favorite and as a result are disliked more. Importantly, classes where the teacher has a pet who is not popular with the other students tend to

have more negative classroom climate and lower student satisfaction and morale (Babad, 2009), which is likely reflected by more peer disliking. Alternatively, this finding could be a consequence of students feeling secure in their relationship with the teacher and therefore feeling more freedom to indicate peers they dislike. Another possibility might be that in an overall positive classroom climate, a slightly negative feeling might result in a nomination for disliking sooner than in a classroom where negativity is to a larger extent the norm, due to a contrast effect. That is, the threshold (Terry, 2000) for indicating dislike for anyone might be lower, which makes it difficult to objectively compare the actual richness of negative ties among peer ecologies. For future research it would be worthwhile to additionally measure peer disliking and aggression from an outsider's point of view.

Status Hierarchy

As expected, in classrooms where the teacher more clearly concentrated positive affect on specific students, more hierarchy existed in the peer ecology, but only for liking and not for popularity. The finding for hierarchy in liking status fits the notion of the teacher as a social referent, that is, the teacher informed his class on the differential value of the students. Surprisingly, the more teacher-student conflict was reported by students, the less hierarchical the distribution of likeability status was. This result may indicate that when the teacher has more conflicted relationships with students, students react against or compensate for this negativity by being more supportive of more of their peers.

Hierarchy in popularity was not associated with any of the teacher support or conflict measures in this study. The classroom structure of popularity may be associated more with student and group characteristics or other aspects of teaching than conveying conflict and support. It could also be the case that by taking the classroom peer ecology as the unit of analysis, influential subgroups are overlooked. For instance, Moore, Shoulberg, and Murray-Close (2012) found that teacher support and conflict affected popularity differently for boys and girls. For future research it seems necessary to delve deeper into the popularity issue, to further unravel how the teacher might affect this type of status within the peer ecology.

Social Behaviors

Following our hypothesis, in classes with higher norms of teacher support, students reported more prosocial behavior. This may indicate that indeed a teacher's stronger focus on positive student characteristics models positive student interaction as well. Likewise, in classes with higher norms of teacher conflict, students reported more aggression, so teachers' negative interactions may pave the way for negative student behavior. Of course, this association could also be due to the teacher having to intervene more often when students show aggressive behavior.

Unexpectedly, also differential teacher support was positively associated with prosocial behavior. It could be the case that teachers deliberately differentiate in the amount of support in order to accommodate students with specific needs. Teachers who do so may model for their students an inclination to help and cooperate with each other, that is, show prosocial behavior. Alternatively, these results may indicate that in some situations peers compensate for the negative consequences of a less equally supportive teacher by making an effort to show more support to each other. For future research it might be interesting to investigate between-class differences not only in the amount, but also in the nature of teacher differential behavior. Another unexpected finding was the positive association between students' perception of support and norms of aggression. This may again be due to a contrast effect, when classes in general are characterized by positive interactions (see above).

Student-specific Versus General Teacher Support and Conflict

In line with the analyses by Den Brok et al. (2006) and Wubbels et al. (2015) we conclude that the conceptualization of support and conflict the teacher expresses either towards specific students or in more general terms deserves consideration. As expected, general teacher support and the classroom norm of student-specific teacher support were positively associated, but correlations were, at best, only moderate in strength (r range .19 to .35). Therefore, these measures seem to be best interpreted as two distinct facets of teacher support. This was also reflected in our results for the student-specific and general support measures. For future

research it is important to keep this distinction in mind and to conceptualize and operationalize classroom measures of teacher support and conflict according to the particular object of research.

Observed and Teacher-reported Teacher Support and Conflict

We did not find any associations between peer ecology and our observations or teacher self-reported support and conflict in class. Possibly, the students' perceptions of a supportive climate are more tightly connected to the peer ecology than the teacher's or an outsider's perceptions. As described earlier, we expected that the modeling and social referencing mechanisms imply that the teacher affects the peer ecology through the students' intake of what the teacher does. In the broader classroom climate literature the importance of the students' subjective perceptions and attributions has long been recognized (e.g., Fraser, 1989; Wubbels et al., 2015). The general reasoning is that for individual student outcomes, such as school engagement, general well-being, or externalizing behavior, it might be more important whether a student feels supported by the teacher rather than exactly how a teacher treated the student. This is not to say that the teacher's or an observer's perception are irrelevant, but it may account for the finding that observations and the teacher's perspective did not add to the explanation of the several peer ecology outcomes.

For the observations in particular, the lack of significant results could be due to the fact that we were only able to record two hours of video material per class. Therefore, it is possible that this material was not representative, for example because we observed a teacher on a particularly positive or moody day. Another possibility is that the two hours of video did not include rare, but influential occurrences of teacher behavior. The students' perceptions, however, were based on a wealth of witnessed teacher-student interactions, including those rare but potentially influential teacher interactions. For instance, research on the negativity bias (e.g., Rozin & Royzman, 2001; Vaish, Grossman, & Woodward, 2008) suggests that one negative interaction may have a far stronger impact than many positive ones. Thus, a single conflicted interaction between the teacher and a student may have

colored peer perceptions of this student's level of teacher conflict, but was not recorded on camera. Another possible explanation is that peer perceptions are not only informed by observed teacher behavior, but are likely to be biased by students' prior judgments of their peers (Mikami et al., 2012), and therefore may be more closely related to the peer ecology than observed behavior. The positive correlations between student-specific support measures and both observed interactions and student-perceived collective support, however, do suggest that these nominations are at least partly associated with the teacher's actual interaction with students. Thus common-method variance does at least not seem to be the only source for co-variation.

Limitations and Future Directions

In sum, our study shows that in particular the level and distribution of student-specific teacher support and conflict is related to several aspects of the peer ecology. These results need to be interpreted in the light of some limitations. First, in this study we have mainly explained the associations in terms of the teacher functioning as a model or social referent and as such influencing the peer ecology. However, given the correlational design that was used, statements regarding causality cannot be made. Interrelations between the teacher and peer variables are probably more complex than they are depicted here. If the teacher and peers together form a system that evolves through time with elements mutually influencing each other (Sabol & Pianta, 2012), the peer ecology also affects teacher behavior. A classroom in which students all like each other and behave nicely probably makes it easier for teachers to act in a supportive way, whereas in classrooms where bullying and fighting are more common teachers may need to correct students more often. Although the plausibility of bidirectional effects has been acknowledged by researchers (e.g., Bierman, 2011; Gest & Rodkin, 2011), empirical research in this area is only in its early stages. An important challenge for future research is to study to what extent associations between teacher support and conflict on the one hand and peer ecology on the other are the result of an ongoing interaction between the two aspects of the classroom climate. Still, reciprocity in the associations between teacher practices and peer ecology does not alter

the possibility (or necessity) for the teacher, as a responsible professional, to take action and exert her influence to guide the development of the peer ecology in a desirable direction.

Secondly, although peer nominations have proven their value extensively in prior studies (see Cillessen, 2009; Rubin et al., 2006), the peer ecology measures derived from them may provide a one-sided image. For example, conclusions about social behaviors can only be derived from the students' perceptions of each of their peers, not about a more absolute level of prosocial behavior or aggression in the classroom climate in general. Directly asking participants to rate the ecology as such could improve and enrich the conceptualization of the peer ecologies (cf. Boor-Klip, Segers, Hendrickx, & Cillessen, 2016).

A final limitation is the sample size. Although most data entries were based on information gathered from almost 1500 students, data about our main focus of classroom peer ecologies and teacher support regarded the 58 higher level cases. This clearly limited statistical power and only relatively strong effects could be detected. Still, we found that some of the teacher support and conflict measures were significantly related to the peer ecology outcomes. Therefore, we encourage future research to investigate these processes using larger samples of classrooms. Only then can the more subtle associations between the teacher and the classroom peer ecology be found and can the teacher's touch be fully unraveled.

Implications for Practice

The study findings indicate that for teachers, showing support and avoiding conflict is important for the peer ecology within which students interact with each other. Education and intervention programs focusing on classroom social dynamics might benefit from addressing how elevating the classroom level of teacher support may function as an effective intervention for altering the way students approach and value each other. In this sense, every-day teacher practices could become network-related teaching strategies (see Gest & Rodkin, 2011), when teachers deliberately apply them to affect the peer ecology. As an example, Reinke, Lewis-Palmer,

and Merrell (2008) studied an intervention called Classroom Check-Up (CCU), in which they aimed to increase teachers' supportive comments and decrease their more conflicted, reprimanding remarks. CCU did alter teacher behavior, and consequently also students' aggressive behavior declined.

Building and maintaining supportive relationships with all students may not always be easy for teachers (Newberry, 2010). Emotionally or behaviorally demanding students place more relational press on teachers than those who are easily managed (Newberry & Davis, 2008). Not reprimanding these students, but instead showing support, might moreover interfere with classroom management goals, such as preventing or decreasing disruptive behavior. Following from our study, a solution might be not to reprimand students publicly for their behavior, but more privately. Because in our study in particular the peer-perceived teacher support and conflict measures were related to the peer ecology, teachers need to be aware of supportive or conflictive interactions that are visible and/or audible to the other students in the classroom. So, the combination of a private reprimand aimed at decreasing disruptive behavior and a public expression of support another time might serve both classroom management and peer ecology, and thus individual students' development, best.

Conclusion

This study illustrates that in the classroom, teacher support and conflict and peer ecologies are not isolated constructs but are related to each other. Research aimed at investigating classroom social dynamics and student development, but also teachers and teacher educators, thus should be cognizant of both constructs. Our findings support the notion that the teacher functions as a model or social referent for students regarding how to interact and form relationships with others. When teachers are aware of this, they can deliberately use their everyday interactions with students as network-related teaching strategies. Future research in this field may build on these insights in further revealing the invisible hand of the teacher.

TEACHER BEHAVIOR AND PEER LIKING AND DISLIKING: THE TEACHER AS A SOCIAL REFERENT FOR PEER STATUS ^{5, 6}

ABSTRACT

According to social referencing theory, cues peers take from positive and negative teacher behavior towards a student affect the student's peer liking and disliking status. The present study was the first to test the hypothesized mediation model connecting teacher behavior with peer liking and disliking status, via peer perceptions of teacher liking and disliking for the student. We used a longitudinal design and controlled for peer perceptions of student behavior. A sample of 1420 fifth-grade students ($M_{age} = 10.60$) from 56 classes completed sociometric questionnaires at three time points within one school year. At the first time point video data was also recorded, and teacher behavior towards specific students was coded. A multilevel path analysis showed that teachers did function as social referents for peer status but only through their negative behavior towards a student. Negative teacher behavior was associated with peer perceptions of the teacher's disliking for the student three months later, which in turn predicted peers' disliking of the student six months later. Findings suggest that teachers play a prominent role in peer relationships, particularly in peer disliking. For practice, this suggests that it may be important for teachers to refrain from openly negative behavior towards students, particularly those at risk of peer rejection.

5 This chapter is based on:

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INTRODUCTION

The teacher, as the one professional close to the peer society but still not a part of it, may play a crucial role in shaping peer relations (Farmer, McAuliffe Lines, & Hamm, 2011). Besides supporting a classroom climate that stimulates positive peer relationships (e.g., Gest & Rodkin, 2011; Mikami, Griggs, Reuland, & Gregory, 2012) and shapes social behavior and academic achievement norms (e.g., Gest & Rodkin, 2011; Hamm, Farmer, Lambert, & Gravelle, 2014), teachers may also function as a social referent for students' peer liking and disliking status (Hughes, Cavell, & Willson, 2001). Peer liking and disliking status refer to the extent to which students are accepted versus rejected by their classmates (Cillessen & Mayeux, 2004; Rubin, Bukowski, & Parker, 2006), and is strongly related to students' academic (Flook, Repetti, & Ullman, 2005; Wentzel, 2005) and social development (Ladd, 2006; Ladd & Troop-Gordon, 2003).

Generally, social referencing describes how a child refers to a significant other (usually a parent) for cues regarding how to react in ambiguous situations (Feinman, 1982; Walden & Ogan, 1988). In a classroom, the teacher is adult students turn to for these cues (Hughes et al., 2001; McAuliffe, Hubbard, & Romano, 2009). The teacher's behavior toward an individual student provides the student's peers with information about the likeability of the student. In this sense, the teacher functions as an affective model (Bandura, 1992) for how to feel about a student. At the same time, the social referencing mechanism also requires an active role of peers, who perceive their teacher's behavior towards another student and then interpret it in terms of their own affective evaluation of the student (Hughes, Im, & Wehrly, 2014). So far, however, no studies have investigated the entire social referencing mechanism from teacher behavior via peer perceptions to peer status.

The present study addresses this gap in knowledge and investigates (a) which teacher behaviors are related to peer-perceived teacher liking and disliking, and how these peer perceptions relate to liking and disliking status (basic social referencing hypothesis), and (b) whether the association

between teacher behavior and peer status is fully mediated by peer-perceived teacher liking and disliking (strong social referencing hypothesis). The present study adds to our understanding of the teacher's role in peer relations and, in particular, whether and which teacher behaviors are associated with peer liking and disliking status. For teachers, an understanding of how they, deliberately or not, inform their students' peer status may also be an enriching element to their repertoire of strategies to optimize student development.

The Teacher as a Social Referent

Although no studies have investigated associations between teacher behavior, peer-perceived teacher-student relationships, and peer status at the same time, several lines of research each support part of the social referencing mechanism.

Teacher behavior and peer status. First, multiple studies have shown associations between teacher behavior towards specific students and the students' peer status. Based on an experimental study, Flanders and Havumaki (1960) concluded that teacher praise affected peers' sociometric choices for the student. White and colleagues (White & Jones, 2000; White & Kistner, 1992; White, Sherman, & Jones, 1996) also performed a series of experimental studies that featured video vignettes of classroom interaction. Student behavior was kept constant, but teacher behavior towards a target student was manipulated to vary from derogatory to positive. Kindergarten through second-grade participants watched the video and rated their liking of the students. In the positive feedback condition, the target was evaluated more positively than in the derogatory feedback condition (White & Kistner, 1992), even when participants received information on the target's peer reputation (White & Jones, 2000; White et al., 1996). In a more naturalistic study, McAuliffe et al. (2009) studied how positive and negative teacher comments predicted how students were perceived by their peers. In line with White and colleagues' findings, McAuliffe et al. also found that negative teacher behavior was positively associated with peer disliking. But in contrast with their expectations, positive teacher behavior was

negatively associated with peer liking. They explained this as either an indication of a teacher's pet effect, when students were seen as the teacher's favorite and therefore less liked (see Babad, 1995; 2009), or the result of an intervention program in which teachers positively addressed students who demonstrated undesirable behavior.

Peer-perceived teacher liking and disliking and peer status.

Associations of peer perceptions of teacher (dis)liking of students with students' peer status – the second and third component of social referencing – were investigated by Hughes and colleagues (2001, 2014; Hughes, Zhang, & Hill, 2006). In a series of studies with first- through fourth-grade students, they examined the role of peer-perceived teacher support in peer acceptance. They used the term *peer reputation* to refer to combined perceptions of all classroom peers (Hughes et al., 2014; cf. Hymel, Wagner, & Butler, 1990). Students who had a stronger peer teacher support reputation also had higher peer likeability. In one study, Hughes et al. (2001) also investigated peer reputation of teacher conflict and found that it was positively associated with peer disliking but was not associated with peer liking. Moreover, teacher support was a stronger (negative) predictor of peer disliking than teacher conflict.

Teacher reports of the teacher-student relationship. Two final lines of research are more distantly related to the social referencing mechanism, as these examined teacher-reported teacher-student relationships. Chang et al. (2007), Mercer and DeRosier (2008), and Taylor and Trickett (1989) found that teacher preference for students was positively related to their peer status, concurrently and after one or two years. Additionally, De Laet et al. (2014) and Hughes and Chen (2011) showed that teacher-reported support and conflict in the relationship with a student were associated with the student's likeability with peers, although Leflot, Van Lier, Verschueren, Onghena, and Colpin (2011) did not find such an association.

Teacher-reported preference, support and conflict are likely reflected in the behavior of the teacher towards

the students. However, McAuliffe et al. (2009) found that teacher preference was associated with negative rather than positive teacher behavior. The association between teacher preference and peer liking and disliking status thus might be due to teachers and students valuing the same agreeable characteristics in a student (e.g., Howes, Hamilton, & Matheson, 1994) rather than a social referencing effect through teacher behavior.

Connecting the three components of social referencing.

Taken together, these studies suggest that teacher behavior with individual students informs peers about the teacher's (dis)liking for the student, which in turn affects peers' (dis)liking of that student. However, research has yet to reveal the degree to which peers' views of teacher (dis)liking of the student are related to cues in teacher behavior.

Cues in Teacher Behavior

Teachers have many different kinds of interactions with students, each potentially containing social cues. Whereas prior research (e.g., McAuliffe et al., 2009; White & Kistner, 1992) has only linked overall teacher positivity and negativity to peer status, types of positive and negative behavior may differentially affect peer status. For example, a positive teacher comment may concern a student's academic achievement, agreeable behavior, or a nice jacket, whereas negative teacher comments could focus on a wrong answer or aggressive behavior towards a peer. To further qualify teacher behavior, in this study we distinguished between cognitive and affective teacher comments (Martin & Briggs, 1986; Woolfolk, Hughes, & Walkup, 2013; see also Babad, 2009). The cognitive domain entails giving instructions and providing positive or negative feedback on the student's performance, whereas the affective domain refers to the extent to which the teacher expresses warmth and liking versus disliking for the student. When commenting in the affective domain, a teacher directly communicates positive or negative affect for the student, and thereby acts as an affective model (Bandura, 1992). Although less directly, when a teacher comments in the cognitive domain, peers may also view this as the teacher valuing the student (see Babad, 2009), and

thus may also use this information in their interpretation of the likeability of the student.

The Role of Student Behavior

A large body of research has also shown that peer acceptance and rejection are strongly predicted by student behavior (e.g., Cillessen & Mayeux, 2004; Newcomb, Bukoswki, & Pattee, 1993; Rubin et al., 2006). Thus, when examining the association between teacher behavior and peer status, student behavior also has to be taken into account. The present study included the four broadband categories of student behavior that, as noted in several reviews, are most consistently related to peer liking and disliking status (aggression, prosocial behavior, social withdrawal, and academic achievement; Asher & McDonald, 2009; Cillessen & Mayeux, 2004; Newcomb et al., 1993). In general, showing prosocial behavior and good academic performance are positively related to peer liking and negatively to peer disliking, whereas aggression and withdrawing from the peer group are positively associated with peer disliking (Asher & McDonald, 2009; Cillessen & Mayeux, 2004; LaFontana & Cillessen, 2002; Wentzel, 2009).

In social referencing, student behaviors might not only relate to peer status, but also to teacher behavior and peer-perceived teacher (dis)liking. For example, student behavior likely influences teacher behavior, because teachers respond to what students do (e.g., Doumen et al., 2008). This may result in more positive teacher behavior with students who show prosocial behavior and more negative behavior with aggressive students. Peers' perceptions of a student's behavior may also inform peer perceptions of teacher (dis)liking. Hughes et al. (2001) found strong associations of peer reputation of teacher support and conflict with peer-perceived cooperative and aggressive behavior ($r = .70$, and $.77$, respectively). This may be due to a halo effect (Thorndike, 1920), as prior peer evaluations of whether a student performs well in school, helps others, or shows aggressive behavior, might bias other peer evaluations (Moskowitz, 2005), in this case teacher liking versus disliking.

To separate the teacher's role in peer status from other processes occurring in the classroom, we controlled for peer perceptions of student behavior. In addition, student gender was included, as teachers seem to maintain closer and more positive relationships with girls than with boys (e.g., Hughes et al., 2001; McCormick & O'Connor, 2015).

Developmental Considerations

In primary school, teachers seem to have a unique window of opportunity for affecting students' peer evaluations, a window that seems to shrink in adolescence, when the peer world becomes a social world of itself that is more and more separated from adults (LaFontana & Cillessen, 2010). For instance, Engels et al. (2016) found that in Belgian secondary schools, peers' perceptions of the teacher-student relationship were not associated with later peer likeability. Therefore, in the present study the focus was on fifth-grade students and their teachers. In this upper-elementary age group, generally the amount of negative or conflicted teacher-student interaction increases, whereas the amount of positive teacher-student interaction decreases (see Esposito, 1999; Jerome, Hamre, & Pianta, 2009). This heterogeneity in teacher behavior, combined with the still present sensitivity for the teacher of elementary-school students, made this age group a particularly interesting one in the investigation of the role of the teacher as a positive as well as negative social referent for peer status.

The Present Study

The present study explicitly tested the social referencing mechanism in two steps. First, we tested a basic social referencing hypothesis by examining paths from teacher behavior via peer perceptions of teacher (dis)liking to peer status, controlling for peer perceptions of student behavior and gender. Figure 3.1 represents an overview of the conceptual model. Teacher behavior encompassed positive and negative teacher behavior in the affective and cognitive domain. For peer perceptions of teacher (dis)liking of a student, we investigated peer reputation of teacher liking (PRTL) and disliking (PRTD; see Peer Reputation of Teacher Support; Hughes et al., 2014). Peer status comprised

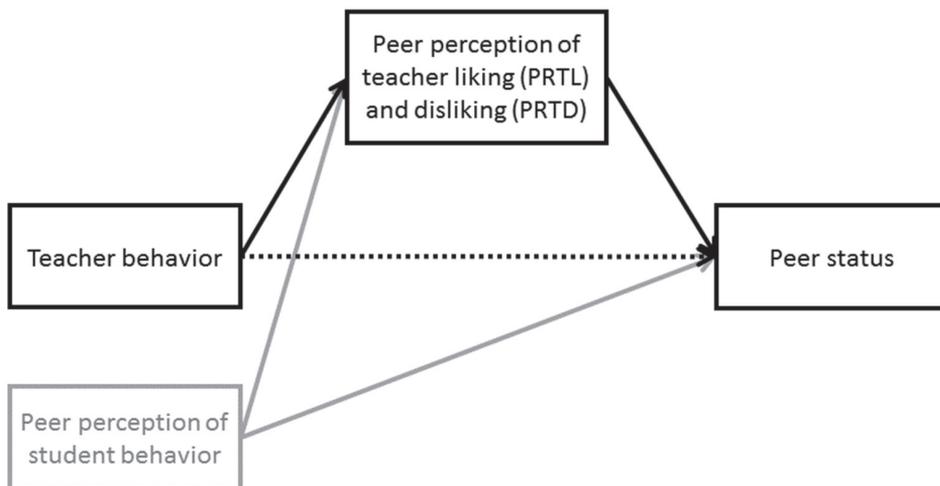


Figure 3.1. Overview of the conceptual model tested in this study. Teacher behavior comprises positive and negative behavior in the cognitive and affective domain. Peer perception of student behavior concerns prosocial behavior, overt and relational aggression, social withdrawal, and academic achievement. Peer perception of teacher liking and disliking comprises PRTL and PRTD (Peer Reputation of Teacher Liking and Disliking). Peer status comprises peer liking and peer disliking. Solid black lines represent the basic social referencing hypothesis. The grey lines depict the role of student behavior. The dashed line is expected to be 0 under the strong social referencing hypothesis.

both liking and disliking status to discern how the teacher contributes to both acceptance and rejection.

As a second step, we tested whether a strong hypothesis of social referencing was tenable – that is, whether associations between teacher behavior and peer status are fully mediated by PRTL and PRTD (i.e., the dashed line in Figure 3.1 equals zero). Following social referencing (Hughes et al., 2001; Walden & Ogan, 1988), we expected positive teacher behavior to be indirectly and positively related to peer liking and negatively to peer disliking, fully mediated by (higher) PRTL and (lower) PRTD. For negative teacher behavior, social referencing predicts a negative association with peer liking and a positive one with peer disliking, fully mediated by (lower) PRTL and (higher) PRTD.

Because we assumed positive and negative cognitive cues in teacher behavior to model personal affect less directly than affective cues, we expected a smaller effect of cognitive than of affective teacher behavior. Furthermore, based on previous research in which negative behavior was more consistently associated with peer status than positive behavior (see McAuliffe et al., 2009; White & Kistner, 1992), we expected negative teacher behavior to be more strongly related to peer status than positive behavior. This is in line with negativity bias, or a “propensity to attend to, learn from, and use negative information far more than positive information” (Vaish, Grossman, & Woodward, 2008, p. 383). Similarly, PRTD was expected to have a stronger association with peer status than PRTL.

In addition to the social referencing paths, we expected peer perceptions of prosocial behavior and academic achievement to relate to PRTL because of a positive halo effect (Thorndike, 1920) and peer-perceived aggressive behavior and social withdrawal to predict PRTD because of a negative halo effect. Finally, we expected prosocial behavior and academic achievement to be positively related to peer liking status and negatively related to peer disliking status, and aggression and social withdrawal to be positively related to peer disliking status (Asher & McDonald, 2009; Newcomb et al., 1993).

METHOD

Design

Data were collected at three time points within one school year (fall, winter, and spring). Teacher behavior and peer-perceived student behavior were measured at Time 1 (T1), PRTL and PRTD at Time 2 (T2), and peer liking and disliking status at Time 3 (T3). Measuring the variables at different time points added to the predictive power of the proposed model (Hayes, 2013), although we acknowledge that we could not draw conclusions regarding causality.

Participants

Teachers and their students in 56 classes from 37 elementary schools participated in this study, which was part of a larger research project on classroom climate in fifth grade⁷. Class sizes ranged from 18 to 34 students ($M = 26.14$, $SD = 3.75$).

7 In total, 59 classes participated in the research project. Three classes, from three schools, were not included in the present study: one because the class dropped out after T1, one because of its exceptionally large class size and two teachers present at all times, and one because the classroom teacher was on personal leave at T2.

Only students for whom informed parental consent was obtained for both video recording and questionnaires participated (1420 out of 1466; 96.9%). The students' mean age at T1 was 10.60 years ($SD = 0.50$), and 47.3% were girls. According to the classification used by Statistics Netherlands (2012b), 84.3% of the students were Dutch (both parents born in the Netherlands), 5.5% were Western immigrants (at least one parent born in another Western country) and 10.2% were non-Western immigrants (at least one parent born in a non-Western country). This distribution was representative for the areas in which the schools were located (Statistics Netherlands, 2012a).

In the Netherlands, primary school students have the same teacher for every lesson (approximately 25 hours a week) or two part-time teachers. Fourteen classes (25%) had a single teacher and 42 classes had two teachers, in which case the teacher who spent the most hours in the classroom participated (60.7% of all teachers were with their class at least four days a week). At T1, teachers were on average 41.33 years old (range 24.51 to 62.47, $SD = 11.92$), had an on average of 15.12 years of experience (range 1 to 39, $SD = 11.01$), and most were women ($n = 36$, 64.3%).

Measures

Teacher behavior. From two hours of video observation, we coded teacher behavior in each occurrence of public dyadic teacher-student interaction. Using event sampling, every instance of teacher behavior was coded when (a) at least half of the student's classmates were present in the classroom and (b) it was uttered in connection to a single student or small group. Our approach of coding only public teacher behavior excluded those teacher behaviors exhibited to a few students with a soft voice (e.g., working with an individual student or small group of students), while others were working independently or in separate small groups. Each occurrence was coded as negative, positive, or neutral/other (see McAuliffe et al., 2009), for the affective and cognitive domain independently. For example, a single teacher comment could be positive in the affective domain but negative in the cognitive domain. Table 3.1 provides an

Table 3.1

Operationalization of Teacher Positive and Negative Behavior

Code	Indicators	Examples
Affective domain		
Negative	Teacher shows conflict, verbalizes disliking for the student or his behavior.	Warning a child by calling their name "Stop that!" "You are being really annoying right now!" "Please stop that"
Positive	Teacher shows warmth, verbalizes liking for the student or his behavior.	Words of affection, like sweetheart, darling, dear, my friend Laughing and joking "That's very nice of you" "Thank you"
Cognitive domain		
Negative	Teacher indicates that a student's contribution is incorrect	"You got it wrong" "No" "That is almost correct" "That's just not quite right"
Positive	Teacher acknowledges or praises the student's contribution	"Yes" "Correct" "That is perfect"

overview of the operationalization and examples for each code. As we were mainly concerned with positive and negative teacher cues, we used the number of positive affective, negative affective, positive cognitive, and negative cognitive comments. The neutral/other code was included to be able to code all behavior exhaustively. The first author and two trained research assistants scored the videos. Inter-observer agreement was first checked for event occurrence; agreement that an event had occurred ranged from 81% to 87% for the pairs of observers. Next, a set of 1624 occurrences (8.9% of the total number of fragments) of teacher behavior was coded with respect to the content. Weighted Cohen's kappas for the affective domain ranged from .72 to .77 for the pairs of observers (substantial agreement; Landis & Koch, 1977) and ranged from .83 to .86 for the cognitive domain (almost perfect agreement).

Peer perceptions of teacher liking and disliking. PRTL and PRTD were each measured with one peer nomination item (PRTL: "Which classmates are liked most by the teacher?"; PRTD: "Which classmates are liked least by the teacher?"). Items stated the name of the teacher involved. Students nominated from a list containing all first names of their classmates. To avoid sequence effects (see Poulin & Dishion, 2008), the names were presented in a random order that was different for each participant. Same and opposite-sex nominations were allowed, and nominations were unlimited, with a minimum of one. Apart from themselves, students could nominate any classmate, whether or not present and consented. Nominations of non-consented students were excluded from the dataset. We calculated a proportion score for PRTL and PRTD for every student as the number of received nominations divided by the number of nominators (i.e., the students who were present and consented, reduced by 1 if the student was among the nominators).

Peer liking and disliking status. We measured peer liking and disliking status by asking students to nominate those peers they liked most ("Which classmates do you like most?") and peers whom they liked least ("Which classmates do you like least?"). The same procedures were applied as those for PRTL and PRTD to gather the nominations and to compute proportion scores.

Peer perceptions of student behavior. Peer perceptions of prosocial behavior, overt and relational aggression, social withdrawal, and academic achievement were measured using similar sociometric procedures. The prosocial items were "Which classmates cooperate well?" and "... help other children?" (Cronbach's $\alpha = .86$). Overt aggression items were: "Which classmates call other children mean names?" and "... hit or kick other children?" (Cronbach's $\alpha = .94$). Relational aggression items were: "Which classmates gossip about other children?" and "... exclude other children?" (Cronbach's $\alpha = .83$). The social withdrawal item was "Which classmates are often by themselves during breaks?". Peer-perceived academic achievement was measured using the item "Which classmates receive high

grades?”. For each item, proportion scores were computed as indicated above. Prosocial behavior and overt and relational aggression were calculated as the average scores on the relevant items.

Procedure

Schools located in middle, southern, and eastern regions of the Netherlands were recruited to participate. After a school’s principal and the classroom teacher agreed to participate, parents were informed about the study goals and were asked for their consent regarding their child’s participation. Data were collected in the fall (T1), winter (T2) and spring (T3) of the 2012/2013 school year, 13 to 15 weeks (T1–T2) and 9 to 11 weeks (T2–T3) apart. At every time point, all consented students completed the questionnaires on netbook computers in their own classrooms. The students were seated separately and partition screens flanked the netbooks to prevent distraction and increase privacy. Standard instructions were given concerning the content of the questions and confidential data handling. Two hours of video were recorded on the same day the questionnaires were completed. A camera was positioned in the back of the classroom and teachers wore a microphone, so that their verbal behavior was well audible to the observers. During video recording, no researcher was present in the classroom. Teachers were free to follow their normal lesson plans, except from scheduling tests – because little interaction takes place during tests – and from individual student presentations – because classroom interactions then typically revolve around the presenting student. After the third measurement moment, teachers received a summary of the findings for their classrooms.

Analysis

To test our hypotheses, two path analysis models were tested using M_{plus} version 7.2 (Muthén & Muthén, 1998–2012). First, to test the basic social referencing hypothesis, we specified a model containing paths from T1 teacher behavior variables to T2 PRTL and PRTD and from T2 PRTL and PRTD to T3 peer liking and disliking status (the solid black lines in Figure 3.1), and all paths from T1 student behavior variables to T2 PRTL and PRTD and to T3 peer

liking and disliking status (the grey part of Figure 3.1). Gender was added as a dichotomous predictor variable (boys = 0, girls = 1). Second, to test the strong social referencing hypothesis of full mediation, paths from T1 teacher behavior to T3 peer status were added (the dashed line in Figure 3.1), and the change in model fit was examined as well as the significance of the parameter estimates.

To account for the nested data structure with students clustered in classes, the "Complex" function in Mplus was used with maximum likelihood estimation with robust standard errors (MLR). All predictor variables, except for gender, were class-mean centered (i.e., the class mean was subtracted from the individual scores) to correct for classroom-level tendencies to nominate more or fewer students or teachers' tendencies to have more or fewer positive and/or negative interactions with their students (see Marsh et al., 2012). In addition, both models contained all covariances among the T1 predictors, between T2 PRTL and PRTD and between T3 peer liking and disliking status.

As part of the research project on classroom climate, 25 of the 56 classrooms participated in an intervention between T1 and T2, which involved increasing teacher awareness of the classroom social climate, rearrangement of classroom seating, and teacher assignments with individual students. We therefore also tested for path invariance across the intervention and control conditions. We used chi-square difference tests based on log likelihood values and scaling correction factors obtained with the MLR estimator (see Satorra, 2000) to compare the constrained (equal path estimates for both conditions) and unconstrained (path estimates freely estimated for both conditions) models. For model identification reasons, we tested invariance separately for the prediction of PRTL and PRTD, and for peer liking and peer disliking status. Path invariance could be assumed for peer liking and peer disliking, $\Delta\chi^2(10) = 7.15, p = .711$. For PRTL and PRTD, path invariance could not be assumed, $\Delta\chi^2(11) = 26.82, p = .005$, unless the path from gender to PRTL was allowed to vary across conditions; $\Delta\chi^2(10) = 17.61, p = .062$. The path was significant and positive for both conditions but was stronger in the intervention condition.

Hence, the path from gender to PRTL was estimated separately for both conditions.

In a similar vein, classes that had a single teacher or two teachers can be considered two subpopulations in which social referencing paths might differ. Using the same procedure as applied for model invariance across study conditions, we tested model invariance for the classes that had a single teacher versus the classes in which the primary of two teachers participated. Path invariance could be assumed for all outcomes (PRTL: $\Delta\chi^2(5) = 4.66, p = .459$, PRTD: $\Delta\chi^2(6) = 6.25, p = .396$, peer liking: $\Delta\chi^2(4) = 2.25, p = .690$, and peer disliking: $\Delta\chi^2(6) = 4.38, p = .625$).

RESULTS

Preliminary Analyses

Before running the analyses, assumptions were checked. Negative teacher behavior variables, PRTD, peer disliking, overt and relational aggression, and social withdrawal were positively skewed, which was accounted for by the MLR estimator. Assumptions of univariate and multivariate linearity and homoscedasticity were met. In total, 49 students (3.5%) had multivariate outliers; these cases differed from those without outliers in prosocial behavior: $M_{\text{outlier}} = -.08$; $M_{\text{no_outlier}} = .00$; $t(49.94) = 3.34, p = .002$, overt aggression, $M_{\text{outlier}} = .15$; $M_{\text{no_outlier}} = -.01$; $t(49.03) = 3.42, p = .001$, social withdrawal, $M_{\text{outlier}} = .06$; $M_{\text{no_outlier}} = -.00$; $t(49.30) = 2.37, p = .022$, and PRTD, $M_{\text{outlier}} = .22$; $M_{\text{no_outlier}} = -.01$; $t(48.60) = 4.67, p < .001$. As the scores of these outlier cases were extreme but not impossible, we kept the data intact and ran the analyses twice, including and excluding outliers.

Descriptive statistics of the study variables are displayed in Table 3.2. Missing values were all due to absence on the day of data collection or to students who were no longer attending the school. Teachers made more negative than positive comments in the affective domain, $t(1377) = 6.24, p < .001$, but more positive than negative comments in the cognitive domain, $t(1377) = 25.92, p < .001$. On average, students were perceived by their peers as being more liked by the teacher (PRTL) than disliked (PRTD), $t(14100) = 30.88,$

$p < .001$, and peer liking scores were higher than peer disliking scores, $t(14050) = 14.51, p < .001$. The intra-class correlations (ICC) represent the amount of variance that can be ascribed to the class level. These ranged from 0% (for social withdrawal) to 56% (for PRTL). In general, ICCs for positive teacher and peer variables were higher than those for negative variables (regarding teacher behavior and peer perceptions).

Table 3.3 shows the bivariate Spearman correlations, which were used given the non-normality. Most correlations are in line with the social referencing hypotheses; both types of negative teacher behavior were positively related to PRTL, which was negatively related to peer liking and positively to peer disliking status. PRTL was positively associated with peer liking and negatively with peer disliking status. Only the correlations involving positive teacher behavior were not in line with the expectations. Positive teacher behavior in the affective domain was slightly negatively related to PRTL ($r_s = -.11, p < .001$) and positively to PRTL ($r_s = .09, p = .001$). Positive teacher behavior in the cognitive domain was positively related to PRTL ($r_s = .05, p = .047$). Finally, positive teacher behavior in the affective domain was slightly positively correlated with peer disliking ($r_s = .06; p = .034$).

Basic Social Referencing Model

In the first model, we tested all paths from teacher behavior to PRTL and PRTL and from PRTL and PRTL to peer liking and disliking status, while controlling for peer-perceived student behavior and gender (see Figure 3.2 for the path diagram). The model fit was excellent; $\chi^2(8) = 6.95, p = .542$, RMSEA = .00, CFI = 1.00, TLI = 1.00, SRMR = .00. Table 3.4 contains the parameter estimates for this model. The model explained 40.9% of the variance in PRTL, 59.8% of the variance in PRTL, 32.1% of the variance in peer liking, and 51.6% of the variance in peer disliking.

Negative teacher behavior in both the affective and cognitive domains predicted PRTL, which in turn predicted peer disliking status. As expected, PRTL and PRTL were both predicted by the student behavior variables and gender. PRTL was most strongly associated with peer-

Table 3.2

Descriptive Statistics of the Study Variables

Variable	N	M	SD	Min	Max	ICC
Social referencing variables						
Teacher positive affective T1	1378	1.42	2.32	0.00	20.00	.36
Teacher negative affective T1	1378	2.02	3.30	0.00	39.00	.11
Teacher positive cognitive T1	1378	2.22	2.77	0.00	21.00	.20
Teacher negative cognitive T1	1378	0.46	0.98	0.00	9.00	.10
PRTL T2	1411	.34	.19	.00	1.00	.56
PRTD T2	1411	.10	.16	.00	.97	.04
Peer liking T3	1406	.21	.12	.00	.67	.18
Peer disliking T3	1406	.12	.15	.00	1.00	.01 ^a
Control variables						
Prosocial behavior T1	1420	.27	.15	.00	.82	.17
Overt aggression T1	1420	.11	.18	.00	.98	.02
Relational aggression T1	1420	.12	.13	.00	.76	.03
Social withdrawal T1	1420	.06	.12	.00	.95	.00 ^a
Academic achievement T1	1420	.25	.24	.00	1.00	.03

Note. Descriptive statistics reflect scores before centering. PRTL = Peer Reputation of Teacher Liking.

PRTD = Peer Reputation of Teacher Disliking.

^a ICCs of peer disliking and social withdrawal were not significant.

perceived prosocial behavior of the student, and girls were viewed as liked more by the teacher than boys. PRTD, on the other hand, was most strongly predicted by overt aggression. Peer liking status was most strongly predicted by peer-perceived prosocial behavior, but also (negatively) by peer perceptions of social withdrawal. Peer disliking status was, next to PRTD, predicted by social withdrawal and overt aggression, and was negatively related to prosocial behavior. Boys were liked somewhat more than girls, and girls were disliked somewhat more than boys. This could be due to the slightly skewed gender distribution in the sample. As liked-most nominations are mostly given to same-sex peers and liked-least nominations to opposite-sex peers (e.g., Dijkstra, Lindenberg, & Veenstra, 2007; Rose & Smith, 2009), with more boys in the sample boys were more likely to receive liked-most nominations and less likely to r

Table 3.3

Bivariate Spearman Correlations among all Study Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Social referencing variables													
1. Teacher positive affective	-												
2. Teacher negative affective	.23**	-											
3. Teacher positive cognitive	.27**	.12**	-										
4. Teacher negative cognitive	.20**	.17**	.33**	-									
5. PRTL T2	-.11**	-.30**	.01	-.05	-								
6. PRTD T2	.09**	.29**	.05*	.10**	-.59**	-							
7. Peer liking T3	-.04	-.16**	.00	-.00	.29**	-.30**	-						
8. Peer disliking T3	.06*	.19**	.04	.05	-.38**	.46**	-.51**	-					
Control variables													
9. Prosocial behavior T1	-.09**	-.27**	-.00	-.08**	.57**	-.55**	.53**	-.56**	-				
10. Overt aggression T1	.12**	.33**	.03	.08**	-.51**	.66**	-.29**	.42**	-.56**	-			
11. Relational aggression T1	.08**	.25**	.08**	.07**	-.31**	.40**	-.20**	.35**	-.32**	.53**	-		
12. Social withdrawal T1	-.04	-.03	-.02	-.04	-.02	.05	-.28**	.19**	-.23**	.02	-.16**	-	
13. Academic achievement T1	-.02	-.12**	-.02	-.09**	.24**	-.27**	.31**	-.31**	.56**	-.22**	-.18**	-.16**	-
14. Gender	-.14**	-.28**	-.02	-.07**	.47**	-.41**	.08**	-.17**	.35**	-.49**	.02	-.04	-.03

Note. All variables are group mean centered, except for peer (dis)liking; PRTL = Peer Reputation of Teacher Liking; PRTD = Peer Reputation of Teacher Disliking.

* $p < .05$. ** $p < .01$.

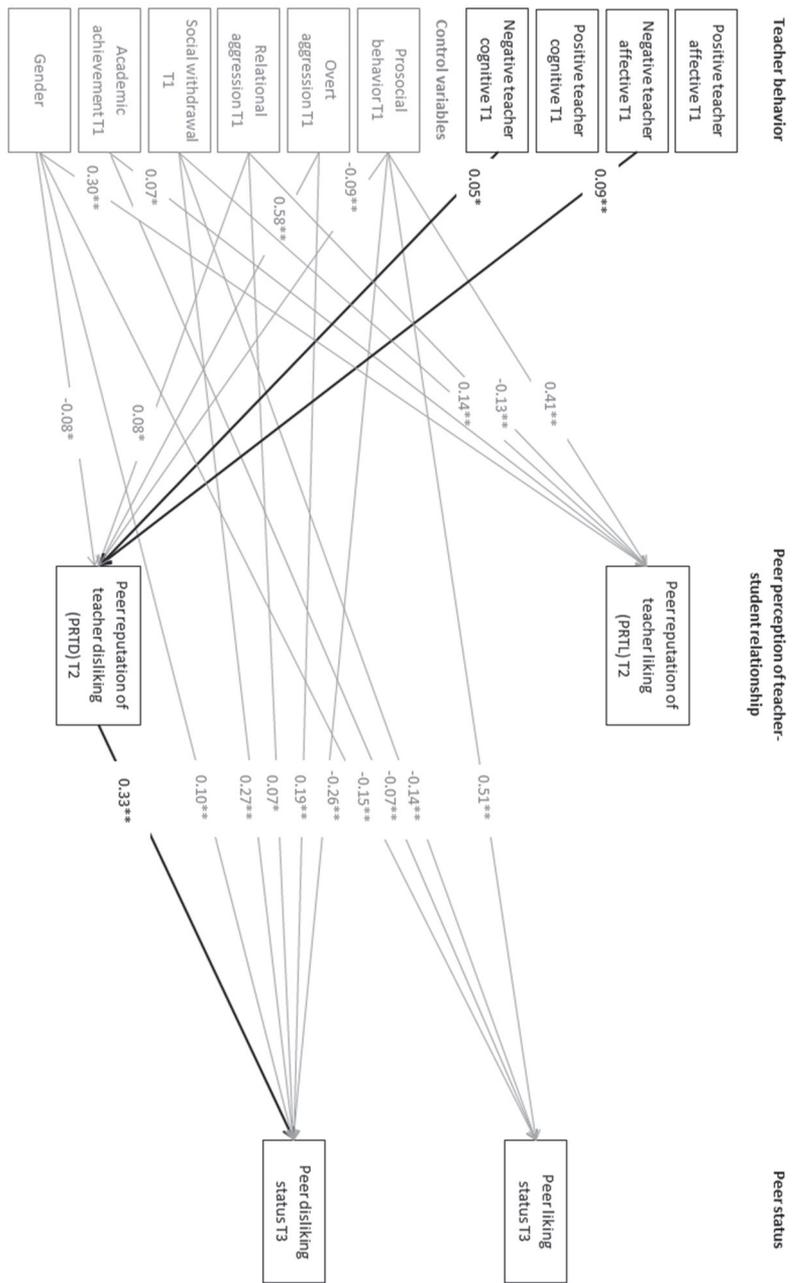


Figure 3.2. Path diagram of the final model, containing all significant paths except covariances among measures taken at the same time point (e.g., peer liking and disliking status at T3). Black arrows represent social referencing paths, grey arrows represent control variable paths. Standardized path estimates are provided. * $p < .05$. ** $p < .01$.

Table 3.4

Path Analysis Results of the Basic Social Referencing Model, Predicting Peer-perceived Teacher Liking and Disliking and Peer Status

Predictor	Peer perception of teacher liking and disliking				Peer status			
	PRTL T2		PRTD T2		Peer liking T3		Peer disliking T3	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Social referencing variables								
Positive teacher affective T1	0.00 (0.00)	0.00	0.00 (0.00)	0.01				
Negative teacher affective T1	0.00 (0.00)	-0.01	0.01 (0.00)**	0.09				
Positive teacher cognitive T1	0.00 (0.00)	0.05	-0.00 (0.00)	-0.01				
Negative teacher cognitive T1	-0.00 (0.00)	-0.01	0.01 (0.00)*	0.05				
PRTL T2				0.02 (0.03)	0.02	0.05 (0.03)		0.04
PRTD T2				-0.05 (0.03)	-0.06	0.31 (0.06)**		0.33
Control variables								
Prosocial behavior T1	0.38 (0.04)**	0.41	-0.10 (0.03)**	-0.09	0.47 (0.04)**	0.51	-0.28 (0.04)**	-0.26
Overt aggression T1	0.01 (0.03)	0.02	0.51 (0.04)**	0.58	-0.04 (0.03)	-0.06	0.16 (0.05)**	0.19
Relational aggression T1	-0.13 (0.03)**	-0.13	0.10 (0.05)*	0.08	0.00 (0.03)	0.00	0.08 (0.04)*	0.07
Social withdrawal T1	0.14 (0.03)**	0.14	0.04 (0.03)	0.03	-0.15 (0.02)**	-0.14	0.33 (0.04)**	0.27
Academic achievement T1	0.04 (0.02)*	0.07	-0.03 (0.02)	-0.04	-0.04 (0.01)**	-0.07	0.02 (0.02)	0.03
Gender	0.07 (0.01)*** ^a	0.30	-0.02 (0.01)*	-0.08	-0.04 (0.01)**	-0.15	0.03 (0.01)**	0.10
R^2	.41		.60		.32		.52	

Note: PRTL = Peer Reputation of Teacher Liking; PRTD = Peer Reputation of Teacher Disliking.

^a The path from gender to PRTL is the combined path for both conditions. The parameter estimate was 0.10 (SE 0.02, $p < .001$) for the intervention and 0.05 (SE 0.01, $p < .001$) for the control condition.

boys in the sample boys were more likely to receive liked-most nominations and less likely to receive liked-least nominations.

Appendix A shows the results of the model when excluding the multivariate outliers, which were very similar, except that the path from negative teacher behavior in the affective domain to PRTL became significant, $b = -0.002, p = .042$. This path was consistent with social referencing theory, but its effect size was relatively small ($\beta = -0.04$). The appearance of this path after excluding outliers might indicate that the outliers increased error variance and thus decreased power to detect smaller effects (Howitt & Cramer, 2011; Stevens, 2001).

The role of student behavior. To examine the importance of the covariates in the social reference model, we tested the model again without peer perceptions of student behavior. Although this less complex model showed a good fit, $\chi^2(8) = 8.42, p = .394, RMSEA = .01, CFI = 1.00, TLI = 1.00, SRMR = .01$, the AIC (-7817.30 vs. -9801.99) and BIC (-7702.42 vs. -9561.78), indices showed better model fit for the one including the covariates. The less complex model also explained considerably less variance; only 5.6% and 16.3% of the variance in PRTL and PRTD, and 11.0% and 34.2% of the variance in peer liking and disliking. The worse model fit and the lower rate of explained variance in the less complex model highlight the importance of considering student behavior and gender as covariates.

Strong Social Referencing Model

Finally, we tested whether a strong hypothesis of social referencing was tenable – that is, whether teacher behavior was only indirectly related to peer status through peer perceptions of teacher (dis)liking. Adding direct paths from the teacher behavior variables to peer liking status did not improve the model fit; $\Delta\chi^2(8) = 6.95, p = .542$. Correspondingly, neither of these paths were significant. Table 3.5 shows the coefficients of the indirect paths from the teacher behavior and student variables to peer disliking status, mediated by PRTD. The indirect path from overt aggression to peer disliking, via PRTD, was the most prominent.

Table 3.5

Indirect Effects on Peer Disliking via Peer Reputation of Teacher Disliking

Predictor	<i>B</i> (<i>SE</i>)	β
Social referencing variables		
Negative teacher affective T1	0.001 (0.000)**	0.03
Negative teacher cognitive T1	0.003 (0.001)*	0.02
Control variables		
Prosocial behavior	-0.032 (0.012)**	-0.03
Overt aggression	0.159 (0.031)**	0.19
Relational aggression	0.032 (0.015)*	0.03
Gender	-0.007 (0.003)*	-0.03

* $p < .05$. ** $p < .01$.**DISCUSSION**

Social referencing theory posits that peers evaluate a student based, in part, on their observations of teacher-student interaction (Hughes et al., 2001; McAuliffe et al., 2009). This study was the first to investigate all three components of social referencing together and over time: teacher behavior, peer perceptions of the teacher (dis)liking of students, and peer (dis)liking status. Also, this study added to earlier research by considering the added value of teacher behavior over and above well-known effects of peer perceptions of student behavior and student gender (see Cillessen & Mayeux, 2004; Newcomb et al., 1993). We found partial evidence for the social referencing theory, particularly through a negative pathway. The more negative teacher comments a student received, the more peers thought the teacher disliked that student, which was

in turn related to a higher peer disliking status. As social referencing theory predicts (Hughes et al., 2001), the association of teacher behavior with peer disliking status was fully mediated by how peers perceived teacher disliking of the student. However, contrary to earlier findings (see Hughes et al., 2001, 2014), we did not find evidence of a positive social referencing pathway linking positive teacher behavior with peer liking. The present study findings underline the importance of controlling for student behavior, and examining effects for peer liking and disliking status separately.

Negative Teacher Behavior and Teacher Disliking

In concordance with McAuliffe et al.'s (2009) and White and Kistner's (1992) findings, negative teacher behavior was positively associated with subsequent peer disliking status. And in line with negativity bias (Vaish et al., 2008), negative teacher behavior was more strongly related to peer status than positive behavior. As predicted by social referencing theory (Hughes et al., 2001), the association of negative teacher behavior with peer status depended on peer perceptions of teacher disliking. Nonetheless, peer-perceived overt aggression was a stronger predictor of both PRTD and peer disliking than teacher behavior. This may indicate a negative halo effect; when peers see aggressive student behavior they are inclined to think the teacher must dislike the student (Moskowitz, 2005; Thorndike, 1920). Alternatively, other, unrecorded teacher behaviors might be more strongly connected to PRTD. To further explore whether the origin of PRTD lies primarily in teacher behavior or in specific student behavior, it would be interesting to interview students and ask how they know that the teacher dislikes a certain classmate.

As expected, negative teacher behavior in the affective domain predicted PRTD more strongly than negative teacher behavior in the cognitive domain. The former directly communicates teacher negative affect of what a student says or does, whereas this affective valence is less clearly present in the cognitive domain. When a teacher says that an answer is incorrect, peers will not necessarily believe that the teacher dislikes the student. Still, the negative information in the cognitive domain added to peer perceptions of teacher disliking. In line with Hughes et al. (2001), PRTD was

associated with peer disliking but not peer liking. Apparently, having a reputation of being disliked by the teacher has the power to amplify negative affect among peers but does not reduce liking.

Positive Teacher Behavior and Teacher Liking

Notably, teacher behavior did not inform peer-perceived teacher liking, and peers seemed to use other information sources to decide whether or not the teacher likes a student. We found indications of a positive halo effect: peer-perceived prosocial behavior and academic performance predicted peer perceptions of teacher liking. Alternatively, peers might deduce the teacher's preferences from other teacher practices, for example, spending time with students during breaks, contact in the hallway or giving students special tasks. Also, positive teacher behavior in the affective domain may have included praise for compliance (e.g., "thank you for using your soft voice"), which teachers possibly use more often with students who generally show undesirable behavior. The finding that teacher positive and negative behaviors correlated positively, which was inconsistent with McAuliffe et al.'s (2009) findings, might also reflect this. A student who often disrupts a lesson may receive many negative teacher comments, but also more positive teacher comments when he does occasionally comply with the classroom rules. For future research, it seems worthwhile to interview students and ask why they think that the teacher likes a classmate, and to unravel which positive comments actually send the message that the teacher is not pleased with the student.

Inconsistent with the findings of Hughes et al., (2001; 2006; 2014), PRTL did not predict peer status after controlling for peer perceptions of student behavior and student gender. Our consideration of these covariates might explain this difference. We did find a positive correlation between PRTL and peer liking status, but PRTL did not uniquely predict peer liking after controlling for the covariates. Given the current results, it seems important to take student behavior and student gender into account, as not including them might lead to an overestimation of associations between teacher variables and peer status. An alternative

explanation could be that some students were viewed as the teacher's pet (Babad, 2009). Babad (1995) found that peers either liked the students whom they also perceived the teacher to like (liked by all) or disliked those students (teacher's pet), and that a larger part of students who were liked by the teacher were also liked by peers. Similarly, in our study, of the 194 students who had a relatively high PRTL score (at least one SD above the mean), 56 (28.9%) also had a high score on peer liking, but 29 (14.9%) had a high score on peer disliking. For future research, it would be interesting to investigate the determinants of being in the "liked by all" versus the "teacher's pet" category. Possibly, in Hughes et al.'s younger student samples, the teacher's pet phenomenon was less of an issue, as younger students seem to be more likely to adopt the teacher's views than older students (Chang et al., 2007). Furthermore, in pre-adolescence it becomes less normative to have a positive relationship with the teacher (see Esposito, 1999; Jerome et al., 2009). Therefore, in this age group, some students who are perceived to be liked by the teacher might be at higher risk of not complying to the norm, and being liked less as a result.

Limitations

Our findings must be interpreted in the light of certain limitations. First, to test the social referencing hypotheses, our model examined the association between teacher behavior and students' peer perceptions. However, it is also possible that associations are bidirectional, or entirely the other way around. For example, teachers may behave differently toward well-accepted students than toward rejected students (see De Laet et al., 2014). Also, when peers dislike a student, they might be inclined to mainly view behavior that is in agreement with their negative evaluation (Nickerson, 1998). To further strengthen the evidence for (or against) social referencing, it would be interesting to test the stability of the constructs and bidirectional associations using a cross-lagged panel model.

Secondly, both the mediators and outcomes were measured using single item peer nominations, an approach that introduces higher susceptibility to measurement error than using multiple items. However, since the proportion

scores came from multiple informants, we argue that this has not distorted the findings too much. This approach also raised concerns about shared method variance, as the data coming from the same participants could partly account for the associations. Nonetheless, using a method that is different from asking peers, in order to get to know peers' perceptions of a student, would have impeded the validity of the measures. To limit shared method variance, we designed data collection on mediating and outcome variables at different time points.

One of the major strengths of the current study, as opposed to several earlier studies (e.g., Chang et al., 2007; De Laet et al., 2014; Hughes & Chen, 2011), was that we observed actual teacher behavior, instead of relying on teacher reports as a proxy. A drawback of this method is that teachers could have behaved differently than when no camera was present in the classroom. As a balance to this concern, we were not present in the classroom to minimize intrusiveness, and when asked after the recording, most teachers mentioned that they got used to the camera very fast. Another drawback of observations is that they are time intensive and necessarily cover only a limited time frame. Some students did not have interactions with the teacher at all, and the representativeness of the coded teacher behavior might therefore be limited. Note, however, that more than 18,000 incidents were coded.

Future Directions for Social Referencing Research

While the present study connected actual teacher behavior to peer perceptions of the teacher-student relationship, and thereby has provided further empirical ground for social referencing, future research can undertake several steps that would lead to deeper understanding of teacher effects on students' affective peer evaluations. First, existing research has mainly focused on how students within a class are treated differently by their teacher. Future research could also incorporate differences between classes, regarding overall positivity or negativity in the teacher's behavior or the amount of differential teacher behavior. For instance, in classes where teachers in general treat their students more positively, students in general may like each other better

(see Gest & Rodkin, 2011; Hendrickx, Mainhard, Boor-Klip, Cillessen, & Brekelmans, 2016; Hughes et al., 2006), but students who do receive many negative teacher comments might also stand out more and be more strongly disliked. Thus, research on social referencing could benefit from employing a multi-level approach that also includes teacher-level effects.

Second, social referencing theory implies that an individual student witnesses teacher behavior towards a peer, has an impression of the teacher's evaluation of the peer, and bases his or her own liking of the peer on this impression. Because of the focus on a student's peer status in the entire classroom group, existing research cannot yet make claims about such intra-personal processes. Social referencing research would profit from adopting analysis techniques aimed at unraveling the antecedents of (dis) liking between two individual students (e.g., Snijders, 2001).

Third, in the current as well as prior research (McAuliffe et al., 2009), only teachers' verbal behavior was examined. Non-verbal teacher behavior directed towards a student is likely to contain additional cues that may inform peers' evaluations of a student as well. This could include smiling or giving a student a thumbs-up on the positive side, and frowning or raising one's voice on the more negative side.

Finally, the field would benefit from comparing social referencing processes across age groups so that we can pinpoint the stages in development in which peer status is particularly prone to the influences of teacher behavior. Several studies with differing age groups, ranging from six-year-olds (Chang et al., 2007; Hughes et al., 2006) to adolescents (Engels et al., 2016), have resulted in differing findings, but differences in methods make interpretation difficult.

Practical Implications

When teachers are aware of the possible detrimental impact of their behavior toward a student on peer disliking, they can use this information to interact strategically with their

students. Adapting teacher behavior in public interactions with individual students may also be an avenue to improve the peer status of students in addition to social or behavioral training for the student (e.g., Bierman & Powers, 2009). From our findings, the most important message to teachers is to be wary of publicly communicating negative affect for a student, and that investing in positive interactions with disliked students is probably less effective than decreasing the amount of negative interaction. This is an essential finding, as both faking positive reactions and suppressing negative ones require emotional labor (Glomb & Tews, 2004). Intervention studies targeting teacher-student interaction (e.g., Reinke, Lewis-Palmer, & Merrel, 2008; Spilt, Koomen, Thijs, & Van der Leij, 2012) show that teachers, particularly when provided with feedback, are well able to adjust their interactions with specific students to become less conflicted and more supportive. However, withholding negative attention may not always seem to be suitable, as some student behaviors can be strongly undesirable, or even harmful, and need to be stopped. It could therefore be important to invest in finding ways to keep negative comments subtle and only noticeable to the student in question, so that the teacher can correct undesirable behavior without drawing too much attention.

Appendix A

Path Analysis Results of the Basic Social Referencing Model, Predicting Peer-perceived Teacher-Student Relationship and Peer Status Excluding Outliers

Predictor	Teacher-student relationship		Peer status						
	PRTL T2		PRTD T2		Peer liking T3		Peer disliking T3		
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	
Social referencing variables									
Positive teacher affective T1	0.00 (0.00)	0.00	0.00 (0.00)	-0.00					
Negative teacher affective T1	-0.00 (0.00)*	-0.04	0.01 (0.00)**	0.11					
Positive teacher cognitive T1	0.00 (0.00)	0.04	-0.00 (0.00)	-0.02					
Negative teacher cognitive T1	0.00 (0.00)	-0.00	0.01 (0.00)*	0.06					
PRTL T2				0.03 (0.04)	0.03	-0.00 (0.03)	-0.00		
PRTD T2				-0.04 (0.03)	-0.05	0.21 (0.04)**	0.24		
Control variables									
Prosocial behavior T1	0.37 (0.04)**	0.43	-0.08 (0.03)**	-0.07	0.45 (0.04)**	0.49	-0.24 (0.03)**	-0.26	
Overt aggression T1	0.02 (0.03)	0.02	0.49 (0.04)**	0.59	-0.04 (0.03)	-0.06	0.17 (0.04)**	0.23	
Relational aggression T1	-0.13 (0.03)**	-0.14	0.12 (0.03)**	0.10	0.00 (0.03)	0.00	0.09 (0.03)**	0.09	
Social withdrawal T1	0.12 (0.03)**	0.12	0.03 (0.03)	0.02	-0.16 (0.02)**	-0.15	0.29 (0.03)**	0.26	
Academic achievement T1	0.02 (0.02)	0.04	-0.02 (0.02)	-0.04	-0.03 (0.01)*	-0.06	0.01 (0.02)	0.02	
Gender	0.07 (0.01)**	0.31	-0.02 (0.01)*	-0.07	-0.04 (0.01)**	-0.15	0.03 (0.01)**	0.10	
R^2	.43		.62		.31		.48		

Note: Model fit was excellent, $\chi^2(8) = 9.57, p = .297, RMSEA = .01, CFI = 1.00, TLI = 1.00, SRMR = .01$. PRTL = Peer Reputation of Teacher Liking; PRTD = Peer Reputation of Teacher Disliking.

* $p < .05$. ** $p < .01$.

OUR TEACHER LIKES YOU, SO I LIKE YOU: A SOCIAL NETWORK APPROACH TO SOCIAL REFERENCING ^{8, 9}

ABSTRACT

The teacher is a social referent for peer liking and disliking when students adjust their evaluations of a peer based on their perceptions of teacher liking and disliking for this peer. The present study investigated social referencing as an intra-individual process that occurs over time, using stochastic actor-oriented modeling with RSiena. The co-evolution of peer-perceived teacher liking and disliking networks with peer liking and disliking networks was analyzed in 52 fifth-grade classes in the Netherlands, with 1370 students ($M_{age} = 10.60$). Results showed that when a student viewed the teacher to like a peer, this student would also like this peer. Regarding disliking, there was a stronger effect in the opposite direction, indicating that for students disliking a peer themselves increased the likelihood that they would view the peer as disliked by the teacher as well. In sum, partial evidence for social referencing as an intra-individual process was found. For teachers this implies that particularly the cues they provide regarding their liking of a student, and not necessarily their disliking, may affect individual peers' liking of this student.

⁸ This chapter is based on: Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (accepted for publication). Our teacher likes you, so I like you: A social network approach to social referencing. Journal of School Psychology.

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INTRODUCTION

The classroom is a primary context for peer interactions and for the development of peer relationships (McAuliffe, Hubbard, & Romano, 2009; Rubin, Bukowski, & Parker, 2006). In addition to students' interactions with their teachers, peer interactions and relationships are considered important determinants of social and academic adjustment (Ladd, Kochenderfer-Ladd, Visconti, & Ettekal, 2012; Rubin et al., 2006; Wentzel, 2005). Connecting these two influential agents of child development, a growing body of research has focused on how teachers influence children's development indirectly via peer relationships (e.g., Chang et al., 2007, Hughes, Cavell, & Willson, 2001; McAuliffe et al., 2009). More specifically, one branch of research has viewed the teacher as a social referent for affective peer evaluations – that is, students are hypothesized to use social cues from how the teacher interacts with a peer as information about the likeability of the peer (Hughes et al., 2001; McAuliffe et al., 2009). Because the teacher is the main focal point in the classroom, students have ample opportunity to witness teacher behavior and to develop ideas about whether the teacher likes or dislikes each of their peers. Students can use this information in their own affective evaluations of their classmates (Hughes et al., 2001; Hughes, Im, & Wehrly, 2014). When teachers indeed are social referents for peer liking and disliking, teachers can put this mechanism to use and strategically interact with a student in such a positive manner that they improve peers' views of the student (McAuliffe et al., 2009). In this way, teachers can exert their "invisible hand" (Farmer, McAuliffe, & Hamm, 2011), and affect not only students' academic adjustment but also their social development.

Since social referencing relies on individual students to develop an idea about teacher liking for a peer, and then to adapt their own view of the peer accordingly, social referencing implies an intra-individual process. Research thus far (e.g., Hughes et al., 2001) has only inferred this intra-individual process based on analyses of classroom-level reputation or status. The present study extended the existing research in three ways. First, to directly test social referencing as an intra-individual process, individual

students' tendencies to adjust their liking and disliking of a peer, based on their individual perceptions of the teacher's like or dislike of this particular peer, were investigated. Second, to conduct a further test of social referencing as the mechanism that drives the associations between teacher and peer liking and disliking, possible effects in the opposite direction were studied, so, whether peer (dis)like also affected students' perceptions of teacher (dis)like. Finally, to investigate whether perceived model competence was a factor that impacted social referencing, we examined whether students' likeliness to follow their teacher's affective evaluations of their peers depended on the students' perceptions of the teacher's warmth. Together, these additions to the existing knowledge base will provide more insight into how social referencing actually works within individual students' minds and will make room for directions for teachers that are even better grounded in empirical findings.

The Teacher as a Social Referent for Peer Liking and Disliking

According to social referencing theory, children look to their caregivers for social cues regarding how to respond to novel or startling situations (Feinman, 1982; Walden & Ogan, 1988). Hughes et al. (2001) extended this theory to the classroom and hypothesized that students refer to their teachers' interactions with their peers for cues regarding how to evaluate these classroom peers. Most researchers interested in the impact of teachers on peer liking and disliking relationships in primary schools (first to sixth grade) have focused on how observable teacher behavior (e.g., McAuliffe et al., 2009), teacher-rated preference or affect for students (e.g., Chang et al., 2007; Kiuru et al., 2015), or teacher-rated support and conflict in the teacher-student relationship (e.g., De Laet et al., 2014; Hughes & Im, 2016) are related to peer liking and disliking status. In agreement with social referencing theory, these studies have generally found that children who have positive rather than negative relationships with their teachers are liked more by their classmates. However, based on the nature of these studies, the active role of students who developed an image of how the teacher liked or disliked a peer and accordingly liked or disliked the peer themselves could only

be assumed because student perceptions of teacher liking for their peers were not considered.

Hughes and colleagues (2001, 2014; Hughes, Zhang, & Hill, 2006) extended the existing research by focusing on how students' perceptions of the teacher-student relationship in primary education are related to students' peer liking and disliking status. They found, in accordance with social referencing theory, that students who were viewed by their classmates as having a supportive relationship with the teacher were liked by more of their peers, whereas students who were perceived to be in frequent conflict with the teacher were disliked by more of their peers. To the contrary, research in Belgian secondary schools (Engels et al., 2016; *M*_{age} = 13.79 years) found no significant correlation between peer-perceived teacher-student relationships and peer liking. Thus, it might seem that teachers particularly function as a social referent for students' peer liking and disliking in primary school.

Social referencing as an intra-individual process. Engels et al. (2016) and Hughes et al. (2001; 2006; 2014) investigated peer perceptions as the classroom-averaged reputation or status. Thus, all nominations a student received from any of his or her peers were aggregated into the student's reputation score. Reputations are valuable representations of the valence of a group's sentiment toward a peer (Hughes et al., 2014), and it is not unlikely that a positive association between teacher and peer liking reputation indicates social referencing. However, this is not conclusive evidence for an intra-individual process, so conclusions and implications based on existing research must still be formulated with a certain degree of caution. In the present study, we explicitly focused on the intra-individual processes and studied whether for individual students, thinking that the teacher likes or dislikes a peer would make it more likely that this particular student would come to like or dislike this particular peer as well. For instance, if Ann thinks the teacher likes her classmate Beth, Ann would come to like Beth as well. On the other hand, if Ann thinks the teacher dislikes Beth, Ann will take this as a cue to come to dislike Beth as well. In other words, we investigated

whether teacher (dis)liking ties lead to peer (dis)liking ties, where a tie refers to a relationship of any kind between two actors in a social network (Borgatti, Everett, & Johnson, 2013), the social network in this case being a class of students. Note that we refer to a student viewing that the teacher likes a peer as a *teacher liking* tie, although it is not a tie in terms of an emotional relationship between two people, such as a friendship or a liking tie. Rather, it is a social cognition tie (Babad, 2009; Cillessen, 2009) in the sense that a student identifies those peers whom they believe are liked by the teacher.

Effects of Prior Peer Evaluations on Perceived Teacher Liking and Disliking

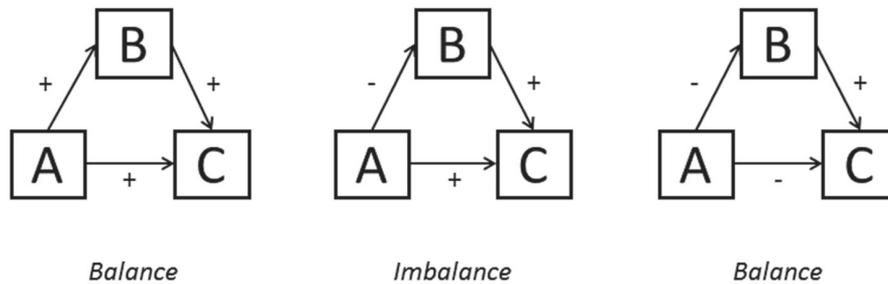
Up to this point, associations between peer-perceived teacher (dis)liking and peer (dis)liking have been mainly explained as students following their teacher's affective evaluations of their peers. This explanation corresponds to the dominant conceptualization of the teacher as a socializing agent who affects peer relations (Farmer et al., 2011). However, students' perception formation might not be such a straightforward process, and effects of peer liking and disliking ties on peer-perceived teacher liking and disliking could also underlie the previously found correlations. When a student likes a peer, the student could be more likely to view the teacher to like this peer accordingly, possibly because confirmation bias (Hymel, Wagner, & Butler, 1990; Nickerson, 1998) plays a role. Confirmation bias refers to students mainly attending to information that corresponds to their already existing evaluation of something (in this case a peer) and disregarding incoherent information. Such a bias is known to affect how students evaluate their peers' personalities and behaviors (Hymel, 1986; Hymel et al., 1990). Translating this bias to the effects of peer (dis)liking on students' perceptions of teacher (dis)liking, it might, for instance, lead Ann, who already likes her classmate Beth, to believe that the teacher also likes Beth because she consistently evaluates interactions between the teacher and Beth as positive and disregards any possible negative interaction. Thus, although associations between peer-perceived teacher liking and disliking and peers' own

liking and disliking are often viewed as driven by students' perceptions of teacher evaluations, students' prior affect for the peer might also drive the associations.

Thus far, little research has been conducted that connects primary school students' perceptions of peers to later perceptions of how teachers view these peers. Only in the study by Engels et al. (2016) in secondary education were such effects included; however, neither peer likeability status nor peer popularity status was associated with later peer-perceived positive and negative teacher-student relationships. By focusing on how peer liking and disliking ties and student perceptions of teacher liking and disliking ties between students developed across three measurement moments across one school year, in the present study we were able to disentangle the effects of each type of tie on the other.

Model Competence: The Moderating Role of Teacher Warmth

Beyond investigating social referencing as an intra-individual process and assessing the direction of effects between teacher and peer (dis)liking ties, the present study also aimed to provide further insight into the conditions under which social referencing might occur. We pursued this goal by examining whether the social referencing effect might be moderated by the amount of teacher warmth that the student perceives. In the process of social referencing, teachers have been theorized to convey information through affective modeling (Bandura, 1992) because the teacher models a positive or negative affect for a certain student. Research on modeling in terms of observational learning has shown that the extent to which the modeled behavior or attitude is learned by students depends on, among other factors, the perceived competence of the model (Schunk, 2004). We propose that, in the case of the teacher modeling social preferences, a relevant teacher characteristic that could add to the perceived model competence of a teacher might be the ability to establish relationships characterized by warmth and positive affect (see Judd, James-Hawkins, Yzerbyt, & Kashima, 2005; Sabol & Pianta, 2012). The more teacher warmth the student perceives, the more relevant and credible the teacher might



become as a model for peer liking. In other words, perceived teacher warmth could moderate the extent to which students are inclined to refer to their teacher for information regarding how to evaluate their peers.

This proposition is in agreement with social balance theory (Heider, 1946), which conceptualizes consistency in positive and negative social relationships as a driver of positive and negative attitudes. That is, if Ann likes Beth, and Beth likes Chris, to create balance, Ann will like Chris as well. In contrast, if Ann dislikes Beth, and Beth likes Chris, Ann disliking Chris also creates a balanced situation. To illustrate how this principle might relate to social referencing, Figure 4.1 represents three situations of social relationships among a student (Ann), a teacher (Mrs. Baker), and a peer (Chris). In the left diagram, there are no

Figure 4.1. Social balance and imbalance in relationships. Pluses represent liking relationships, minuses represent disliking relationships.

tensions in the positive and negative associations among the actors. Ann likes the teacher, and in accordance with Mrs. Baker's evaluation of Chris, Ann likes Chris as well. The middle diagram represents an imbalanced situation, because Ann has a positive relationship in common with someone she dislikes. In this situation, Ann could come to dislike Chris because the teacher likes him (right diagram in Figure 4.1). Because Ann dislikes Mrs. Baker, she will be less likely to accept her as a model. Thus, social referencing could depend on how Ann values Mrs. Baker. In the present study, the student's perception of teacher warmth was considered to represent the extent to which a student values the teacher.

The Present Study

Existing research on social referencing has provided important indications that this mechanism plays a role in students' affective evaluations of their peers. However, the studies conducted so far have focused on peer liking and disliking status as classroom reputation and have not investigated whether social referencing occurs as an intra-individual process. Furthermore, the existing research has rarely employed longitudinal designs, so development over time and the directionality of effects have yet to be examined. In the present study, the focus was on social referencing as an intra-individual process and on changes in students' views of each other over three time points within one school year. Moreover, to incorporate model competence and thereby provide further insight in the conditions under which social referencing might occur, it was examined whether students' perceptions of teacher warmth moderated the effects of perceived teacher (dis)liking on peer ties.

To investigate social referencing at the intra-individual level, stochastic actor-oriented modeling (Snijders, 2001) was applied. This social network analysis technique evaluates how ties within social networks develop over time. In the present study, the development of four networks of ties among students was investigated: a peer liking network, a peer disliking network, a peer perception of teacher liking network, and a peer perception of teacher disliking network. Using stochastic actor-oriented modeling

for the analysis of the co-evolution of multiple social networks (Snijders, Lomi, & Torló, 2013), we could test the main social referencing hypotheses that reflect network change as a result of intra-individual processes from one time point to the next:

Hypothesis 1a. A teacher liking tie leads to the existence of a peer liking tie and the non-existence of a peer disliking tie.

Hypothesis 1b. A teacher disliking tie leads to the existence of a peer disliking tie and the non-existence of a peer liking tie.

As indicated in the section about social referencing as an individual process, a teacher liking or disliking tie between a student and a peer refers to the situation in which the student indicates that the teacher likes or dislikes the peer. As an alternative process that might account for the previously found correlations at the group level, the confirmation bias effect is expressed in the second set of hypotheses:

Hypothesis 2a. A peer liking tie leads to the existence of a teacher liking tie and the non-existence of a teacher disliking tie.

Hypothesis 2b. A peer disliking tie leads to the existence of a teacher disliking tie and the non-existence of a teacher liking tie.

The third hypothesis focused on model competence in terms of teacher warmth:

Hypothesis 3. The extent to which a teacher liking or disliking tie leads to a peer liking or disliking tie depends on the student's perception of teacher warmth.

The hypotheses were tested while controlling for basic tendencies in network development and for gender because students tend to like same-sex classmates and to dislike opposite-sex classmates (e.g., Dijkstra, Lindenberg, & Veenstra, 2007; Rose & Smith, 2009), and girls often have more supportive and less conflicting relationships with teachers than boys (e.g., McCormick & O'Connor, 2015).

10 In total, 59 classes participated in this larger project. Four classes were omitted from the analyses because, over the course of the study, four substitute teachers participated due to an illness, maternity leave or travel of the primary teacher, one class was omitted from the analyses because it did not participate in all three waves, one was omitted because of the permanent presence of two teachers who served an exceptionally large class size of 42 students at wave 1 and 44 at waves 2 and 3, and one was omitted because of a deviation in the data collection procedure at waves 2 and 3.

METHOD

Participants

As part of a larger study of classroom climate in the fifth grade of elementary education in the Netherlands, 52 fifth-grade classes with 52 teachers and their 1370 students participated in three waves of data collection (fall – winter – spring)¹⁰. Only students for whom informed parental consent was provided participated (1351, 98.6% of the total number of students). During the first wave, 1309 students participated (eight had not yet joined the classes, and 34 were absent); during the second wave, 1284 students participated (three had not yet joined, ten had left the classes, and 54 were absent); and during the third wave, 1285 students participated (14 had left the classes, and 53 were absent). There were 1197 students who participated in all three waves (88.6% of all consented students). The students' mean age during the first wave was 10.60 years old ($SD = 0.50$), and 52.6% of them were male. According to the classification of Statistics Netherlands (2012), 83.8% were Dutch (both parents born in the Netherlands), 5.7% were Western immigrants (at least one parent born in another Western country), and 10.5% were non-Western immigrants (at least one parent born in a non-Western country). The class size was, on average, 26.17 pupils ($SD = 3.87$, range 18 to 34). As is quite common in the Netherlands, in 86.5% of the classes in our sample, the composition of the group was, to a large extent, the same as the year before, with only a few students joining or leaving a group. In the Netherlands, as opposed to the group composition, teachers do generally change every year. Students have either a single teacher (12 classes, 23.1%), or two teachers who each work part-time (40 classes, 76.9%). In the case of two teachers, the teacher who spent more time in the classroom participated; in total 32 of all participating teachers (61.5%) taught at least 4 days a week. The teachers were, on average, 41.40 years old (range 24.51 to 62.47, $SD = 11.83$); the teachers' mean experience was 14.96 years (range 1 to 39, $SD = 10.83$), and 33 teachers were female (63.5%).

Instruments

Network data. On each measurement occasion, two peer nomination items were used to measure dyadic peer liking and disliking ties: "Which classmates do you like most?" and "Which classmates do you like least?" Also on each measurement occasion, the students were asked to nominate which of their classmates they thought were liked most and liked least by their teacher: "Which classmates are liked most by ...?" and "Which classmates are liked least by ...?" Each item included the name of the teacher involved. Same- and opposite-sex nominations were allowed and nominations were unlimited. The students were asked to nominate at least one of their classmates. Apart from themselves, the students could nominate any classmate, whether or not present and whether or not consented. Nominations given to non-consented students were excluded from the dataset. Thus, the primary sample of 1309, 1284, and 1285 present and consented students at the three time points indicated to have ties with a larger sample of 1343, 1338, and 1337 students who were consented and belonged to the class at a certain time point. The primary sample of students nominated their classmates from a list. To avoid sequence effects (Poulin & Dishion, 2008), the order of the classmates' names on this list was random and thus different for each participant on each measurement occasion. This nomination procedure resulted in four directed network matrices per class (peer liking and disliking, and peer-perceived teacher liking and disliking).

Teacher warmth. Student perceptions of teacher warmth at the first and second time point were included to predict the development of the peer liking and disliking networks from the first to second and second to third waves. The students evaluated their teachers by completing the Questionnaire on Teacher Interaction for Primary Education (QTI-PE; see Hendrickx, Mainhard, Boor-Klip, Cillessen, & Brekelmans, 2016). The QTI-PE is based on the QTI as developed for secondary education (Brekelmans, Mainhard, Den Brok, & Wubbels, 2011; Wubbels, Brekelmans, Den Brok, & Van Tartwijk, 2006; Wubbels et al., 2012), and in the present study, it was used to measure a student's perceived teacher warmth. The questionnaire consists of 16 items, each of which reflects a certain degree of warmth. The item "This

teacher is friendly”, for example, reflects a high degree of warmth, and items such as “This teacher yells” and “This teacher is impatient” reflect a low level of teacher warmth. The items again included the name of the teacher involved. A 5-point Likert scale was used, ranging from 1 (almost never) to 5 (almost always). Following standard procedures (see Wubbels et al., 2012), each item was weighted for the amount of warmth, and the sixteen weighted item scores were averaged, resulting in a single score, ranging between -1 and 1. The Cronbach’s alpha values were .82 and .86 for the first and second waves, respectively.

Procedure

The data were collected in 2012/2013, with the first wave starting at least one month after the start of the school year. The waves were 13-15 weeks (wave 1 – wave 2) and 9-11 weeks (wave 2 – wave 3) apart. Schools located in the middle, south, and east of the Netherlands were recruited to participate. After a school’s principal and the classroom teacher agreed to participate, parents received information about the goals of the study and were asked for consent for their child to participate. All students for whom informed consent was granted completed the questionnaires on netbook computers in their own classrooms. The students were seated separately, and the netbooks were flanked by partition screens to prevent distractions and to increase privacy. Standard instructions were provided in which voluntary participation was assured, and it was explained that the answers provided would be handled confidentially. After all data were collected, the teachers received a summary of the findings for their classrooms.

Analysis

Social network analysis. The data were analyzed using stochastic actor-oriented modeling with SIENA (Simulation Investigation for Empirical Network Analysis; Ripley, Boitmanis, & Snijders, 2015), a statistical package applied in R software (R core team, 2015) and therefore referred to as RSiena. RSiena is dedicated to the longitudinal analysis of social networks, and it simulates how a network at a certain point in time has developed from a network at an earlier time point (Ripley, Snijders, Boda, Vörös, & Preciado,

2015). It does so by decomposing all network changes into so-called microsteps, in which one student (the actor, ego) has the opportunity to create or terminate one tie toward a classroom peer (alter). Then, it tests whether ego's changes follow tendencies or behavioral rules, which are predefined by the researcher (Ripley, Snijders et al., 2015) to test specific hypotheses. A reciprocity effect is an example of such a tendency: if ego is liked by alter, ego will like alter as well. RSiena yields parameter estimates (β) for each given effect, which can be tested by referring the t-ratio (parameter estimate divided by its standard error) to a standard normal distribution (Snijders, Van de Bunt, & Steglich, 2010). Parameter estimates can be either positive, when a tendency is present in the data, or negative, when the opposite of the tendency is present. As parameter estimates refer to multinomial logit models, they can be interpreted in terms of odds ratios. That is, if a parameter estimate β was obtained in the analysis, then $\exp(\beta)$ gives the odds of an actor making a network change in which the effect statistic increases by one unit versus making a change in which this statistic does not change (see Ripley, Snijders et al., 2015).

In addition to examining changes within single networks, RSiena can also be used to study the co-evolution of two or more networks, in which the ties in one network lead to changes in ties in the other network (Snijders et al., 2013). Using this analysis technique, we tested whether our hypotheses regarding the co-evolution of peer-perceived teacher liking and disliking with peer liking and disliking indeed represented tendencies that explained network change. For instance, we tested the rule "If ego thinks the teacher likes alter, ego will like alter as well" (i.e., Hypothesis 1a: a teacher liking tie leads to a peer liking tie).

Parameter estimation. Estimation was performed using the Method of Moments (Snijders, 2001), and all of the analyses were performed with 3000 iterations and were repeated until convergence was attained, as indicated by an overall maximum convergence ratio lower than .25 (as advised in the RSiena manual; Ripley, Snijders et al., 2015). As indicated in the Participants section, not all students

participated in all three waves of data collection, which induced missing values. RSiena can take into account missing values up to 20%, which are treated in such a way to minimize their impact on the estimation results (Ripley, Snijders et al., 2015). That is, missing data is handled in two steps: first, to enable meaningful simulation on complete data, missing values are imputed. For missing observations at the first measurement moment, the value 0 (no tie, for instance Ann has not indicated to like Beth) is imputed, because in general network data are sparse, so “no tie” is the value that occurs most often. For missing observations at the second or third measurement moment, the prior value, if available, is considered most informative and therefore this value is imputed. As a second step, in order to ensure a minimal impact of imputed missing values on the results and to avoid bias in the parameter estimates, the calculation of the target statistics uses only non-missing data (see Huisman & Steglich, 2008; Ripley, Snijders et al., 2015).

Nested data. Data were nested (measurement occasions were nested within students who were nested within classes). At the lower level of nesting, that of time points within students, the unit of analysis is a period of change from one network at a certain moment to another at the next moment, so in our case there are two periods; one from T1 to T2 and one from T2 to T3. RSiena assumes that the time dynamics is homogeneous, which will lead to smooth trajectories of the main statistics from wave to wave (Snijders et al., 2010). Based on the theory regarding social referencing, we did not have reasons to assume differences in the effects across these periods, which was empirically supported by initial exploration of time heterogeneity.

The RSiena approach to account for the nesting of students within classes is to model effects in two steps: first the models are run for each class separately, which in our case resulted in 52 separate model runs. Next, the results of those model runs are combined across classes in a meta-analysis (Snijders & Baerveldt, 2003). We used this technique to generate mean parameter estimates that reflected the extent to which each hypothesized effect indeed represented a tendency that was present in the

entire sample. Next to overall mean parameter estimates and tests of their significance, the meta-analysis also yields a standard deviation and significance test for each effect. These results were used to evaluate whether the parameter estimates differed across classes.

Analytical plan. Data analysis of the effects per class proceeded in two steps: first for the evolution of separate networks and second for the co-evolution of teacher and peer networks (see Huitsing, Snijders, van Duijn, & Veenstra, 2014).

Evolution of separate networks. In the first analysis step, to control for predominant within-network development effects, we modeled the development of peer liking, peer disliking, teacher liking, and teacher disliking separately. We included the basic effects that have been found in, for instance, friendship networks and other network types (e.g., Ellwardt, Steglich, & Wittek, 2012; see also Snijders, 2001): out-degree (the balance between creating and terminating ties), reciprocity (the extent to which ties are reciprocated), transitivity (the tendency to like those who are liked by the people you like), out-degree activity (the extent to which being nominated by many peers leads to being nominated by more peers), in-degree popularity (the extent to which nominating many peers leads to nominating more peers), and out-degree popularity (the extent to which nominating many peers leads to being nominated by more peers). Further information on the effects and their statistical expressions can be found in the RSiena manual (Ripley, Snijders et al., 2015). For the development of peer disliking, transitivity was not included because we did not assume that when, for instance, Ann disliked Beth and Beth disliked Chris, Ann would become to dislike Chris as well. The peer-perceived teacher liking and teacher disliking networks are networks of social cognition rather than networks of social relationships (see Babad, 2009; Cillessen, 2009). Therefore, we did not expect many of the standard network effects to occur. For instance, just as with peer disliking we did not expect transitivity; that is, when Ann thought Beth was liked by the teacher and Beth thought Chris was liked by the teacher, we had no reason to expect that Ann would be more likely to think that the teacher liked Chris merely

because of the other relationships in this triad. Therefore, only the very basic effects of out-degree, reciprocity, and in-degree popularity were included in the analyses of the teacher networks.

In addition to these within-network effects, gender was included as a control variable. For the liking and disliking networks, we included gender similarity to reflect a tendency to like same-sex classmates and to dislike opposite-sex classmates. For the teacher liking and disliking networks, we included gender of the alter because girls were hypothesized to be more likely to be viewed by their classmates to be liked by the teacher and less likely to be viewed as disliked by the teacher, due to a general tendency of girls to have more supportive and less conflicted relationships with teachers than boys (McCormick & O'Connor, 2015).

Co-evolution of teacher and peer networks. In the second analysis step, we modeled the co-evolution of two networks at a time (Snijders et al., 2013), combining a teacher network with a peer network. With two teacher networks and two peer networks, this resulted in a total of four combinations for each class. Two types of intra-individual (dyadic) effects were tested: the social referencing effects of the teacher ties on the peer ties (the extent to which ego thinking the teacher likes or dislikes alter leads to ego liking or disliking alter; Hypothesis 1), and the confirmation bias effects of the peer ties on teacher ties (the extent to which ego liking or disliking alter leads to ego thinking the teacher likes or dislikes alter; Hypothesis 2). Hypothesis 3, regarding the role of teacher warmth as a moderator of social referencing, was tested using an interaction effect of the students' perception of teacher warmth with the dyadic effect of a student's perception of teacher liking or disliking on the peer tie¹¹. Students' perceptions of teacher warmth were centered around the group mean, so values represent individual deviations relative to the class's average perception of the teacher's warmth (see Enders & Tofghi, 2007). Because these analyses are performed for each class separately, the group mean is per analysis the only available and relevant mean (see Ripley, Snijders et al., 2015). In addition to the effects that directly examined our three hypotheses, popularity effects were tested to compare the intra-individual effects with the effects from

11 *As part of the aforementioned study of classroom climate in fifth-grade classrooms, after the first wave an intervention occurred in 23 of the classes, aimed at increasing teachers' awareness of their classes' peer systems and ameliorating teacher-student and peer contact (for more information, see Boor-Klip, Segers, Hendrickx, & Cillessen, 2016). Results from a MANOVA showed that there were no differences between the conditions in parameter estimates of between-network effects; Wilk's $\Lambda = 0.188$, $F(8, 2) = 1.08$, $p = .566$.*

reputation-based results (the extent to which being perceived by many to be (dis)liked by the teacher leads to being (dis) liked by many peers and the extent to which being (dis)liked by many peers leads to being perceived by many to be (dis) liked by the teacher; see Hughes et al., 2001, 2014).

Supplementary analyses. If a dyadic effect of peer-perceived teacher liking or disliking ties on peer liking or disliking (Hypothesis 1) co-occurred with a dyadic effect in the opposite direction (Hypothesis 2), this would be informative regarding a correlation between Ann thinking the teacher likes Beth and her own liking for Beth, but would still be little informative regarding the source of this association. To delve further into the direction of effects and to determine whether there was more support for Hypothesis 1 or 2, as an additional analysis, we ran the analyses anew, but split up the dyadic effects into a creation and endowment (also referred to as maintenance) function. To explain how these functions are used, we refer to Table 4.1 in which effects from peer-perceived teacher liking on peer liking are disentangled.

RESULTS

Descriptive Statistics

In Table 4.2, descriptive statistics of the four networks for the three time points are presented; in particular, the average densities (number of nominations expressed as a proportion of the maximum number possible), degrees (average number of given or received nominations by an individual), and Jaccard coefficients (the degree of similarity between the networks at subsequent time points; Snijders et al., 2010) are provided. As seen in Table 4.2, the densities and average degrees were higher for peer liking than for peer disliking, indicating that students reported more positive than negative relationships. Furthermore, the students nominated more peers to be liked than disliked by the teacher. For the Jaccard coefficients, with a possible range of 0 (no ties remained the same) to 1 (all ties remained the same), a minimum of .20 is recommended for a model based on a gradual change process to be reasonable (Snijders et al., 2010). On average, the Jaccard coefficients in our study ranged from .25 to .45 for the different networks. Thus, in general, the networks met the

Table 4.1

Situations that are Compared Using the Creation and Endowment Functions

Situation	Ann thinks teacher likes Beth at	Ann likes Beth	Ann likes Beth
	T1	at T1	at T2
1	Yes	Yes	Yes
2	Yes	No	Yes
3	Yes	Yes	No
4	Yes	No	No

Table 4.2

Density, Degree, and Jaccard Coefficient of the Four Networks

Network	Density <i>M (SD)</i>	Degree <i>M (SD)</i>	Jaccard coefficient <i>M (SD)</i>
Peer liking			
T1	.14 (.05)	3.51 (1.09)	.32 (.06)
T2	.19 (.05)	4.73 (1.31)	.37 (.08)
T3	.21 (.05)	5.12 (1.48)	
Peer disliking			
T1	.10 (.03)	2.44 (0.73)	.28 (.07)
T2	.12 (.03)	3.01 (0.68)	.32 (.07)
T3	.12 (.03)	3.06 (0.83)	
Teacher liking			
T1	.29 (.10)	7.28 (2.47)	.34 (.11)
T2	.33 (.12)	8.26 (3.14)	.45 (.13)
T3	.34 (.14)	8.55 (3.62)	
Teacher disliking			
T1	.12 (.04)	2.89 (0.90)	.25 (.11)
T2	.13 (.05)	3.31 (1.24)	.32 (.13)
T3	.14 (.06)	3.45 (1.43)	

Table 4.3

Co-occurrence of Teacher and Peer Ties in Percentages

	Peer network							
	Peer liking				Peer disliking			
	No	Peer tie	Teacher	Both	No	Peer tie	Teacher	Both
Teacher liking								
T1	64.2	7.3	22.1	6.4	64.2	7.3	26.2	2.3
T2	57.0	10.4	24.5	8.1	59.2	8.2	28.9	3.7
T3	55.3	11.2	24.6	8.9	58.3	8.2	29.6	3.9
Teacher disliking								
T1	76.2	12.5	10.1	1.2	82.4	6.3	8.1	3.3
T2	70.3	16.7	10.9	1.9	79.2	7.8	9.0	4.1
T3	68.6	17.8	11.3	2.3	78.1	8.3	9.8	3.8

Note. Mean amount of dyads per class from which these percentages are taken is 664 (Wave1), 650 (Wave2), and 650 (Wave3).

requirements of gradual change. All four networks remained more stable during the second period (wave 2 – wave 3) than the first (wave 1 – wave 2).

Table 4.3 shows how teacher liking and disliking ties co-occurred with peer liking and disliking ties among dyads at the same time point. In all four combinations of teacher and peer networks, the majority of dyads had no ties, neither a teacher liking nor a peer tie (55.3% to 82.4% of the dyads in the four network combinations). As seen in the columns reading “both ties”, peer-perceived teacher liking co-occurred more often with peer liking than with peer disliking, whereas peer-perceived teacher disliking more often co-occurred with peer disliking than with peer liking.

Evolution of Separate Networks

Table 4.4 shows the results of the RSiena meta-analyses of the basic within-network effects that were modeled to control for predominant effects within each separate network. For all four networks, there was a negative out-degree effect. This is quite a common finding (Snijders et al., 2010) and indicates that the networks were sparse rather than dense in nature. As expected, reciprocity effects were only found for peer liking and disliking. Thus, when a student indicated to (dis)like a peer, this peer was more likely to indicate to (dis)like the student as well. The transitivity effect showed that students had a tendency to close triplets; that is, if Ann liked Beth, and Beth liked Chris, Ann was likely to come to like Chris as well. In-degree popularity was significant for all networks, except for peer liking. In the other three networks, when a student was nominated by many classmates, this student was likely to be nominated by even more classmates at the next time point. Out-degree activity and out-degree popularity were only tested for the peer networks. Students who liked or disliked many at a certain time point were likely to nominate even more peers at the next time point (out-degree activity), and students who liked or disliked many others at a certain time point were less likely to be nominated themselves by many others during the next wave (out-degree popularity). Finally, gender effects were in the expected directions: girls were more likely than boys to be perceived as liked by the teacher and less likely to be perceived as disliked by the teacher, and students tended to like same-sex peers and dislike opposite-sex peers.

Co-evolution of Teacher and Peer Networks

To test our hypotheses, social network analyses were performed of the co-evolution of peer-perceived teacher liking and disliking with peer liking and disliking networks in each class. The analyses reached convergence in 61.5% (peer-perceived teacher liking with peer liking network), 73.1% (peer-perceived teacher liking with peer disliking network), 59.6% (peer-perceived teacher disliking with peer liking network), and 67.3% (peer-perceived teacher disliking with peer disliking network). Non-convergence is not uncommon in research applying these social network

Table 4.4

Meta-analysis Results of the Separate Models for the Evolution of Peer Liking, Peer Disliking, Teacher Liking and Teacher Disliking Networks

Effect	Peer Liking	Peer Disliking	Teacher Liking	Teacher Disliking
	Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Out-degree	-1.61 (0.07)**	-2.35 (0.04)**	-0.58 (0.13)**	-1.60 (0.06)**
Reciprocity	1.15 (0.05)**	0.76 (0.06)**	-0.01 (0.03)	0.06 (0.07)
Transitive triplets	0.48 (0.03)**	-	-	-
In-degree popularity	-0.00 (0.01)	0.16 (0.00)**	0.02 (0.01)*	0.11 (0.01)**
Out-degree activity	0.04 (0.00)**	0.08 (0.00)**	-	-
Out-degree popularity	-0.09 (0.01)**	-0.05 (0.01)**	-	-
Gender alter ^a	-	-	0.20 (0.03)**	-0.37 (0.05)**
Gender similarity	0.57 (0.04)**	-0.23 (0.06)**	-	-

^a Gender was coded 0 for boys and 1 for girls.

* $p < .05$. ** $p < .01$.

techniques in multiple groups (see, for instance, Knecht, Burk, Weesie, & Steglich, 2010). Logistic regression analysis at the classroom level was performed to identify significant predictors of convergence. In correspondence with Knecht et al.'s (2010) study, we found that convergence was predicted by the amount of information available (in this case, the degree in the teacher networks, i.e., the average number of nominations, and the number of pupils in the classroom). In addition, convergence was predicted by greater stability (average Jaccard index). Surprisingly, in the network combinations that involved teacher liking ties, the effect of degree was negative, indicating that with more information available there was a smaller chance of convergence. This could be because in some classes many children nominated every other peer to be liked by the teacher ("Our teacher likes all of us"). This situation yielded

limited dispersion of ties, which might have negatively affected convergence. In summary, because with more information and more variability comes greater analytical power, we argue that these results can still reasonably be generalized to the population.

Table 4.5 shows the results of the meta-analyses combining the results from all of the classes in which convergence was reached. The columns reading "Mean parameter" show the mean parameter estimates across all classes and indicate the extent to which each effect represented a tendency that was generally present in the data. The standard deviation indicates the extent to which a parameter estimate differed across classes. In the table, asterisks indicate two-sided p -values; in the remainder of this section, one-sided p -values are used when our hypotheses clearly indicated a positive or negative effect.

Peer liking. The left part of Table 4.5 shows the results of the meta-analyses involving the peer liking network. Following Hypothesis 1a, there was a between-network dyadic effect of peer-perceived teacher liking on peer liking; $\beta = 0.33$, $t = 3.02$, one-sided $p = .003$, odds ratio = 1.39. Thus, when a student indicated that the teacher liked a peer, there was an increased chance of the student indicating liking this peer on the next measurement occasion. There was also a reverse effect, albeit smaller (Hypothesis 2a); when a student indicated to like a peer, there was an increased chance that the student would nominate this peer as someone who is liked by the teacher at the next measurement point; $\beta = .28$, $t = 3.33$, one-sided $p = .001$, odds ratio = 1.32. Because these effects co-occurred, we further examined the direction of effects by re-running the analyses while dividing the tendencies into a creation and endowment part. In this supplementary analysis, only the effects of peer-perceived teacher liking on peer liking were significant. The parameter estimate for creating a new liking tie was 1.09 ($t = 2.87$, one-sided $p = .004$, odds ratio = 2.97), and for terminating an existing liking tie, it was -0.69 ($t = -2.65$, one-sided $p = .007$, odds ratio = 0.50). Thus, when a student thought that the teacher liked a peer, this student was more likely to come to like the

Table 4.5

Meta-analysis Results of the Co-evolution of Teacher and Peer Networks

Effect	Peer liking network				Peer disliking network			
	Mean parameter	Standard deviation	χ^2	df	Mean parameter	Standard deviation	χ^2	df
Social referencing effects								
Teacher liking tie → peer tie	0.33 (0.11) ^{††}	0.61**	80.64	31	0.07 (0.07)	0.43	40.08	34
Teacher disliking tie → peer tie	-0.08 (0.10)	0.53	22.48	26	0.26 (0.14) [†]	0.80	41.75	33
Confirmation bias effects								
Peer tie → teacher liking tie	0.28 (0.08) ^{††}	0.47**	84.37	31	0.22 (0.08)	0.46	43.65	36
Peer tie → teacher disliking tie	0.21 (0.12)	0.69**	75.39	30	0.47 (0.09) ^{††}	0.53	45.02	34
Model competence effects								
Teacher liking tie → peer tie	-0.12 (0.41)	2.29*	48.53	31	-0.00 (0.30)	1.74	35.16	33
Teacher disliking tie → peer tie	-0.39 (0.30)	1.49	21.59	24	0.43 (0.33)	1.79	30.96	28
Reputation effects								
Teacher liking rep → peer rep	0.02 (0.01) [†]	0.04	41.28	31	-0.06 (0.01) ^{††}	0.06	35.81	37
Teacher disliking rep → peer rep	-0.03 (0.01) ^{††}	0.03	24.12	30	0.03 (0.01) ^{††}	0.04	20.11	33
Peer rep → teacher liking rep	0.02 (0.01) [†]	0.06	41.42	31	-0.02 (0.01) ^{††}	0.04	44.57	36
Peer rep → teacher disliking rep	-0.04 (0.01) ^{††}	0.07	42.17	30	0.01 (0.01)	0.04	32.96	33

Note: rep = reputation

* $p < .05$, two-tailed; ** $p < .01$, two-tailed; [†] $p < .05$, one-tailed; ^{††} $p < .01$, one-tailed.

peer later and was less likely to stop liking the peer if he or she already did so. Both effects significantly differed across classes; $\chi^2(25) = 64.16, p < .001$ for the creation function, and $\chi^2(27) = 42.08, p = .032$ for the endowment function. In contrast with our expectations as expressed in Hypotheses 1b and 2b, at the dyadic level, teacher disliking ties were not related to peer liking ties in either direction. Furthermore, no support for Hypothesis 3 was found: teacher warmth did not moderate the dyadic effects of peer-perceived teacher liking or disliking on peer liking ties. At the actor level, resembling the effects tested in earlier studies (see Hughes et al., 2001; 2006; 2014), a higher teacher liking reputation was related to a higher peer liking reputation at the next time point; $\beta = 0.02, t = 2.40, \text{one-sided } p = .012, \text{odds ratio} = 1.02$. Thus, when a student was perceived by many classmates to be liked by the teacher, there was a slightly increased chance that at the next time point many classmates would like this student. This effect was less strong than the dyadic, intra-individual effect. Again, the reverse was also true: a higher peer liking reputation led to higher teacher liking reputation; $\beta = 0.02, t = 1.88, \text{one-sided } p = .034, \text{odds ratio} = 1.02$. A teacher disliking reputation was also related to a peer liking reputation in the expected direction. That is, when a student was perceived by many others to be disliked by the teacher, the student was somewhat less likely to be liked by others at the next time point; $\beta = -0.03, t = -4.62, \text{one-sided } p < .001, \text{odds ratio} = 0.97$, and students who were liked by many others were somewhat less likely to be nominated by others as being disliked by the teacher; $\beta = -0.04, t = -3.10, \text{one-sided } p = .002, \text{odds ratio} = 0.96$.

Peer disliking. The right part of Table 4.5 shows the results of the meta-analyses involving the peer disliking network. In agreement with social referencing, when a teacher disliking tie existed, it was more likely that a peer disliking tie existed at the next time point (Hypothesis 1b; $\beta = 0.26, t = 1.91, \text{one-sided } p = .032, \text{odds ratio} = 1.30$). However, support for the opposite effect (Hypothesis 2b) was stronger; $\beta = 0.47, t = 5.23, \text{one-sided } p < .001, \text{odds ratio} = 1.60$. Because both dyadic effects co-occurred, these effects again were disentangled by separating the creation and endowment functions in a supplementary analysis. The result was that only the effect

of peer disliking ties on the creation of teacher disliking ties existed; $\beta = 0.76$, $t = 4.72$, one-sided $p < .001$, odds ratio = 2.14. Neither of the endowment functions was significant, so teacher disliking ties did not prevent the termination of a peer disliking tie, and peer disliking ties did not prevent the termination of teacher disliking ties.

The second part of Hypothesis 2b stated that if a peer disliking tie existed, there was a smaller chance of a teacher liking tie existing at the next time point. There was no support for this hypothesis. Actually, it seemed that when a student disliked a peer, this student was more likely, rather than less likely, to nominate this peer as being liked by the teacher at the next measurement occasion; $\beta = 0.22$, $t = 2.99$, two-sided $p = .005$, odds ratio = 1.25.

Again, there was no support for Hypothesis 3: teacher warmth did not moderate the associations of peer-perceived teacher liking or disliking with peer disliking. At the actor level, both teacher liking and disliking reputation were significantly related to peer disliking reputation. When a student was perceived by many others to be liked by the teacher, this student was somewhat less likely to be disliked by many; $\beta = -0.06$, $t = -6.84$, one-sided $p < .001$, odds ratio = 0.94. In contrast, when a student was perceived by many to be disliked by the teacher, the student was slightly more likely to be disliked by many others; $\beta = 0.03$, $t = 4.00$, one-sided $p < .001$, odds ratio = 1.03. The effect in the opposite direction was also significant for teacher liking: students with higher peer disliking reputation were a little less likely to have high teacher liking reputation; $\beta = -0.02$, $t = -3.08$, one-sided $p = .002$, odds ratio = 1.01.

DISCUSSION

The hypothesis that teachers function as a social referent for peer liking and disliking describes how students refer to their teachers for cues regarding how to evaluate classroom peers. The aim of the present study was to provide evidence for social referencing as an intra-individual process that unfolds over time. Past studies have either not acknowledged the need to investigate students' perceptions of how their teachers relate to their peers (e.g., De Laet et al., 2015;

McAuliffe et al., 2009), or, when they did focus on student perceptions, have examined social referencing in terms of associations between reputations at the group level (Engels et al., 2016; Hughes et al., 2001; 2006; 2014). Applying a multilevel social network approach to longitudinal data, we investigated whether for individual students, perceiving the teacher to like or dislike a classmate affected their future evaluations of that peer. To provide further evidence for social referencing, we tested effects in the opposite direction as well, and we finally examined whether model competence, in terms of teacher warmth, moderated the extent to which students indeed followed their teachers' affective evaluations of classmates. The present study provides partial support for social referencing as an intra-individual process because students who perceived the teacher to like a peer were more likely to come to like this peer themselves. However, for peer disliking, there was more support for an effect in the opposite direction – when a student disliked a peer first, the student was more likely to come to think that the teacher disliked the peer as well.

The Teacher as a Social Referent

In agreement with social referencing (Hughes et al., 2001; McAuliffe et al., 2009), our first set of hypotheses was (a) that students who thought the teacher liked a peer would be more likely to like this peer themselves and less likely to dislike this peer; and (b) that students who thought the teacher disliked a peer would be more likely to dislike this peer themselves and less likely to like this peer. Indeed, there was a tendency for students to come to like a classmate whom they perceived as being liked by the teacher and a tendency to come to dislike a classmate whom they perceived as being disliked by the teacher. These findings substantiated prior work on peer reputations in teacher-student relationships (e.g., Hughes et al., 2001, 2014) by showing that correlations between reputations of teacher and peer liking and disliking at the class level indeed are likely rooted in an intra-individual process. In contrast with predictions based on social referencing, however, perceived teacher liking did not function as a protective factor against peer disliking. Possibly, for some students, perceiving a peer to be liked by the teacher had the negative connotation of a teacher's pet (Babad, 2009),

which would lead them to dislike the peer because of the perceived teacher liking. When this process co-occurs with social referencing, the effects might negate each other. For future research, it would be interesting to delve further into the conditions under which the teacher's pet effect and the social referencing effect are present.

The results regarding reputations showed overall negative associations between classroom-level perceived teacher liking and peer disliking and between classroom-level perceived teacher disliking and peer liking, which is in agreement with the findings by Hughes et al. (2001). Thus, individuals who were generally viewed as liked versus disliked by the teacher were slightly less likely to be disliked versus liked by many of their classmates. Because these reputation-level associations were not reflected in dyadic-level associations, these were likely due to mechanisms beyond social referencing. Possibly, this occurred because of general likeable or dislikeable qualities of the student that would result in some peers liking or disliking them and other peers perceiving them to be liked or disliked by the teacher. Likeable qualities could include a tendency to help others, share, or display other prosocial behavior, whereas dislikeable qualities might include aggression or bullying (Asher & McDonald, 2009).

Effects of Prior Peer Evaluations on Perceived Teacher Liking and Disliking

The second set of hypotheses that was tested in this study was that students' (dis)liking of a peer might also lead them to think that the teacher (dis)likes that peer, for example, because students' prior liking and disliking for a peer biases their views on teacher interaction with that peer. For peer liking, effects in this direction were found, but were less strong than the effects in line with social referencing. Thus, although there was some evidence for bidirectional associations between teacher and peer liking, the teacher seemed to be the engine in this process. For disliking, however, there was more support for an effect of disliking a peer on indicating that the teacher dislikes the peer as well than for effects in agreement with social referencing. Apparently, for peer disliking more so than for peer liking, the personal affect that a student had for a peer guided his or her perception

of teacher disliking for this peer. This seems to indicate that students who dislike a peer are inclined to assume that the teacher dislikes the peer as well, perhaps because – due to confirmation bias – they predominantly pay attention to negative teacher behavior toward this peer. These differences between findings for peer liking and disliking are in agreement with Hughes and Im’s (2016) conclusion that it is important to separate these two aspects of peer evaluations, which are very often analyzed together as peer status (see Coie, Dodge, & Coppotelli, 1982).

Surprisingly, when a student disliked a peer, this seemed to increase the likelihood of the student thinking the teacher liked the peer. That is, when a student disliked a peer, this student became more, instead of less, likely to view the teacher liking that peer. A possible explanation is that teachers notice that a certain student is disliked by his or her peers and therefore try to compensate by increasing the amount of positive interaction that they have with the student (see McAuliffe et al., 2009). When peers pick up on this positivity, they might come to think that the teacher likes the student. Alternatively, a student who dislikes a peer might view any positive teacher behavior toward the peer as unwarranted or unfair, which could lead to the student becoming more aware of and sensitive to any sign that the teacher might like the peer. Because teachers generally develop more supportive than conflicted relationships with their students (e.g., De Laet et al., 2014; Hughes & Im, 2016), it is likely that such signs are present for every student at some point. Thus, when a student is more sensitive to teacher positivity toward a certain peer whom he or she dislikes, he or she could become more likely to nominate the peer as someone who is liked by the teacher.

Model Competence: The Moderating Role of Teacher Warmth

Based on the idea of model competence and consistent with principles of social balance, our third hypothesis was that students would be more likely to follow the teacher’s affective evaluation of a peer when they perceived more teacher warmth. However, our findings did not indicate that such an effect existed. An explanation could be that there was relatively little power to detect such complicated tendencies. Although more than 1400 students participated in this study,

these analyses were performed on each class separately. Because the classes consisted of only approximately 25 students, it was difficult to find support for complex moderating effects. It is also possible that we failed to capture an effect of teacher warmth because we only investigated students' personal deviations from the class mean perception of teacher warmth. So, we examined differences between students within classes, in which all students assessed the same teacher's warmth. As shown by intra-class correlations of .21 and .26 for the two waves, respectively, a substantial part of the total variance in teacher warmth was due to differences between teachers. Because the classes differed in the extent to which social referencing played a role, it seems relevant to investigate why certain teachers were stronger social referents than others, and if model competence was important at this level.

Limitations and Directions for Future Research

The study results must be interpreted in light of some limitations. First, in the present study, associations between teacher and peer liking and disliking were investigated. However, both are related to multiple characteristics of the student, such as his or her behavior or academic achievement (e.g., Asher & McDonald, 2009; Cillessen & Mayeux, 2004, Hughes et al., 2001). Because of the already complex nature of the analyses, it was necessary to focus on teacher and peer ties and to omit these actor-level variables. To control to some degree for these effects, we incorporated the basic network effects of in-degree popularity, out-degree popularity, and out-degree activity (see Ripley, Snijders et al., 2015), and we included effects of gender to at least capture that aspect. This approach was not perfect, and it might be the case that the study results would be affected if some other student variables were controlled for.

Second, whereas this study addressed an important assumption underlying research on social referencing, one aspect of this mechanism was not incorporated: actual teacher behavior. In social referencing theory, students witness teacher behavior toward their peers and, based on their perceptions of this behavior, develop an idea of how the teacher evaluates each peer. Some studies have shown that

students from a very young age are able to see differences in teacher behavior directed toward their classmates and based on these differences, make correct inferences regarding the teacher's affective evaluations of these classmates (e.g., Babad, 1993, 2009; Kuklinski & Weinstein, 2001). Research is needed that connects teacher behavior toward a classmate with students' perceptions of teacher liking and disliking of this classmate.

Finally, in the present study, we did not find indications that perceived teacher warmth affected the extent to which social referencing occurred. Nevertheless, social referencing is likely to differ across students, peers, and dyads, and there are multiple other possible variables that could moderate the social referencing process. For instance, some students' opinions might in general be more malleable than others', and some students might more readily accept the teacher as a model. Target peers' characteristics, affecting the extent to which social referencing applies to them, could include popularity and prosocial or aggressive behaviors. The relevant features of the dyad might include whether the student and peer share the same neighborhood or hobbies, whether there is animosity, and how close in space to each other they are within the classroom (see Van den Berg & Cillessen, 2015). For future research, it might be fruitful to delve into these more or less subtle processes to further deepen the understanding of when and how social referencing occurs in class.

Implications

The present study substantiated social referencing as a truly intra-individual process. Research focusing on how individuals alter their views about peers is more suitable when conclusions are to be drawn about what occurs within students' minds than research that uses peer reputations within the classroom group. For future research regarding social referencing and other social-cognitive processes in the classroom, it is important to be aware of possible discrepancies between theories about intra-individual processes and the employed statistical analyses. Unless data analysis is performed on how dyadic ties are formed, there will always be some uncertainty regarding whether the intended mechanisms actually occur. Therefore, although the stochastic actor-oriented modeling technique that we employed is fairly

complex – particularly with a large multi-leveled sample such as the present one – we strongly recommend future research to consider applying this technique as well.

For teachers, interacting with their students is a major feature of their profession, which can have an impact on more aspects of students' development than teachers anticipate. If future research is able to empirically relate teacher behavior to students' perceptions of teacher liking for their peers, this may hold implications for teachers. If teachers knew that students might refer to them for information regarding other students in the class, they could deliberately model their interactions with certain students with the aim of affecting how peers view this student. Several studies have shown that interventions based on altering teacher interaction with some of their students indeed affected teacher behavior and peer perceptions of students (e.g., Mikami, Lerner, & Lun, 2013; Spilt, Koomen, Thijs, & Van der Leij, 2012). In order to adapt their teaching, teachers first need to be aware of students' social standing with their peers. However, in general this awareness appears to be limited (Gest, 2006; Neal, Cappella, Wagner, & Atkins, 2010). Therefore, teacher training and in-service professional development programs would likely benefit from paying greater attention to the social dynamics of the classroom, how teachers can get attuned to peers' views of each other, and how teachers could interact with certain students to boost their peer relationships.

Conclusion

In conclusion, the application of stochastic actor-oriented modeling of social networks as they develop over time has further illuminated how individual students change their minds about individual peers. Consistent with social referencing, this study has shown that individual students are more likely to come to like a peer when they think that their teacher likes this peer. However, in the case of negative peer evaluations, it seems that disliking a peer informs the view that the teacher must dislike this peer as well, more so than the other way around. For future research, it is important to align the level at which analyses are performed with the level at which hypotheses are formulated and thereby to draw valid conclusions about processes occurring in the individual mind.

TEACHER LIKING FOR A STUDENT AS AN AFFECTIVE FILTER FOR PEER ACCEPTANCE OF STUDENT BEHAVIOR ^{12, 13}

ABSTRACT

This study investigated how peer perceptions of teacher liking and disliking for a student moderate associations between the student's peer-perceived social behavior and peer liking and disliking status. We studied individual teacher liking and disliking as well as classroom norms as moderators of individual and classroom-level behavior-status associations. Peer nominations of (dis)liking, being (dis)liked by the teacher, and prosocial and aggressive behavior were gathered from 1454 students (Mage = 10.60) in 58 fifth-grade classes. Results from multilevel analyses showed the teacher made a difference in particular for those students who were at-risk of low peer status, that is, those students who were perceived by many of their peers to show aggressive behavior and by few to show prosocial behavior. These students were disliked less and liked more when they were perceived by peers to be less disliked and more liked by the teacher. Furthermore, the amount of disliking associated with overt and relational aggression differed across classrooms, depending on norms of teacher liking. These findings may help teachers to understand and improve an individual student's peer status, and alter the behavior–status dynamics in their class.

12 *This chapter is based on: Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (submitted). Teacher liking as an affective filter for the association between student behavior and peer status.*

13 *Acknowledgement of author contributions: MH, TM, HB-K, and MB designed research; MH and MB recruited participants and conducted data collection; MH, TM, and MB planned data analysis; MH performed data analysis; MH drafted the manuscript; all authors participated in finalizing the manuscript, approving it and are accountable for the accuracy and integrity of the content.*

INTRODUCTION

Students' social status with peers, in terms of peer liking and disliking, is an important predictor of their social and academic development (Nelson & Dishion, 2004; Rubin, Bukowski, & Parker, 2006; Wentzel, 2005). Research on factors contributing to peer status has shown that student behavior, in particular prosocial and aggressive behavior, strongly predicts how peers evaluate a student (Cillessen & Mayeux, 2004; Newcomb, Bukowski, & Pattee, 1993; Rubin et al., 2006). Recently, evidence has been produced that the teacher can also contribute to students' social status among peers (e.g., De Laet et al., 2014; Hoffman, Hamm, & Farmer, 2015; McAuliffe, Hubbard, & Romano, 2009). In the present study, we integrated these relatively separate lines of research by investigating how behavior-status associations are affected by teacher-student relationships, for instance how being liked by the teacher may weaken the negative association of aggressive behavior with peer status. More specifically, we argue that teacher liking and disliking for a student can function as an affective filter, providing a context within which student behavior is evaluated by peers. When peers think that the teacher likes a student more, they might also evaluate the student's behavior more positively (Hughes, 2012; Hughes, Cavell, & Willson, 2001). If this indeed is the case, teachers could use this knowledge to improve peers' views of a certain student, thereby improving the student's peer status. Next to behavior-status associations at the level of the individual student, we take the system of the classroom into account and propose that the teacher's general tendency to like versus dislike students may explain why some of the variability in behavior-status associations at the classroom level (see Chang, 2004; Stormshak et al., 1999).

Farmer, McAuliffe-Lines, and Hamm (2011) referred to the teacher's role in peer relations as the teacher's "invisible hand", as this role is relatively underrepresented in research on teacher effectiveness. The aim of the present study was to partly reveal this invisible hand by gaining understanding as to how the teacher affects associations between student behavior and peer status, both at the student and at the classroom level. Insights from this study might help

teachers to understand and improve an individual student's peer status and to alter the behavior–status dynamics as part of the classroom climate.

Peer Status and Student Behavior

A student's peer status reflects how he or she is valued by the classroom peer group as a collective. In this study the focus is on peer liking and disliking status, which have also been referred to as peer acceptance and rejection. Research has extensively shown how peer liking and disliking are important for students' social and academic development; higher levels of peer liking are associated with more emotional wellbeing (Ladd, 2006), and higher levels of motivation and academic competence (Flook, Repetti, & Ullman, 2005; Wentzel, 2005). On the other hand, higher levels of disliking are associated with more internalizing and externalizing behavior (Ladd & Troop-Gordon, 2003), academic disengagement (Buhs, Ladd, & Herald, 2006) and dropout (French & Conrad, 2001).

Research on the factors that contribute to peer status has largely focused on the behavior of the student at stake (see Asher & McDonald, 2009). Two broadband categories of student behavior that have been studied in relation to peer status are prosocial behavior and aggression. In general, students who show prosocial behavior, for instance helping others and cooperating, are liked by their peers (Asher & McDonald, 2009; Rubin et al., 2006). Students who show much aggression are generally disliked by their peers, both when they show overt aggression (hitting, calling names; Asher & McDonald, 2009) and relational aggression (gossiping, excluding others; Crick & Grotpeter, 1995; Neal, 2010). Aggression does not typically predict peer liking (Crick et al., 2009; Graham & Juvonen, 2002).

Peer Status and Reputation of Teacher Liking and Disliking

Besides by student behavior, peer status may also be informed by the teacher (Hughes et al., 2001). Teachers, in their position of powerful social role models, have the unique opportunity to inform peers about qualities and attributes of a student and thereby affect peers' affective responses to the student (Hughes et al., 2001).

For instance, when a teacher often reprimands a student, classmates may infer from this interaction that the student is to be disliked. That is, through repetitive occurrences of supportive or conflicted teacher-student interactions, the teacher communicates a particular liking or disliking for this student, which peers seem to adopt as their own (Chang et al., 2007). Even at a young age students notice how teachers interact differently with their classmates, and based on this information students make accurate inferences regarding the teacher's attitudes towards these classmates (Babad, 1993, 2009; Kuklinski & Weinstein, 2001; Weinstein, Marshall, Sharp, & Botkin, 1987). Students whom peers perceive to be liked by the teacher are generally liked more and disliked less by their peers, whereas students who have the reputation to have more conflict with or to be disliked by their teacher are generally liked less and disliked more (Hendrickx, Mainhard, Oudman, Boor-Klip, & Brekelmans, 2016; Hughes et al., 2001; Hughes, Im, & Wehrly; 2014).

Teacher Liking and Disliking as an Affective Filter

Chang et al. (2007) argued that teacher liking and disliking may not be directly adopted by peers, but may be a source of information that peers use to evaluate a student's behavior. Chang et al. found that, particularly when students get older, the teacher moderates associations between peer-perceived social behavior and students' peer status. Hughes (2012) proposed that peer reputations of teacher-student relationships function as an affective filter that biases peer evaluations of student behavior. Research on affective bias has shown that peers respond differently to certain student behaviors based on their affect for the student (Hymel, 1986; Peets, Hodges, & Salmivalli, 2008). Peets et al. (2008) referred to this mechanism as "affect-congruent" social-cognitive evaluations. Hughes (2012) argued that besides peers' own affect for a student, also the teacher's affect could have this filtering function. For instance, when a student is perceived by peers to be liked by the teacher, this may result in peers valuing the student's behaviors in a manner that is congruent to their perception of the teacher's affect. In this sense, student behaviors may be differently associated with peer approval or disapproval, depending on the positive versus negative affective filter provided by the teacher.

Several studies in which teacher–student relationships were measured using teacher and observer ratings have found evidence for this filtering effect of the teacher. First, White and Kistner (1992) used video vignettes to manipulate the teacher’s positive or negative response to a target student who showed disruptive behavior. Respondents who watched the videos liked the target better in the positive than in the negative condition. In more ecologically valid settings, researchers have primarily investigated teachers’ reports of their preference of students as a moderator for the behavior–status associations. Chang et al. (2007) found that aggressive girls, but not boys, were less disliked by their peers when the teacher reported more preference for them. Furthermore, in that study, the positive prosocial behavior–status association was tempered for students who had higher teacher preference. Chang et al. explained this unexpected finding by hypothesizing that students with higher teacher preference were already more liked, and prosocial behavior had a weaker added positive effect on likeability. Finally, following a comparable line of reasoning, Moore et al. (2012) found that teacher-reported preference could function as a protective factor for the association of aggression with peer disliking. In sum, in accordance with the affective filter mechanism, there seems to be evidence in particular for a buffering function of teacher liking and disliking, partly counteracting negative associations between aggression and peer status. Teacher liking as a context amplifying associations between prosocial behavior and peer status has not yet been clearly shown.

Classroom Norms of Teacher Liking and Disliking

The association between student behavior and peer status does not only differ across individuals, but also across classrooms (e.g., Boor-Klip, Segers, Hendrickx, & Cillessen, 2015; Chang, 2004). Mikami, Lerner, and Lun (2010) argued that the context within which students interact may impact these associations. Chang (2003; see also Gest & Rodkin, 2011) suggested that the teacher, as part of the classroom context, may affect the extent to which prosocial and aggressive behaviors are valued positively or negatively in the classroom, or the norm salience of prosocial and aggressive behaviors (see Henry et al., 2000). Teachers

may do so by modeling liking and thereby creating a classroom climate that fosters positive interactions, versus modeling disliking and creating a norm for disliking each other (Farmer et al., 2011; Gest & Rodkin, 2011). The classroom norm of teacher support, or extent to which a supportive teacher-student relationship is common or typical in a classroom, predicts individual students' peer status (Hughes et al., 2006). To our best knowledge, studies have not yet investigated classroom norms of teacher liking and disliking as predictors of classroom-based behavior–status associations. However, Chang (2003) found that teacher warmth, measured at the classroom level, alleviated the negative association between aggressive behavior and peer acceptance. Teacher warmth did not moderate the association between prosocial behavior and acceptance in that study.

The Present Study

Research aimed at revealing the invisible hand of the teacher has produced relevant insights regarding the potential influence of the teacher on students' peer experiences. The present study advances this knowledge base by investigating how teacher liking and disliking are a context for the association between student behavior and peer liking and disliking status. Importantly, we aimed to study peers' affective responses to the behavior they identified, in context of the teacher (dis)liking they perceived. Therefore, we made sure to investigate peer-perceived student behavior as well as peer reputations of teacher liking and disliking (PRTL and PRTD; see Hughes et al., 2014: "peer teacher support reputation"). Moreover, because of the different antecedents and consequences of peer liking and disliking status, in this study liking and disliking were studied as two separate outcome measures.

We addressed the general problem: To what extent do peer reputation of teacher liking and disliking affect the association between peer perceptions of student behavior and peer liking and disliking? by investigating (1) to what extent peer reputation of teacher liking and disliking for individual students moderate associations between peer-perceived student behavior and peer liking and disliking; and (2) whether classroom norms of teacher liking and

disliking moderate classroom-based associations between peer-perceived student behavior and peer liking and disliking. Student gender was included as a covariate in this study, because of the differences between boys and girls regarding student behavior (e.g., Rubin et al., 2006), and teacher-student relationships (e.g., Baker, 2006; McCormick & O'Connor, 2015). Furthermore, we investigated whether moderation effects were similar for boys and girls.

We expected that peer reputation of teacher liking would strengthen the positive prosocial behavior-liking association, and that it would temper the negative aggression-disliking association, as positive aspects of the student are pronounced via the positive affective filter. Peer-perceived teacher disliking was expected to temper the prosocial behavior-liking link and strengthen the aggression-disliking link, because of the negative affective filter that highlights negative aspects of the student. Teacher disliking was expected to have a stronger moderating function than teacher liking, because of negativity bias and the presupposed contrast with a general high level of positive teacher affect.

In comparison to teacher liking, peer reputation of teacher disliking was expected to be particularly powerful. Negative information has a much stronger impact than positive information, as research on the negativity bias has shown (e.g., Rozin & Royzman, 2001; Vaish, Grossman, & Woodward, 2008). Also, negative affect is generally less common in primary school classrooms (e.g., Baker, 2006; Hughes et al., 2001) and may therefore have a stronger signaling value than more common positive affect. Students in our sample were in fifth grade. Even though over the course of primary school the amount of positive, supportive teacher-student interaction decreases, whereas the amount of negative, conflicted ones increases (Esposito, 1999; Jerome, Hamre, & Pianta, 2009), positive relationships still prevail over negative ones. Therefore, a student who is disliked by the teacher may stand in sharp contrast to their peers and thus peer reputation of teacher disliking may have a stronger effect on a student's peer status than reputation of teacher liking.

The second research question, regarding the classroom-based behavior–status associations, was more exploratory in nature. Higher norms of teacher liking and lower norms of teacher disliking were expected to be related to a climate of more peer liking and less peer disliking, because the teacher communicated positive affect and understanding for each other and each other's behaviors. This would result in less strong peer rejection of aggressive behavior (Chang, 2003).

METHOD

Participants

Students in 58 fifth-grade classrooms in 40 Dutch primary schools participated in this study, which was part of a larger research project on the classroom climate in upper elementary schools¹⁴. Class size ranged from 18 to 34 students ($M = 26.14$, $SD = 3.69$). Only students for whom active parental informed consent was obtained participated (1496 out of 1518, participation rate 98.6%). Students' mean age was 10.60 years ($SD = 0.50$), and 47.2% were girls. According to the classification by Statistics Netherlands (2012), 84.4% were Dutch (both parents were born in The Netherlands), 5.6% were Western immigrants (at least one parent was born in another Western country), and 9.9% were non-Western immigrants (at least one parent was born in a non-Western country). Absence on the day of data collection led to a final sample of 1454 students who completed questionnaires.

Fifth-grade classes in the Netherlands are taught by a single teacher or two teachers each working part-time, with only one teacher being present in class at a time. In the case of two teachers, the teacher who spent most hours in the classroom participated in the study (60.3% at least 4 days a week). Teachers were on average 41.25 years old (range 24.51 to 62.47, $SD = 11.91$), and had 15.17 years of experience (range 1 to 39 years, $SD = 10.99$). Of the teachers, 63.8% were women.

Measures

Peer nominations. Peer nominations were used to measure peer status, peer perceptions of student behavior, and peer

14 One of the in total 59 classrooms participating in the larger research project was excluded from this study, because of a diverting didactical approach with two teachers present in the classroom at all times who served an exceptionally large class of 43 students.

reputation of teacher liking and disliking. Students were asked which of their classmates, who all were presented on a list, fitted a certain description. Unlimited, same and cross-sex nominations were allowed for each question. For each student all received nominations on an item, expressed as a proportion of the maximum possible number of nominations, represented the student's score on that item.

Peer status. Peer liking was measured with the item "Which classmates do you like most?". Peer disliking was measured with the item "Which classmates do you like least?".

Student behavior. Peer-perceived prosocial behavior was measured using two items: "Which classmates help others?" and "Which classmates cooperate well with others?" (Cronbach's $\alpha = .86$). The overt aggression items were "Which classmates call other children names?" and "Which classmates hit or kick others?" (Cronbach's $\alpha = .96$). Relational aggression items were "Which classmates gossip about others?" and "Which classmates exclude others?" (Cronbach's $\alpha = .83$).

Peer reputation of teacher liking and disliking. Peer reputation of teacher liking (PRTL) was measured with the item: "Which classmates are liked most by the teacher?". Peer reputation of teacher disliking (PRTD) was measured with the item: "Which classmates are liked least by the teacher?". In order to get students to focus specifically on the teacher that participated in the study, in both these items, "the teacher" was substituted with the name of the teacher involved.

Classroom norms. The classroom means of the proportion scores for PRTL and PRTD were used to indicate the norms of teacher liking and teacher disliking (i.e., the degree of liking and disliking the teacher usually shows to students, according to their peers).

Procedure

Data were collected in the fall of 2012, at least one month after the start of the school year. Schools located in the middle, south, and east of the Netherlands were recruited

to participate. After the school board and classroom teacher agreed to participate, parents were informed and were asked for their consent regarding their child's participation. Consented students completed the questionnaires on netbook computers in their classrooms. Students were seated separately, and the computers were flanked by partition screens to prevent distraction and to safeguard the students' privacy. A standard instruction was given in which confidential data handling was explained. The computers presented the peer nomination items one by one, accompanied by a list of all classmates the students could nominate. Students chose the classmates that best fitted the description from this list. To avoid sequence effects (Poulin & Dishion, 2008), the order of the names was randomized for each participant. Apart from themselves, students could nominate any of their classmates, regardless of whether they were present or had consent. Nominations given to non-consented students were excluded from the dataset. The primary sample of 1454 present and consented students provided data on a larger sample of 1496 consented students. After data collection was finished, teachers received a report containing averaged results for their classroom.

Analysis

To account for the nested data structure of students within classrooms, we performed multilevel analyses in Mplus, version 7.2 (Muthén & Muthén, 1998-2012). All student-level (L1) predictors were entered group-mean centered, and all classroom-level (L2) predictors were entered grand-mean centered. Using this approach, both the classroom level of the predictor and an individual student's deviation from it are assessed and student-level and classroom-level predictors are tested independently. For peer liking and disliking outcomes separately, a sequence of six modelling steps was followed to test the hypotheses. The quality of each model over the prior one was tested using the likelihood ratio test based on the deviance of the models. First, students' gender and prosocial behavior, overt aggression and relational aggression, as well as PRTL and PRTD were entered in model M1. Second (M2), we tested the hypotheses that PRTL and

PRTD functioned as moderators for the student-level behavior–status associations. To this end, we included all two-way interaction effects of student behavior*individual PRTL/PRTD. In M2a, we tested whether these interaction effects were similar for boys and girls by including three-way interactions of student behavior*individual PRTL/PRTD*gender.

The first models only included predictors at the student level. Next, classroom norms of PRTL and PRTD were added to the model M3. Then, random slopes for the main effects of prosocial and aggressive behaviors were added, to test to what extent behavior–status associations differed across classrooms. As suggested by Hox (2010), random slopes were tested on a variable-by-variable basis. Hereafter, only those slopes that were significant and improved the model were added in M4. Finally, to explore how differences in behavior–status associations across classes were associated with classroom norms of teacher liking and disliking, cross-level interaction effects of student behavior*classroom norm of PRTL/PRTD were examined in M5, only for those student behaviors for which the association with peer liking or disliking significantly differed across classrooms.

Peer disliking was positively skewed, and 29 cases (1.9%) with multivariate outliers (based on residuals) were present, which were all within the possible range but did contribute to non-normality. To address these issues, the multilevel analyses were executed with robust standard errors using a sandwich estimator (see Hox, 2010).

RESULTS

Descriptive Statistics

In Table 5.1 the descriptive statistics are shown. Because of the aforementioned issues regarding normality, Spearman correlation coefficients are presented. Note that in the correlations, the multilevel structure of the data is not taken into account. Correlations among the student-level variables were all in expected direction, with positive correlations among peer liking, prosocial behavior, and PRTL, as well as among peer disliking, overt and relational

Table 5.1
Spearman Correlation Coefficients and Descriptive Statistics of the Study Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	N	M	SD	Min	Max
1. Peer liking	-									1496	.14	.09	.00	.54
2. Peer disliking	-.40**	-								1496	.10	.13	.00	.72
3. Prosocial behavior	.62**	-.49**	-							1496	.27	.15	.00	.82
4. Overt aggression	-.30**	.54**	-.49**	-						1496	.11	.18	.00	.98
5. Relational aggression	-.13**	.43**	-.24**	.54**	-					1496	.12	.13	.00	.76
6. Gender (1 = female)	.15**	-.16**	.31**	-.51**	.03	-				1496	-	-	-	-
7. PRTL individual	.37**	-.26**	.56**	-.42**	-.26**	.38**	-			1496	.29	.16	.00	.89
8. PRTD individual	-.28**	.51**	-.49**	.65**	.45**	-.42**	-.46**	-		1496	.10	.16	.00	1.00
9. PRTL norm	.16**	.08**	.19**	.03	.01	.03	.60**	.03	-	58	.29	.10	.11	.55
10. PRTD norm	.05*	.14**	.12**	.11**	.13**	-.00	-.03	.18**	-.02	58	.10	.03	.04	.18

Note. PRTL = peer reputation teacher liking; PRTD = peer reputation teacher disliking. All correlations among group mean centered variables. Means, standard deviations, and range are based on un-centered variables.

* $p < .05$. ** $p < .01$.

aggression, and PRTD. Classroom norms of teacher liking and disliking were not correlated. On average, students were more liked than disliked, $t(1495) = 9.29, p < .001$, and students were more perceived to show prosocial behavior than overt aggression, $t(1495) = 21.42, p < .001$, or relational aggression, $t(1495) = 25.76, p < .001$. Students thought their teacher had liking for more of their peers than disliking, $t(1495) = 27.73, p < .001$. Similarly, classroom norms of teacher liking were higher than classroom norms of teacher disliking, $t(57) = 14.12, p < .001$.

Because of the relatively high correlations between student behavior variables and peer reputation of teacher liking and disliking, careful attention was paid to possible problems regarding multicollinearity. Collinearity diagnostics did not reveal problematic values (Tabachnick & Fidell, 2007). As the correlation between overt aggression and peer reputation of teacher disliking was highest, the variability in the teacher variables for students scoring low and high on overt aggression was further examined. Table 5.2 shows the mean level, standard deviation and range in proportion scores of peer reputation of teacher liking and disliking for students in the lowest and highest quartile of overt aggression scores. Table 5.2 shows that although highly aggressive students in general had lower PRTL and higher PRTD, variability in both teacher liking and disliking was still quite high. Some students scoring high on aggression were considered by over half of their peers to be liked by the teacher and some were perceived by no one to be disliked by the teacher. Also, students who according to their peers showed little aggression occupied the entire range of teacher liking. Finally, students with low aggression scores were relatively rarely viewed as being disliked by the teacher. Thus, although correlations were fairly high, higher levels of aggression did not automatically mean higher levels of PRTD or lower levels of PRTL, and multicollinearity was not deemed problematic for the analyses in this study.

Peer Liking

Table 5.3 shows the results of the multilevel models with peer liking as the outcome. The intercept-only model (M0) shows that the intra-class correlation (ICC) was .178. Thus,

Table 5.2

Means and Ranges in Peer Reputations of Teacher Liking and Disliking for Students Showing Little and Much Overt Aggression

	Low overt aggression			High overt aggression		
	<i>M (SD)</i>	Min.	Max.	<i>M (SD)</i>	Min.	Max.
PRTL	.39 (.17)	.00	.89	.20 (.12)	.00	.65
PRTD	.02 (.04)	.00	.28	.28 (.22)	.00	1.00

Note. PRTL = peer reputation teacher liking; PRTD = peer reputation teacher disliking.

17.8% of the variance in peer liking status was located at the class level. That is, in some classes students in general liked each other better than in others.

Model M1 contained gender, peer-perceived student behavior, and PRTL and PRTD. The decline in deviance of this model compared to M0 indicated a significant improvement, $\chi^2(6) = 740.22, p < .001$. Model M1 explained 40.4% of the first-level variance in peer liking. As expected, the more prosocial behavior peers perceived the student to show, the more the student was liked by peers. Furthermore, the higher peer perceptions of overt aggression were, the less peers liked the student. As gender was coded 0 for boys and 1 for girls, girls had somewhat lower liking scores than boys. This could be due to a slight overrepresentation of boys in the sample. Students nominate more same-sex

Table 5.3

Student Behavior and Peer Reputation of Teacher Liking and Disliking as Predictors of Peer Liking Status

	Intercept only		Student-level models					Class-level models					
	M0		M1		M2		M3		M4		M5		
	B	(SE)	B	(SE)	B	(SE)	B	(SE)	B	(SE)	B	(SE)	
Fixed part													
Intercept	0.14	(0.01)**	0.15	(0.01)**	0.15	(0.01)**	0.15	(0.01)**	0.15	(0.01)**	0.15	(0.01)**	
Student main effects													
Gender (0 = male)			-0.02	(0.01)**	-0.02	(0.01)*	-0.02	(0.01)**	-0.02	(0.01)**	-0.01	(0.01)	
Pros			0.40	(0.03)**	.63	0.41	(0.03)**	.65	0.41	(0.03)**	0.41	(0.03)**	
OVAgg			-0.03	(0.02)	-.06	-0.01	(0.03)	-.03	-0.01	(0.03)	-0.00	(0.03)	
ReAgg			0.03	(0.02)	.05	0.04	(0.02)	.05	0.04	(0.02)	0.02	(0.02)	
PRTL			0.01	(0.03)	.02	0.04	(0.03)	.06	0.04	(0.03)	0.03	(0.03)	
PRTD			0.00	(0.02)	.00	0.03	(0.03)	.06	0.03	(0.03)	0.03	(0.03)	
Student interactions													
Pros*PRTL					-0.42	(0.17)*	-.10	-0.42	(0.17)*	-.10	-0.44	(0.17)**	
Pros*PRTD					-0.22	(0.17)	-.07	-0.21	(0.17)	-.07	-0.25	(0.17)	
OVAgg*PRTL					-0.29	(0.16)	-.08	-0.27	(0.16)	-.08	-0.23	(0.14)	
OVAgg*PRTD					-0.22	(0.07)**	-.17	-0.22	(0.06)**	-.17	-0.21	(0.06)**	
ReAgg*PRTL					0.39	(0.24)	.07	0.40	(0.24)	.07	0.31	(0.24)	
ReAgg*PRTD					0.12	(0.09)	.05	0.13	(0.09)	.06	0.11	(0.09)	
Class main effects													
PRTL norm							0.22	(0.06)**	.52	0.21	(0.05)**	0.22	(0.06)**
PRTD norm							0.21	(0.17)	.13	0.26	(0.16)	0.20	(0.17)
Cross-level interactions													
Pros*PRTL norm											0.03	(0.22)	
Pros*PRTD norm											-0.56	(0.92)	
Random part													
Student variance	.0073	(.0004)	.0043	(.0003)	.0043	(.0003)	.0043	(.0003)	.0040	(.0002)	.0040	(.0002)	
Class variance	.0016	(.0005)	.0017	(.0005)	.0017	(.0005)	.0012	(.0003)	.0013	(.0003)	.0013	(.0003)	
Pros slope									.0163	(.0051)	.0161	(.0049)	
Deviance													
-2Loglikelihood	-3010.00		-3750.22		-3768.81		-3786.41		-3835.13		-3835.66		
Δ -2Loglikelihood			740.22**		18.59**		17.60**		48.72**		0.53		

Note. PRTL = peer reputation teacher liking; PRTD = peer reputation teacher disliking; Pros = prosocial behavior; OVAgg = overt aggression; ReAgg = relational aggression.
* $p < .05$. ** $p < .01$.

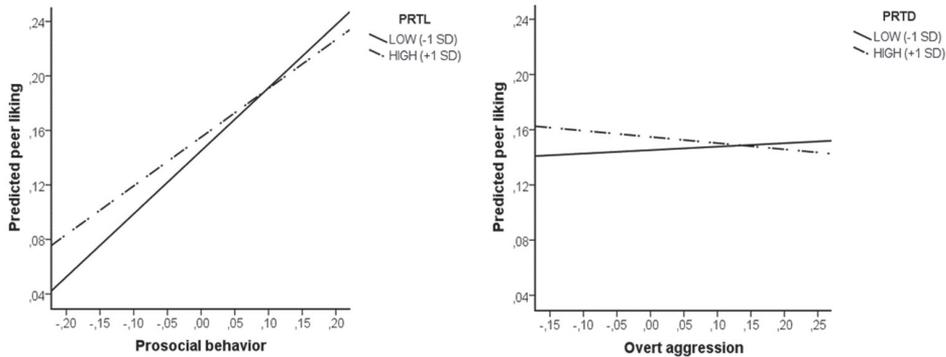


Figure 5.1. Predicted values for peer liking as a function of prosocial behavior for low and high levels of PRTL (left graph), and of overt aggression for low and high PRTD (right graph).

peers as liked most, and more opposite-sex peers as liked least (e.g., Dijkstra, Lindenberg, & Veenstra, 2007; Rose & Smith, 2009), so the larger amount of boys might have made boys more likely to receive liked-most nominations and less likely to receive liked-least nominations.

PRTL and PRTD as affective filters. As a next step (M2 in Table 5.3), interaction effects among student behaviors and PRTL and PRTD were added to the model. As evident in the drop in deviance, this model was an improvement, $\chi^2(6) = 18.59, p = .005$. M2 explained 41.2% of the level-1 variance in peer liking. The positive prosocial behavior–peer liking association was weakened for students who had high PRTL. To facilitate interpretation, we calculated predicted values of likeability for students with comparably high and low levels of peer-perceived prosocial behavior, in combination with

a higher (+1 *SD*) or lower (-1 *SD*) PRTL. These values are graphically depicted in Figure 5.1 (left graph). The positive association between prosocial behavior and peer liking was slightly weakened when students had higher PRTL. This was possibly due to a difference between students who were low in prosocial behavior and had (a) low PRTL, or (b) high PRTL. The liking score was .03 higher when students had high PRTL compared to low PRTL (one third of a *SD*). Translated to the number of classmates nominating the student for the average class size in our sample, on average one peer more per class indicated to like this student. Considering the mean level of peer liking of three and a half classmates (14% of the participants), we considered being nominated by one peer more or less a rather meaningful difference.

PRTL moderated the association between overt aggression and peer liking. Only for students who had a high reputation of teacher disliking the association between peer-perceived overt aggression and peer liking showed a slightly negative slope (see Figure 5.1, right graph). Thus, students who were perceived by their peers to show more overt aggression were less liked when they had a high reputation of teacher disliking than when they had a lower reputation of teacher disliking. This difference was .02 in liking score, so on average "one half" of a peer less who indicated to like the highly aggressive student.

In model M2a, we examined whether each of the two-way interaction effects (both significant and non-significant in M2) differed depending on gender. Adding these six three-way interaction effects did not significantly improve the model, $\chi^2(6) = 8.89, p = .180$, and correspondingly, neither of the three-way interactions were significant. Therefore, we excluded these interaction effects from our next modeling steps.

Classroom norms of teacher liking and disliking. In model M3, we investigated main effects of classroom norms of teacher liking and disliking on peer liking. Compared to M2, this was a significant improvement, $\chi^2(2) = 17.60, p < .001$. M3 explained 28.3% of the class-level variance in peer liking that was present in M2. The higher the classroom norm for teacher liking was, the more peers liked each other in these classes.

Next, we examined whether the amount of peer liking associated with each type of student behavior differed across classrooms. Only for prosocial behavior the difference in deviance showed that allowing the association with peer liking to differ across classes improved the model, $\chi^2(2) = 48.72, p < .001$, so only this random slope was added to M4.

As a final step, in M5 we tested whether part of this slope variation could be explained by classroom norms of PRTL and PRTD. Adding the cross-level interaction effects did not further improve the model, $\chi^2(2) = 0.53, p = .767$, so classroom norms could not explain variation in the prosocial behavior-peer liking association across classes.

Peer Disliking

Table 5.4 shows the results of the multilevel models with peer disliking as the outcome. The intercept-only model (M0) shows that the ICC was .015. Thus, only 1.5% of the variance in peer disliking status was located at the class level. In contrast to the findings for peer liking, classes hardly differed in the extent to which peers disliked each other. Multilevel analysis was nonetheless proceeded to correctly estimate standard errors and cross-level interaction effects for these nested data (Hox, 2010).

Model M1 contained gender, peer-perceived student behavior, and PRTL and PRTD, and was a significant improvement to M0, $\chi^2(6) = 1088.12, p < .001$. M1 explained 53.2% of the student-level variance in peer disliking. As expected, the more overt as well as relational aggressive behaviors students showed according to their peers, the more they were disliked by their peers. The more prosocial behavior nominations students received, the less they were disliked by their peers. Betas show that the association with disliking was stronger for overt aggression ($\beta = .31$), and prosocial behavior ($\beta = -.33$) than for relational aggression ($\beta = .08$). In accordance with the results for liking, girls received somewhat more disliking nominations than boys. Surprisingly, both PRTL and PRTD were positively related to peer disliking. Teacher disliking was more strongly associated with peer disliking than was teacher liking, as $\beta = .08$ for PRTL and $\beta = .26$ for PRTD.

Table 5.4
Student Behavior and Peer Reputation of Teacher Liking and Disliking as Predictors of Peer Disliking Status

	Intercept only		Student-level models					Class-level models		
	M0	M1	M2	M3	M4	M5				
	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	B (SE)	
Fixed part										
Intercept	0.10 (0.00)**	0.08 (0.01)**	0.07 (0.01)**	0.07 (0.01)**	0.07 (0.01)**	0.07 (0.01)**	0.07 (0.01)**	0.07 (0.01)**		
Student main effects										
Gender (0 = male)										
Pros		0.04 (0.01)**	0.03 (0.01)**	0.11	0.03 (0.01)**	0.11	0.03 (0.01)**	0.03 (0.01)**	0.03 (0.01)**	
OvAgg		-0.31 (0.03)**	-0.36 (0.03)**	-0.38	-0.35 (0.03)**	-0.38	-0.36 (0.03)**	-0.36 (0.03)**	-0.36 (0.03)**	
ReAgg		0.22 (0.06)**	0.20 (0.06)**	.28	0.21 (0.06)**	.29	0.23 (0.06)**	0.23 (0.06)**	0.23 (0.06)**	
PRTL		0.08 (0.03)**	0.11 (0.04)**	.11	0.11 (0.04)**	.11	0.10 (0.03)**	0.10 (0.03)**	0.10 (0.03)**	
PRTD		0.08 (0.03)**	.08	.05	0.06 (0.04)	.06	0.06 (0.04)	0.05 (0.04)	0.05 (0.04)	
PRTL		0.21 (0.06)**	.26	.05	0.05 (0.06)	.06	0.03 (0.06)	0.03 (0.06)	0.03 (0.06)	
Student interactions										
Pros*PRTL			0.32 (0.22)	.05	0.31 (0.21)	.05	0.21 (0.22)	0.19 (0.22)	0.19 (0.22)	
Pros*PRTD			-0.97 (0.31)**	-.20	-0.94 (0.30)**	-.19	-1.13 (0.35)**	-1.13 (0.35)**	-1.13 (0.35)**	
OvAgg*PRTL			0.67 (0.46)	.13	0.76 (0.46)	.14	0.49 (0.49)	0.41 (0.48)	0.41 (0.48)	
OvAgg*PRTD			0.30 (0.14)*	.16	0.29 (0.14)*	.15	0.12 (0.20)	0.11 (0.20)	0.11 (0.20)	
ReAgg*PRTL			-0.24 (0.37)	-.03	-0.22 (0.37)	-.03	-0.07 (0.39)	-0.05 (0.39)	-0.05 (0.39)	
ReAgg*PRTD			-0.29 (0.22)	-.08	-0.27 (0.22)	-.08	-0.18 (0.23)	-0.18 (0.23)	-0.18 (0.23)	
Class main effects										
PRTL norm				0.08 (0.03)**	0.50 (0.14)**	.35	0.08 (0.04)*	0.08 (0.03)**	0.08 (0.03)**	
PRTD norm				0.56			0.48 (0.14)**	0.47 (0.14)**	0.47 (0.14)**	
Cross-level interactions										
OvAgg*PRTLnorm									-0.97 (0.25)**	
OvAgg*PRTDnorm									-1.50 (1.16)	
ReAgg*PRTLnorm									0.87 (0.25)**	
ReAgg*PRTDnorm									0.71 (0.94)	
Random part										
Student variance	.0163 (.0010)	.0076 (.0005)	.0073 (.0005)	.0073 (.0005)	.0073 (.0005)	.0063 (.0005)	.0063 (.0005)	.0063 (.0005)	.0063 (.0005)	
Class variance	.0002 (.0002)	.0006 (.0002)	.0005 (.0002)	.0003 (.0001)	.0004 (.0001)	.00450 (.0118)	.0004 (.0001)	.0004 (.0001)	.0004 (.0001)	
OvAgg slope									.0345 (.0104)	
ReAgg slope									.0140 (.0065)	
Deviance										
A -2Loglikelihood	-1891.04	-2979.16	-3042.32	-3061.33	-3061.33	-3179.27	-3179.27	-3192.97	-3192.97	
A -2Loglikelihood		1088.12**	63.16**	19.01**	19.01**	117.94**	117.94**	13.70**	13.70**	

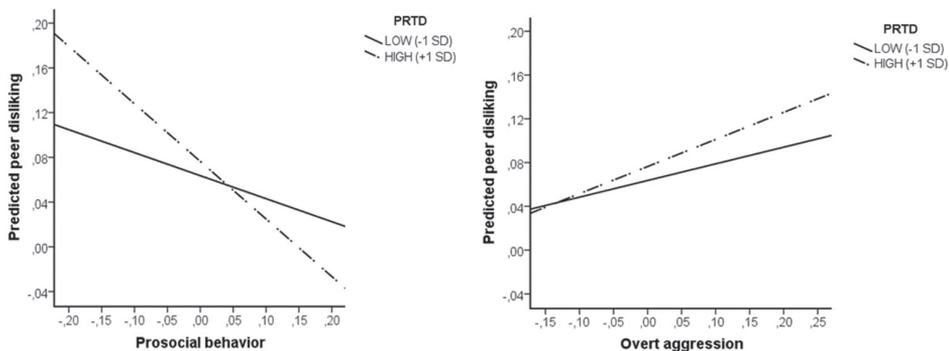
Note. PRTL = peer reputation teacher liking; PRTD = peer reputation teacher disliking; Pros = prosocial behavior; OvAgg = overt aggression; ReAgg = relational aggression.
 * $p < .05$. ** $p < .01$.

PRTL and PRTD as affective filters. In M2 the interaction effects of the student behaviors with PRTL and PRTD were added. This was an improvement as compared to M1, $\chi^2(6) = 63.16, p < .001$. This model explained 55.3% of the level-1 variance in peer disliking. PRTD moderated the prosocial behavior–disliking and the overt aggression–disliking association. The negative prosocial behavior–disliking association was strengthened for students who had high PRTD (see Figure 5.2, left graph). Thus, students who were perceived by peers to show relatively much prosocial behavior were even less disliked more peers thought the teacher disliked the student. As we did for peer liking, we translated this difference to numbers of peers who nominated the student. On average, this difference in disliking was .04, or 1 disliking nomination less. On the other end, students who received relatively little nominations were more strongly disliked by their peers when they had a high reputation of teacher disliking. This difference was .06 or one and a half nominations. On average, students were disliked by two and a half peers with a standard deviation of three peers, so again a difference of one or one and a half nominations was considered rather substantial.

The positive overt aggression–disliking association was amplified for students who had higher PRTD (see Figure 5.2, right graph). When relatively highly aggressive students had a higher reputation of teacher disliking, their disliking score was even .04 higher. That is, they were disliked by one more peer than when they had lower PRTD.

In model M2a, again none of the two-way interaction effects differed depending on gender. Adding these six three-way interaction effects did not significantly improve the model, $\chi^2(6) = 10.08, p = .121$, and neither of the three-way interactions were significant. Therefore, as we did for peer liking, we proceeded to the next modeling step without including these three-way interaction effects.

Classroom norms of teacher liking and disliking. M3 contained the main effects of classroom norms of PRTL and PRTD (see Table 5.4), which was a significant improvement of the model, $\chi^2(2) = 19.01, p < .001$. M3 explained 41.1% of



the class-level variance in peer disliking that was present in M2. Surprisingly, both norms of teacher liking and of teacher disliking were positively associated with peer nominations for disliking status in the class. As expected, the teacher disliking norm was more strongly associated with peer disliking than was the teacher liking norm, as $\beta = .35$ and $\beta = .56$ for PRTL and PRTD norms, respectively.

Figure 5.2. Predicted values for peer disliking as a function of prosocial behavior (left graph) and overt aggression (right graph) for low and high PRTD.

Next, we examined whether behavior–disliking associations differed across classes. Adding a random slope for overt aggression showed a significant drop in deviance compared to M4, $\chi^2(2) = 100.62, p < .001$, as did adding a random slope for relational aggression, $\chi^2(2) = 27.21, p < .001$. Consistently, M4 containing both these random slopes was an improvement compared to M3, $\chi^2(5) = 117.94, p < .001$, and both slopes significantly varied across classes.

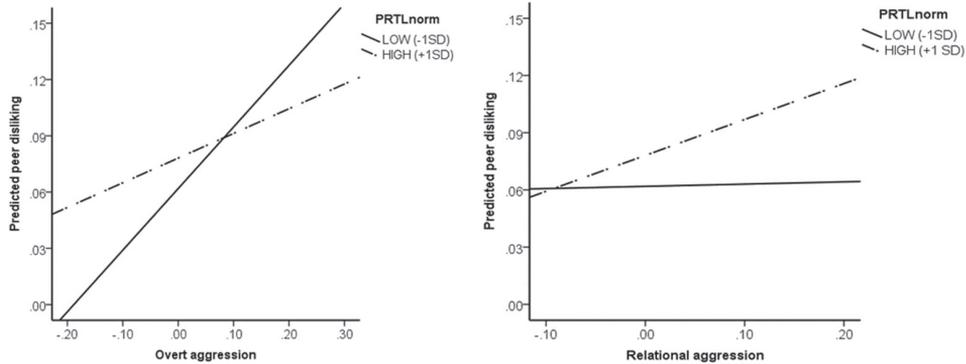


Figure 5.3. Predicted values for peer disliking as a function of overt aggression (left graph) and relational aggression (right graph) in classes with low and high PRTL norms.

Finally, in M5 we tested whether variation in associations between each type of aggression and peer disliking could be explained by classroom norms of PRTL and PRTD. M5 was an improvement compared to the previous model, $\chi^2(4) = 13.70, p = .008$. Cross-level interaction effects explained 23.3% of the slope variance for overt aggression, and 28.2% of the slope variance for relational aggression. Classroom norms of PRTL were associated with the slopes of both types of aggression, but, remarkably so, in opposite directions. As can be seen in Figure 5.3 (left graph), the positive overt aggression–disliking association was less strong in classrooms where norms of teacher liking were higher. Students who received many overt aggression nominations had a disliking score that was .03 lower in a classroom with a high PRTL norm (+1 SD) than in a class with a low PRTL norm (-1 SD), which corresponds to being

disliked by almost one peer less. The positive relational aggression–disliking association was stronger when classroom norms of teacher liking were higher (see Figure 5.3, right graph). Students who were perceived by their peers to show much relational aggression had a disliking score that was .05 higher in a classroom with a high PRTL norm than in one with a low PRTL norm, corresponding to over one peer more who disliked the student.

DISCUSSION

In this study, we aimed to investigate how peer reputations of teacher liking and disliking are an affective filter for the affective peer evaluation of students' prosocial and aggressive behavior. The study advances the understanding of the role of the teacher in peer relationships and builds on an integrative framework including both student and teacher predictors that contribute to peer status on an individual and on a classroom level. In addition, studying peer liking and disliking separately instead of the composite measure of social preference allowed us to disentangle effects and pinpoint exactly in which area the teacher can be of significance. Results revealed that at the individual level, primarily peer reputation of teacher disliking, and to a lesser extent also reputation of teacher liking, moderated some of the behavior–status associations. The teacher made a difference in particular for those students who were at-risk of low peer status, that is, those students who were perceived by many of their peers to show aggressive behavior and by few to show prosocial behavior. At the class level, we found that differences across classes in aggression–disliking associations depended on classroom norms of teacher liking.

Individual Peer Reputation of Teacher Liking and Disliking

The results regarding the moderating role of peer reputations of teacher liking and disliking on the individual level support the concept of the teacher as an affective filter (Hughes, 2012) for peers' affective responses to prosocial behavior and overt aggression. Peer perceptions of these student behaviors were differentially associated with peer status, depending on teacher liking (prosocial behavior) and disliking (prosocial behavior and overt aggression). These findings are in concordance with studies by Chang et al.

(2007) and Moore et al. (2012). Moore et al. interpreted their results as the teacher having a protective role for at-risk students' peer status. Our study supports this proposition, as peer reputation of teacher liking or disliking was mostly of significance for the peer status of those students who showed little prosocial behavior or much overt aggression. For these students, being liked or disliked by the teacher made the difference between being liked or disliked by on average one or "one and a half" peer more or less. For friendships, it is known that having one friend instead of no friends has a strong effect on students' well-being (Hodges, Boivin, Vitaro, & Bukowski, 1999). The same may hold for peer liking; students who are liked by at least one classmate may have the feeling of a secure base to count on for social support. Being disliked by one peer less may decrease the chances for a student to be ignored or excluded from social activities, and increase the chances to engage in enjoyable and fruitful social interactions.

Viewing the role of the teacher as a moderator was a significant improvement to the models that only included main effects of peer reputation of teacher liking and disliking. This corresponds to Chang et al.'s (2007) finding that older students are less likely to directly incorporate the teacher's views as their own, but rather will adapt to and use the information provided by the teacher to create their own image of their classmates.

As we expected, peer reputation of teacher disliking was more strongly related to peer status than reputation of teacher liking, possibly because of negativity bias and a contrast between the individual and the group. In accordance with prior research (e.g., De Laet et al., 2014; Hughes et al., 2001), the average peer reputation of teacher liking was indeed more than twice as high as the average peer reputation of teacher disliking. Possibly, teacher liking is ambivalent regarding its association with peer status. On the one hand, teacher liking can result in a positive affective filter, which would lead to peer liking, whereas on the other hand students who are liked by the teacher can be seen as the teacher's pet (Babad 1995, 2009) and are therefore disliked by peers. When both these processes occur, the

combined association of teacher liking with peer status might turn out to equal zero. For future research it would be interesting to examine which student, peer and teacher factors contribute to a student being liked by both teacher and peers versus the student becoming a non-popular teacher's pet (see Babad, 2009).

Classroom Norms of Teacher Liking and Disliking

In line with prior research (e.g., Chang, 2004; Stormshak et al., 1999) we found behavior–status associations to differ across classrooms as well as across individuals. As expected, the teacher also played a role at the class level (see Chang, 2003; Gest & Rodkin, 2011). In classes with a higher norm of teacher liking, peer-perceived overt aggression was less strongly associated with peer disliking than in classrooms with lower norms of teacher liking. This may reflect that peers have more understanding for students who show deviant behavior, and do not respond too harshly to students who occasionally act out. Contrary to this finding and to our expectations, peer-perceived relational aggression was more strongly related to peer disliking in classrooms with higher norms of teacher liking. Possibly in classes with a high teacher liking norm positive peer relationships are more strongly encouraged and valued, and correspondingly peers more easily dislike those students whom they view to attempt to disturb these liking ties. Relational aggression is different form overt aggression in the sense that it is mainly aimed at harming interpersonal relationships. In other words, showing relational aggression may violate the norm of fostering positive relationships and therefore is more strongly rejected.

In agreement with Hughes et al.'s (2006) findings, we found that in classes where teacher liking was more normative, students in general liked more of their peers themselves as well, whereas, in classes where teacher disliking was more normative, students also disliked more of their peers. These findings support the view that teachers, when fostering a climate in which positive relationships are more and negative relationships are less normative, may promote positive versus negative relationships among peers as well. Surprisingly, classroom norms of teacher liking were also

positively associated with peer disliking. It could be the case that this reflects a random tendency within classes to nominate a smaller or larger proportion of classmates on any questionnaire item. Alternatively, higher norms of teacher liking could create a climate in which students feel safer to indicate their disliking for others.

Practical Implications

Efforts to improve students' peer status have often focused on behavioral training for the target student (for a review, see Bierman & Powers, 2009). However, it often turns out to be difficult to alter behavior, and even if students, for instance, become less aggressive this does not necessarily affect their peer status (Denham & Holt, 1993). As an addition to this social skill deficits approach, Hymel, Wagner, and Butler (1990) made a case for including the social context of the classroom in intervention efforts. Our study findings provide several suggestions for how the teacher, as the main professional in this social context, could be a target of such intervention efforts.

First, the study findings suggest that when teachers communicate less disliking for students who show little prosocial behavior or much overt aggression, these students are likely to be disliked less by their peers. Based on our findings it is probably not necessary to "fake" liking for a disruptive student by actively engaging in positive interaction. Rather, teachers might well be advised to focus on not communicating strong disliking, so not engaging too much in negative interactions. Glomb and Tews (2004) described faking a positive emotion and suppressing a negative emotion as two strategies of appropriate emotional display in an event that mainly evokes negative emotions, such as a student who misbehaves. Both strategies induce emotional labor, which can cause stress and decrease well-being (Glomb & Tews, 2004). Allocating emotional behavior to the option that is most effective is important to diminish the associated stress level of the teacher. Of course, not reprimanding students who show undesirable behavior might interfere with classroom management goals, such as preventing or decreasing aggressive behavior. A solution might be not to reprimand students publicly for their

behavior, but more privately, when peers may not be able to notice the negative teacher behavior. Thus, teachers seem to need to be mainly aware of their negative behavior with students at-risk for low peer status when this behavior is witnessed by the student's classmates.

At the classroom level, it seems important for teachers to show liking for their students and thereby to create a climate in which liking is the norm, more so than disliking. Our results suggest that a climate of positive affect induced understanding and respect for students who sometimes hit or kick others or call them names. Although this may sound like a desirable situation, there is also a downside. The norm salience (i.e., the association between student behavior and peer status) can be viewed in terms of rewards or sanctions that are within a classroom generally associated with different types of student behavior (Henry et al., 2000). When overt aggression is less strongly related to peer disliking, the behavior is less strongly sanctioned, which can lead to increased exhibition of aggressive behavior (Henry et al., 2000). When teachers notice that aggression is on the rise as a result of the alleviated association between aggression and disliking, they may need other practices or intervention programs to neutralize this unwanted side effect. In the light of norm salience in terms of rewards and sanctions, the findings for relational aggression are promising; in classes with higher norms of teacher liking, this positive climate was associated with stronger sanctions, in terms of peer disliking, following gossiping about or excluding others.

These implications for teacher practice come with the side note that, because we studied peer reputations of teacher liking and disliking, we do not know exactly which teacher-student interactions inform these reputations. Studies using observational data, linking concrete teacher behavior to PRTL and PRTD, are needed to further understand the ways in which teacher-student interactions and students' peer status are related.

Limitations and Directions for Future Research

The study results need to be interpreted in the light of several limitations. First, although we explained our findings

in terms of peer reputations of teacher liking affecting peer status and behavior–status associations, associations between teacher and peer variables are probably far more complex than depicted here. Possibly, teacher behavior is also interpreted by peers to reflect teacher liking and disliking differently for students whom peers perceive to show prosocial behavior or aggression. Future research would benefit from a longitudinal design in which the temporal order of effects (and, to a certain degree, causality) can be better investigated.

A second limitation may be that all study variables were based on peer reports and thus shared method variance could be an issue; it could be the case that students' evaluations of their peers reflected a general positive versus negative evaluation of the peer. Since we were mainly interested in associations between peers' own views, using observations or teacher ratings of student behavior or teacher–student relationships would lower the validity of our measures, which seemed to be a larger disadvantage than using peer nominations for all study variables. Based on our investigation of multicollinearity, we think it is relatively safe to conclude that common method variance did not distort the results too much. At least not all students only reported a general positive or negative evaluation of their classmates. Third, peer reputations of teacher (dis)liking may not only moderate associations between peer perceptions of student behavior and peer (dis)liking, but also associations between actual and peer-perceived student behavior. Students interpret ambiguous behavior differently when exhibited by a peer they like or a peer they dislike (Peets et al., 2008). In the same vein, the affective filter provided by teacher liking or disliking may affect whether or not ambiguous student behaviors, for instance, a punch, are interpreted as playful or as aggressive. So, the association between actual and peer-perceived student behavior might also be moderated by the teacher, which would make the teacher's invisible hand even stronger.

Finally, the affective filter mechanism might better be examined as situated within each individual perceiver rather than in terms of peer reputation. That is, a single peer

perceiver has an idea of how the teacher likes a certain target student. The peer may use this information when evaluating the student himself. For future research, a focus on the processes from the point of view of the individual perceiver may add to the interpretation of an affective filtering mechanism. To this end, analysis techniques that are aimed at determining the probability of an individual peer indicating to like or dislike a certain student, based on characteristics of the student, the peer, and the dyad, could be useful (e.g., Snijders, 2001; Zijlstra, Van Duijn, & Snijders, 2006).

Conclusion

In conclusion, this study's findings add to the existing literature aimed at revealing the invisible hand of the teacher. Lower versus higher peer reputation of teacher disliking seems to have the power to increase versus further decrease the peer status of students who are perceived by peers to show little prosocial behavior and much overt aggression. Furthermore, also the normative levels of teacher liking and disliking in the classroom were associated with peer relationships. When teachers understand the consequences of the interactions they have with individual students for the students' peer status, they may interact more strategically and create a climate in which positive peer relationships flourish.

THE ROLE OF THE TEACHER IN STUDENTS' SOCIAL ISOLATION

15, 16

ABSTRACT

Students who rarely engage in peer interaction can be considered socially isolated. Isolation hampers opportunities for developing social as well as academic skills. Teachers may contribute to the social participation of isolated students by modeling (positive) interaction with the students. To examine the role of teachers in peer isolation, this study explored how teachers behaved with isolated students during their lessons. Moreover, we examined how these interactions were related to changes in students' isolation over time. Multilevel analyses were performed with a sample of 1452 fifth-grade students (Mage = 10.60) and their 57 teachers. Results showed that teachers had less interaction with isolated students than with non-isolated students, with even lower frequency of interaction when students were more severely isolated. When isolated students were more rejected by their peers (students were excluded), teachers had more frequent interaction with them, but this interaction had a more negative character. Teachers were relatively aware of their students' isolation, yet teacher behavior could hardly be predicted by teachers' judgment of isolation. The results of a latent growth model showed that when teachers acted less negatively towards isolated and rejected students, their level of isolation decreased, whereas more teacher negativity was associated with a maintained or increasing level of isolation. Thus, although teachers could have a positive impact on students' social participation, they generally seemed to act in a manner that might continue or even worsen isolation.

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INTRODUCTION

Students' social status with peers, in terms of peer liking and disliking, is an important predictor of their social and academic development (Nelson & Dishion, 2004; Rubin, Bukowski, & Parker, 2006; Wentzel, 2005). Research on factors contributing to peer status has shown that student behavior, in particular prosocial and aggressive behavior, strongly predicts how peers evaluate a student (Cillessen & Mayeux, 2004; Newcomb, Bukowski, & Pattee, 1993; Rubin et al., 2006). Recently, evidence has been produced that students who rarely engage in social interaction with their classroom peers can be considered socially isolated (Rubin, Coplan, & Bowker, 2009; Spangler & Gazelle, 2009). Being engaged with peers is essential for students to develop social skills (Rubin et al., 2009), but also gives them opportunities to take part in activities such as collaborative learning, which boost academic skills (Wentzel, 2005). Isolated students often the target of teasing, harassment, and bullying, which is related to a limited sense of belonging (Wormington, Anderson, Schneider, Tomlinson, & Brown, 2016) and academic difficulties (Lee & Cornell, 2009). Moreover, they are at increased risk of developing internalizing as well as externalizing behavioral problems (e.g., Gazelle & Ladd, 2003; Hymel, Rubin, Rowden, & LeMare, 1990; Laursen, Bukowski, Aunola, & Nurmi, 2007). Existing research has shown how characteristics of individual students (e.g., temperament and biology; Hariri et al., 2002; Henderson, Fox, & Rubin, 2001), peer group characteristics (e.g., larger group size and more status hierarchy; Bukowski & Véronneau, 2014), and family characteristics (e.g., overprotective parenting; Coplan, Arbeau, & Armer, 2008; Mikulincer & Shaver, 2014) contribute to students' level of isolation. Surprisingly, the classroom teacher, who represents a significant developmental actor in students' school lives, has yet to be structurally linked to social isolation of students in upper elementary school. Teachers, as the single professionals close to the classroom peer society yet just not part of it, have the unique opportunity to manage classroom peer interactions and relationships (Farmer, McAuliffe Lines, & Hamm, 2011). Through their interaction with students, teachers can (often unintentionally) affect a student's

peer status in terms of acceptance, rejection, or popularity (e.g., De Laet et al., 2014; Hughes, Cavell, & Willson, 2001; McAuliffe, Hubbard, & Romano, 2009). Isolation is a dimension of peer relatedness that has been relatively understudied in relation to the contribution of the teacher, particularly in upper elementary education. Because of the possibly detrimental effects of isolation on social as well as academic outcomes, increasing the social participation of isolated students may be considered part of teachers' professional role. To examine the role of teachers in peer isolation, the current study first explored how teachers generally behave in everyday interaction with isolated students compared to non-isolated students. Second, we examined how these interactions are related to isolated students' degree of isolation over time.

Isolation

Social isolation from the peer group is not a unidimensional phenomenon with a single manifestation, but a multifaceted construct (Bukowski & Véronneau, 2014; Coplan & Rubin, 2010; Rubin & Coplan, 2004). That is, students can come to occupy a social position apart from the rest of the peer group through different mechanisms. Two basic processes are the peer group moving away from the student – the peer group excludes the student – and the student moving away from the peer group – the student withdraws him- or herself from the peer group (Rubin, Bukowski, & Parker, 2006; Rubin et al., 2009; Spangler & Gazelle, 2009). When peers exclude a student and do not want to interact with him or her, the student is rejected from the peer group. Peer rejection is associated with externalizing behavior as well as internalizing behavior problems (Ladd & Troop-Gordon, 2003), academic disengagement and underachievement (Buhs, Ladd, & Herald, 2006; Véronneau, Vitaro, Brendgen, Dishon, & Tremblay, 2010), and dropout (French & Conrad, 2001).

Students who themselves choose not to participate in peer interaction are considered socially withdrawn (Rubin et al., 2009). A further distinction can be made as to students' motivation to refrain from interacting with peers; they can be shy and socially anxious on the one hand, or unsociable on the other hand (Rubin et al., 2009; Spangler & Gazelle,

2009). Shy/anxious students do have a relatively high social approach motivation but they also have an avoidance motivation that blocks their social engagement. Unsociable students, on the other hand, have a relatively low social approach motivation; they have a social disinterest and prefer to be by themselves (Coplan, Ooi, & Nocita, 2015). Compared to shy/anxious students, unsociable students seem to experience fewer internalizing problems (e.g., Bowker & Raja, 2011; Coplan & Weeks, 2010). Still, unsociable students also engage less in interactions with peers that could potentially expand their social and academic skills and therefore may experience problems with peers and sub-optimal adjustment (Coplan & Armer, 2007; Nelson, 2013).

The Role of the Teacher

An emerging research base has been unveiling the teacher's invisible hand (Farmer et al., 2011), that is, the previously undiscovered – hence invisible – impact the teacher has on peer relationships. Teacher practices are related to a multitude of peer experiences, including peer acceptance (Hughes & Im, 2016; Kiuru et al., 2015) and perceived popularity (De Laet et al., 2014; Moore, Shoulberg, & Murray-Close, 2012) of individual students, and relationship hierarchy (Gest & Rodkin, 2011; Hendrickx, Mainhard, Boor-Klip, Cillessen, & Brekelmans, 2016; see Chapter 2) and behavioral norms (Ahn & Rodkin, 2014; Hendrickx et al., 2016) within the classroom peer ecology. Although the classroom teacher thus clearly is a developmental actor in peer relations, teacher effects on social isolation have not received much attention yet. In this section we explicate how the existing findings in this area of research may inform how teaching is related to peer isolation. Two general ways of influence are discussed: through isolated students' own perceptions and behavior and through peers' perceptions of isolated students.

First, by developing a supportive relationship with a student, teachers may affect this student's social behavior and beliefs (Hughes, 2012; Pianta, Hamre, & Stuhlman, 2003; Verschueren & Koomen, 2012). Teacher support can serve as a secure base from which children can explore the

classroom and interact with their peers, whereas teacher conflict functions as a stressor that may impair students' adjustment and exacerbate negative developmental outcomes (Birch & Ladd, 1997; Thijs & Koomen, 2008). Research has shown that supportive teacher-student relationships can compensate for, or buffer, risk factors for pleasant peer interactions (see, for a review, Sabol & Pianta, 2012). For example, Arbeau, Coplan, and Weeks (2010) found that shy students were less anxious around peers and more likely to engage socially when they had a close relationship with their teacher than when this relationship was less close and more conflicted. Thus, teachers may positively affect isolated students' self-concept and confidence to interact with peers by interacting with them in a supportive manner and without conflict. This may particularly be the case with students who have a stronger desire to be involved socially, yet are too shy or anxious to engage in peer interaction (see Arbeau et al., 2010). Teacher support may help these students to overcome their shyness and anxiety and encourage them to engage in interactions with their classroom peers. In contrast, teacher conflict may exacerbate the negative consequences of students' shyness and further decrease students' peer interactions (Sabol & Pianta, 2012).

A second mechanism that has been studied in previous research regards teacher effects on peers' social cognitions and evaluations of a student (Hughes, 2012). Hughes et al. (2001) argued that a teacher's interactions with a student provide classmates with cues informing them of the student's competencies and likeability (see also Hughes, Im, & Wehrly, 2014). Based on this information, peers may interact differently with the student. That is, in their interactions with a student, teachers can be a model for peers' interactions with the student. Indeed, several studies have found that teachers' observed positive versus negative behavior towards students (Hendrickx, Mainhard, Oudman, Boor-Klip, & Brekelmans, 2016; see Chapter 3; McAuliffe et al., 2009; White & Kistner, 1992) and peers' perceptions of a supportive versus conflicted teacher-student relationship (Hughes et al., 2001, 2014) are associated with peer acceptance and rejection.

In line with this modeling mechanism, teachers who interact frequently with an isolated student in the classroom may send a message to classroom peers that this student is worthwhile talking to and that it is in fact normal to interact with him or her. Conversely, limited teacher interaction with this student may provide peers with the message that it is alright not to talk to this person and to not engage her or him socially. In addition to interacting frequently with isolated students, it seems adaptive for teachers to interact with them in such a way that they are seen positively by their peers. That is, next to frequency also the valence of teacher behavior is important. The teacher modeling positive behavior towards a student would be especially helpful for students who are actively excluded by their peers. Thus, teachers may positively affect peers' behavior with isolated students by having frequent and positive interaction with them.

In summary, teachers may improve the social participation of isolated students by interacting with them more frequently (modeling interaction in itself) and by interacting less negatively and more positively (providing support and modeling positive interaction). However, existing research, albeit limited and mostly undertaken in preschool or first-grade settings, suggests that adaptive behavior in terms of increased frequency and positive valence do not always occur. On the one hand, regarding frequency of contact, teachers have reported (Evans, 2001) and have been observed (Rudasill & Rimm-Kaufman, 2009) to have less, rather than more, frequent interactions with isolated students, particularly with those who withdrew themselves from the peer group. These researchers have argued that because of isolated students' limited social participation, they do not frequently trigger attention and therefore remain relatively unnoticed by the teacher and by peers. On the other hand, some studies suggest that withdrawn children do not stay unnoticed by teachers at all and that teachers do actively engage with them (Coplan & Prakash, 2003; Thijs, Koomen, & Van der Leij, 2006). Regarding the valence of teacher behavior towards isolated students, teachers have reported to have more conflicted rather than supportive relationships with first-grade students

whom they perceived to be relatively anxious, unsociable, and to be excluded by peers (Arbeau et al., 2010; Rudasill & Rimm-Kaufman, 2009). De Laet et al. (2014) also found that rejection by peers was negatively associated with future teacher support and positively with teacher conflict. Thus, with young students, teachers seemed to behave in accordance with the low social status of the students, which likely maintains this low status, rather than trying to improve students' social status by providing support.

Teacher judgment of isolation. Teachers' attunement to students' social isolation from the peer group may facilitate teachers' adaptive behavior (Hamm, Farmer, Dadisman, Gravelle, & Murray, 2011; Hoffman, Hamm, & Farmer, 2015). Teacher attunement reflects teachers' accurate judgment of students' peer relations (Hamm & Hoffman, 2016). If teachers are unaware of who the isolated students are, they cannot be expected to purposefully intervene or change their practices accordingly. Indeed, Hoffman et al. (2015) showed that students became more socially integrated over time when teachers were more attuned to their peer affiliations. Teacher attunement is mostly measured as the correspondence between teacher judgments of peer relations with students' own indication of their friends, peers they like, or peers who have certain characteristics (see Hamm & Hoffman, 2016). In general, however, teacher judgments of peer relationships show limited overlap with peer reports (Gest, 2006; Hoffman et al., 2015; Neal, Cappella, Wagner, & Atkins, 2011; Pearl, Leung, van Acker, Farmer, & Rodkin, 2007). Therefore, in the present study, to better understand the nature of teacher behavior, teacher judgment of students' social isolation is taken into account.

Present Study

As isolated students are at risk for social and academic adjustment problems, it is important to understand what teacher behavior can support isolated students' social participation in the classroom. In the present study, everyday teacher behavior in interactions between the teacher and individual students was observed and coded in terms of frequency and valence. In addition, in line with previous research that highlighted how teacher

behavior impacts students' peer status through classmates' perceptions of the teacher-student relationship (see Hughes et al., 2001, 2014), we measured peers' perceptions of the frequency and valence of teacher behavior towards a student. To do justice to the multifaceted nature of social isolation (see Bukowski & Véronneau, 2014; Rubin & Coplan, 2004), we took into account the mechanisms that might have led to a student's isolation. That is, next to studying whether and to what extent students were isolated, we also considered the degree to which students were actively excluded or rejected by the peer group and the degree to which students themselves preferred not to engage in social interaction. The examination of the role of the teacher in social isolation was guided by two specific research questions.

The first goal of this study was to explore how sensitive or adaptive teacher behavior was to students' isolation. The corresponding research question was: How do teachers behave in everyday interaction with isolated students? To answer this question, we first compared teacher behavior with isolated and non-isolated students. Next, within the group of isolated students, we examined whether teacher behavior was different when students were more severely isolated, and when there were different reasons for their isolation (i.e., when they were more or less strongly rejected by peers, or when they had a smaller or larger desire to be socially involved). Finally, we examined if teachers' judgments of isolation were associated with their behavior. Based on earlier studies with younger students (Evans, 2001; Rudasill & Rimm-Kaufman, 2009), we expected that teachers would interact less with isolated students, which would represent an insensitive approach rather than an adaptive one. Regarding valence, we expected teachers to show less positive and possibly more negative behavior (see Arbeau et al., 2010), particularly with isolated students who were also rejected by their peers (De Laet et al., 2014). To examine whether teacher behavior could help isolated students to become more socially engaged, the second research question was: How does teacher behavior relate to changes in students' social isolation over time? Based on studies that connected teacher-student interaction with other aspects of peer relations (e.g., De Laet et al.,

2014; Hughes et al., 2001, 2014; McAuliffe et al., 2009), we expected that students with whom the teacher interacted more frequently became less isolated over time, because the teacher would model interacting with them to the other students in the classroom. We also expected that students with whom the teacher had more positive and fewer negative interactions became less isolated over time, because the teacher would provide them with positive support and would model positive rather than negative interaction with them to the other students in the classroom. Modeling positive interaction was expected to be particularly helpful for isolated and rejected students' social participation.

METHOD

Participants

As part of a larger study on classroom climate in elementary education, 57 fifth-grade classrooms¹⁷ from 39 elementary schools in the Netherlands participated in three waves of data collection. Only students with parental consent to complete questionnaires and to be recorded on camera participated (1452 out of 1499; 96.9%). Due to absence on the day of data collection or not being part of the class yet/anymore, at the first wave (T1), 1404 students participated, at the second wave (T2) 1379 students participated, and at the third wave (T3) 1384 students participated in the study. Students' mean age at T1 was 10.60 years ($SD = 0.50$, range = 8.43 - 12.79); 47.4% were girls. According to the classification of Statistics Netherlands (2012b), 84.4% of the students were Dutch (both parents born in the Netherlands), 5.6% had another Western background (at least one parent born in another Western country), and 10.0% had a non-Western background (at least one parent born in a non-Western country). This distribution was representative for the areas in which the schools were located (Statistics Netherlands, 2012a). Average class size was 26.12 students ($SD = 3.72$, range 18 - 34). As is common in the Netherlands, in 49 (86.0%) of the classrooms in our sample the composition of the group was largely the same as the year before, with only a few students who had moved in or out.

17 In total, 59 classes participated in the research project. Two classes were not included in the present study: one because the class dropped out of the project after the first measurement occasion and one because of its exceptionally large class size with two teachers present at all times.

In Dutch fifth-grade classrooms, students either have a single teacher or two teachers who each work part-time. In those classrooms where there were two teachers (43 classrooms, 75.4%), the teacher who spent more time in the classroom participated in our study. In total, 34 of all participating teachers (59.6%) taught at least 4 days a week. Teachers' mean age was 41.09 years ($SD = 11.95$, range 24.51 - 62.47); their average experience was 14.96 years ($SD = 10.98$, range 1 - 39). All teachers were Dutch and 37 were female (64.9%). Due to personal leave of the participating classroom teacher, because of travel, illness, or maternity leave, substitute teachers were present at T2 (one teacher) and T3 (three teachers). Teacher data of these classes at those measurement moments were therefore discarded.

Measures

Isolation. Social isolation was measured with three peer nomination items: solitude ("which of your classmates is often by him/herself during breaks?"), not belonging to a group ("which of your classmates does not belong to an informal group of friends?"), and being least popular ("which of your classmates are least popular"). Primary participants (those present and consented) nominated those classmates who best fitted each description from a list containing the classmates' first names. Both same- and cross-sex nominations were allowed, and nominations were unlimited with a minimum of one. Apart from themselves, participants could nominate any classmate, whether or not present and consented. Nominations of non-consented students were excluded from the dataset, so that the set of secondary participants were all students who were consented to participate, whether or not they were present. To avoid sequence effects (see Poulin & Dishion, 2008), classmates' names were presented in a random order that was different for each participant. For each item, proportion scores were computed as the total number of nominations received divided by the maximum number of possible nominations. Cronbach's alpha of the three proportion scores was .85, .83, and .81 for the three measurement waves. Proportion scores were group mean centered to account for class-level tendencies to nominate more or fewer students. Because of scaling differences, the scores

were standardized over the sample and then averaged to form an isolation score.

Isolated subsample. The students in our sample who had the 20% highest isolation scores at T1 were considered (relatively) isolated, and the remaining 80% were considered non-isolated. The cut-off of 20% was chosen in accordance with the three-tier model based on Positive Behavioral Interventions and Supports (PBIS; Reinke, Splett, Robeson, & Offutt, 2009). According to this model, 80% of students respond successfully to proactive universal (classroom) strategies that provide systematic reinforcement and training of expected social behavior, but the top 20% will experience social problems and will not respond to such universal school-wide interventions and will need more intensive interventions to help them succeed in school. The subsample of isolated students in our sample at T1 consisted of 288 students, 2 to 9 students (6.5% to 34.8%) from each participating class. At T2, 2 to 10 students from each class were considered isolated (6.9 to 40.0%), and at T3, 1 to 10 students from each class had the top 20% isolation scores (3.6% to 37.0%). Table 6.1 compares the demographics of non-isolated students with those who were considered isolated according to our approach at minimally one measurement occasion. The isolated group did not differ statistically from the non-isolated group in age, $t(1439) = -1.15, p = .250$, gender distribution, $\chi^2(1) = 0.00, p = .958$, or parents' country of birth, $\chi^2(2) = 1.48, p = .476$.

Causes of isolation. To further understand students' isolation, we measured: (a) the extent to which students were rejected by peers, to represent active exclusion, and (b) students' desire for social interaction, to represent the extent to which students had a social approach motivation or rather preferred to be by themselves.

Peer rejection. Using the same peer nomination procedure as described above, students were asked to indicate which of their classmates they liked least. Peer rejection scores were calculated for each student as the proportion of the available classmates that had nominated them.

Table 6.1

Demographics of the Non-Isolated and the Isolated Students

	Non-isolated	Isolated
<i>N</i>	1074	367
Mean age	10.6	10.6
Female %	47.4	47.3
Dutch %	85.1	82.5
Non-Dutch Western %	5.4	6.0
Non-Western %	9.5	11.5

Desire for social interaction. To measure desire for social interaction, we included the negative aspect of the social self-concept scale as adapted from the Dutch version of the Harter scales (Veerman, Straathof, Treffers, Van den Bergh, & Ten Brink, 2004). Three self-report items were included ("I would like to have more friends", "I would like for more children to like me", and "I have a hard time making friends"), which were answered on a scale ranging from 1 (not true at all) to 5 (completely true). Cronbach's alpha at the three consecutive time points was .71, .72, and .75.

Teacher attunement. Teachers' judgment of students' isolation was measured with three items that paralleled the three peer nomination items for isolation. Teachers rated each student's solitude and popularity on a 7-point Likert scale (1 = not at all, 7 = very much). The popularity item

was reverse coded, so that a higher score indicated more unpopularity. Furthermore, teachers indicated which students did not belong to a group of friends. This variable was dummy coded (0 = not mentioned by the teacher, 1 = mentioned by the teacher as not belonging to a group of friends).

Teacher behavior. Teacher behavior with a student was measured from an outside observer's perspective and from the perspective of the student's peers.

Observed teacher behavior. Teacher behavior was coded from two hours of video observation in each classroom. Event sampling was used to select teacher comments that were (a) expressed in connection with a single student (dyadic) or a small group, and (b) expressed in public, that is, when at least half the students were present in a whole-class teaching setting (see McAuliffe et al., 2009). Teacher behavior was coded as positive, negative, or neutral in cognitive and affective domains. Positive or negative teacher behavior in the cognitive domain referred to how the teacher evaluated a student's academic contributions (e.g., stating that an answer was correct vs. incorrect). Positive or negative teacher behavior in the affective domain referred to how the teacher evaluated a student as a person or how the teacher evaluated a student's behavior (e.g., praising a student for being quiet vs. asking a student not to speak during instruction). Teacher behavior was coded as neutral when it did not contain affective or cognitive valence. Each teacher comment was independently coded in both domains. For example, a single teacher comment could be coded as positive in the affective domain but negative in the cognitive domain (e.g., "that was not quite right, darling"). Frequency of teacher behavior with a student was computed as the total number of teacher behaviors directed to an individual student. The valence of teacher behavior in each domain was computed as the proportion of positive comments minus the proportion of negative comments in that domain, yielding a score from -1 to +1. For more information on the coding system of teacher behavior, including further examples, see Hendrickx et al. (2016; see Chapter 3).

Peer-perceived teacher behavior. Following procedures similar to those described above, three peer nomination items were used to measure how students perceived their teacher's behavior towards their classmates. To measure the frequency of teacher-student interactions, students were asked to nominate classmates "who hardly received any attention from their teacher." The item contained the name of the teacher involved. Nominations received were counted for each student and divided by the number of nominators to create a proportion score. This score was then subtracted from 1, so that a higher score indicated more frequent interaction with the teacher.

Two additional nominations were used to measure the valence of teacher-student interactions. Students were asked who "received a lot of praise and many compliments" (positive teacher interaction) and classmates "at which the teacher got angry often" (negative teacher interaction). Items again contained the name of the teacher involved and nominations received were counted and transformed into proportion scores. The valence score then was created by taking the positive proportion score minus the negative proportion score (range -1 to +1).

Procedure

Schools for elementary education in the middle, south, and east of the Netherlands were recruited for this study. After the school's principal and fifth-grade teacher agreed to participate, parents were informed of the study goals and asked for their consent for their child's participation. Data were collected in the fall (T1), winter (T2) and spring (T3) of the 2012-2013 school year. T1 started at least one month after the beginning of the school year. Measurement moments were 13 to 15 weeks (T1-T2) and 9 to 11 weeks (T2-T3) apart. At the three time points, all students for whom consent was granted completed the questionnaires on netbook computers in the classroom. Students were seated separately and partitioning screens flanked the netbooks to prevent distraction and to guarantee privacy. Standard instructions were given concerning voluntary participation, confidential data handling, and the content of the questions. Teachers were present in the classroom

and completed their own questionnaires, also on a netbook computer. In addition, two hours of video were recorded on the same day the questionnaires were completed. During the observation, teachers were free to follow their normal lesson plans, except for scheduling tests (because little interaction takes place during tests) and for individual student presentations (because classroom interactions then typically revolve around the presenting student which would result in unrepresentative high frequency of teacher behavior with the presenter). A camera was located in the back of the classroom and researchers were not present during video observation to limit intrusion. After T3, teachers received a summary of the findings for their classroom.

After developing the coding system for teacher behavior, the first author and two research assistants tested it for inter-observer reliability in two steps. First, agreement for event occurrence ranged from 81% to 87% for the pairs of observers. Second, a set of 1624 occurrences of teacher behavior was coded with respect to the content. For the pairs of observers, weighted Cohen's kappa ranged from .72 to .77 for the affective domain (substantial agreement; Landis & Koch, 1977) and from .83 to .86 for the cognitive domain (almost perfect agreement). After establishing the coding scheme as a reliable measure, three additional research assistants were trained to code the video data until they reached agreement with the first author of at least 80% for event occurrence and a weighted Cohen's kappa of at least .80 for both the affective and cognitive domains for a set of 207 instances selected to reflect a wide range of teacher behaviors.

Analysis

Research question 1: Teacher behavior with isolated students.

To answer the first research question, we explored teacher behavior with isolated and non-isolated students in two steps. First, to broadly examine if teachers treated isolated students differently from non-isolated students, we performed a set of multilevel analyses predicting teacher behavior from isolated status (non-isolated or isolated), for each of the five teacher behavior outcome variables separately: observed frequency, observed valence in the

cognitive and affective domain, peer-perceived frequency, and peer-perceived valence. These analyses were performed for the three measurement moments together, using the SPSS (version 24) mixed procedure, using all behavioral data available. Next to the class, student, and occasion level variance, there was another level of variance that needed to be taken into account in these analyses: that of the observed lesson (class*occasion). That is, part of the variation in, for instance, frequency of teacher behavior with a student, was due to the observed lesson being more or less student-oriented. In some classrooms, at the first occasion we videotaped two hours of teacher-led classroom interaction, in which the teacher constantly addressed individual students, whereas at the second occasion we mainly observed seat work during which very limited public dyadic teacher behavior occurred. Thus, we accounted for this cross-classified nesting by modelling measurement occasions of teacher behavior with a student (level 1) as being nested within students (level 2a) and lessons (level 2b), which were both nested within classes (level 3).

The second step was to obtain a more fine-grained picture of variation in teacher behavior with isolated students. To do so, within the isolated subsample, we regressed teacher behavior on students' severity of isolation, on their peer rejection and social desire, and finally on teacher judgment of isolation. We performed a multilevel analysis with the isolated sub-sample, predicting each of the observed teacher behavior variables separately: observed frequency, observed valence in the cognitive domain and observed valence in the affective domain. We first tested students' isolation, rejection, and social desire as predictors (M1) and then added teacher judgment to the models M2. We used multilevel process analysis (with the same levels as indicated above) to predict teacher judgments of students' isolation at the student level (averaged over time) and at the level of the time point (a student's momentary deviation from the average; see Papp, 2004), again using the SPSS Mixed procedure. Multilevel process analysis reflects an approach to multilevel analysis with occasion at the lowest level but without examining time as a predictor (Papp, 2004). Peer rejection and teacher judgment of isolation

were centered on the group mean before selecting the isolated subsample, to eliminate classroom tendencies to nominate more or less peers (peer rejection) and for teacher tendencies to give high versus low scores on the rating scales (teacher judgment). Thus, these predictor variables represented individual students' deviances from the classroom mean at a certain measurement occasion (see Hox, 2010).

Research question 2: Change in isolation over time. To answer the second research question, examining whether isolated students' changes in isolation over time were associated with observed and peer-perceived teacher behavior, a latent growth curve model was run in which students' slope in isolation was regressed on observed and peer-perceived teacher behavior. This model was tested for the students who were in the isolated subsample at T1. First, we associated slope in isolation to the teacher behavior variables for all isolated students in the model M1. Second, to examine whether teacher behavior differentially affected changes in isolation depending on students' levels of rejection and social motivation, we included the interactions of the teacher behavior variables with rejection and social desire in a second model (M2). These growth models were set up as second-order models (see Ferrer, Balluerka, & Widaman, 2008) in Mplus, version 7.4 (Muthen & Muthen, 1998-2015). In second-order models, the observed variables (here: the three peer nomination items for isolation) are used as indicators of a latent variable (first-order factor, here: isolation) at each measurement occasion. Then, a growth model is used to structure the covariation among the first-order latent factors (intercept and slope are introduced as second-order factors). The time scores for the growth slope factor were corrected for unequal distances between T1 and T2 and between T2 and T3. Finally, predictors can be added to explain variance in intercept and slope across students. In the current study, we tested observed and peer-perceived teacher behavior as predictors of students' isolation slope, that is, of the change in isolation over time. The Complex function in Mplus was used to control for the nesting of the data (students within classes). This model had no cross-

classification issues since the time points are not treated as a level in the structural equation modeling variant of growth curve modeling. Student-level predictor variables were group-mean centered before selecting the isolated sub-sample, so that variability at the class or lesson level are eliminated. Thus, again, these predictor variables represented individual students' deviances from the classroom mean (see Hox, 2010).

RESULTS

Descriptive Statistics

Table 6.2 shows the means, standard deviations, range, and correlations for the study variables. Spearman correlations are given because isolation, peer disliking, and peer-perceived frequency of teacher-student interaction deviated from normality. Values represent the data prior to centering, and the nesting of the data was not taken into account. As expected, isolation correlated positively but weakly with rejection ($r_s = .30, p < .001$), indicating that the two reflect different facets of low peer status. Teacher judgments of the three isolation indicators correlated positively with isolation (r_s ranged from .27 to .54), and correlations between teacher judgment of isolation and teacher behavior were low (r_s ranged from -.16 to .0). The correlations of peer perceptions of frequency with observed frequency ($r_s = .04$) and peer perceptions of valence with observed teacher behavior ($r_s .30$ and .04 for affective and cognitive valence, respectively) were also weak to moderate.

Research Question 1: Teacher Behavior with Isolated Students

The first step in exploring teacher behavior with isolated students was to compare frequency and valence in observed and peer-perceived teacher behavior with isolated and non-isolated students (see the upper part of Table 6.3). Teachers interacted less frequently with isolated students than with non-isolated students, $F(1, 1421.98) = 4.92, p = .027$. Peers also thought that isolated students received less teacher attention than their non-isolated classmates, $F(1, 1431.15) = 307.84, p < .001$. The valence of observed teacher behavior did not differ between isolated and non-isolated students, neither in the affective domain,

Table 6.2

Means, Standard Deviations, Range, and Spearman Correlations of Study Variables

	M	SD	Min	Max	1	2	3	4	5	6	7	8	9	10
1 Isolation	0.00	0.90	-1.18	6.52	-									
2 Rejection	.11	.14	.00	1.00	.30**	-								
3 Social desire	2.51	0.97	1.00	5.00	.33**	.24**	-							
4 TJ solitude	3.20	1.77	1.00	7.00	.27**	-.05**	.14**	-						
5 TJ unpopularity	3.62	1.60	1.00	7.00	.54**	.38**	.31**	.34**	-					
6 TJ not belonging	.09	.29	.00	1.00	.33**	.23**	.21**	.12**	.33**	-				
7 TO frequency	11.98	10.96	0.00	103.00	-.09**	.14**	-.00	-.16**	-.01	.03*	-			
8 TO valence aff.	-.04	.29	-1.00	1.00	.01	-.11**	-.07**	.09**	-.04*	-.04*	.03*	-		
9 TO valence cogn.	.13	.18	-1.00	1.00	-.04**	-.02	.01	.02	-.02	.02	.22**	.10**	-	
10 P frequency	.90	.09	.38	1.00	-.30**	-.16**	-.13**	-.18**	-.28**	-.15**	.04**	.04**	-.01	-
11 P valence	.22	.33	-1.00	.94	.01	-.39**	-.10**	.15**	-.14**	-.12**	-.20**	.30**	.04*	.08**

Note. TJ = teacher judgment. TO = teacher observed. Aff. = affective. Cogn. = cognitive. P = peer.

* $p < .05$. ** $p < .01$.

Table 6.3

Teacher Behavior and Judgment of Isolation for Non-Isolated and Isolated Students

	Non-isolated		Isolated	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Observed teacher behavior				
Frequency	12.21	11.20	11.29*	10.17
Affective valence	-.04	.29	-.04	.30
Cognitive valence	.13	.18	.12	.19
Peer-perceived teacher behavior				
Frequency	.92	.07	.85**	.10
Valence	.23	.33	.19*	.33
Teacher judgment				
Solitude	2.94	1.66	3.96**	1.84
Unpopularity	3.13	1.36	5.06**	1.34
Not belonging to a group	.03	.18	.27**	.45

Note. Values are averages over the three time points.

* Value for isolated students significantly different from non-isolated students with $p < .05$.

** Value for isolated students significantly different from non-isolated students with $p < .01$.

$F(1, 1347.77) = 0.50, p = .480$, nor the cognitive domain, $F(1, 1395.36) = 2.53, p = .112$. Peers, however, did perceive differences in valence in teacher-student interaction; they thought that teachers interaction with isolated students had more negative valence than teacher interaction with non-isolated students, $F(1, 1415.98) = 4.45, p = .035$.

To better understand teacher behavior with isolated students, we examined, within the isolated group and across the three time points, whether observed teacher behavior was associated with students' severity of isolation as well as the mechanisms that may have led to their isolation, that is, their peer rejection and social desire. A null model for teacher behavior was run first that contained only random intercepts at the occasion (L1), student (L2a), lesson (L2b), and class (L3) level, to see how variance in

Table 6.4

Variance Decomposition of Observed Teacher Behavior with Isolated Students

Level	Frequency		Affective valence		Cognitive valence	
	σ^2	%	σ^2	%	σ^2	%
1 Occasion	54.58	52.7	0.070	76.9	0.030	87.0
2a Student	29.45	28.5	0.010	10.6	0.001	3.2
2b Lesson	9.40	9.1	0.001	0.9	0.001	3.4
3 Class	10.06	9.7	0.011	11.6	0.002	6.4

teacher behavior with isolated students was partitioned across these levels (see Table 6.4). For all three behavior variables, most of the variance was located at the level of the measurement occasion.

Table 6.5 shows the results of the analyses predicting teacher behavior with isolated students from students' severity and their peer rejection and social desire (M1). When students in general (student level), were more severely isolated, teachers had less frequent interaction with them. Momentary variations in severity of isolation were not related to differences in frequency of teacher behavior. The more isolated students were rejected by their peers, the more frequently the teacher interacted with them. Regarding affective valence at the between-student level, teachers showed more negative behavior to students who were

Table 6.5

Results of the Multilevel Analyses Predicting Frequency and Valence in Observed Teacher Behavior with Isolated Students

	Frequency				Affective valence				Cognitive valence			
	M1		M2		M1		M2		M1		M2	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Isolation	-1.07**	0.39	-0.55	0.43	0.01	0.01	0.02	0.01	0.00	0.01	0.00	0.01
Peer rejection	12.26**	2.35	8.02**	2.53	-0.27**	0.06	-0.23**	0.07	-0.11**	0.04	-0.12**	0.04
Social desire	0.33	0.47	0.19	0.44	-0.02	0.01	-0.02	0.01	-0.00	0.01	-0.00	0.01
T. judgment												
Solitude			-1.38**	0.28			0.01	0.01			0.00	0.00
Unpopularity			-0.57	0.41			-0.00	0.01			0.01	0.01
Not belonging			2.21*	1.06			-0.06*	0.03			-0.00	0.02
R ²			.15	.38		.31		.31		.30		.49
			Within-student momentary variation									
Isolation	0.30	0.64	0.64	0.66	-0.01	0.02	-0.01	0.02	0.03	0.01	0.03	0.02
Peer rejection	0.05	3.78	0.44	3.81	-0.04	0.13	-0.03	0.13	-0.23**	0.09	-0.23**	0.09
Social desire	0.02	0.54	0.10	0.55	-0.02	0.02	-0.02	0.02	0.01	0.01	0.01	0.01
T. judgment												
Solitude			-0.23	0.25			0.01	0.01			-0.00	0.01
Unpopularity			-0.45	0.42			0.01	0.01			0.00	0.01
Not belonging			0.77	1.16			0.03	0.04			0.02	0.03
R ²			.01	.02		.00		.02		.01		.00

Note: T. judgment = Teacher judgment.
* $p < .05$. ** $p < .01$.

rejected by peers. A similar negative association between peer rejection and cognitive valence was present, both when a student was more strongly rejected and when, at a certain measurement occasion, rejection was stronger. Together, the predictors explained little variance in momentary deviations in teacher behavior, but did explain a moderate amount of between-student variance (ranging from 15 to 31%).

Secondly, we incorporated teacher judgment in our models. First, to assess the quality of these judgments, the degree of agreement between teacher judgments and peer relations (i.e., attunement) was checked. To this end, the lower part of Table 6.3 shows teachers' judgments of solitude, unpopularity, and not belonging to a group for isolated and non-isolated students. As expected, teachers rated isolated students higher on solitude, $F(1, 1430.94) = 145.54, p < .001$, and unpopularity, $F(1, 1420.70) = 796.32, p < .001$, and they were more likely to nominate isolated students as not belonging to an informal group, $F(1, 1444.54) = 312.73, p < .001$, than their non-isolated classmates. To further investigate teacher attunement to students' isolation, we performed three multilevel analyses predicting teacher judgment of isolation from students' severity of isolation, peer rejection, and their desire to be more involved socially (see Table 6.6). Particularly between-student variation in teacher judgment of isolation was predicted by the students' overall isolation characteristics (as opposed to momentary variations). The more severely isolated students were, the higher teachers scored their solitude and unpopularity, and the higher the chance that teachers would indicate them as not belonging to a group. This finding suggests that teachers were relatively attuned to students' isolation. The more students were rejected by their peers, the lower teachers rated their solitude and the higher teachers rated their unpopularity, indicating that aspects of isolation were judged separately by teachers.

Next, teacher judgment of the three isolation aspects was added to the models explaining teacher behavior (the models M2 in Table 6.5). It turned out that the more a teacher thought a student spent much time by himself, the lower the frequency of teacher behavior was, whereas when the teacher thought a student did not belong to the classroom group,

Table 6.6

Results of the Multilevel Analyses Predicting Teacher Judgment of Isolation

	Solitude		Unpopularity		Not belonging	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Between-student variation						
Isolation	0.36**	0.08	0.39**	0.05	0.13**	0.02
Peer rejection	-3.01**	0.46	1.61**	0.31	0.22	0.11
Social desire	-0.06	0.09	0.05	0.06	0.02	0.02
<i>R</i> ²	.21		.41		.28	
Within-student momentary variation						
Isolation	-0.00	0.11	0.25**	0.06	0.07**	0.02
Peer rejection	0.49	0.63	0.48	0.37	-0.01	0.13
Social desire	-0.14	0.09	0.13*	0.05	-0.01	0.02
<i>R</i> ²	.00		.03		.00	

* $p < .05$. ** $p < .01$.

the teacher had more frequent interaction with the student. However, when teachers thought a student did not belong to the group, teacher behavior was also more negative in the affective domain. Note that the association between severity of isolation and frequency was no longer significant in this model. The models including teacher judgment explained a moderate to large amount of variance in the between-student variation in teacher behavior (31 to 49%).

Research Question 2: Changes in Isolation over Time

To answer the second research question, we tested whether observed and peer-perceived teacher behavior predicted changes in isolation over time. Before we proceeded to the growth curve models, we tested for measurement invariance over time to ensure that the same latent variable was assessed at each time point (Ferrer et al., 2008). We

Table 6.7

Results of the Growth Curve Model Predicting Slope in Isolation

	M1		M2	
	<i>B</i> (<i>SE</i>)	β	<i>B</i> (<i>SE</i>)	β
Main effects				
Observed frequency	-0.02 (0.07)	-0.02	0.03 (0.24)	0.03
Observed affective valence	-0.02 (0.09)	-0.01	0.23 (0.29)	0.14
Observed cognitive valence	-0.00 (0.00)	-0.04	-0.01 (0.01)	-0.16
Peer-perceived frequency	-0.11 (0.08)	-0.12	0.15 (0.33)	0.16
Peer-perceived valence	0.08 (0.20)	0.03	-0.59 (0.72)	-0.20
Peer rejection			0.42 (0.20)*	0.26
Social desire			0.03 (0.02)	0.09
Interaction with rejection				
Observed frequency			0.01 (0.02)	0.07
Observed affective valence			-0.86 (0.34)*	-0.19
Observed cognitive valence			-0.13 (0.84)	-0.02
Peer-perceived frequency			1.93 (1.33)	0.15
Peer-perceived valence			0.61 (0.33)	0.23
Interaction with social desire				
Observed frequency			0.00 (0.00)	0.11
Observed affective valence			0.00 (0.06)	0.01
Observed cognitive valence			-0.05 (0.10)	-0.10
Peer-perceived frequency			0.14 (0.20)	0.18
Peer-perceived valence			-0.07 (0.10)	-0.28

Note. Explained slope variance (R^2) of M1 is .01. R^2 of M2 is .10.

* $p < .05$.

compared a configural model in which all factor loadings and intercepts of the three indicator variables of isolation were freely estimated to a constrained model in which factor loadings and intercepts were set to be equal over time, using the Satorra-Bentler scaled chi-square test (Satorra, 2000). The configural model showed good fit, $\chi^2(15) = 20.63, p = .149$; RMSEA = .04; CFI = 1.00; TLI = .99; SRMR = .02; imposing constraints did not decrease model fit, $\Delta SBS\chi^2(10) = 13.63, p = .190$. As there was factorial invariance over time, we proceeded to build the intercept and slope on this factor structure. This model showed a small negative slope in isolation, $b = -0.05, SE = 0.02, p = .006$, so on average isolated students became slightly less isolated over time. There was significant slope variance, $s = 0.08, SE = 0.02, p = .001$, indicating that students differed in their change in isolation over time. Table 6.7 shows the results of the analyses predicting this slope in isolation from teacher behavior in the general first model (M1) and in interaction with rejection and social desire in M2.

Unexpectedly, none of the teacher behavior variables was associated with students' slope in isolation. Second, we examined whether isolated students' change in isolation was differently associated with teacher behavior as they were more rejected or had stronger social desire in model M2. Only the interaction of observed valence in the affective domain with peer rejection was significant. This indicated that positive valence in teacher behavior was differently related to change in isolation depending on students' degree of rejection. It seemed that for more strongly rejected students, more positive valence in affective teacher behavior was helpful, as it predicted a more negative slope in isolation. So, rejected students seemed to benefit from positive teacher behavior by becoming less isolated. The less rejected students were, the lower their slope in isolation was in general, so the more decrease in isolations students showed. Students who were to a lesser extent rejected did not benefit from positive teacher behavior by having a stronger decrease in isolation over time.

DISCUSSION

Students' social isolation is an important aspect of peer relations associated with social and academic adjustment, and therefore deserves teacher attention. Studies on the impact of the teacher on other dimensions of peer relations repeatedly have found that teacher behavior with individual students can affect students' peer status, mostly in terms of peer acceptance (e.g., Hendrickx et al., 2016; see Chapter 3; McAuliffe et al., 2009), but also in terms of popularity (e.g., De Laet et al., 2014). However, research on the role of the teacher in social isolation of students in upper elementary education has been limited. To fill this gap, the present study first examined the extent to which teacher behavior in interaction with isolated students was adaptive in the sense that it would potentially improve students' social participation. Based on research on teacher support and modeling (see Arbeau et al., 2010; Hendrickx et al., 2016; see Chapter 2; McAuliffe et al., 2009), we defined adaptive teacher behavior as (a) frequent, thereby modeling for peers to interact with the student, and (b) positive, thereby on the one hand providing support for the student and on the other hand modeling for peers to interact positively with the student as well. Although teachers' judgements of student isolation were fairly accurate, we found no evidence that teachers in general acted adaptively. Rather, teachers acted in line with isolated students' limited amount of social interaction, and in the case of rejected as well as isolated students, their behavior was in line with the overall negative character of social interaction with peers. The final research question was how teacher behavior was associated with students' increase or decline in social isolation. Even though teachers overall did not act adaptively, when they did show positive behavior, in particular rejected students benefited by becoming less isolated over time.

Teacher Behavior with Isolated Students

In general, and in line with findings in the preschool context (Evans, 2001; Rudasill & Kaufman, 2009), teachers interacted less frequently with isolated students than with their non-isolated classmates. Thus, teachers acted in accordance with the students' limited social participation instead of modeling a high frequency of interaction; students' social

isolation seemed to have an evocative impact (Nurmi & Kiuru, 2015) on teacher behavior. This non-adaptive trend was even stronger as students were more isolated. Moreover, peers of isolated students were aware of the limited amount of teacher attention for isolated students. These findings are worrisome, as by structurally having less frequent interaction with isolated students, teachers might send the message to peers that it is normal to neglect them and leave them out of social interaction. Thereby, teachers may, unknowingly and unintentionally, maintain the social position of isolated students.

When isolated students were more rejected by their peers, frequency of teacher behavior increased but was also more negative. The tendency to have more conflicted interactions with more rejected students is again in line with students' social status and might be evoked by students, rather than reflecting a tendency for teachers to actively counteract the negativity present in students' peer relations. Students who are rejected by their peers are often aggressive (Asher & McDonald, 2009) and although some negativity towards them may be necessary for classroom management purposes, investing in positive interaction with a rejected student may in the long run positively affect peers' approach of the student. This, in turn, could decrease the student's own aggressive behavior (Ladd, 2006). In this way, the teacher may be able to break the negative cycle of rejection, frustration, and aggression.

Teachers were relatively aware of students' isolation. That is, the more isolated students were according to peers, the more teachers thought the students were solitary and unpopular and did not belong to informal groups. The more rejected isolated students were, the higher teachers rated their unpopularity but the lower teachers rated their solitude. Apparently, rejected students' unpopularity was more salient to teachers than their solitude. The attunement teachers had seemed not to be translated into more adaptive teacher behavior. That is, teacher behavior was hardly predicted by teacher judgments of isolation and thus seemed not to be informed by it. Only frequency of teacher behavior with an isolated student was associated

with teacher judgments, but not in a clear direction. When teachers thought students were more solitary, they had less interaction with them, whereas when teachers thought a student did not belong to a group of friends, they more often interacted with the student. For future research it would be valuable to investigate differences between these perceptions to see if and how teachers rate aspects of isolation differently and how they act accordingly.

Changes in Isolation over Time

There were no overall effects of teacher behavior on students' changes in isolation over a school year. However, as we expected based on the literature on teacher modeling of peer relations (De Laet et al., 2014; Hughes et al., 2001, 2014; McAuliffe et al., 2009), for isolated students who were more strongly rejected by their peers, positive affect in teacher behavior was related to less isolation over time. Thus, rejected students seemed to benefit from being treated more positively. Possibly, positive teacher interaction provides a model for peers to engage in positive interaction with this student as well. This may be particularly beneficial for rejected students, who are generally disliked by peers. Positive teacher behavior towards such a student is incongruent with these negative feelings and thus might attract relatively more attention of peers.

The limited effects of observed teacher behavior on changes in isolation could at least in part be explained by the teachers' generally non-adaptive behavior towards isolated students. This may have resulted in a narrow range in observed teacher behavior with isolated students, which may have confined the possibilities to find effects. The small role of the teacher in changes in social isolation is also likely to be rooted in the relational history most classes have as a group. In Dutch primary schools, students generally have a new teacher every year, whereas the peer group stays mostly the same. Thus, in order for the teacher to affect the social integration of an isolated student, having more adaptive interaction with him or her might not be enough to eliminate years of peer experiences and reputations, or needs to be much more pronounced than the behavior observed in the current sample of teachers.

Limitations and Suggestions for Future Research

The study results must be interpreted in the light of some limitations. First, observed teacher behavior in the present study included teacher comments expressed publicly in the classroom. When increasing teacher support is at stake to increase an isolated student's feelings of security, public and verbal teacher behavior is not the only possible element. The next step would be to also include teacher behavior in more private, one-on-one interactions with students. Non-verbal teacher behaviors, such as giving a student a thumbs-up or high five, laughing, or standing close to a student, also should be part of a complete picture of teacher supportive behavior. Such non-verbal behaviors might also be important for peers' perceptions of how the teacher interacts with and evaluates a student.

Second, a drawback of video observations is that teachers could have behaved differently than they would without a camera in the classroom. In order to minimize intrusiveness, the researchers were not in the classroom during the recordings. Anecdotally, most teachers mentioned that they got used to the camera quickly. Moreover, as observing teacher behavior is intensive, naturally only a limited period of time can be covered. Some students, isolated but also without an isolated status, did not have interactions with the teacher at all, and the representativeness of the coded teacher behavior is therefore limited to a certain degree. Nonetheless, our measure did indicate differences in teacher behavior between isolated and non-isolated students that were in line with earlier studies.

The study findings could have also been impacted by the chosen cut-off point of the top 20 percent for isolation. To examine the stability of study findings, analyses were also performed for the top 10 percent of isolated students. This analysis showed very similar results: only two small differences were found, that did not alter the main conclusions. For the 10% group, frequency of interaction could not be predicted by severity of isolation, $b = -0.33$, $SE = 0.62$, $p = .593$. This could be due to the fact that in this group only the most severely isolated students were present. Second, affective valence was no longer associated with teacher judgement of not belonging

to the group, $b = -0.06$, $SE = 0.04$, $p = .146$. In the model with the 20 percent most isolated students, this effect also did not explain additional variance after the first model was estimated. Considering these small differences between the results using these two cut-offs, we think it is safe to assume that the choice of 20 percent has not affected the conclusions too much.

As indicated above, we may have observed little adaptive behavior and thus have had limited opportunities to investigate the associations between adaptive behavior and change in isolation over time. Future research on teacher effects on changes in isolation would benefit from an experimental design, in which teacher behavior is manipulated in such a way that isolated students would receive more, and more positive, teacher attention than naturally occurs. A systematic comparison of conditions might further reveal differential effects of frequency and valence of teacher behavior in interaction with different subtypes of isolated students (e.g., actively excluded vs. unsociable). This would benefit advise for teachers regarding the effectiveness of what we have defined here as adaptive teacher behavior.

Finally, we explained differences in teacher behavior within and between students using student characteristics as stable and time-varying predictors. In addition to the levels of student and measurement occasion, a considerable proportion of the variance in teacher behavior was located at the level of the classroom, representing differences between teachers in the treatment of isolated students as well. Future research could examine teacher characteristics as predictors of teacher behavior with these students. Possibly, teachers who feel more efficacious in managing peer relations (see Ryan, Kuusinen, & Bedoya-Skoog, 2015), or are more prone to see students' socio-emotional development as their responsibility (see Kochenderfer-Ladd & Ladd, 2016), may be more successful in behaving sensitively with isolated students.

Practical Implications

The study findings provide some practical implications for teachers who wish to improve the peer relations in their classroom. Before teachers can be assumed to actively and

deliberately engage in interaction with students with the purpose of ameliorating their peer relations, it is essential that they know who their target students are. Recent studies have found positive effects of an intervention program aimed partly at increasing teachers' attunement to the classroom dynamics of peer relations (Hamm et al., 2011; Hoffman et al., 2015). Importantly, the teachers in this study already showed relatively good attunement to students' isolated peer status. They noticed isolated students' solitude, unpopularity, and lack of group belonging, and more so when a student was more isolated. Therefore, it seems specifically important to invest intervention efforts in translating this attunement into behaviors that potentially increase the social integration of isolated students.

When teachers believed students were isolated to a greater extent, they did not adapt their behavior. Rather, they behaved in accordance with the student's peer status and had infrequent interactions with students they thought were more often by themselves. Isolated and rejected students benefited from receiving more positive teacher comments, particularly in the affective domain, as shown by a decrease in isolation over time. Therefore, the clearest indication that this study provides is for teachers to avoid negativity and increase positivity in public interactions with isolated students, particularly those students who are also rejected by their peers. When teachers communicate to a student's classroom peers that they enjoy interacting with the student, teachers may encourage peers to value the student as well. Intervention studies have shown effects on teacher behavior and peer relations of programs aimed at increasing the valence of teacher behavior with students in general (Mikami, Gregory, Allen, Pianta, & Lun, 2011) and with students with externalizing behaviors in particular (Spilt, Koomen, Thijs, & Van der Leij, 2012). Such findings are promising for the possible success of an intervention program aimed at isolation. So, when teachers are able to translate their attunement to adaptive behavior in interaction with their students, they might be able to encourage students' social integration.

GENERAL DISCUSSION

The classroom is a fundamentally social setting in which students spend most of their time in interaction with their teacher and peers. This social setting provides an important context that can foster and facilitate students' learning but that can also hamper and obstruct students' functioning in school. A wide research base reflects the importance of supportive teacher-student interactions and relationships for students' academic and social development (e.g., Cornelius-White, 2007; Roorda, Koomen, Spilt, & Oort, 2011). Also, the significance of positive peer relations for students' social as well as academic adjustment has been shown extensively (e.g., Cairns & Cairns, 1994; Ladd, 2006; Wentzel, 2005). Yet, although both relationships with teachers and with peers take place in the classroom and although they form together the classroom social system or climate, research on the role of the teacher in peer relations has remained scarce. The teacher, as the primary architect of the classroom context that surrounds and regulates interactions within it (Pianta & Walsh, 1996; Wentzel, 2012), is in a unique position to overlook and shape peer relations (Farmer, McAuliffe Lines, & Hamm, 2011). Therefore, the aim of this dissertation was to contribute to the emerging research base on the role of the classroom teacher in peer relations. An increased understanding of this role will ultimately enable teachers to explicitly promote the social aspect of students' classroom lives, and thereby to contribute to positive social as well as academic development. This concluding chapter integrates the main findings of this dissertation and discusses implications for research as well as practice.

Teacher Practices and Peer Relations

The classroom peer system is a complex set of peer relations that can be understood on multiple levels, including that of the individual, dyad, and group (Rubin, Bukowski, & Parker, 2006). To do justice to the complexity of peer relations within the social system of a class, each of these levels was taken into account in this dissertation.

The classroom group was investigated in terms of the peer ecology, or the structure, types, and diversity of relations and interactions among classmates. When focusing on the individual, the studies in this dissertation examined the peer status or social standing of each student within the classroom group. The dyadic level was investigated in terms of liking and disliking ties, representing who likes whom and who dislikes whom.

Teacher practices that potentially affect peer relations can be divided into two categories: network-related teaching efforts, that is, specific endeavors undertaken with the intention to improve students' peer relations, and general everyday teaching practices that are often undertaken without the particular goal to improve peer relations (Gest & Rodkin, 2011). In this dissertation, the focus was on the latter, in order to investigate everyday patterns of interaction that occur in any classroom. This knowledge can ultimately inform network-related teaching strategies that are potentially easy to apply for all teachers. The everyday teaching practices that were investigated are interactions that teachers have with the class as a whole and with individual students specifically. The main mechanisms that were studied were the extent to which teachers model pleasant and inclusive classroom interactions in general, and whether peers refer to their teacher's behavior with a specific student for information regarding how to evaluate this student (Farmer et al., 2011; Hughes, Cavell, & Willson, 2001; McAuliffe, Hubbard, & Romano, 2009; Mikami, Griggs, Reuland, & Gregory, 2012). In addition to observing teacher behavior, the studies in this dissertation included students' perceptions of teacher-student interactions and relationships, because these are viewed as highly relevant in the modeling and social referencing mechanisms (see Hughes, Im, & Wehrly, 2014).

Overview of the Findings

The aim of the present dissertation was to examine the role of everyday teacher practices in peer relations, in terms of the peer ecology of the classroom group, students' social status with peers, and dyadic ties between students. To summarize and integrate the findings, this section

provides an overview of the five studies that constitute this dissertation, structured by these three levels.

Teacher Practices and the Peer Ecology

Chapter 2 focused on how classroom-level teacher practices were related to three elements of the classroom peer ecology: the richness of interpersonal ties, the classroom peer status hierarchy, and the social behaviors that characterize peer interactions. Teacher practices that were investigated were the general amount of teacher support and conflict, the norms (i.e., commonness) of support and conflict in individual teacher-student relationships, and teachers' differential provision of support and conflict to their students. We hypothesized that by showing support and not engaging in conflict, teachers model positive relationships and prosocial rather than aggressive interactions (Gest & Rodkin, 2011). Indeed, student perceptions of teacher support were related to peer liking and prosocial behavior, whereas student perceptions of teacher conflict were associated with peer disliking and norms of aggressive behavior. Moreover, teachers also modeled differential treatment of students (see Babad, 2009), as more differential provision of teacher support and conflict was associated with a more hierarchical classroom structure in terms of peer liking status.

The classroom peer ecology was also the focus of the second part of Chapter 5, that examined how teacher support and conflict are associated with norm salience of prosocial and aggressive behavior, that is, the extent to which prosocial and aggressive behavior are related to peer acceptance and rejection within a class. Norm salience is important, as the desire to be accepted can drive students to show behaviors associated with being liked and to refrain from showing those behaviors associated with being disliked by peers. The findings showed that when teacher liking was more normative, that is, when teachers modeled liking more strongly, students' overt aggression was less strongly associated with peer disliking in the classroom. For relational aggression, the reverse was found: the more teachers modeled liking, the more gossiping and neglecting others were related to peer disliking.

In summary, by modeling supportive rather than conflicted interactions, teachers seem to foster a classroom peer ecology in which (a) positive rather than negative peer relations and interactions are the norm, (b) social status is distributed in a more egalitarian rather than hierarchical manner, and (c) occasionally acting aggressively is less harshly rejected, whereas hampering positive peer relations by being relationally aggressive is resented more. These findings underline the notion of the teacher setting the tone for a classroom climate characterized by positive versus negative relations (Gest & Rodkin, 2011).

Teacher Practices and Students' Peer Status

The majority of the chapters in this dissertation focused on associations between teacher practices and individual students' peer status in the classroom group. More specifically, Chapters 3 and 5 dealt with associations between teacher practices and peer liking and disliking status, and Chapter 6 focused on students' socially isolated status.

Chapter 3 started from the notion of social referencing theory that peers take cues from teachers' behavior with a student, that inform them whether to like or dislike the student themselves (Hughes et al., 2001, 2014; McAuliffe et al., 2009). This implies a chained mechanism over time with three elements: teacher behavior towards a student, peers' perceptions of how the teacher evaluates the student, and peers' own affective evaluations of the student. The study described in Chapter 3 was the first to investigate these three elements as these are related over time. We found evidence for the social referencing chain, but only in a negative sense; negative teacher behavior towards a student was associated with a peer reputation of teacher disliking for the student, which in turn was related to peer disliking. A positive pathway did not appear; peer perceptions of teacher liking for a student were more informed by peer-perceived prosocial behavior of the student (and the student's gender) than by positive teacher behavior. Moreover, peer liking was not predicted by peer perceptions of teacher liking. These findings were in line with McAuliffe et al.'s (2009) results, which also showed

an association between negative teacher behavior and peer disliking only, after controlling for students' prosocial and aggressive behavior. However, the results contradicted earlier findings that peer-perceived positive relationships with the teacher were associated with being liked by peers (Hughes et al., 2001, 2014). Our careful consideration of student behavior covariates might explain this difference, and additionally this could also be due to differences in the age groups as our sample was older than Hughes et al.'s participants.

Chapter 5 examined how students' peer reputations of teacher liking and disliking function as an affective filter for concurrent associations between student behavior and peer liking and disliking (see Chang et al., 2007; Hughes, 2012). In this study, rather than looking at direct effects of teacher practices on peer status, we examined how peer-perceived teacher liking and disliking was a moderator, or a filter through which peers evaluated students' social behavior. We found that concurrent associations between student behavior and peer status indeed depended on peer-perceived teacher liking and disliking for the student. Particularly students who were at risk for low peer status (i.e., showing much overt aggression or little prosocial behavior) benefited from having a reputation of being liked and not disliked by the teacher. These findings are in concordance with studies by Chang et al. (2007) and Moore, Shoulberg, & Murray-Close (2012) and may point to the teacher functioning as a protective factor particularly for students who are at risk of being disliked by peers.

Both in Chapters 3 and 5, peer reputation of teacher disliking was more strongly related to peer status than peer reputation of teacher liking. Thus, teacher negativity seemed to be a more important factor for peer liking and disliking status than teacher positivity. This may reflect a negativity bias, which entails that negative information in general has a much stronger impact than positive information (e.g., Rozin & Royzman, 2001; Vaish, Grossman, & Woodward, 2008). Also, negative affect is generally less common in primary school classrooms as teachers are expected to be professionals and maintain positive relations with their students (e.g., Baker,

2006; Hughes et al., 2001). Therefore, teacher negativity may have a stronger signaling value than the more common positive affect, and a student to whom the teacher acts negatively or who is disliked by the teacher might contrast more sharply with the rest of the classroom.

In Chapter 6, peer status was investigated in terms of social isolation. Isolated students generally have a lower sense of belonging to the classroom, have fewer opportunities to interact with peers, and are at increased risk for internalizing and externalizing behavioral problems and victimization (Gazelle & Ladd, 2003; Hymel, Rubin, Rowden, & LeMare, 1990). As less research was available on teacher effects on social isolation than on peer liking and disliking, the chapter employed a more explorative approach. That is, before considering associations between teacher practices and the development of social isolation, we examined how adaptively teachers behaved in interaction with isolated students versus non-isolated students. Adaptive teacher behavior was defined as having more frequent and more positive interactions with the isolated student, thereby modeling for peers to engage in (positive) interaction with the student and also providing the student support. Prior research with younger children (mainly preschool or first grade) showed mixed findings regarding the amount of interaction teachers had with isolated students (see Rudasill & Rimm-Kaufman, 2009; Thijs, Koomen, & Van der Leij, 2006). It turned out that in our sample with older children, teachers communicated less, instead of more, with isolated students. So instead of counteracting the limited amount of interaction a student had with peers, teachers also had limited interaction with isolated students. The more isolated students were disliked by their peers, the more interactions teachers had with them, but the more negative in nature these were. These findings reflect that in the context of isolation, teacher interactions with a student mirror the student's social position among peers. The classroom system of peer relations seems to evoke certain teacher behaviors (Nurmi & Kiuru, 2015), which likely makes it more difficult for teachers to act adaptively.

In addition, Chapter 6 also investigated whether teacher behavior was associated with inclusion versus further isolation of isolated students over the course of the school year. Only for isolated students who were also rejected, more positive teacher behavior was related to more inclusion over time. So, although teachers in general interacted rather negatively with isolated and rejected students, when they were able to behave more positively with them, these students benefited and became more integrated in the peer group. So it seemed, just as was the case in Chapter 5, that teachers can function as a protective factor (see Moore et al., 2012) for a certain group of students who are at risk of low peer status.

Together, the studies of Chapters 3, 5, and 6 show that teacher behavior towards a student, as well as peer perceptions of the teacher-student relationship, are indeed related to students' peer liking, disliking, and isolated status. That is, teachers can put their students in a positive or negative light by interacting with them in a positive or negative manner. As is shown in Chapters 5 and 6, when teachers act in a manner that is not in line with a student's current peer relations (e.g., emanating liking for an aggressive student; interacting positively with an excluded student) the teacher can be of importance particularly for students who are at risk of suboptimal social adjustment.

Teacher Practices and Dyadic Ties

In Chapter 4, we noted that social referencing implies that a single peer perceives the teacher's evaluation of a single student, which informs this peer to like or dislike the student and thus results in a dyadic liking or disliking tie. Yet, research has mainly focused on how a group of peers perceive the teacher's evaluation of a student (peer reputations of teacher liking and disliking), and how this group likes or dislikes the student (peer liking and disliking status; Hughes et al., 2001, 2014), which provides only indirect information on dyadic ties between students. To fill this gap, this study focused on the emergence of dyadic liking and disliking ties as a reaction to perceived teacher liking and disliking. A social network approach (Snijders, 2001) allowed us to investigate the evolution in these

dyadic ties in Chapter 4. In contrast to Chapter 3, where only a negative pathway was found from teacher behavior to peer-perceived teacher disliking to peer disliking status, in Chapter 4 we found evidence for a social referencing mechanism for peer liking only. That is, when Ann thought Beth was liked by the teacher, Ann was likely to become to like Beth as well. For peer disliking, there was evidence for an effect in the opposite direction: when Ann disliked Chris, Ann was more likely to come to think that the teacher disliked Chris as well.

These results of Chapter 3 and 4 seemed contradictory. Before this contradiction can be interpreted substantively, it must be noted that the analytical approach in these two studies was rather different. In Chapter 3, we predicted peer liking and disliking status from peer reputations of teacher liking and disliking as well as from peer-perceived student behavior and academic performance, and gender. In Chapter 4, we focused on how dyadic liking and disliking ties were formed based on individual perceptions of teacher liking and disliking for a peer, treating gender as a covariate. To reach an integrated conclusion regarding the function of social referencing in students' formation of evaluative perceptions of classmates, the perfect study would incorporate both aspects: A) the emergence of dyadic liking and disliking ties would need to be predicted from individual perceptions and not reputations of teacher liking and disliking (as we did in Chapter 4), but also from B) individual perceptions of prosocial and aggressive behavior, social withdrawal, and academic achievement (the covariates in Chapter 3). Only then can a conclusion be reached about the extent to which social referencing takes place. Hopefully, computer technology will continue to grow so that these very complex analyses will soon be possible. Until then, the conclusions that we can draw have to be treated with caution.

More substantively, if future research will confirm peer disliking status (i.e., the negative valence of the group sentiment) is indeed mainly predicted by a reputation of being disliked by the teacher, whereas dyadic liking ties (i.e., individual perceptions of a single peer) are affected

by individual perceptions of being liked by the teacher, what would that mean conceptually? Such findings may reflect basic differences in the nature of peer liking versus disliking. Peer liking, on the one hand, mostly reflects personal preferences, that are often reciprocated. Peers who like each other often have shared characteristics or a shared background, such as their neighborhood, hobbies, SES, or academic orientation (see Hughes & Im, 2016; Rubin, Coplan, Chen, Bowker, & McDonald, 2011). Peer disliking, on the other hand, may reflect not only dyadic antipathy but also a more collective sentiment within the peer group. Indeed, peer disliking nominations are less often reciprocated than peer liking nominations (Hughes, 2012, see also Table 4.4). Moreover, peer disliking is often more focused on a few individual classmates, whereas peer liking ties are generally more dispersed. Thus, conceptually it may make sense to view peer disliking more as a peer status variable or a group consensus rather than a dyadic tie, whereas peer liking seems to be more dyadic in nature. In this light, the role of the teacher for peer disliking may constitute a group influence process, affecting peer disliking status, whereas the teacher's role in peer liking might operate primarily at the dyadic level, thus affecting peer liking ties. This reasoning underlines the importance of distinguishing between peers' positive versus negative affect for each other, as well as investigating peer relations in terms of both an individual's position or status in the peer group and dyadic ties between students.

Conclusion

The studies in this dissertation have, together and by themselves, filled gaps in existing research on the role of the teacher in classroom peer relations. By focusing on (a) multiple facets of peer relations at different levels, (b) actual teacher behavior as well as peer perceptions of the teacher's liking for and behavior with students, (c) relevant student behavior covariates, and (d) the emergence of single dyadic liking and disliking ties, this dissertation has added relevant insights about the role of the teacher in peer relations in general and modeling and social referencing in particular. Taken together, the studies in this dissertation show that the teacher indeed is a factor in classroom peer

relations. By modeling positive versus negative behavior and affect in relations with others in general and with specific students, teachers can set the stage for positive versus negative relations among classmates.

Considerations for Future Research

As is often the case with scientific research, the studies in this dissertation have questions but at the same time raise new questions and challenges. This section offers an overview of new directions for research on the role of the teacher in classroom peer relations.

Teacher Behavior and Peer Perceptions of Teacher Liking

Most studies in this dissertation incorporated peer-perceived teacher liking as a predictor of the peer ecology, peer status, and dyadic ties. In Chapter 3, we examined the behavioral basis of these perceptions, and found that student characteristics (behavior, academic reputation, and gender), but not teacher positive behavior with a student, predicted peer-perceived teacher liking. So, for future research a challenge remains to find the origins of students' views of the teacher's preference for their classmates. Following the reasoning of a halo effect (Thorndike, 1920; Moskowitz, 2005), it could be that peers do not look for actual cues in teacher behavior to assess whether or not the teacher likes a student, but base this assessment on their own evaluation of the student or on their ideas of what teachers might like in students. However, before the conclusion can be drawn that positive teacher behavior with a student does not affect peer perceptions of teacher liking for the student, the range of teacher behaviors should be extended. For instance, a recent study in secondary education indicated that positive teacher-student relationships are largely formed outside the classroom setting, during breaks and before or after lessons (Claessens et al., 2016). Also, next to the verbal cues that were included in the studies in this dissertation, non-verbal behavior, such as smiling, giving a student a thumbs-up or high five, may provide relevant cues of teacher liking. Moreover, based on research relating physical proximity to psychological proximity (Latané, Liu, Nowak, Bonevento, & Zheng, 1995; Patterson and Sechrest 1970), teachers'

moving around in a classroom, getting close to some students but not to others, may provide peers with cues regarding teacher liking for students. In order to understand the perception formation in students better, another interesting avenue would be to ask students how they know their teacher likes a certain classmate.

Digging Deeper: Conditional Effects

In the studies that constitute this dissertation, since not much research was available yet about the role of the teacher in peer relations, we mostly investigated associations that were common for all students and presumed to be equal across the sample. Our research questions were generally aimed at the association between certain aspects of teacher practices and peer relations. This provided interesting results, but a next step for the field would be to dig deeper. That is, probably a wealth of terms and conditions applies, such that in certain classes, with certain teachers, or for certain students, there is a stronger association between teacher practices and aspects of peer relations, that may be smaller in other classes, with other teachers, and for other students. Future research on the impact of the teacher on peer relations might elucidate those conditions. To illustrate some of the possibilities of an investigation of the conditions that may be at issue, we apply this reasoning to the example of the teacher's pet, a recurring theme in several chapters. Having a peer reputation of being liked by the teacher was not unequivocally associated with being liked by peers. An explanation that we gave in Chapters 3, 4, and 5 was that some students might be seen as the "teacher's pet" (Babad, 1995, 2009) and therefore disliked rather than liked by peers. For future research it would be valuable to investigate the conditions under which being liked by the teacher can be an asset, as a situation that has a positive effect on one's peer status, versus the conditions that make being liked by the teacher a hindrance for peer status.

Student characteristics. A first set of conditions applies to the target student. Certain student qualities might make them more or less likely to become a teacher's pet. For future research it would be interesting to examine

which qualities are critical in this sense. The student characteristics that were investigated as covariates for the social referencing model in Chapter 3, prosocial behavior, aggression, social withdrawal, academic achievement, and gender, are likely candidates as these were all in some way related to peer-perceived teacher liking and disliking and/or peer liking and disliking. The moderation analyses in Chapter 5 provide some information on the factors that contribute to the teacher's pet phenomenon. Yet, this information is limited to students' scores on single variables and does not paint a complete picture of the types of students that are more or less likely to be seen as the teacher's pet. Students as persons represent specific combinations of a large set of relevant variables, and not merely the variable that we choose to study. Therefore, it seems promising to apply a person-centered approach, establishing person-specific configurations or profiles of student characteristics (e.g., Lazarsfeld, Henry, & Anderson, 1968; Vermunt & Magidson, 2002). Using a cluster analytical approach, classifying students with a similar profile of behaviors and characteristics might enable us to delineate the types of students for which being liked by the teacher has a positive, null, or negative effect on their peer status. In other words, a person-centered approach may help to determine which students are more likely to become a teacher's pet.

Peer group characteristics. Second, characteristics of the peer group context likely impact whether peer-perceived teacher liking is related to peer liking or disliking status, so whether or not a student is viewed as the teacher's pet. An interesting quality of the peer group are classroom norms. Chang (2004) proposed a social context model of peer acceptance, stating that "social acceptance of behavior is reinforced by the prevalence of the behavior within the group" (p. 692). In that study, classroom descriptive norms, or the commonness of prosocial leadership, aggression and social withdrawal in a classroom group, impacted the association between individual children's display of each of these behaviors and their peer acceptance (see also Boor-Klip, Segers, Hendrickx, & Cillessen, 2015). In terms of the teacher's pet effect, the classroom norms of teacher liking

– that is, the extent to which students generally are liked by the teacher – might moderate the association between an individual’s teacher liking has and his or her peer status. In addition to classroom norms affecting how one’s own level of teacher liking is evaluated by peers, subgroup norms could also represent an important context. Positive teacher behavior may be more common in one subgroup than in another. For example, teachers often have more supportive relationships with girls than with boys (e.g., Baker, 2006; McCormick & O’Connor, 2015), so teacher liking may be more normative among girls than among boys. When 75% of the girls but only one boy in the classroom have a high peer reputation of teacher liking, for the girls this might be an asset, whereas for the one boy, teacher liking might make him stand out in a negative way.

Teacher characteristics. Multiple teacher characteristics have the potential to impact the way they exert their invisible hand, and the extent to which their liking of a student is associated with the student’s peer liking status. That is, being liked by one teacher may be quite different from being liked by another. Future research, on the teacher’s pet phenomenon and on the role of the teacher in peer relations in general, would benefit from examining the teacher qualities that are at stake. Among these could be a teacher’s personality and teaching style, years of experience, age, or gender. As an example, in Chapter 4 we investigated whether the association between dyadic teacher liking ties (Ann thinks Beth is liked by the teacher) and peer liking ties (Ann likes Beth) was moderated by Ann’s perception of the teacher’s warmth. We argued that Ann would be more likely to follow the teacher’s judgment of Beth as Ann perceived her teacher as warm, because the teacher would then be considered a good model. Although we did not find such an effect, this approach illustrates how teacher characteristics may impact the association between teacher and peer liking.

In summary, future research may benefit from investigating characteristics of the target student, peer group, and teacher as moderators of associations between teacher practices and peer relations. Thus, intersecting the levels

in teacher-student as well as peer relations, for instance to find out how peer group norms impact dyadic or individual-level associations, seems a promising approach. When more information is available regarding the specific conditions under which it is beneficial for a student to receive positive rather than negative teacher comments, further implications for teaching can be provided.

The Other Way Around: Peer Relations also Affect Teacher Practices

The studies in this dissertation mainly analyzed and interpreted associations between teacher practices and peer relations in terms of the teacher affecting peers. Yet, several studies – including the one in Chapter 4 – have shown that this may also be the other way around. The teacher and students may best be seen as a system in which elements mutually influence each other so that existing peer relations evoke certain teacher practices just as the other way around. For example, in a peer ecology that is strongly characterized by students behaving aggressively and disliking each other as well as the teacher, teachers are likely also drawn toward more conflict instead of support. Similarly, an individual student who is rejected by his peers and structurally misbehaves and disturbs lessons might be met by more negative teacher behavior than a student who is friendly to her peers. In future research more attention is needed for these bidirectional or reciprocal influences. For instance, cross-lagged panel designs could be used (see, e.g., De Laet et al., 2014; Engels et al., 2016), or network analysis could be extended to fully examine the impact of the teacher on peer relations as well as the reverse.

When teachers and students are seen as a system in which influence each other, the teacher still is the responsible professional who might have the opportunity to affect the extent to which they let themselves be influenced by students. In line with the suggestion to dig deeper and to find student, peer group, and teacher characteristics that moderate the effects of the teacher on peer relations, the extent to which peer relations affect the teacher also likely differs across teachers and peer groups. Some teachers may be able to face the challenges of a non-optimal peer

ecology better than others, and as a result may be able to act in a more adaptive and proactive rather than reactive, negative manner. Future research could invest effort in examining the teacher factors that make them more or less prone to follow versus counteract peer tendencies. Teacher characteristics that might affect this include years of teaching experience, the extent to which they appreciate their role in peer relations, self-efficacy regarding the management of peer relations (see Ryan, Kuusinen, & Bedoya-Skoog, 2015), and attunement to the peer structure (see Hamm & Hoffman, 2016).

Manipulating Teacher Behavior

The studies in this dissertation have examined teacher behavior as it naturally occurs and thus reflect the range of naturally occurring teacher behavior connected to real, everyday classroom processes. For future research, experimental designs, in which teacher behavior with certain individuals is manipulated, might be useful to further unravel the causal mechanisms that underlie the interrelatedness of teacher practices and peer relations. For instance, teachers can be trained to diminish their public negative behavior with certain aggressive or rejected students. An examination of the possible effects of this intervention in naturally occurring teacher behavior on students' peer status could provide indications as to the extent to which peers' perceptions of the students are informed by teacher behavior. As far as we know, only laboratory studies have taken place in which teacher behavior was manipulated to test for effects of teacher practices on students' perceptions of certain classmates (White & Kistner, 1992; White, Sherman, & Jones, 2000). Manipulating teacher behavior in the classroom would be a more ecologically valid option that could still reveal underlying mechanisms. It may be helpful to use a process-oriented approach (see Lavelli, Pantoja, Hsu, Messinger, & Fogel, 2005), investigating change as it occurs within the classroom after carefully selected perturbations of the social system so as to understand the process, rather than compare the situations pre and post change and only see the product.

Developmental Considerations

The studies in this dissertation were all conducted with a sample of students from fifth grade, who were 10 to 12 years old. Other studies have examined similar mechanisms with younger (e.g., Hughes et al., 2001, 2014), same-age (e.g., Gest & Rodkin, 2011; McAuliffe et al., 2009), and older students (e.g., Engels et al., 2016), but a careful comparison of teacher effects on peer relations in different stages of development is still lacking. There are at least three reasons that might cause differences in the role of the teacher in peer relations across the developmental span. First, as students get older, the peer world becomes more and more separated from adults (LaFontana & Cillessen, 2010). Thus, peer relations might to a lesser extent, or differently, be impacted by teacher practices, or differently. Second, as students get older, negative or conflicted teacher-student interactions increase, whereas positive teacher-student interactions decrease (see Esposito, 1999; Jerome, Hamre, & Pianta, 2009). So, the exceptionality of negative versus positive teacher comments, or of being liked versus disliked by the teacher, changes over time, possibly affecting their impact on peer relations. Third, when students leave primary school and enter secondary education (after sixth grade in the Dutch educational system), they change teachers – and in the later years also classroom groups – every hour. Thus, the peer group and pool of teachers increase and time spent with an individual teacher decreases. This leads to a wealth of questions about differences between teachers and the importance of being (dis)liked by all of them or perhaps by only one or a few. In sum, a deeper understanding of the different processes by which teachers influence peer relationships at different stages in education would permit more targeted teacher practices to promote students' social and academic adjustment.

In addition to research comparing teacher effects across age groups, a related question for future research would be whether results exceed the boundaries of the specific classroom situation with a certain teacher and certain peer group. When students move to a different peer group, with a different teacher, do effects endure? From the modeling point of view, when teachers model pleasant relationships

and interactions, it would be logical that students are socialized to have positive interactions with their peers, also when their peers are no longer the same. From a social referencing point of view, when teachers affect peer evaluations of a student, these peer evaluations are not likely to directly transfer to new peer groups, as the new peers were not affected by the positivity or negativity of the previous teacher's behavior with the student. Only effects of social referencing on social competence, self-esteem, or academic engagement of the student might transfer to the new peer group. To test these hypotheses, research is needed that covers a larger period of time, including transitions from one teacher to another, from one peer group to another, and possibly even from one school to another. Only then can the lasting of effects be uncovered.

Practical Implications

In this dissertation we examined teacher behaviors that are mostly exhibited without the explicit purpose of fostering the classroom social dynamics, yet do affect how peers relate to each other. Based on the findings, teachers might purposefully adapt their everyday practices to foster peer relations. Because of the relevance of the social context for students' social as well as academic competence, teacher training programs about the role of the teacher in peer relations might be a highly relevant element of pre-service as well as in-service teacher education. We propose two main elements: (a) increasing teachers' knowledge regarding peer relations in general and their specific role in it, and (b) providing teachers with strategies to skillfully fulfil this role.

Teacher Knowledge

When teachers are to successfully intervene in classroom social dynamics, an awareness of the multiple facets of peer relations and their impact on students' lives may help them (Hamm & Hoffman, 2016). Without such awareness, teachers may act intuitively, but can hardly be expected to meaningfully and purposefully engage in shaping classroom peer relations or to contribute to the social goals of their students, or to reflect on their teaching practices. Moreover, an awareness of the degree of association between social and academic development might be important for some

teachers to appreciate the value of trying to improve peer relations. If teachers view it as their sole purpose to provide students with opportunities to gain academic skills and do not see social-emotional learning as their responsibility, they will probably not try to promote peer relations (Kochenderfer-Ladd & Ladd, 2016). However, when teachers come to understand the importance of a pleasant peer ecology for academic achievement, they may invest in peer relations as a pathway to academic success.

A next step would be for teachers to learn about the mechanisms that connect their practices to peer relations. Teachers are likely knowledgeable of one or multiple network-related teaching practices or curricula that can be implemented for social-emotional learning, but may not be conscious of the effects their everyday interactions with students have on classroom peer relations. For purposeful teaching in order to promote peer relations, they would benefit from an awareness of how their everyday interactions with their students influence their peer relationships and the broader classroom peer ecology. Informing teachers of the principles of the modeling and social referencing mechanisms may show them how this influence is enacted.

Teacher Strategies

Teachers may benefit from two sets of strategies that together put them in the position to manage classroom peer relations. First, for teachers to gain access to the structure of peer relations in their classroom, it would be worthwhile for them to learn to use sociometric instruments. For teachers, these may be valuable instruments to increase their awareness of peer dynamics that previously were hidden to them. Several sociometrical tools are already available for teachers, but training in their use is limited. One of the conclusions of this dissertation was that teachers can be a protective factor for at-risk students (see Chapters 5 and 6), providing a valuable positive spotlight that can temper peers' negative feelings for the students. When teachers know who their at-risk students are, they might better be able to intervene and help them to improve their peer relations.

Second, teachers need a behavioral repertoire that allows them to purposefully affect peer relations. The chapters of this dissertation offer some valuable suggestions for teachers on how to foster positive peer relations. When it comes to shaping a classroom climate in which positive peer relations flourish, it seems important for teachers to set the example (see Chapter 2). Showing support and avoiding conflict is associated with a peer ecology in which students interact with and relate to each other in a pleasant, egalitarian manner. Moreover, teachers seem to be well advised to diminish their differential treatment of students, as this may inform students of their differential value.

When aiming to ameliorate individual students' social status, teachers should be aware of the frequency and valence of their interactions with them. Positive versus negative behavior towards a student informs peers whether to like or dislike that student. Note, however, that the studies in this dissertation covered a limited range of teacher behaviors. In Chapter 3, we were able to connect peer-perceived teacher disliking to actual teacher behavior, but have not yet found the origins of peer perceptions of teacher liking in observable teacher practices. This limits the possibilities of providing clear implications for positive teacher behavior in interaction with their students.

Several studies in this dissertation indicated that negative teacher behavior or a peer reputation of teacher disliking more strongly informed peer status than positive teacher comments or a reputation of teacher liking. Therefore, it seems particularly sensible for teachers to diminish negative interactions they have with their students, particularly when the student is at risk for peer rejection or already has a less desirable social status. In Chapter 3 we found that negative comments in both the affective and the cognitive domain were associated with a peer reputation of teacher disliking and, ultimately, with peer disliking status. Thus, teachers need to be aware of any negativity in their behavior with a student. Unfortunately, students who are disliked by their peers are often the ones who disturb lessons and may elicit negative teacher behavior in the affective domain more often than positive teacher

behavior. Thus, teachers' goals when it comes to peer relations may not always be in line with the perceived requirements of a situation. To serve both peer relations and classroom management goals, teachers could encourage positive behaviors of the student rather than punish negative ones, encourage positive behaviors of other students rather than punishing the student in question, or keep negative comments to this student private, inaudible to the student's classmates.

As the studies presented here focused on how classmates perceived the teacher to interact with a student, it is particularly important that teachers are aware of their public interactions with students. Since public dyadic teacher-student interactions are visible and audible to all classroom peers, these have an increased potential for informing peer evaluations.

In sum, teacher training considering classroom peer relations would ideally incorporate both increasing teachers' knowledge regarding peer relations and their role in it, and providing teachers with strategies to fulfil this role. Various training programs have shown to affect teachers' awareness of social networks in their classes (Farmer, Hall, Petrin, Hamm, & Dadisman, 2010), observed teacher behavior (McIntosh, Rizza, & Bliss, 2001; Spilt, Koomen, Thijs, & Van der Leij, 2012), students' perceptions of the classroom environment (Brock, Nishida, Chiong, Grimm, & Rimm-Kaufman, 2008), and observed peer interactions (Mikami, Gregory, Allen, Pianta, & Lun, 2011). These effects are promising and show that teacher behavior in general and with individual students can change. To further strengthen behavioral change, it is important that teachers receive coaching and concrete feedback on their behavior (Reinke, Lewis-Palmer, & Martin, 2007; Noell, Witt, Gilbertson, Ranier, & Freeland, 1997).

The Role of the Teacher in Classroom Peer Relations

In conclusion, this dissertation contributes to the emerging research field that combines relationships between teachers and students on the one hand and among classroom peers on the other. The results demonstrate

that, although the system of peer relations does not include the teacher, the teacher does play a role and is able to modify how peers relate to each other. In particular, peers' perceptions of the teacher-student relationship were associated with peer evaluations of the student. For students, a favorable interplay between their relationships with the teacher and with peers has the potential to encourage their school adjustment. Therefore, acknowledging the importance of teaching practices for pleasant and fruitful classroom peer relations has important practical implications. When teachers regulate their contact with students in such a way that it benefits the classroom peer ecology, individual students' social status in the classroom, and dyadic ties between students, they shape an environment in which students' social as well as academic learning can blossom.

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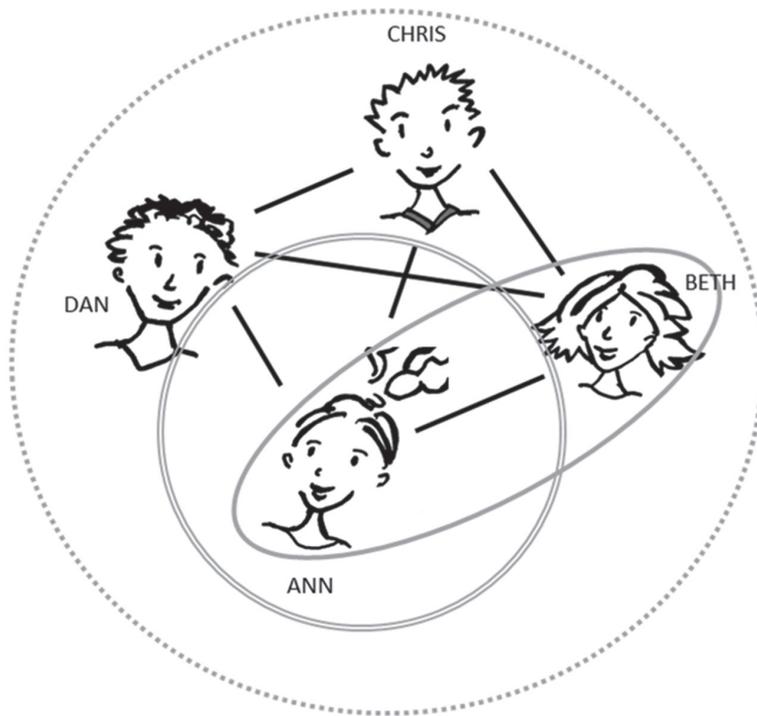
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NEDERLANDSE SAMENVATTING

Introductie

Sociale interacties en relaties die leerlingen in het basisonderwijs hebben met hun peers, hun klasgenoten, vormen een belangrijke context voor hun sociale en cognitieve ontwikkeling. In dit proefschrift is de rol van de leerkracht voor peer-relaties onderzocht. In 2011 hebben Farmer, McAuliffe Lines, en Hamm deze invloedrol van de leerkracht "de onzichtbare hand" van de leerkracht genoemd, vanwege het gebrek aan onderzoek naar hoe de leerkracht de aard van de relaties tussen leerlingen in een klas mede bepaalt. Sindsdien zijn de inzichten in dit veld groeiende, maar er is nog weinig bekend over de mechanismes die kunnen verklaren waarom leerkrachtgedrag en peer-relaties met elkaar samenhangen. Het doel van dit proefschrift was dan ook om meer inzicht te krijgen in hoe de leerkracht een rol speelt bij peer-relaties tussen klasgenoten.

Peer-relaties. De term "peer-relaties" is erg breed en omvat alle sociale relaties en interpersoonlijke interactieprocessen die plaatsvinden tussen leeftijdsgenoten, in dit geval tussen klasgenoten. Peer-relaties kunnen bestudeerd worden op verschillende niveaus van complexiteit. In dit proefschrift komen peer-relaties aan bod op het niveau van (1) de sociale status (positie van een individuele leerling in de klas), (2) de dyadische relatie (relatie tussen twee leerlingen) en (3) de peer ecology (relaties tussen alle leerlingen in de klas). Figuur 1 illustreert deze drie niveaus aan de hand van een hypothetische klas met vier leerlingen: Anne, Bente, Chris en Daan. De grootste cirkel omvat de peer ecology, oftewel de structuur van alle relaties binnen de klas. De cirkel met de dubbele lijn in Figuur 1 geeft de sociale status van Anne in de groep weer. Hieronder wordt verstaan hoe Anne zich verhoudt tot de klas; wordt zij over het algemeen aardig of onaardig gevonden, heeft ze veel vrienden, is ze populair, of valt zij misschien buiten de groep? De cirkel met de enkele lijn duidt de dyadische relatie tussen Anne en Bente aan; vindt Bente Anne aardig of onaardig?



Figuur 1. Peer-relaties in een klas van vier kinderen in termen van peer ecology (gestippelde lijn), individuele sociale status (dubbele lijn) en dyadische relatie (enkele ononderbroken lijn).

De rol van de leerkracht in peer-relaties. In het onderzoek tot nu toe naar de rol van de leerkracht voor peer-relaties zijn twee benaderingen te onderscheiden (Gest & Rodkin, 2011). Aan de ene kant kan de leerkracht peer-relaties heel bewust beïnvloeden, bijvoorbeeld door het inzetten van lesprogramma's of het strategisch bepalen van de klassenindeling of groepjes voor samenwerking. Aan de andere kant heeft de leerkracht ook meer onbewust invloed op de peer-relaties in een klas, door de dagelijkse omgang met leerlingen. In dit proefschrift worden met name de alledaagse interactieprocessen in de klas onderzocht, aangezien deze het hart vormen van het onderwijs en deel uitmaken van de lespraktijk van iedere leerkracht. Behalve meer inzicht in peer-relaties in de klas, biedt het onderzoek ook aanknopingspunten voor interventies waarmee

leerkrachten peer-relaties in de klas kunnen verbeteren.

Het verband tussen leerkrachtgedrag en peer-relaties wordt in dit proefschrift voornamelijk onderzocht aan de hand van twee mechanismen: modeling en social referencing. Modeling veronderstelt dat er een samenhang is tussen leerkrachtgedrag en peer-relaties, doordat een leerkracht model staat voor hoe leerlingen met elkaar omgaan (Farmer et al., 2011). Behandelt een leerkracht de leerlingen positief, dan leren kinderen hiervan dat het normaal is om positief naar elkaar te zijn. Heeft een leerkracht echter veel conflicten met leerlingen, dan stelt hij of zij negatieve omgang tot voorbeeld. Modeling komt met name aan bod in Hoofdstuk 2 van dit proefschrift wanneer de samenhang tussen leerkrachtgedrag en de peer ecology wordt onderzocht, maar ook in Hoofdstuk 6, waar een leerkracht model staat voor de omgang met specifieke, sociaal geïsoleerde, individuele leerlingen. Social referencing veronderstelt dat er een samenhang is tussen leerkrachtgedrag en peer-relaties, doordat klasgenoten aanwijzingen in het leerkrachtgedrag in interactie met een leerling voor hun eigen beoordeling van de leerling gebruiken (Hughes, Cavell, & Willson, 2001; McAuliffe, Hubbard, & Romano, 2009). Wanneer een leerkracht bijvoorbeeld boos wordt op een leerling, kunnen klasgenoten dit interpreteren als: de leerkracht vindt deze leerling vervelend. Vervolgens zullen klasgenoten hun beeld van de leerling aanpassen in de negatieve zin en deze leerling onaardig vinden. Verschillende methodische en inhoudelijke toevoegingen op het bestaande onderzoek naar social referencing komen aan bod in Hoofdstuk 3 en 4 van dit proefschrift.

Overzicht van de Studies

Dit proefschrift beschrijft vijf empirische studies, uitgevoerd met een dataset die is verzameld bij 59 groepen 7 in het kader van het project "Social competence and social climate in the classroom" (NWO-PROO project # 411-10-915). In het schooljaar 2012/2013 hebben 1570 leerlingen en hun 59 leerkrachten op 3 momenten vragenlijsten ingevuld over zichzelf en de leerlingen in de klas. De leerlingen waren bij aanvang van de studie gemiddeld

10 en een half jaar oud. Het grootste gedeelte van de vragenlijsten die leerlingen ingevuld hebben, bestond uit sociometrische vragen in de vorm van peer-nominaties. Leerlingen krijgen dan een beschrijving of kenmerk en kiezen (nomineren) vervolgens uit hun klasgenoten die leerlingen voor wie de beschrijving volgens hen geldt. Veelgebruikte vragen gaan over persoonlijke affectie voor klasgenoten: "Welke klasgenoten vind jij het meest/minst aardig?", of over sociaal gedrag: "Welke klasgenoten helpen andere kinderen?". Per leerling kan dan bekeken worden hoe aardig hij of zij over het algemeen gevonden wordt. De sociometrische vragen zijn ook gebruikt om de klassennormen (wat is 'normaal' in een klas) in kaart te brengen. Twee sets van sociometrische vragen die in dit proefschrift veel aan bod komen, zijn vragen naar het gedrag van de leerkracht in interactie met klasgenoten en naar de mening van de leerkracht over klasgenoten:

- Welke klasgenoten krijgen vaak complimentjes van juf Kim?
- Op welke klasgenoten wordt juf Kim vaak boos?
- Welke klasgenoten krijgen bijna geen aandacht van juf Kim?
- Welke klasgenoten worden het meest aardig gevonden door juf Kim?
- Welke klasgenoten worden het minst aardig gevonden door juf Kim?

Naast de peer-percepties van de leerlingen en de leerkracht-leerlingrelatie zijn video-opnames gebruikt om leerkrachtgedrag te observeren. Op drie meetmomenten is twee uur video opgenomen, die vervolgens gecodeerd is in termen van publieke dyadische leerkrachtgedragingen. Dat wil zeggen dat elk moment waarop een leerkracht iets zei tegen één leerling of een klein groepje (maximaal vier), terwijl minimaal de helft van de klas aanwezig was en het kon horen, gecodeerd werd. Meer specifiek werden de mate van positiviteit en negativiteit gescoord in een affectief en cognitief domein. De leerkrachtingspraak: "Dat heb je goed berekend, Anne!" werd bijvoorbeeld als positief in het cognitieve domein gecodeerd, terwijl de uiting: "Ga nu eens eindelijk recht zitten, Chris!" werd gecodeerd als negatief in het affectieve domein. Per leerling kon zo worden vastgesteld hoe vaak de leerkracht tegen hem of haar had

gesproken, in welk domein, en met welke waardering.

Resultaten

De leerkracht als model voor de peer ecology. In **Hoofdstuk 2** lag de focus op de samenhang tussen leerkrachtondersteuning en -conflict en de aard van de peer ecology in de klas. De peer ecology is onderzocht in termen van het totaal aantal positieve en negatieve relaties tussen leerlingen, de hiërarchie in de sociale status van de leerlingen en de normen voor pro-sociaal en agressief gedrag onder leerlingen. Een positieve peer ecology, gekarakteriseerd door voornamelijk positieve relaties, weinig hiërarchie en voornamelijk pro-sociaal gedrag, bevordert sociale en cognitieve processen in de klas (Cappella, Kim, Neal, & Jackson, 2013; Espelage, Holt, & Henkel, 2003; Wentzel & Caldwell, 1997). De belangrijkste hypothese in dit hoofdstuk was dat de leerkracht model zou staan voor peer-relaties. De drie aspecten van de peer ecology zijn in verband gebracht met leerkrachtondersteuning en -conflict in het algemeen met de hele klas en ook met individuele leerlingen. Bovendien is de mate van differentiatie, dus de mate waarin leerkrachten leerlingen verschillend benaderen, meegenomen in deze studie.

Voor deze studie zijn de gegevens van het eerste tijdsmoment gebruikt. Resultaten van drie multivariate multipelere regressieanalyses lieten zien dat de leerkracht inderdaad model stond voor de peer ecology. Wanneer een leerkracht volgens leerlingen veel ondersteunend gedrag vertoonde, vonden leerlingen elkaar aardiger en rapporteerden zij meer pro-sociaal gedrag. Conflictueuze relaties en interacties tussen de leerkracht en klas gingen samen met een meer negatieve peer ecology, gekenmerkt door meer leerlingen die elkaar onaardig vonden en meer agressief gedrag. Bovendien was meer differentiatie in leerkrachtgedrag gerelateerd aan meer hiërarchie in de status van leerlingen.

De leerkracht als sociale referent voor peer status. In de hoofdstukken 3, 4 en 5 stond de mate waarin leerlingen aardig en onaardig gevonden worden door hun klasgenoten centraal. Naarmate leerlingen aardiger gevonden worden

door peers, worden zij meer geaccepteerd en voelen zij zich over het algemeen beter op hun gemak in de klas, zijn zij meer gemotiveerd en presteren zij beter op school (Flook, Repetti, & Ullman, 2005; Ladd, 2006; Wentzel, 2005). Hoe onaardiger leerlingen gevonden worden, dus hoe meer ze afgewezen worden door hun klasgenoten, hoe meer risico ze lopen op internaliserend en externaliserend probleemgedrag en schoolse problematiek (Buhs, Ladd, & Herald, 2006; French & Conrad, 2001; Ladd & Troop-Gordon, 2003).

In **Hoofdstuk 3** vormt de volledige keten die social referencing veronderstelt het onderwerp van onderzoek: (1) leerkrachtgedrag naar een leerling toe, (2) percepties die klasgenoten hebben van de mate waarin hun leerkracht de leerling aardig en onaardig vindt en (3) de eigen affectieve evaluatie (aardig of onaardig) die klasgenoten hebben van de leerling. De percepties die klasgenoten hebben worden peer-percepties genoemd. Eerder onderzoek bood informatie over de verbanden tussen slechts twee van deze drie elementen en meestal niet als een proces over de tijd. In Hoofdstuk 3 wordt de gehele keten onderzocht over het verloop van het schooljaar, waarbij gecontroleerd is voor het sociale gedrag van de leerling.

Deze keten is geanalyseerd met een padmodel, gebruikmakend van de gegevens die verzameld zijn op elk van de drie meetmomenten. De resultaten van deze studie ondersteunen de keten van de elementen van social referencing, maar alleen in negatieve zin: negatief leerkrachtgedrag hing samen met de peer-perceptie dat een leerkracht een leerling onaardig vond, welke weer samenhang met hoe onaardig de leerling werd gevonden door klasgenoten. Er was geen aanwijzing voor een keten waarbij positief leerkrachtgedrag verband hield met aardig gevonden worden door medeleerlingen. Percepties die klasgenoten hadden over hoe aardig een leerling werd gevonden door de leerkracht leken vooral gevoed te worden door hun eigen percepties van het sociale gedrag en de schoolse prestaties van de betreffende leerling en daarnaast door het geslacht van de leerling en niet zozeer met leerkrachtgedrag.

De leerkracht als sociale referent voor dyadische relaties.

Hoofdstuk 3 heeft al een belangrijk hiaat in het onderzoek naar social referencing gevuld door de drie elementen van de keten met elkaar in verband te brengen. In Hoofdstuk 4 zoeken we een oplossing voor een ander probleem: de werking van social referencing lijkt plaats te vinden in het hoofd van individuele leerlingen, maar is voornamelijk onderzocht als groepsproces, in termen van peer status (zie Hughes et al., 2001; McAuliffe et al., 2009). In deze studie hebben we daarom onderzocht of het ook zo is dat wanneer een individuele klasgenoot denkt dat de leerkracht een leerling aardig vindt, deze klasgenoot deze leerling ook zelf aardig gaat vinden. Dat hebben we gedaan door middel van longitudinale analyses van sociale netwerken, met RSiena (Snijders, 2001), over de gegevens van de drie meetmomenten.

Deze analyses hebben laten zien dat er inderdaad een tendens is dat wanneer een bepaalde leerling (Anne) denkt dat de leerkracht een andere leerling (Bente) aardig vindt, er een grotere kans bestaat dat Anne Bente ook aardig gaat vinden. Voor negatieve affectie bleek dit verband eerder omgekeerd; wanneer Anne Bente al onaardig vindt, is het waarschijnlijk dat Anne ook gaat denken dat de leerkracht Bente onaardig vindt. Deze tendensen waren niet afhankelijk van hoe de leerlingen de leerkracht zelf beoordeelden.

De leerkracht als affectief filter. In Hoofdstuk 5 zijn de peer-percepties van hoe aardig en onaardig de leerkracht een leerling vond gebruikt als moderators van de samenhang tussen peer-percepties van sociaal gedrag en hoe aardig en onaardig klasgenoten een leerling vonden. Over het algemeen worden kinderen die pro-sociaal gedrag vertonen aardiger gevonden door hun medeleerlingen, terwijl het vertonen van agressief gedrag samengaat met onaardiger gevonden worden. In deze studie is onderzocht of de leerkracht kan dienen als affectief filter, waarbij de peer-perceptie dat een leerling aardig gevonden wordt door de leerkracht ervoor zou kunnen zorgen dat het negatieve gedrag van de leerling minder sterk samenhangt met een negatieve affectieve evaluatie door klasgenoten. Andersom zou deze samenhang versterkt kunnen worden wanneer klasgenoten denken dat de leerkracht de leerling onaardig vindt.

Met behulp van multi-levelanalyse konden we laten zien dat de leerkracht inderdaad als affectief filter kan dienen. De leerkracht kon met name verschil maken voor leerlingen die meer risico lopen op een lage sociale status (dat wil zeggen, leerlingen die volgens klasgenoten weinig pro-sociaal gedrag of veel agressief gedrag vertoonden). Leerlingen die weinig pro-sociaal gedrag vertoonden werden door meer klasgenoten aardig gevonden, wanneer meer klasgenoten dachten dat de leerkracht deze leerling aardig vond, maar werden ook door meer klasgenoten onaardig gevonden wanneer gedacht werd dat de leerkracht de leerling onaardig vond. Wanneer leerlingen openlijk agressief gedrag vertoonden en er bovendien in sterkere mate gedacht werd dat zij onaardig werden gevonden door de leerkracht, werden zij door minder leerlingen aardig gevonden en door meer leerlingen onaardig. Daarnaast is in deze studie ook onderzocht in hoeverre het verband tussen sociaal gedrag en (on)aardig gevonden worden verschilde tussen klassen, afhankelijk van de mate waarin de leerkracht over het algemeen positieve of negatieve relaties had met leerlingen. Uit deze analyse bleek dat openlijke agressie, zoals duwen, schoppen en uitschelden, minder sterk samenhang met onaardig gevonden worden naarmate de leerkracht over het algemeen meer positieve relaties had met de leerlingen. Dit resultaat was andersom voor relationele agressie, zoals roddelen en anderen buitensluiten. Naarmate leerkrachten meer positieve relaties hadden met leerlingen in een klas, hing relationele agressie sterker samen met onaardig gevonden worden.

De rol van de leerkracht bij sociale isolatie. In Hoofdstuk 6 lag de focus op de mate van sociale interactie die leerlingen hebben met de groep. Wanneer leerlingen in beperkte mate deelnemen aan sociale interactie belemmert deze sociale isolatie hen in hun sociale ontwikkeling en kan de samenwerking aan schooltaken lastiger zijn (Rubin, Coplan, & Bowker, 2009; Wormington, Anderson, Schneider, Tomlinson, & Brown, 2016). Als eerste stap in deze studie is het leerkrachtgedrag tegenover geïsoleerde en niet-geïsoleerde leerlingen vergeleken en is bekeken hoe adaptief het leerkrachtgedrag was. Hiertoe is adaptief leerkrachtgedrag

gedefinieerd in termen van hoge frequentie (om model te staan voor veel interactie met de leerling) en van positieve aard (om model te staan voor positieve interactie met de leerling). Vervolgens is onderzocht hoe geïsoleerde leerlingen zich over de tijd ontwikkelden en of het leerkrachtgedrag samenhang met een verandering in sociale isolatie. Met behulp van een multi-level procesanalyse konden we laten zien dat leerkrachten minder, in plaats van meer, interactie hadden met geïsoleerde leerlingen dan met hun niet-geïsoleerde klasgenoten. Wanneer geïsoleerde leerlingen ook nog onaardig gevonden werden door hun medeleerlingen (d.w.z. actief buitengesloten werden) was interactie frequenter, maar ook negatiever van aard. Leerkrachten vertoonden dus geen adaptief gedrag, maar leken juist mee te gaan in de beperkte en negatieve interactie die de leerlingen hadden met hun medeleerlingen. Een groeimodel liet zien dat geïsoleerde leerlingen die ook nog eens onaardig gevonden werden door leerkrachten er wel baat bij hadden wanneer de leerkracht positiever met hen om ging; zij raakten dan minder geïsoleerd over de tijd.

Conclusie

Al met al hebben de studies in dit proefschrift, tezamen en elk voor zich, nieuwe kennis opgeleverd over de rol van de leerkracht bij peer-relaties. Door te kijken naar (a) meerdere facetten van peer-relaties, op verschillende niveaus, en (b) daadwerkelijk leerkrachtgedrag en peer-percepties heeft dit proefschrift het onderzoek in dit veld een stap verder gebracht. De leerkracht blijkt inderdaad een rol te spelen wanneer het gaat om peer-relaties. Ook al zijn leerkrachten niet direct onderdeel van de peer ecology in hun klas, ze staan er wel zo dicht bij en hebben er zo veel mee te maken dat ze deze lijken te kunnen vormen. Het zal vaak onbewust gaan, maar door middel van positief gedrag en affectie in relaties met leerlingen in het algemeen en met individuele leerlingen in het bijzonder kunnen leerkrachten de basis leggen voor positieve relaties onder leerlingen. Leerkrachten fungeren als model voor positief sociaal gedrag en zetten individuele leerlingen in een positief spotlight dat ervoor zorgt dat ook klasgenoten deze leerlingen positiever gaan zien. Aan de andere kant kunnen ook de meer negatieve of

conflictueuze relaties en interacties die leerkrachten hebben met leerlingen doorsijpelen naar de peer-relaties en zo, vaak waarschijnlijk onbedoeld, het klasklimaat alsmede de sociale positie van individuele leerlingen negatief beïnvloeden. Uit de studies in hoofdstukken 3 en 5 bleek zelfs dat deze negatieve invloed belangrijker en sterker kan zijn dan de positieve invloed, mogelijk doordat mensen meer geneigd zijn op negatieve boodschappen dan op positieve te reageren (negativity bias; zie Vaish, Grossman, & Woodward, 2008), of doordat leerkrachten meestal positief omgaan met leerlingen, waardoor negatieve interactie meer kan opvallen.

Suggesties voor Vervolgonderzoek

Zoals dat zo vaak gebeurt, hebben de studies in dit proefschrift belangrijke vragen beantwoord, maar roepen ze ook nieuwe vragen op. Ten eerste zou het waardevol zijn om verder te onderzoeken welk docentgedrag ten grondslag ligt aan de percepties die klasgenoten hebben dat een leerling aardig gevonden wordt door de leerkracht. Vervolgonderzoek zou moeten uitwijzen of ander gedrag dan het gedrag dat voor dit proefschrift geobserveerd is verband houdt met deze percepties. Hierbij valt te denken aan gedrag buiten de les om, bijvoorbeeld op het schoolplein of voor en na lessen (zie Claessens et al., 2016), maar ook aan non-verbale uitingen. Mogelijk zouden interviews met leerlingen ook informatie op kunnen leveren.

Bovendien zou het informatief zijn om verder onderzoek te doen naar de specifieke omstandigheden waarin leerkrachtgedrag een positief of negatief effect heeft op peer-relaties. Waar het voor sommige leerlingen positief zou kunnen uitwerken wanneer de leerkracht hen aardig vindt en in een positief daglicht zet, zou dat voor anderen funest kunnen zijn en ertoe leiden dat de leerling als het lievelingetje van de leerkracht wordt gezien. Evenzo zou het uit kunnen maken hoe de groep leerlingen structureel in elkaar zit en zouden er leerkrachtkenmerken kunnen zijn die maken dat het met bepaalde leerkrachten wel gunstig is om een positieve relatie te hebben, terwijl dat met anderen niet positief overkomt. Vervolgonderzoek zou deze condities verder kunnen uitpluizen.

Een andere vraag die nader onderzoek vereist, is in hoeverre de gevonden effecten op de peer-relaties blijvend zijn, of dat deze vervagen op het moment dat leerlingen naar een nieuwe klas gaan met een (of meerdere) nieuwe leerkracht(en). Ook is het waarschijnlijk dat docentgedrag andere effecten heeft als leerlingen veel jonger of juist ouder zijn. Zo is het bij adolescenten bijvoorbeeld 'cool' om ruzie te maken met de docent (zie De Laet et al., 2014). Om docenten beter advies te kunnen geven zou dit verder uitgezocht moeten worden.

Implicaties voor de Praktijk

In de studies die hier beschreven zijn, heeft het leerkrachtgedrag dat elke dag in normale lessen aan bod komt centraal gestaan. Het is aannemelijk dat dit gedrag niet primair gericht was op het bevorderen van peer-relaties. Wanneer leerkrachten bepaald gedrag bewust zouden kunnen inzetten, zou dit de sociale relaties in de klas ten goede kunnen komen. De rol van de leerkracht in peer-relaties zou daarom een mooie toevoeging kunnen zijn aan de opleiding en professionaliseringstrajecten van leerkrachten. Twee elementen zouden hierbij van belang kunnen zijn: het vergroten van kennis van leerkrachten met betrekking tot peer-relaties in het algemeen en hun rol daarin in het bijzonder (mechanismes van modeling en social referencing) en het aanreiken van strategieën die leerkrachten kunnen inzetten om deze rol gericht te vervullen.

Wanneer het gaat om de kennis van leerkrachten gaat het ten eerste om hun conceptuele inzicht in peer-relaties en het belang daarvan voor de sociale ontwikkeling én schoolprestaties van leerlingen. Daarnaast is het van belang dat leerkrachten de mechanismes van modeling en social referencing leren kennen en inzicht krijgen in hoe en wanneer ze deze zouden kunnen inzetten om de peer-relaties in hun klas te bevorderen.

Ook voor strategieën om peer-relaties te bevorderen kunnen op basis van dit onderzoek enkele suggesties worden gedaan. Hierbij moet wel opgemerkt worden dat de gevonden verbanden tussen leerkrachtgedrag en peer-relaties voor een groot deel gebaseerd zijn op peer-

percepties en niet alleen op geobserveerd leerkrachtgedrag. Vervolgonderzoek moet de gedragsmatige basis van die percepties nog verder ophelderen, dus suggesties voor leerkrachtgedrag kunnen nog verder aangescherpt worden. Natuurlijk zijn er wel al enkele suggesties te geven. Over het algemeen is gebleken dat het de peer-relaties ten goede komt wanneer leerkrachten hun publiekelijke interactie met leerlingen in het algemeen zo veel mogelijk positief en zo min mogelijk negatief vormgeven. Ook voor individuele leerlingen is het van belang om de publieke interactie zo positief mogelijk te houden en wanneer een leerling toch terechtgewezen moet worden dit klein te doen, zonder dat medeleerlingen er lucht van krijgen. Het lijkt zo te zijn dat de negatieve interactie die leerkrachten met hun leerlingen hebben meer verband houdt met de sociale status van een leerling dan de positieve interactie. Daarom lijken leerkrachten op basis van dit onderzoek het best geadviseerd te worden om zich voornamelijk te richten op het verminderen van negatieve interactie.

Als leerkrachten erin slagen om hun dagelijkse omgang met leerlingen op een dergelijke manier in te vullen dat deze tegemoet komt aan de peer ecology, de sociale status van individuele leerlingen binnen de groep én dyadische relaties tussen twee leerlingen, vormen zij een omgeving waarbinnen leerlingen zowel op sociaal als op school gebied optimaal kunnen ontplooiën.

ABOUT THE AUTHOR

Marloes Hendrickx studied Educational Sciences at Utrecht University (2005-2011). During her study, she worked at Utrecht University as a teacher assistant. After obtaining her bachelor's degree in 2009, she was attracted to doing research so she enrolled in the educational sciences research master program at Utrecht University. She wrote her master's thesis on students' socio-cognitive conflicts during collaborative learning and graduated in 2011 (cum laude).

During her research master program, Marloes' enthusiasm for conducting research in the field of education further increased. Therefore, in September 2011, she started her PhD project on the role of the teacher in classroom peer relations at Utrecht University. Besides her research, during this time she also taught courses, supervised students' bachelor and master theses, and was a board member of VPO (VOR Promovendi Overleg; a Dutch/Flemish association for PhD students in the field of Education).

Currently, Marloes is employed as a postdoc researcher at Utrecht University as well as at Eindhoven University of Technology. She is working on various research projects, which share a focus on interactions and relationships in education, including those among teachers, among students, and between teachers and students.



LIST OF PUBLICATIONS

Peer reviewed publications

Boor-Klip, H. J., Segers, E., **Hendrickx, M. M. H. G.**, & Cillessen, A. H. N. (2014). Beleving van de peer context in de klas: Samenhang met sociaal functioneren, academisch functioneren en zelfbeeld. *Pedagogische Studiën*, *91*, 288-301.

Boor-Klip, H. J., Segers, E. , **Hendrickx, M. M. H. G.**, & Cillessen, A. H. N. (2015). The moderating role of classroom descriptive norms in the association of student behavior with social preference and popularity. *Journal of Early Adolescence*. Advance online publication.

Boor-Klip, H. J., Segers, E. , **Hendrickx, M. M. H. G.**, & Cillessen, A. H. N. (2016). Development and psychometric properties of the classroom peer context questionnaire. *Social Development*, *25*, 370-389.

Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., Cillessen, A. H. N., & Brekelmans, M. (2016). Social dynamics in the classroom: Teacher support and conflict and the peer ecology. *Teaching and Teacher Education*, *53*, 30-40.

Hendrickx, M. M. H. G., Mainhard, M. T., Oudman, V. S., Boor-Klip, H. J., & Brekelmans, M. (2016). Teacher behavior and peer liking and disliking: The teacher as a social referent for peer status. *Journal of Educational Psychology*. Advance online publication.

Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (accepted for publication). Our teacher likes you, so I like you: A social network approach to social referencing. *Journal of School Psychology*.

Submitted papers

Boor-Klip, H. J., Segers, E., **Hendrickx, M. M. H. G.**, & Cillessen, A. H. N. (2016). *Guiding the invisible hand: Improving classroom peer relationships through tools for teachers*. Manuscript submitted for publication.

Boor-Klip, H. J., Segers, E., **Hendrickx, M. M. H. G.**, & Cillessen, A. H. N. (2016). *A positive view of the peer context moderates the association between low status and poor school adjustment*. Manuscript submitted for publication.

Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (2016). *Teacher liking as an affective filter for the association between student behavior and peer status*. Manuscript resubmitted for publication.

Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., Cillessen, A. H. N., & Brekelmans, M. (2016). *The role of the teacher in upper elementary students' social isolation*. Manuscript submitted for publication.

Van der Sande, L., Mainhard, M. T., & **Hendrickx, M. M. H. G.** (2016). *Learning disabilities and low social status: the role of peer academic reputation and peer reputation of teacher liking*. Manuscript resubmitted for publication.

Conference contributions (selection of contributions as first author)

Hendrickx, M. M. H. G., Mainhard, M. T., Oudman, S., Boor-Klip, H., & Brekelmans, M. (2016, June). *Leerkrachtgedrag en peer status: De mediërende rol van peer percepties van de leerkracht-leerlingrelatie*. Paper presented at the Onderwijs Research Dagen (ORD), Rotterdam, the Netherlands.

Hendrickx, M. M. H. G., Oudman, V. S., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (2016, April). *Teacher-student interactions and peer status: The mediating role of peer reputation of teacher liking and disliking*. Paper presented at the meeting of Society for Research on Adolescence (SRA), Baltimore, MD.

Hendrickx, M. M. H. G., Francot, R. J. R. M., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (2016, April). *How teachers affect trajectories of isolation in the classroom group*. Poster presented at the meeting of Society for Research on Adolescence (SRA), Baltimore, MD.

Hendrickx, M. M. H. G., Oudman, V. S., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (2016, January). *Teacher behavior and peer status: The teacher as a social referent*. Paper presented

at the Peer Relations Research meeting (PRO), Nijmegen, The Netherlands.

Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (2015, April). The teacher as a social referent for classroom peer acceptance. In T. Wubbels (Chair), *How teachers and peers affect children's life in the classroom*. Symposium conducted at meeting of American Educational Research Association (AERA), Chicago, IL.

Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (2015, March). The teacher as a social referent for likeability: A multilevel social network approach. In A. H. N. Cillessen (Chair), *Classroom social climate in adolescence: Peers and teachers*. Symposium conducted at meeting of Society for Research in Child Development (SRCD), Philadelphia, PA.

Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (2014, July). *Teacher-child relationship and peer status*. Paper presented at the International Congress of Applied Psychology (ICAP), Paris, France.

Hendrickx, M. M. H. G., Mainhard, M. T., Boor-Klip, H. J., & Brekelmans, M. (2014, June). De leerkracht-leerlingrelatie en geliefdheid bij peers. In E. Segers (Chair), *Het samenspel tussen leerkracht-leerling relaties en peer relaties in de basisschool: relaties met sociale status en schoolse betrokkenheid*. Symposium conducted at the Onderwijs Research Dagen (ORD), Groningen, The Netherlands.

Hendrickx, M. M. H. G., Mainhard, M. T., Klip, H. J., Segers, E., Cillessen, A. H. N., & Brekelmans, M. (2012, August). *The teacher's invisible hand. An explorative study of the classroom social climate in three classes*. Poster presented at the meeting of EARLI SIG 5: Learning and Development in Early Childhood, Utrecht, The Netherlands.

Hendrickx, M. M. H. G., Mainhard, M. T., Klip, H. J., Segers, E., Cillessen, A. H. N., & Brekelmans, M. (2012, April). *Making the teacher's invisible hand visible: How teacher-child interactions are related to the child's social status in class*. Round table session held at the International Conference on Interpersonal Relationships in Education (ICIRE), Vancouver, Canada.

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