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A social network perspective on bullying

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Chapter 4

Self-, Peer-, and Teacher-Reports on Bullying Networks in Kindergartens

Abstract

It was investigated if and how children and teachers differ in their assessment of victim-bully relations in kindergartens. Self-, peer-, and teacher-reports on bullying networks (*who bullies whom*) were investigated in 25 Swiss kindergartens with 402 5- to 7-year-olds. Further, it was examined whether gender and internalizing and externalizing problem behaviors were related to informants' observations. Statistical network models showed that informants agreed more often on the identity of bullies than of victims. Internalizing problems related negatively and externalizing problems related positively to reported bullying; internalizing problems did not relate to reported victimization. Using self- and peer-reports, boys as well as girls were reported to bully boys and girls equally; teachers reported less cross-gender bullying compared to same-gender bullying.

This study is based upon:

Huitsing, G., Van Duijn, M. A. J., Snijders, T. A. B., Perren, S., & Veenstra, R. (2014). Self, peer, and teacher reports on bullying networks in kindergartens. *Submitted for publication*.

4.1 Introduction

Bullying is studied mostly for children in late childhood or preadolescence. Relatively little is known about bullying in the early childhood years (up to the age of 8), although the number of studies on bullying in the first years of education is increasing (see for a review: Vlachou, Andreou, Botsoglou, & Didaskalou, 2011). Early school years are important for children's socialization. Children have to participate in a peer group, where they learn to cope with a new environment, and where difficulties in social interactions in a natural setting can be detected by professionals. Signaling and preventing behavioral problems at a young age may prevent escalation in later years (Barker et al., 2008). For early interventions it is important that children, teachers, and parents agree about children's needs. It is therefore important to gain more knowledge about different informant perspectives on bullying in early school years.

The aim of the present research was to investigate if and how children and teachers differ in their recognition of bullies and their victims in kindergartens. More specifically, we investigated the perspectives of children themselves (self-reports), their classmates (peer reports), and their teacher (teacher reports) on victim-bully relations. We aimed to investigate the pairwise concordance of self-, peer, and teacher reports, to answer the question to what extent informants agree in their judgment of victims and bullies. Moreover, we investigated whether children's gender and internalizing and externalizing behavioral problems (reported by parents) were related to the informants' observations. Do these child characteristics influence the extent to which informants observe victimization and/or bullying? To address our research aims, we used a multi-informant approach with data collected in 25 kindergartens with 5- to 7-year-old children in Switzerland.

4.1.1 Bullying in the Early Years: Preschool and Kindergarten

Bullying is a form of aggression, usually defined as behavior characterized by an imbalance of power between bullies and victims, and where negative actions of the bully toward the victim are intentional and repeated over time (Olweus, 1993). Young children (4- to 6- as well as 8-year-olds) are not always aware of the characteristics that differentiate bullying from aggression or teasing: repetition and imbalance of power (Monks & Smith, 2006). They additionally do not easily differentiate between forms of bullying, such as physical and non-physical (verbal, relational) bullying (Smith, Cowie, Olafsson, & Liefoghe, 2002). A second complication investigating bullying processes in early childhood is that being victimized in the early years may not be such a stable process as it is in middle childhood or early adolescence (Kochenderfer & Ladd, 1996a). Victimization is often situation and context-

specific (Snyder et al., 2003). Bullying others, however, is more stable over time. Stable patterns in bullying or aggression were already found for 3- to 4-year-old children in an 18-month longitudinal study (Crick et al, 2006b). It has been suggested that children with an aggressive nature target many peers at first, and later direct their aggression to more easy and submissive targets (Perry, Perry, & Boldizar, 1990).

Several research labs have examined bullying in preschool or kindergartens, and used child interviews to overcome the challenges to obtain reliable information about bullying from young children (instead with, for example, questionnaires or observations). Österman et al. (1994) were among the first to use interviews with 8-year-old children about bullying. They found that children rated themselves as less aggressive than their peers did, a finding reported for late childhood or preadolescence as well (e.g., Salmivalli & Peets, 2009). Monks and colleagues also used interviews to identify children's roles in bullying situations for 4- to 6-year-olds (Monks, Ortega Ruiz, & Torrado Val, 2002; Monks, Smith, & Swettenham, 2003). They presented children with cartoons to illustrate "bullying" situations. Perren and Alsaker (2006) used comparable cartoons and combined child interviews with teacher questionnaires. They found that personal and interpersonal characteristics of bullies and victims in eighteen Swiss kindergartens (5- to 7-year-old children) were similar to those of older children. For example, bullies were found to be assertive and both physically and socially aggressive, whereas victims were non-assertive, submissive and withdrawn. Another study, using 200 child interviews, revealed that about 20% of 5- to 7-year-olds reported being victimized, either generally, verbally, or physically (Kochenderfer & Ladd, 1996a; 1996b). Those young victims felt more lonely and had a higher desire to avoid school (Kochenderfer & Ladd, 1996b).

4.1.2 Informants on Bullying and Victimization

A relevant question for research on negative peer relations is how such sensitive data can be obtained reliably (Clemans, Musci, Leoutsakos, & Ialongo, 2014; Ladd & Kochenderfer-Ladd, 2002): who should be used as informants about children's bullying and victimization relations? Research overviews have shown that different informants provide different views on children's social, emotional, or behavioral problems (Achenbach, McConaughy, & Howell, 1987; De Los Reyes & Kazdin, 2005).

The reliability of information about bullying and victimization is related to the context in which it occurs and the competence of the informant to report information (Ladd & Kochenderfer-Ladd, 2002). An advantage of self-reports is that they capture specific experiences of victims not observable by others. A disadvantage is potential bias, because children may not be willing to report painful experiences, or may overreport victimization

and underreport bullying (Graham & Juvonen, 1998). An advantage of peer reports is that many raters in a classroom assess the behavior of a classmate. Peers may be less subject to underreporting bias, given that they are often present during bullying incidents (O'Connell, Pepler, & Craig, 1999) and may be willing to report painful experiences of others. However, peers may also be sensitive to prejudices and reputation effects. Young children may be more subject to over- or underreporting bias, because of difficulties in differentiating bullying from other negative peer interactions and/or problems in acquiring an accurate overview of relations in their peer group. Teachers, finally, can be seen as observers with regular opportunities to observe children in the classroom. Teachers have finer, qualitative distinctions of children's behaviors than children themselves, especially compared to young children. However, teachers may not always be aware of bullying incidents, because they may not be present during their occurrence, and are not necessarily informed by victims or other witnesses (see also Neal, Cappella, Wagner, & Atkins, 2011).

One study investigated student-teacher agreement on victim-bully relations in American first, third, and fifth grades, and found it to be rather low, with on average 8% of victim-bully relations reported by both the teacher and student (Ahn, Rodkin, & Gest, 2013). Student-teacher agreement was almost twice as high for same-gender bullying and boys bullying girls when compared with girls bullying boys. Investigations into concordance between informants in early childhood revealed that the agreement between children, peers, and teachers was higher for perpetrators of aggression than for victims (Camodeca, Caravita, & Coppola, 2014; Monks et al., 2003; Perren & Alsaker, 2006).

4.1.3 Gender

Many studies have found that boys are more involved in bullying than girls (see for a review, Hong & Espelage, 2012b). This gender difference corresponds to the finding that boys are usually more directly aggressive (i.e., physically or verbally) than girls, whereas for indirect aggression (i.e., relational or social) gender differences are trivial (Card, Stucky, Sawalani, & Little, 2008). In early childhood, there is a general tendency for children to have gender-segregated peer groups because of different play styles for boys and girls (Cherney & London, 2006; Leaper, 1994; Maccoby, 1998). Given the gender-segregated nature of early childhood play settings, the opportunity structure makes it reasonable to expect that bullying would occur often within same-gender relations (Crick et al, 2006b). However, investigations in early childhood showed that cross-gender aggression occurred, with boys having both male and female targets, rather than girls targeting boys (Hanish, Sallquist, DiDonato, Fabes, & Martin, 2012; Vermande, Van den Oord, Goudena, & Rispen, 2000), which is in line with victim-bully relations in late childhood and preadolescence (Olweus, 2010; Rodkin & Berger,

2008; Tolsma, van Deurzen, Stark, & Veenstra, 2013; Veenstra et al., 2007). A possible reason for boys bullying girls and not vice versa, may be that boys are physically stronger than girls (Olweus, 1993), which is demonstrated by their elevated levels of direct aggression.

4.1.4 Behavioral problems

Behavioral problems of children are often distinguished into externalizing and internalizing problems (Campbell, Shaw, & Gilliom, 2000; Eisenberg et al., 2001). Externalizing behavior is disruptive outward behavior where a child acts negatively to the *external* environment, with oppositional behavior or aggression as examples. Examples of internalizing problems are withdrawn, anxious, inhibited, or depressed behaviors. Internalizing problems in early childhood are related to victimization (Hanish & Guerra, 2002; Perren & Alsaker, 2009; Van Lier et al., 2012), whereas externalizing problems are related to bullying (Perren & Alsaker, 2006; Vermande et al., 2000). Investigations in early childhood also showed, however, that externalizing problems are strongly related to victimization (Arseneault et al., 2006; Hanish & Guerra, 2002; Perren, Von Wyl, Stadelmann, Burgin, & Von Klitzing, 2006; Perren, Stadelmann, & Von Klitzing, 2009; Snyder et al., 2003; Van Lier et al., 2012). This may be explained by the instability of victimization in the early years; young children may respond to aggression with retaliation (Hanish et al., 2012).

4.1.5 The present study

Investigations into bullying and victimization often classified children into the “role” of bully, victim, or both. Bullying and victimization are, however, relational phenomena; children can be involvement in multiple relations. Investigating bullying and victimization properly requires therefore a relational or social network perspective: *who bullies whom?* Children’s relations in classrooms are interdependent; the formation of relations is dependent not only on the existence of children’s relations but also on existence of other relations in the network. To handle these dependencies, we investigated victim-bully relations through statistical social network analyses of complete social networks (using Exponential Random Graph Models, see Lusher, Koskinen, & Robins, 2013; Robins, Pattison, Kalish, & Lusher, 2007a). Victim-bully relations manifest at the relationship or dyadic level. A dyad is defined as a pair of children and the (possible) tie(s) between them. Victim-bully relations can also be aggregated to the child level (for example, to examine whether children with certain characteristics bully multiple children), and can be investigated at a higher-order level (e.g., investigating network structures through relational patterns between three or more children). Together, all relations in a classroom form the structure of the larger social network.

The concordance between informants on victim-bully relations was expected to be lower for teacher- versus self- or peer-reports than for self- and peer-reports, because teachers have a different position to observe victimization and bullying (*hypothesis 1*). Moreover, it can be expected that informants are more concordant for bullies than for victims, given that bullying is more stable and visible than victimization in early childhood (*hypothesis 2*). Regarding gender, we expected that bullying occurred most often between children of the same gender, and if there was cross-gender bullying, boys were expected to be more often bullies than girls (*hypothesis 3*). The observations of informants were expected to relate externalizing problems to both victimization and bullying (*hypothesis 4a*), whereas internalizing problems were expected to be exclusively related to victimization (*hypothesis 4b*). In addition, we explored the specific differences in internalizing and externalizing problems between victims and their bullies at the relationship level; for example, whether bullies had more externalizing problems than the victims they harassed (*hypothesis 5*).

4.2 Method

4.2.1 Sample and Participants

This study was part of a larger project, called *Pathways to Victimization*, aimed at evaluating the effectiveness of an anti-bullying prevention program in Swiss Kindergartens (Alsaker & Valkanover, 2012). Because of the specific topic of the current study, we used only the pre-test data that includes information from children, teachers, and parents. Although attendance at kindergarten in Switzerland is voluntary, most children attend preschool education in kindergarten two years before they go to compulsory primary school which starts after their seventh birthday. Children in kindergartens are together in stable mixed-age groups.

Kindergartens were selected using a clustered sampling design, where the initial sampling unit was the community, then the school, and finally the classroom. The communities were selected from the Canton of Bern on the basis of a series of criteria: region, size of the town, urban or rural areas, and socio-economic factors. Children of different economic, educational, or cultural backgrounds were included. Once communities had been chosen, school authorities were asked for permission to conduct the study in their school/kindergarten. Teachers were asked to participate and parents were asked permission for their children's participation. Following legal advice obtained by the Department of Education of the Canton of Bern, passive consent was obtained from parents.

For the present study, we used a sample for which teachers and parents filled out in-depth questionnaires. Data stem from 402 children in 25 kindergartens, collected in January 2005. The participation rate was high; only 2.5% of the parents refused participation for their

child. Overall, the mean age in the sample was 5.8 years ($SD = 0.58$). For 97% of the children in the sample, age ranged between 4 years 8 months and 6 years 7 months. The remaining children (3%) were older due to a delayed entry into schooling.

4.2.2 Procedure

The assessment included teacher and parent questionnaires and child interviews. Kindergarten teachers as well as parents completed a questionnaire for each child, including items related to the behavior in the peer group as well as various behavioral and personality characteristics. Additionally, each child was interviewed individually by trained students. Time was taken to familiarize the children with the procedures and to explain the reasons for the interviews. For example, about one week before the interview, the interviewers visited the kindergarten groups and told a story about “human researchers” who wanted to do research in a kindergarten. The children could ask questions and practice the interview in a role-play. The interview itself began with the children identifying their peers in photographs, and responding to questions on friendships.

4.2.3 Bullying Networks

Self-reports. To obtain self-reported networks of bullying, bullying was explained in an age appropriate way by presenting four pictures describing several forms of bullying (i.e., verbal, material, physical, relational, see Perren & Alsaker, 2006) without emphasizing the characteristics of repetition or imbalance of power. Children were asked if they were victimized. If they confirmed, they were asked “By whom are you bullied?” Children were asked to indicate their bullies by pointing out the pictures of classmates. These nominations were used to construct networks with victim-bully relations.

Peer-reports. With the same pictures as used for self-reports, children were asked to nominate the children in their class who bully other children. Children were asked to indicate the bullies by pointing out the pictures of classmates. If children nominated bullies, they were asked to mention the children who are victimized by these bullies, again by pointing out pictures of classmates. In addition to specifying victims of the bully, children were also allowed to indicate that the bully was bullying “everybody”, “all the girls”, or “all the boys”.

We considered peer-reports of bullying-networks as meaningful for our research purposes only if children were able to nominate the specific victims of the bully. Children nominated 720 times a bully (this number is including overlapping nominations—referring to some children who are nominated by several classmates for bullying). For 72.1% of these nominations, children were able to indicate the specific victims of the bully. For the other

cases, children reported that everyone was bullied by that bully (17.4%), that the bully harassed all the girls (2.1%) or all the boys (1.1%). It also occurred that the child was not able to report who was victimized by the bully (7.4%). Children who were nominated for bullying all classmates ($N=68$) were at the individual level more often mentioned as a bully through specific nominations ($M=4.4$) than children who were not nominated for bullying all classmates ($M=1.4$), $t(80) = 7.72, p < .01$. This confirms that unspecified reports (i.e., bullying all children) were also captured by specific reports of other children in the classroom. Therefore, we decided not to use the unspecified reports when constructing the networks.

In total, 223 children (55.5% of the sample) were nominated at least once for being a bully; altogether they were involved in 769 victim-bully dyads (which is 12.4% of the total number of possible dyads of 6,212). The majority of these dyads were reported by only one peer (83.0%), 13.8% were reported by two peers, and it rarely occurred that a victim-bully dyad was reported by three peers (3.3%, three is the maximum). With these nominations, peer-reported networks of bullying were constructed when at least one peer reported the dyad.

Teacher-reports. Similar to peer-reports, each teacher was asked which children in their kindergarten class bully, either verbally, materially, physically, or relationally. If teachers reported that children were bullying others, they were subsequently asked to mention the names of the children who are victimized by these bullies. They were requested to mention specific victims for each bully. In a similar way, teachers were also asked which children in their kindergarten class are victimized and by whom. These nominations were combined; if a teacher reported a victim-bully relation in at least one of the two questions, the victim-bully relation was regarded as present in the bullying networks.

4.2.4 Parent-Reported Internalizing and Externalizing Behavior

Internalizing behavior. A 9-item scale, derived from the Child Behavior Checklist (Achenbach, 1991) and the Child Behavior Scale (Ladd & Profilet, 1996), was used to measure children's internalizing problems. Parents responded on a 4-point Likert-type (1 = completely false, 4 = completely true) scale to items that tap internalizing problems, anxiety, and depression, such as "He/she is often sad" or "He/she is easily frightened". The scores for the 9 items formed a reliable scale and were averaged (Cronbach's $\alpha = .72$).

Externalizing behavior. An 8-item scale, derived from the Child Behavior Checklist (Achenbach, 1991) and the Child Behavior Scale (Ladd & Profilet, 1996), was used to measure children's externalizing problems. Parents responded on a 4-point Likert-type (1 = completely false, 4 = completely true) scale to items that tap open aggression, verbal aggression, and oppositional defiant behavior, such as "He/she is physically aggressive (hits,

kicks, bites)” or “He/she insults other children or shouts at them”. The scores for the 8 items formed a reliable scale and were averaged (Cronbach’s $\alpha = .82$).

Missing data imputation. Parental information on externalizing and internalizing problems was available for 60.7% of the children. To handle the missing data, we performed multiple imputation (five imputed datasets, with gender, age, and self-, peer-, and teacher-reported bullying and victimization as predictors for problem behaviors) at the scale level using the MICE package implemented in the R-system (Van Buuren & Groothuis-Oudshoorn, 2011). Simple *t*-tests on self-, peer-, and teacher-reports showed that children with missing parental data neither received nor gave more nominations for bullying. However, as only German and French versions of the questionnaire were offered, non-responders were more often parents with a migrant background (i.e., one of the parents is originally not from Switzerland), $t(317) = 6.57, p < .01$. As a result of the imputations, we were able to include data on all children and analyze therefore the complete networks.

4.2.5 Analytical Strategy

First, we examined the descriptive statistics of the bullying networks at the dyadic (network), individual, and classroom level. We inspected the prevalence of bullying in the networks reported by children, peers, and teachers, and distinguished this by the gender composition of the dyad. We also inspected the concordance between self-, peer-, and teacher-reports using the Jaccard index as an indication of the amount of agreement (to provide a first test of hypotheses 1 and 2). The Jaccard similarity coefficient ranges from 0 to 1 and gives the proportion of agreement in the reports of the present relationships for two or more informants (see Batagelj & Bren, 1995; Neal et al., 2011). As an example, a Jaccard index of .5 indicates that of all relationships reported by either informant, 50% are reported by both.

Exponential Random Graph Models. The complete network structure for the bullying networks was modeled using Exponential Random Graph Models (see, e.g., Lusher et al., 2013; Robins et al., 2007a), which were estimated using the program *XPNet* (Wang, Robins, & Pattison, 2009, available at sna.unimelb.edu.au). The observed networks were modeled using parameters of individual, dyadic, triadic, and higher-order level effects. These parameters represent network configurations; subsets of children with specific patterns of relations between them. The combination of the configurations represents the dependence structure of the observed social network, and the corresponding parameters can be interpreted as the outcome of structural processes in the network. Two networks as reported by two informants were investigated simultaneously in bivariate ERGMs (Lazega & Pattison, 1999; Robins, Pattison, & Wang, 2009) with configurations involving both networks, enabling investigation of the agreement between informants through similarity in network

structure and co-occurrence of observed relations. Although trivariate models involving all three informants would be relevant, examination of two different networks simultaneously is currently the maximum for the available software.

We had to exclude some classrooms in the estimations, because too few nominations were given in these classrooms for either informant. As a consequence, no network structure could be estimated in these classrooms. To facilitate comparisons across models, we only present the results of the classrooms where all models could be estimated ($N = 18$ with 292 students).

Model specification. The model specification was formulated in line with usual practices for ERGMs (Lusher et al., 2013) and their bivariate versions (Robins et al., 2009). We controlled for structural tendencies in the bullying networks by including structural parameters (“structural” because these parameters model the structure of the network). In the choice of structural parameters, we followed Huitsing et al. (2012a – Chapter 2), who identified the essential network parameters to model the structure of most bullying networks. Because these univariate “control” parameters were not the main focus of this study, we explained and discussed them in Appendix A1.

The bivariate structural parameters given in Table 4.1 modelled the presence or absence of concordance between informants (to test hypotheses 1 and 2). All ties in the parameters are directed from the victim to the bully; thus, the sender of a tie is the victim, and the receiver of a tie is mentioned as a bully. At the relationship level, the *multiplex arc* modeled whether two informants mentioned the same victim-bully relation (i.e., complete agreement) to test hypothesis 1. Hypothesis 1 is further tested by a combination of the interpretation of the following four bivariate parameters for the three comparisons of informants (i.e., self vs. peer-reports, self versus teacher-reports, and peer versus teacher-reports). The *multiplex in-stars* modeled agreement of informants on the bullies (but informants related these bullies to different victims), and the *multiplex out-stars* modeled agreement of informants on the victims (but informants related them to different bullies). Together, the *multiplex in-stars* and *out-stars* test also hypothesis 2. The *mixed-stars* parameters were included to investigate disagreement, by modeling whether one informant mentions a child as a bully, whereas the other informant mentions the child as victim, and vice versa.

Gender was used as a dyadic covariate in the network models to test hypothesis 3. Boy–girl and girl–boy dyads were combined into cross-gender dyads, to have enough cases in each category to estimate the network models. Boy-boy dyads and cross-gender dyads were contrasted with girl-girl dyads (the reference category). For internalizing and externalizing problems, *sender* and *receiver* effects were included to examine whether problem behavior was related to sending or receiving ties (hypothesis 4a and 4b). The *absolute difference effect*

models the exploration of specific differences between victims and their bullies in the victim-bully dyads (hypothesis 5).

Meta-analyses. The results of the models for each classroom were combined in a meta-analytic procedure. First, the multiple estimations from the imputed datasets were combined as described by Rubin (1987), by taking the mean of the five estimations and obtaining the standard errors adjusted for the imputations. Next, the single adjusted estimates for each classroom were combined with a meta-analysis using the R-package *metafor* (Viechtbauer, 2010). For an accessible description, see Lubbers and Snijders (2007). The estimated mean parameter represents an aggregated mean estimate across classrooms (along with a standard error), and the accompanying standard deviation represents the degree to which the true parameter (corrected for unreliability) varies across classrooms. Significant variation over the classrooms for the standard deviation was tested with a χ^2 -test with the degrees of freedom equal to the number of classrooms minus 1.

Table 4.1. *Modelling Agreement: Structural Parameters in the Multivariate Exponential Random Graph Models for Bullying Networks*

Parameter (statistic)	Description	Graphical representation
Multiplex arc (Arc-AB)	Occurrence of tie nomination in the same victim-bully dyad for both network A and network B.	
Multiplex in-stars (In-star-AB)	<i>Agreement</i> of informants on the receiver of a tie (bullies) but not on the sender of that tie (victims)	
Multiplex out-stars (Out-star-AB)	<i>Agreement</i> of informants on the sender of a tie (victims) but not on the receiver of that tie (bullies)	
Multiplex mixed-stars AB (Mixed-star-AB)	<i>Disagreement</i> on children's status: Informant A mentions the child as a bully (dotted line) whereas informant B mentions the child as a victim (straight line)	
Multiplex mixed-stars BA (Mixed-star-BA)	<i>Disagreement</i> on children's status: Informant A mentions the child as a victim (dotted line) whereas informant B mentions the child as a bully (straight line)	

Note. A (dotted lines) refers to one of the networks (e.g., self-, peer-, or teacher-reported bullying networks) whereas B (straight lines) refers to one of the other networks.

Table 4.2. Descriptive Statistics of Self-, Peer-, and Teacher-Reports on Victim-Bully Dyads

	Self-reports	Peer-reports	Teacher-reports
Dyadic/network level			
Prevalence (density) ^a	519 (8.4%)	769 (12.4%)	692 (11.1%)
Gender composition ^b			
Girl-girl	72 (5.3%)	98 (7.3%)	192 (14.3%)
Girl-boy	176 (11.2%)	264 (16.8%)	107 (6.8%)
Boy-girl	83 (5.3%)	96 (6.1%)	96 (6.1%)
Boy-boy	188 (11.0%)	311 (18.1%)	297 (17.3%)
Jaccard-index ^c			
Self-report	-		
Peer-report	.25	-	
Teacher-report	.11	.14	-
Individual level			
Jaccard-index ^{c, d}			
Self-report	-	.59	.44
Peer-report	.56	-	.45
Teacher-report	.42	.55	-
Average in/outdegree bullying (number of nominations per child)	1.3	1.9	1.7
Standard deviation outdegree (given nominations for victimization)	1.8	1.7	2.2
Standard deviation indegree (received nominations for bullying)	1.7	2.7	2.2
Classroom level			
Average percentage of bullies (<i>sinks</i>) ^e (standard deviation)	22% (12%)	8% (7%)	11% (8%)
Average percentage of victims (<i>sources</i>) ^e (standard deviation)	20% (12%)	29% (14%)	14% (11%)
Average percentage of <i>isolates</i> ^e (standard deviation)	24% (19%)	16% (19%)	32% (29%)
Average percentage of <i>bully-victims</i> ^e (standard deviation)	35% (22%)	47% (22%)	43% (30%)
Reciprocity for bullying (standard deviation)	15.4% (13.1%)	20.4% (13.5%)	38.1% (27.5%)

Notes.

- ^a The density is the number of victim-bully dyads, relative to the total number of possible dyads (6,212).
- ^b The first person in the victim-bully dyad is the victim, the second person in the dyad is the bully (i.e., boy-girl means that a girl bullies a boy). The percentages are relative to the total number of possible gender-dyads, which are: girl-girl = 1,346; boy-girl = girl-boy = 1,575; boy-boy = 1,716.
- ^c The Jaccard-index is defined by: $N_{AB} / (N_{AB} + N_A + N_B)$; N_{AB} is equal to the ties/individuals reported by both informants, N_A is equal to the ties/individuals reported by informant A, and N_B is equal to the ties/individuals reported by informant B.
- ^d Jaccard-indices below the diagonal are for victims, Jaccard-indices above the diagonal are for bullies.
- ^e *Sinks* are children who are at least once mentioned for bullying (at least one in-tie) but they are not victimized (zero out-ties); *Sources* are children who are mentioned at least once for victimization but they are not mentioned as bullies; *Isolates* are children who are neither reported for victimization nor for bullying; *Bully-victims* are children who are mentioned both as victims and bullies.

4.3 Results

4.3.1 Descriptive Results

Descriptive statistics for the bullying networks are given in Table 4.2 for the dyadic/network (relationship), individual (child), and classroom level. At the dyadic level, the prevalence of bullying ties was highest for peer-reports (12.4%) and lowest for self-reports (8.4%). The gender composition of these victim-bully dyads was quite similar for self- and peer-reports. Boys were reported to bully more than girls, with boy-boy bullying dyads occurring at a similar rate as girl-boy dyads (which is in line with hypothesis 3 - note that the second actor in the dyad is the bully), although bullying by boys was reported more often with peer-reports than with self-reports. Girls bullied to a similar extent girls and boys (girl-girl and boy-girl dyads). The pattern for teacher-reported victim-bully dyads was different. Teachers reported quite similar levels of bullying between boys and between girls (with girl-girl bullying more than twice as high as obtained through self- and peer-reports), but the level of cross-gender bullying (the combination of girl-boy and boy-girl dyads) was less than half of same-gender bullying. The Jaccard-index indicates the amount of agreement between informants for the victim-bully relations. Agreement for self- and peer-reports (25%) was higher than the amount of agreement between peers and teachers (14%). Agreement between self- and teacher-reports was the lowest (11%). These descriptives are in line with hypothesis 1.

Aggregating victim-bully relations to the individual level showed higher levels of agreement. Informants will agree more often on victims and bullies if they don't have to mention specific victim-bully relations. The Jaccard-indices in the second part of the table indicate the agreement for children who were at least once mentioned as victim or bully by either informant. For example, it appeared that 56% of the self-reported victims were also mentioned at least once as victim through peer-reports (but not necessarily the same victim-bully relation). Higher agreement was found for the bullies (above the diagonal) than for the victims (below the diagonal), except for peer- and teacher-reports. On average, peers reported that children were victimized by two bullies (average degree), whereas the self-reported average number of bullies was closer to one. The standard deviations for the degrees of peer-reports were larger for the indegrees than the outdegrees, suggesting that differences between children were larger for the number of bully (incoming) nominations than for the number of victim (outgoing) nominations.

At the classroom level, peer-reports revealed that the majority of the children were involved in bullying, either as bullies (8% of the children had zero out-ties and at least one in-tie for bullying, so-called *sinks*), victims (29% of the children had zero in-ties and at least one out-tie for bullying, so-called *sources*), or bully-victims (47% of the children had both in-ties

and out-ties). Only 16% of the children were *isolates* in the peer-reported bully networks; i.e., they were neither reported as being victimized nor reported as being a bully. According to teachers, more than one third of the children in the sample were not victimized (32% *isolates* plus 11% *sinks* or bullies). When children themselves were asked about their experiences with victimization, 46% of the children did not report being victimized (self-reports: 24% *isolates*, 22% *sinks*) whereas 57% were mentioned as bullies. Finally, the number of reciprocal relations was relatively high for bullying and highest for teachers; about 40% of the teacher-reported bullying relations were reciprocal.

4.3.2 Network Analyses of Agreement Between Informants

In bivariate network analyses, social networks based on the reports of two different informants were investigated simultaneously, to examine whether the same victim-bully dyads (i.e., victims and their specific bullies), the same bullies but with different victims (or vice versa: the same victims with different bullies), or different statuses of a child (i.e., one informant reports the child as victim and the other as bully, and vice versa) were reported. The meta-analyses of the three bivariate analyses are given in Table 4.3, where only multiplex parameters involving both networks are reported. These bivariate models also contained uniplex structural parameters (see for an explanation Appendix A1) as well as gender and problem behaviors effects (see Table 4.3). The complete tables are available in Appendix A2.

A number of victim-bully dyads reported by victims (self-reports) were also reported by peers (strongly positive *arc* parameter, with systematic variation over the classrooms, as can be seen by the significant standard deviation of the meta-analyses – see first part of Table 4.3). In line with hypothesis 1, the agreement was strongest for self- and peer-reports. The *arc* parameter was about twice in size compared to the agreement between self- and teacher-reports as well as peer- and teacher-reports. There was agreement for bullies (significantly positively estimated *in-stars* where the same bullies are mentioned by informants but related to different victims) but not for victims (non-significant estimated *out-stars*) for all informant comparisons, which confirms hypothesis 2. There was also disagreement on the status of children. Children who were mentioned as bullies through self-reports tended to be mentioned as victims through peer-reports (*mixed-star-AB*, upper part of Table 4.3) and self-reported victims tended to be mentioned by peers as bullies (*mixed-star-BA*). Moreover, teachers did not in all cases identify victims and bullies in accordance with self-reports (middle part of Table 4.3); children who were reported through self-reports as bullies tended to be mentioned by teachers as victims (*mixed-star-AB*). For peer and teacher-reports, no such disagreements were found. For all multiplex effects on agreement and disagreement, a large variation over the classrooms was found.

Table 4.3: “Who Bullies Whom?": Bivariate Exponential Random Graph Models for Network Structure of Bullying by Self-, Peer-, and Teacher-reports.

Parameter	Statistic	Mean parameter		Standard deviation		
		Est.	Std. Err.	Est.	χ^2	
Self- and Peer-reports						
Self-report and peer-report (Arc-AB)		1.93	(0.24)**	0.63	83**	
In-ties self-report & in-ties peer-report (In-star-AB)		0.22	(0.06)**	0.06	917**	
Out-ties self-report & out-ties peer-report (Out-star-AB)		0.11	(0.07)	0.08	467**	
In-ties self-report & out-ties peer-report (Mixed-star-AB)		0.23	(0.06)**	0.05	204**	
Out-ties self-report & in-ties peer-report (Mixed-star-BA)		0.05	(0.01)**	0.00	410**	
Self- and Teacher-reports						
Self-report and teacher-report (Arc-AB)		0.96	(0.14)**	0.04	18	
In-ties self-report & in-ties teacher-report (In-star-AB)		0.18	(0.04)**	0.02	529**	
Out-ties self-report & out-ties teacher-report (Out-star-AB)		0.04	(0.06)	0.06	355**	
In-ties self-report & out-ties teacher-report (Mixed-star-AB)		0.13	(0.07)*	0.08	392**	
Out-ties self-report & in-ties teacher-report (Mixed-star-BA)		0.10	(0.09)	0.12	543**	
Peer- and Teacher-reports						
Peer-report and teacher-report (Arc-AB)		0.93	(0.18)**	0.33	47**	
In-ties peer-report & in-ties teacher-report (In-star-AB)		0.10	(0.04)*	0.03	1041**	
Out-ties peer-report & out-ties teacher-report (Out-star-AB)		0.07	(0.07)	0.07	414**	
In-ties peer-report & out-ties teacher-report (Mixed-star-AB)		0.06	(0.06)	0.06	1281**	
Out-ties peer-report & in-ties teacher-report (Mixed-star-BA)		0.03	(0.06)	0.05	561**	

Note. [†] $p < .10$; * $p < .05$; ** $p < .01$. The mean parameter is an unstandardized aggregated estimate across classrooms. The standard deviation represents the degree to which estimates vary across classrooms (N classrooms = 18). All bivariate analyses also contained uniplex structural parameters, gender, and problem behaviors (see Appendix A2).

4.3.3. Gender and Problem Behaviors Related to Informants' Observations

The meta-analyses for the univariate network models of self-, peer-, and teacher-reports are given in Table 4.4. Only the dyadic parameters for gender and actor parameters for internalizing and externalizing problems are presented. The full table, including structural parameters, can be found in Appendix A3.

The first part of Table 4.4 provides the results for gender, with girl-girl dyads as the reference category. In the self- and peer-reported bullying networks, neither boy-boy dyads nor cross-gender dyads occurred significantly more often than girl-girl dyads. In the teacher-reported bullying networks, boy-boy dyads were reported as often as girl-girl dyads. However, in line with the descriptives, cross-gender dyads, in which a boy bullies a girl or vice versa, were significantly less reported by teachers than girl-girl or boy-boy dyads. Note that almost all gender effects had systematic variation over the classrooms, for all informants. This means, for example for teacher-reports, that some teachers reported more boy-boy dyads than girl-girl dyads, whereas other teachers reported fewer boy-boy dyads compared with girl-girl dyads.

The second part of Table 4.4 concerns internalizing and externalizing problem behaviors. Internalizing problems were not found to be related to victimization (*sender* effect, contrasting hypothesis 4b), whereas children with internalizing problems were less likely to be nominated as a bully (*receiver* effect by themselves or by peers). Moreover, children with externalizing problems had a higher chance of being nominated as a bully based on self-reports (possibly also present by teacher-reports – partly in line with hypothesis 4). In addition, children with externalizing problems were more likely to be nominated by teachers as victims (which is in line with hypothesis 4a), whereas this was not found for self- and peer-reports. For none of the informants significant effects for *difference scores* were found (contrasting hypothesis 5), suggesting that bullies did not differ from their specific victims, nor resemble them, with regard to internalizing or externalizing problems, more than is already implied by the sender and receiver effects.

4.4 Discussion

In this study we investigated kindergarten bullying networks. Three types of informants provided information on victim-bully relations. There were some differences in the perceived prevalence rates; with self-reports, 8% of the possible relationships between children were reported as victim-bully relations, whereas this prevalence rate was 12% with peer-reports and 11% with teacher-reports. It is not surprising that the peer-reports are higher on average;

Table 4.4: “Who Bullies Whom?”: Univariate Exponential Random Graph Models for Network Structure of Bullying with Gender and Internalizing and Externalizing Behavioral Problems.

Parameter	Statistic		Self-reports		Peer-reports		Teacher-reports			
	Mean parameter	Standard deviation	Est.	χ^2	Mean parameter	Standard deviation	Mean parameter	Standard deviation		
	Est.	Std. Err.	Est.	χ^2	Est.	Std. Err.	Est.	Std. Err.		
<i>Dyadic covariates</i>										
Girl-girl	○	○	Ref.		Ref.		Ref.			
Cross-gender	○	○	0.00	(0.31)	0.95	55**	0.08	(0.21)	0.44	57**
Boy-boy	●	●	0.01	(0.20)	0.20	24*	0.22	(0.18)	0.23	33*
<i>Actor covariates</i>										
INT prob.										
Sender	●	●	0.20	(0.24)	0.19	15	0.15	(0.19)	0.00	10
Receiver	●	●	-0.55	(0.20)*	0.00	6	-0.29	(0.11)*	0.05	21
Abs. dif.	●	●	0.22	(0.19)	0.00	7	0.07	(0.13)	0.00	15
EXT prob.										
Sender	●	●	-0.20	(0.18)	0.09	14	-0.06	(0.15)	0.00	11
Receiver	●	●	0.56	(0.20)**	0.10	16	0.15	(0.11)	0.09	31*
Abs. dif.	●	●	-0.01	(0.11)	0.00	15	0.09	(0.16)	0.16	30*

Note. † $p < .10$; * $p < .05$; ** $p < .01$. The mean parameter is an unstandardized aggregated estimate across classrooms. The standard deviation represents the degree to which estimates vary across classrooms ($N = 18$). Abs. dif. = Absolute difference score. The models also contained unplex structural parameters (see Appendix A3)

peer-reports were aggregated over all peers in the classroom with a victim-bully dyad being reported if it was mentioned by at least one peer.

Agreement by the informants on victim-bully relations was relatively low. It was highest between children and their peers (hypothesis 1), with 25% of the total number of self- and peer-reported victim-bully relations reported by both. The agreement between peer- and teacher-reports was lower (14% of relations reported by both), and even lower for self- and teacher-reports (10% of relations reported by both). On the child level, there was more agreement in being mentioned as a bully at least once by any of the reporters, or being mentioned as a victim at least once. The agreement was in the range of 40-60% of those mentioned as victim or bully by either type of informant. Estimation of statistical network models to account for the dependencies in the data shed more light on the (dis)agreement between informants. Agreement was higher on bullies than victims (hypothesis 2); informants reported the same children as bullies but did not necessarily relate these bullies to the same victim. No evidence was found for the reversed pattern; reporting the same victims but relating them to different bullies. These findings are in line with earlier investigations finding higher agreement for reporting bullies than for reporting victims (Camodeca et al., 2014; Monks et al., 2003; Perren & Alsaker, 2006). Moreover, there was also disagreement: there was a tendency that some children report (via self-reports) themselves as a victim, while peers reported their bully as victim. There was also a tendency that children who were reported as bullies (by victims) were mentioned by peers and teachers as victims. When children retaliate to victimization, it may be difficult to recognize who has started the victimization and who was targeted first.

Power differences that are key to the definition of bullying seems not to be fundamental characteristics of victim-bully relations in kindergartens. In the first place, the level of reciprocal bullying nominations was quite high, with average percentages of 15%, 20%, and 38% for self-, peer-, and teacher-reports, respectively (compared to 6% in elementary schools, see Huitsing et al., 2012a – Chapter 2). In addition, a high number of children were involved in at least one victim-bully relation; percentages of children that were involved varied from 68% (teacher-report) to 76% (self-reports) and 84% (peer-reports). This means that a minority of the children were uninvolved in bullying networks, where the percentage for teacher-reports (32%) doubled the percentage for peer-reports (16%). These findings may be explained by the young age of the children in this sample; power differences between young children may not be salient, single negative interactions may be interpreted as bullying, and children retaliate to aggression easily (Hanish et al., 2012; Monks & Smith, 2006; Vermande et al., 2000).

There is no clear objective measure of bullying and there is no “true” level of bullying. Inconsistencies among informants’ reports indicate that bullying can be a subjective

experience with a difference between observing bullying and experiencing it. As such, we cannot assess which informant provides most “valid” information on victim-bully relations. For both children and adults it is often difficult to make a distinction between conflicts, fights, teasing, and bullying (Bradshaw, Sawyer, & O'Brennan, 2007; Monks & Smith, 2006; Teräsahjo & Salmivalli, 2003). Peers and teachers do not always have the opportunity to observe the harassment of a child, and if they do, they may interpret this information differently. Therefore, peers and teachers can disagree with children on the interpretation of negative incidents.

4.4.1 Child Characteristics Related to Informants' Observations

Gender was related to involvement into victim-bully relations, and results were generally in line with previous findings in elementary schools (Rodkin & Berger, 2008; Tolsma et al., 2013; Veenstra et al., 2007). Using self- and peer-reports, boys were bullying more than girls, with boys harassing both boys and girls. Contrary to hypothesis 3 and findings in elementary schools (where girls mainly bully other girls), girls were targeting boys to a similar extent as they targeted girls. With teacher-reports, however, a different pattern was found. Teachers reported mostly same-gender bullying and less cross-gender bullying, a finding also recently reported by Ahn et al. (2013) in elementary schools, although there was variation between the teachers. Teachers may observe bullying within the context of the most common interaction patterns in kindergartens, and these are often gender-segregated in early childhood (Cherney & London, 2006; Leaper, 1994; Maccoby, 1998). As a consequence, bullying crossing gender-boundaries is not salient to all teachers. It may even be that not all negative interactions between boys and girls are evaluated negatively by teachers, as they may consider it normative (Boulton, 1997). However, there were differences observed between teachers to the extent they reported cross-gender bullying. Future research may address teacher characteristics that are related to reporting bullying (such as their own gender), which can also be related to the prevalence of bullying in their classroom (Oldenburg et al., 2014).

Teacher-reports were also differently related to parent-reported behavioral problems than self- and peer-reports. Internalizing problems were unrelated to teacher-reports on victimization and bullying, but when using self- or peer-reports, children with internalizing problems were less likely to be mentioned as bullies. Contrary to our expectations, internalizing problems were unrelated to victimization (not in line with hypothesis 4b), which might be explained by low agreement between parents and teachers (and maybe also children) in terms of internalizing symptoms as they observe children in different contexts (Perren et al., 2006). Externalizing problems were also related to bullying others when using self- and peer-reports, but teacher-reports related externalizing problems to involvement in

both bullying and victimization (hypothesis 4a). This is in line with the instability of victimization in the early years as well as retaliation of victims (Hanish & Guerra, 2002; Snyder et al., 2003). However, these findings also suggest that teachers may observe only victimization of children with externalizing problems who are more visible than passive (withdrawn) victims with internalizing problems. In addition to the sender and receiver effects, we explored differences between victims and their specific bullies regarding problem behaviors, but such differences were not found (hypothesis 5). Interpreting these findings together, bullies had generally less internalizing problems (e.g., being withdrawn, depressed) using self- and peer-reports and more externalizing problems (e.g., being more aggressive) using self-reports than victims.

4.4.2 Limitations and Strengths

Bullying relations are relatively rare. Because the information on bullying was limited, we could not distinguish boy-girl from girl-boy bullying dyads in the network models (models would not converge with a larger number of effects included). We compared the perspectives of only two informants in the multivariate analyses because examination of two different networks simultaneously is currently the maximum for the available software. It would be interesting to compare the three perspectives into one network model, although this would increase the number of possible cross-network comparisons substantively. Finally, a considerable percentage of the parents did not respond to the questionnaire. These missing data problems were solved by multiple imputations at the individual level, and running the network analyses five times with the different imputed datasets.

Multiple bivariate social network analyses were performed to account for the complex dependencies in the network data. Other strengths of this study are that extensive data were used: 402 young children in 25 classrooms were each individually interviewed, and additionally we made use of teacher- and parent-reported data. In doing so, data on problem behaviors stemmed from different sources than data on victim-bully relations. Self-, peer-, and teacher-reports on victim-bully relations were meaningfully related to parent-reported internalizing and externalizing problems. However, we were not able to take into account that children may behave differently in different contexts. For example, children can be different at home compared to schools (Veenstra et al., 2008). Generally, a multi-informant approach, rather than a single-informant approach, provides a more complete perspective on problem behaviors (Ladd & Kochenderfer-Ladd, 2002; Perren et al., 2006).

4.4.3 Implications

The findings of this study may have implications for our understanding of bullying in early childhood. First, from a developmental perspective, the findings revealed that being involved in negative incidents may be normative in kindergartens, with more than two thirds of the children being mentioned at least once in a victim-bully relation. With conventional methods (i.e., reports that do not provide insights into relational information on bullying), many of those children would be categorized as uninvolved when using, for example, cutoff scores for the upper 25%. Second, cross-gender bullying is rather common in early childhood despite gender segregation along play styles. Research among 8-year-old children suggest that they are already strategic in targeting children from the other sex who are rejected by significant (same- as well as other-gender) others (Veenstra, Verlinden, Huitsing, Verhulst, & Tiemeier, 2013). Third, teachers and children report differently on victim-bully relations. Compared to children's reports, some teachers reported more girl-girl bullying relations and less cross-gender bullying than children (self- or peer-reports). Teachers sometimes see the roles of victims and bullies reversed (when compared with self-reports) and they reported more reciprocal victim-bully relations than children themselves or peers. Moreover, the findings also suggested that teachers see more victimization for children with externalizing problems. This may suggest that they regard aggressive victims (bully-victims with externalizing problems) more often as victims than passive victims (victims with mainly internalizing problems).

In addition, there are some practical implications following the study findings. First, teachers should be aware that they observe bullying differently than children. It may be important for teachers to know that there are informant differences; if children come to report bullying, teachers may not perceive children's negative experiences as problematic. Second, anti-bullying intervention programs or programs that facilitate socio-emotional learning should pay attention to cross-gender interactions. Exercises can be integrated in student lessons that promote positive interactions between boys and girls. Intervention or prevention programs that focus only on same-gender interactions may not be sufficient to target complete group processes. Third, parental information may be useful for the identification of at-risk children. The current findings demonstrated that parental information on externalizing problems was related to children's involvement in bullying others. Parents observe the behavior of their children at home and in interaction with other children outside the school context. Mutual sharing of information between parents, teachers, and children may lead to a more complete picture that contributes to preventing and signaling the development of problem behaviors in the early school years.

