Detecting Bullying in Early Elementary School With a Computerized Peer-Nomination Instrument

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In this study we describe the PEERS Measure, a computerized assessment instrument that takes an innovative approach to using the peer-nomination method to identify bullying among elementary school children in Grades 1–2. Its psychometric characteristics were measured in 4,017 children from 190 school classes. The intercorrelations between the peer-nomination scores showed congruence of the data (e.g., bullying and peer rejection $r = .51$, defending and prosocial behavior $r = .71$). Boys were more involved in bullying, more rejected, and less prosocial. As reports by different informants were used, correlations of peer-reported bullying with aggressive behavior reported by a child him- or herself ($r = .37$) or by a teacher ($r = .42$) were in the expected range. Good test–retest reliability as measured by the intraclass correlations (average: .72) further suggests that the instrument has good psychometric properties. In line with earlier research, lower maternal educational levels, younger maternal age, and lower household income were related to more bullying and victimization. Overall, our findings show that the instrument provides a reliable measure of peer relations, thus making the use of peer nominations feasible in early elementary school.

Keywords: bullying, aggression, peers, child/children, assessment

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Background

Bullying is already common at the start of elementary school and makes a unique contribution to the development of psychosocial problems in young children (Arseneault et al., 2006; Kochenderfer & Ladd, 1996; Perren & Alsaker, 2006). A child's involvement in bullying is associated with an increased risk of problematic health outcomes, such as psychosocial adjustment problems, depression, borderline personality symptoms, and psychotic symptoms (Arseneault et al., 2011; Wolke, Schreier, Zanarini, & Winsper, 2012). Involvement in it at early elementary school is worrisome, not only because early victimization is likely to be stable over time (Barker, Boivin, et al., 2008; Boulton & Underwood, 1992) but also because children who are continuously victimized tend to have the poorest health outcomes (Barker,

Arseneault, Brendgen, Fontaine, & Maughan, 2008). Although the early detection and prevention of bullying problems is crucial, relatively few studies have examined the problem of peer victimization in early elementary school, partly due to the difficulties of measuring bullying in young children.

As Salmivalli and Peets (2009) stated, classroom context plays an important role in the occurrence of school bullying. Irrespective of whether only two children or more are involved in bullying, all the children in a school class represent the social context within which the status of bully and victim can be understood relative to other group members (Salmivalli & Peets, 2009). The classroom is therefore an important social context for bullies to establish their status with respect to their peers. Naturalistic observations of peer interactions showed that 88% of bullying episodes occurred in the presence of the classroom peers (Hawkins, Pepler, & Craig, 2001).

Because distress and anxiety can result from being a witness to bullying (Janson & Hazler, 2004), it is clear that bullying processes have negative effects not only on the victims but also on other children in the peer group. The behaviors of peers during bullying episodes influence bullying processes: Whereas a smaller number of children try to stop it by defending the victim, most peers actively or passively reinforce it (Salmivalli, Lagerspetz, Björkqvist, Österman, & Kaukiainen, 1996). Taking a specific role in bullying situation depends on many factors, including a child's own current status in the group, his or her relationship with the bully and the victim, fear of becoming a target of bullying, empathy, and, importantly, normative classroom beliefs about bullying (Salmivalli & Peets, 2009). Bullying thus depends greatly on the classroom context.

Bullying is a group process involving all the children in a group, whether actively or passively (Salmivalli et al., 1996). One technique for studying the perceptions and experiences of all the children in a group—and thus class—is the *peer-nomination method*. Once the ratings of *all the peers* in a class are aggregated, it becomes easier to obtain a reliable and objective measure of bullying at group level. Information on the bullying involvement of each dyad in a class can be generated through the use of *dyadic nominations*, which can be used to elicit who bullies whom; bullying-involvement scores can then be aggregated on the basis of the ratings of all the children in a school class (Veenstra et al., 2007).

Importantly, young children were shown to be consistent in nominating the aggressors (Monks, Smith, & Swettenham, 2003)—demonstrating that the peer-nomination method is indeed suitable for assessing victimization in children in the first grades of the elementary school. Because, in the peer-nomination method, a child's involvement in bullying is determined on the basis of the ratings from all the children in a school class, this approach provides complete and reliable information. Some earlier studies used the peer-nomination method in interviews to assess peer aggression: Children were asked questions by a researcher and were asked to answer by mean of nominating their classmates (Ladd & Kochenderfer-Ladd, 2002; Monks et al., 2003; Österman et al., 1994; Perren & Alsaker, 2006; Vermande, van den Oord, Goudena, & Rispens, 2000).

One of these studies, a study of kindergarten children by Perren and Alsaker (2006) showed that age-appropriate use of the peer-nomination method (e.g., with the help of printed illustrations during an interview) makes it possible to capture different forms of bullying, and to measure negative and positive forms of peer relationship. The authors assessed bullying and victimization by interviewing 344 children aged 5–7 years. During the interviews, the term "bullying" was explained with the help of four cartoons that depicted children bullying other children (Perren & Alsaker, 2006). Children were asked about four different forms of bullying: physical bullying, verbal bullying, object-related/material bullying, and exclusion. To help them with their peer nominations, children were shown the photographs of their peers in their kindergarten class and were asked to nominate the bullies and their victims.

Several other research groups have successfully used the peer-nomination method in interviews with young children (Ladd & Kochenderfer-Ladd, 2002; Monks et al., 2003; Österman, et al., 1994; Vermande et al., 2000). Ladd and Kochenderfer-Ladd (2002) collected peer reports of victimization in 197 6-year-olds and their classmates by using photos of the children and by asking the interviewees to nominate the victims of physical and verbal peer aggression. Monks et al. (2003) conducted interviews with 104 children aged 4–6 using pictures with stick figures to depict the aggressor and victim in situations of physical and verbal aggression, social exclusion, and rumor-spreading. Children were first asked whether anyone in the class behaved like this toward others. Then, in order to identify those who did so, they were asked to nominate classmates, including themselves.

Similarly, Österman et al. (1994) used peer-ratings and self-ratings of victimization and of physical, verbal and indirect aggression to interview 404 8-year-olds. They found that peer reports of aggression were more consistent than self-reports (Österman, et al., 1994). But as the opposite was found for victimization, it seemed better for children to report on victimization themselves and for peers to report on bullying. When asking children to nominate their peers in this study, the authors used a group photo of all the children in the class.

Vermande et al. (2000) also used the peer-nomination method to assess aggression in 1,090 5-year-olds, asking them to nominate their aggressors. Like Österman et al. (1994); Vermande et al. (2000) asked children to nominate their aggressors, and not about own roles as bullies, in order to avoid social-desirability bias.

While this interview-based peer-nomination method has been used successfully, it remains a challenge to use the peer-nomination method with young children. Interviewing each child is elaborate and time-consuming; health practitioners, researchers, and school staff may also lack the necessary resources or skills. Although, with older children, lists with the names of participating children can be used to aid the process of peer nominations, it can be quite burdensome for first-graders to answer a number of questions while going through long lists of classmates' names. In early elementary school, children find it easier to understand questions with the help of illustrations; earlier research has also showed the use of cartoon methodology in interviews about peer relations to be successful (Perren & Alsaker, 2006; Smith, Cowie, Olafsson, & Liefooghe, 2002). Similarly, it may be more suitable when studying bullying in young children to use children's photos rather than lists of names during the peer-nomination procedure.

On the basis of the above, we developed the PEERS[1] Measure, an instrument that would allow young children to answer questions about peer victimization and nominate peers independently rather than in an interview. Intended to enable them to report on their own experience of being victimized, and to be rated by their peers for bullying, the PEERS Measure is a computerized assessment that takes an innovative approach to using the dyadic peer-nomination procedure with children aged 6–10. It is an interactive assessment instrument that enables children to complete the task independently by following audio instructions and by using illustrations and photos to answer the questions. As a standardized assessment instrument, it is suitable for collecting dyadic/network data on different forms of bullying, and on peer acceptance, peer rejection, and prosocial behavior.

For purposes of validation of the PEERS Measure, we also examined the role of the background variables such as *gender*, *age*, *child ethnicity*, and *family socioeconomic background* in bullying involvement. With regard to gender, victimization rates among boys and girls are fairly similar (Jimerson, Swearer, & Espelage, 2010): While the risk factors for bullying involvement in boys and girls are virtually the same, research suggests that the perpetration of bullying is more prevalent among boys, except for indirect forms of bullying, such as relational bullying (e.g., social exclusion), which are more common among girls (Arseneault, Bowes, & Shakoor, 2010; Björkqvist, Lagerspetz, & Kaukiainen, 1992).

With regard to the relationship between bullying and child age, involvement in bullying is already common at the start of schooling (Jansen et al., 2012). The highest prevalence is in the first grades of elementary school (Kärnä et al., 2011); at the end of middle school, the prevalence gradually decreases.

Ethnicity and family socioeconomic background were both shown to be related with bullying involvement at school. Earlier studies in the Netherlands reported that children from ethnic minority groups were involved in bullying more than their Dutch peers were (Jansen et al., 2013; Verkuyten & Thijs, 2002), as was a family's socioeconomic status (reflected in parental educational level and family income). For example, children of single parents and of parents of a lower educational level were found to be involved in bullying more than those from a higher socioeconomic background (Jansen et al., 2012).

The overall objectives of this study were to examine the psychometric properties of the PEERS Measure by evaluating its test–retest reliability and its internal consistency, the correlations between its scales, the sociodemographic correlates of bullying and victimization, and its consistency with other measures of child aggressive behavior. We therefore wished to establish the following: (a) the interrelationships between the constructs of the PEERS Measure; (b) whether the instrument has sufficient test–retest reliability and internal consistency and how PEERS bullying scores relate to other measures of child aggression; and (c) whether child and maternal sociodemographic characteristics are associated with children's bullying involvement, and whether these associations are consistent with earlier research.

Method

Design and Study Participants

Elementary schools in Rotterdam received a letter with a booklet about the study and were invited to visit the website describing the study and PEERS Measure. Researchers then phoned the schools. If a school agreed to participate, the letters and booklets for parents of the children were sent to the teachers, who were asked to distribute them to the parents, and to inform them about the upcoming study. Eighty-two schools were invited to participate, some of them repeatedly. Over two school years, 37 schools participated (school response rate 45%), five of them more than once.

To examine possible selection bias, the 37 schools that were willing to participate in the study were compared with the 45 schools that did not participate. This was done on the basis of the total number of children that attended them, and the socioeconomic status (SES) of the school neighborhood. For this, we used official national reports on school size and neighborhood social status. Scores reflecting the SES of the neighborhood were based on the income, educational level and employment of the residents in the area.

The mean total number of pupils in the participating schools was 347 ($SD = 166$); the mean number in the nonparticipating schools was 310 ($SD = 165$). The number of pupils per school did not differ significantly between the schools that participated and those that did not, $t(80) = -1.02$, *ns*. With regard to the comparison of SES scores of the schools' neighborhoods, a lower score represents a more affluent SES. As with pupil numbers, SES scores did not differ significantly between the schools that participated (*M* SES $= 0.77$, $SD = 1.37$) and those that did not (*M* SES $= 1.16$, $SD = 1.44$), $t(80) = 1.23$, *ns.*

In total, 4,087 children (target age 6–10 years) from 190 classes at the participating 37 schools were eligible for participation (see supplemental Figure 1). The parents of each child received a letter and booklet about the study and were invited to visit a website containing more information on the topic and a demo-version of the PEERS Measure.

Informed passive consent was obtained from parents and children. This meant that once parents had been informed about the study, they still had an opportunity to withdraw their child's participation: If they did not wish their child to participate, they were asked to inform a teacher or researcher before the assessment. Children were informed at school about the research and gave oral consent before the assessment.

The decision to use passive consent was based on five considerations. First, similar consent procedures had been used in earlier studies that used peer nominations with young children—in Switzerland, the United Kingdom, and the Netherlands (Monks et al., 2003; Perren & Alsaker, 2006; Vermande et al., 2000). Second, passive consent would reduce the risks of selection bias and of the participation rate being too low to obtain representative reports from peers. Third, we relied upon the earlier positive experience of the schools, in which the PEERS Measure had been piloted, and the local public-health authorities with passive consent. We drew on the experience of Rotterdam's City Public Health Services, which use passive consent in the administration of yearly surveillance questionnaires at elementary schools in the city and its suburbs. Fourth, we considered the nonexperimental nature of the study and its negligible health-related risks. Fifth, we ensured that option was provided for withdrawing from participation at any

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[1] "PEERS" stands for peer evaluation of relationships at school (in Dutch: *pesten en relaties op school*).

time during the study. Not only would parents have the opportunity to withdraw their child's participation, but the children themselves could refuse to participate in the study on the day of testing.

When being instructed on the PEERS Measure, children were informed that their answers would be treated confidentially. After the assessment had been completed, researchers debriefed each child. Feedback was also obtained from teachers. Teachers of the participating classes received reports that contained general and confidential results.

The present study was approved by the Medical Ethics Committee at Erasmus University Medical Center in Rotterdam, the Netherlands (MEC-2010–230).

In the pilot study that had been carried out in three schools (*n* = 209) we evaluated the PEERS Measure on the basis of a checklist on the following aspects: (a) informing parents and consent procedure, (b) working with the PEERS assessment system, (c) communication and collaboration with the school staff and introducing the study to children, (d) obtaining photos of the participating children, (e) instructions for children before the assessment, (f) size of the groups of children for simultaneous testing, (g) the age-appropriateness of the PEERS Measure (computer skills, ability to focus, understanding of the method), (h) time to complete the PEERS Measure, and (i) understanding the questions and the concept of bullying. In consultation with the experts in the field of child development and peer relations, the instrument was evaluated and adapted on the basis of researchers' experience during the pilot study and of feedback from schools and children.

As participation was not allowed by parents of 70 of the 4,087 schoolchildren who had been invited to participate, the study sample consisted of 4,017 children (participation rate 98%). Data were collected in three waves over two school years. For our analyses we used the data from the first assessment in a group of children who participated over two school years. Peer-nomination data were available for all 4,017 children. Although self-report data were not obtained for 115 of the 4,017 children, as they were absent from school on the day of the PEERS assessment, peer-reported data were available on these children.

The test–retest analyses were performed in a sample of 123 children studying in the same class in the same school year (43.9% boys; *M* age = 7.67 years, *SD* = 9.07 months). The time interval between the two assessments was 3 months.

The study evaluating the PEERS Measure was carried out in collaboration with the Generation R Study (Jaddoe et al., 2010), a large population-based prospective cohort in Rotterdam, the Netherlands. Generation R is designed to identify early environmental and genetic causes and causal pathways leading to normal and abnormal growth, development and health during fetal life, childhood and adulthood. It enrolled 9,778 mothers living in Rotterdam whose delivery dates lay between April 2002 and January 2006 and who had been recruited through midwives and obstetricians. Pregnant women who could not be approached during pregnancy were approached in the first months after their child's birth, when newborns visited the routine child-health centers. The response at baseline was 61%, and general follow-up rates until the age of 6 years exceed 80%. All participants provided written informed consent. The Generation R Study was approved by the Medical Ethics Committee at Erasmus University Medical Centre.

During the Generation R Study, regular extensive assessments have been conducted during the prenatal phase, at preschool age

and at later ages (Tiemeier et al., 2012). As well as questionnaires, detailed physical and ultrasound examinations, data collection in mothers, fathers and children includes behavioral observations and biological samples. In 2012, the 6-year examination wave was completed. In it, 6,694 children were assessed, each with a parent; 594 children participated by questionnaire only. In total, parents gave consent for 8,306 children, and children participated at least with health-care data.

As the present study of peer relations used passive consent, age, and gender were the only background data we were allowed to obtain on the children participating in the PEERS assessment. Embedding the current study into the Generation R Study enabled us to combine peers' reports at school with the background variables of participants in the Generation R Study, which were collected before the PEERS Measure.

When the present study was carried out, the oldest Generation R children were in elementary school Grades 1–2. This means that 1,590 of the 4,017 children in our sample were also participants in the Generation R Study. Before the study started, written permission to merge Generation R Study data at schools and registries was obtained from the parents participating in the Generation R Study (MEC 2007– 413). The schools invited for assessment with the PEERS Measure were selected randomly from the list of schools that had at least one Generation R Study participant in Grades 1–2 during the academic year in which the PEERS data were collected.

General analyses were conducted regarding 4,017 children who completed the PEERS Measure. Some additional analyses were conducted in a subgroup of children who participated in the Generation R Study, i.e., for whom background information and additional assessments of behavior were available (*n* = 1,590 children). The extra assessments of child behavior available for these children included the Berkeley Puppet Interview (*n* = 1,330) and Teacher Report Form (*n* = 1,160) of aggressive behavior at school (Ablow, Measelle, & MacArthur Working Group on Outcome Assessment, 2003; Achenbach & Rescorla, 2001).

Procedure and Content

The PEERS Measure, which is an interactive animated web-based computer program, was used to assess peer relationships in elementary school children in Grades 1–2. Before the assessment, researchers visited schools to discuss logistical issues with the directors and teachers, and to tell children about the study. Information on children's names, dates of birth, and genders were obtained from the school registries. Recent portrait photographs of the participating children (required for peer nomination questions) were either provided by the school or were taken by a researcher during an introduction visit. Before the PEERS Measure was administered, the demographic data and photographs were entered into the PEERS assessment program. The procedure children followed when completing the PEERS Measure was standardized and a strict protocol was followed at all times.

Each PEERS assessment was carried out in a group of six to eight pupils. The teachers of the participating classes needed to make no substantial time investment, as all testing was done by the researchers. Before administration of the measure started, a researcher gave children instructions about the PEERS Measure and explained the meaning of bullying through the illustrations con-

tained in the measure. After the general introduction, children were seated at computers, each at a sufficient distance to ensure privacy. Once the task started, children heard a short introduction and instructions via a headset. The assessment began with a self-identification task to check whether a child could recognize him or herself and his or her classmates in the photos. Then, to familiarize children with the nomination technique, two exercise questions followed during which children were asked to nominate an animal they liked most and an animal they liked least.

Throughout the PEERS Measure children had to answer questions about peer rejection and acceptance, victimization, defending and prosocial behavior. The questions about victimization were based on earlier studies of young children (Jansen et al., 2012; Perren & Alsaker, 2006). Perren and Alsaker (2006) used cartoons of four forms of bullying to interview 5- to 7-year-olds on bullying and victimization. Using photos of classmates, they then asked the children to point at those involved in bullying. In our study, too, children were presented with pictures depicting the four forms of bullying and were asked to nominate classmates who demonstrated such behaviors. However, to improve the reliability of the information we would obtain, the children in our study were asked to report who bullied *them*. The mean age we targeted was slightly higher than in Perren and Alsaker's study, as we wished to create an instrument that children could complete independently. Similar to this study, we used photos depicting four forms of bullying to illustrate bullying incidents.

The concept of bullying was operationalized according to the traditional definition (Olweus, 1993), which emphasizes purposive, repeated and continuous nature of aggression and an inability, or weakened ability of a victim, to defend oneself. For the exact wording of the definition of bullying given to children during the instructions, and for the examples of the questions from the PEERS Measure, see the online supplemental material.

During the PEERS Measure, but before the peer-nomination questions, children were asked six *yes–no questions* on victimization, defense, and prosocial behavior. Affirmative answers to them were later used as a measure of frequency of that specific behavior.

Next, children were asked to *nominate* their classmates. This part of the PEERS Measure started with questions about *peer acceptance and rejection*. The children were told to imagine that they were going on an exciting school trip and could nominate not only children they would like to take with them (peer acceptance) but also those they would rather not take (peer rejection). To answer these questions, they should click on the photos of the classmates, which were displayed in random order.

Next, children were asked questions on four different forms of *peer victimization*: (a) physical bullying (i.e., physical peer aggression, such as hitting, kicking or pushing); (b) verbal bullying (i.e., behaviors such as calling names or saying mean or unkind things); (c) material bullying (e.g., taking away or breaking other child's belongings); and (d) relational bullying, a concept that referred mainly to social exclusion. The task ended with a question on *defending* and a question on *prosocial behavior*. All questions in the PEERS Measure were accompanied by an audio and visual description of a situation specific to the concept in question.

Children were asked to nominate those classmates whose behavior toward them demonstrated the behavior in question. For instance, after a verbal form of bullying had been explained, the children were asked, "Does anyone in your class do such things to

you?" If the answer was affirmative, they were then told, "Click on the pictures of the classmates who often say mean things to you." Such a procedure was used after each behavior in question had been explained through visual and audio instructions (see supplemental materials for transcript of the audio and illustrations of the PEERS Measure).

Children could nominate classmates by clicking on their photographs. The number of nominations was restricted to six for peer-acceptance and peer-rejection questions, and to 10 for questions on the four forms of victimization, defending, and prosocial behavior. Aggregate scores for each form of bullying were calculated using ratings by multiple peers. The number of classmates nominated by each child was used to calculate the self-reported victimization scores. The number of nominations as a bully received by each child was used to compute the peer-reported bullying scores. A similar procedure was used to obtain aggregate scores for peer acceptance, peer rejection, defending, and prosocial behavior.

We chose to computerize the task, first for reasons of efficiency and standardization and also to avoid situational effects related to an interviewer's possible influence on a child. Asking open questions was not feasible, as children were intended to complete the task independently. Because it was also important for the nominations to be registered automatically and to be restricted solely to the participating children, the children were presented with the pictures of their participating in the study classmates and were asked to click on the relevant photos to nominate children who behaved toward them in the way described. If a child wished to nominate a classmate who was not participating in the study, he or she could click on a special "dummy" picture with no photograph.

A trained research assistant supervised children completing the PEERS assignment and was available for questions and help at all times. The average time taken to complete the assignment was 7.6 min ($SD = 1.9$ min). Anonymous ID numbers for all the participating children were generated by the PEERS Measure program. A data set containing coded data were created automatically after the PEERS Measure was conducted in each class.

Covariates

Age and gender information was obtained for all participants (M age = 7.9 years, $SD = 11.2$ months; age range = 5.5–10.9 years; 49.7% boys). The data of 1,590 children participating in the Generation R Study (Jaddoe et al., 2010) were merged with the PEERS Measure data generated in the current study. For these 1,590 children, five sociodemographic characteristics were available: (a) the child's national origin, which was defined by the country of birth of the parents and was categorized as "Dutch," "Other Western" and "non-Western" (Statistics Netherlands, 2004a); (b) maternal age; (c) maternal education, i.e., the highest *educational level* attained by the mother in four categories, ranging from "low" (<3 years of general secondary education) to "high" (higher academic education/PhD; Statistics Netherlands, 2004b); (e) monthly household income, which comprised three following categories, "<€1,200" (below social security level), "€1,200–2,000" (average income), and ">€2,000" (modal income); and (e) maternal marital status, which was categorized as "single" and "married/living together."

Consistency With Other Measures

Peer-reported bullying scores obtained with the PEERS Measure were related to teacher-reports and child-reports of aggressive behavior. A Dutch version of the Teacher Report Form (TRF; 6–18 years; Achenbach & Rescorla, 2001) was used at the mean age of 6.5 years ($SD = 14.5$ months) to obtain teacher reports of child aggressive behavior problems in the preceding 6 months ($n = 1,163$, 73% of the present sample; overall TRF response in the Generation R cohort 60%). We used the *Aggressive behavior* scale (20 items) in our analyses as it closely relates to bullying behavior. Examples of the TRF items assessing aggressive behavior are "Cruelty, bullying or meanness to others" and "Destroys property belonging to others." Teachers rated the scale items on a 3-point Likert-type scale ranging from *Not True* to *Very True or Often True*. The TRF has good validity and reliability (Achenbach & Rescorla, 2001). Weighted sum scores were used in the analyses.

Child reports of overt hostility/aggression were obtained using the Berkeley Puppet Interview (BPI), a semistructured face-to-face interview in which hand puppets are used to obtain standardized self-reported information from young children (Ablow et al., 2003). The BPI interviews were available for 1,356 children and were conducted at the mean age of 6.1 years ($SD = 5.0$ months). Overt Hostility/Aggression to Peers scale consisted of seven items. Examples of the scale items are "Likes to tease" and "Hits other kids." The items were coded on a 7-point scale. Summed scale scores were used for analysis, with higher scores representing more problems. The Berkeley Puppet Interview has good psychometric properties (Ablow et al., 2003).

The mean interval between the peer and teacher assessments was 14.7 months ($SD = 15.0$ months), and the mean time difference between the PEERS Measure assessment and the BPI interview was 18.5 months ($SD = 8.8$ months). To illustrate the effect of time difference between the assessments, the correlation coefficients between the peer-reported data and the child and teacher reports of aggression were examined in two subgroups: (a) children in whom the two assessments were conducted ≥ 10 months apart and (b) children whose time between the assessments was <10 months.

Statistical Analyses

The *test–retest reliability* of the PEERS Measure was examined by calculating the intraclass correlation coefficients (ICC). For 123 children who were tested twice during the same school year (with the 3 months in between the assessments), we examined the Bland-Altman plot for agreement between the assessments (Bland & Altman, 1986, 1987). In a Bland-Altman plot, the individual differences between the scores from two assessments are plotted against the averages of the two assessments. The mean of the differences and the lower and upper limits of agreement were calculated. As well as examining whether children gave the same (i.e., affirmative or negative) answers to the "yes–no" questions on victimization, defending and prosocial behavior, we also calculated the Pearson's correlation coefficients for the test–retest scores. In order to assess the internal reliability of bullying and victimization scales, Cronbach's alpha coefficients were calculated.

Next, we examined the *frequencies of the victimization*. Each form of victimization was introduced by a yes–no question, which was used to determine the occurrence of the respective form of peer victimization. Chi-square test statistics were used to study children's answers to the yes–no questions and gender differences in the frequency of reported victimization.

Subsequently, we analyzed the *peer-nomination scores*. If a child reported being victimized, he or she was asked to nominate the bullies. These nominations constitute the victimization score. At the same time, these nominations also contribute to the aggregate bullying scores of other children in the class. Just as all children could nominate the bullies, each child could also be nominated by other children as a bully; this constituted the bullying score he or she received. For each peer nomination question (verbal, physical, material, relational bullying, defending, prosocial behavior, peer acceptance, and peer rejection) we calculated individual proportion scores per child. These individual proportions reflect the number of nominations given by and received from all the other classmates, weighted by the number of classmates performing the evaluation. In order to derive a total score of a construct (e.g., overall bullying score), these proportion scores were averaged. Bullying scores thus reflect the extent to which a child is perceived as a bully by his or her classmates. Higher values represent more bullying (i.e., the higher the score, the more often a child is named as a bully by the peers). Pearson's correlation coefficients were calculated to examine the associations between the peer-nomination scores. Gender differences in nomination scores were examined using the *t* test.

For *validation* purposes we related the PEERS Measure to measures of aggressive behavior assessed with different instruments. We analyzed the correlation coefficients between the bullying scores obtained with the PEERS Measure and (a) child-reported aggression obtained through the Berkeley Puppet Interview and (b) teacher-reported aggression measured by TRF.

Last, we used data for 1,590 Generation R participants to examine the *child and maternal sociodemographic correlates of bullying and victimization*. Sociodemographic differences were studied using *t* test and regression analyses. Additional analyses were carried out to further examine the association between the sociodemographic variables and bullying involvement, also adjusting one for the other and also for child birth order and maternal national origin.

Analyses were performed using STATA (Stata/SE 12.0, StataCorp LP, Texas). As our data were clustered, information obtained from children from the same school classes was likely to be correlated. To account for the clustered structure of the data, we adjusted the standard errors and p-values in our analyses. The reported *p*-values were derived from analyses using robust standard errors (Huber-White sandwich method).

Results

Consistency and Reliability

We analyzed data from 190 school classes ($N = 4,017$), which had average number of pupils of 21 (minimum 10, maximum 31).

The average time to complete the PEERS Measure was 7.6 min ($SD = 1.9$ min).

We examined the internal consistency and test–retest reliability of the constructs assessed by the PEERS Measure. The Cronbach's alpha for the bullying scale (four questions measuring different forms of bullying) was .79; for the victimization scale, the coefficient was .73, and for the positive nominations scale (a combination of peer acceptance, defending and prosocial behavior) it was .85. Test–retest results showed that 72.2% of children gave the same answers to the yes–no questions on victimization, 74.8% gave the same answer to the question on defending, and 86.1% the same answer to the question on prosocial behavior. Pearson's correlation coefficients for peer-nomination scores were high (e.g., for bullying $r = .77$, $p < .001$, and for peer acceptance $r = .79$, $p < .001$). The ICC coefficients showed good agreement between the test–retest scores ($ICC_{bullying} = .78$, $p < .001$; $ICC_{victimization} = .67$, $p < .001$; $ICC_{peer\ rejection} = .71$, $p < .001$; and $ICC_{peer\ acceptance} = .81$, $p < .001$).

To assess the agreement between the test–retest scores, we also examined the Bland-Altman plot, where the mean of the differences for bullying scores from two assessments was close to zero, thus reflecting good agreement ($M = 0.00$, lower limit of agreement $= -0.01$, upper limit of agreement $= 0.09$). There was also good agreement for victimization scores ($M = 0.00$, lower limit of agreement $= -0.15$, upper limit of agreement $= 0.15$).

Self-Reported Victimization and Peer Nominations

Before each peer-nomination question on victimization, the children answered four yes–no questions on different forms of victimization. In total, 38.7% reported being bullied verbally by their classmates, 19.3% reported having experienced bullying that was expressed by taking away or breaking their things or belongings, 39.1% reported being victimized physically, and 38.5% reported that they had experienced relational victimization. Girls reported a higher frequency of relational victimization (43.5% vs. 33.5%, $p < .001$), verbal victimization (40.8% vs. 36.7%, $p = .02$), and material victimization (21.6% vs. 17.0%, $p = .001$). Both genders reported a similar frequency of physical peer victimization.

Next, we examined the *peer-nomination scores*. Correlations among peer acceptance, peer rejection, defending, prosocial behavior and bullying were all statistically significant. All were in the direction expected (Table 1): e.g., bullying and peer rejection were positively correlated ($r = .51$, $p < .001$), and bullying and prosocial behavior were negatively correlated ($r = -.14$, $p < .001$). The most strongly associated were defending and prosocial

behavior ($r = .71$, $p < .001$), peer acceptance and defending ($r = .61$, $p < .001$), and peer acceptance and prosocial behavior ($r = .66$, $p < .001$). The results showed that children who behave prosocially toward others also defend their classmates if they are bullied and are more accepted by their peers.

We determined how many children nominating bullies gave the maximum number of nominations allowed and found that 4.8% gave the maximum number allowed for verbal victimization, 2.7% gave the maximum for physical victimization, 1.4% gave the maximum for material victimization, and 3.9% for relational victimization.

Table 2 presents the gender differences in *peer-nomination scores* and shows that boys and girls received a similar number of nominations for relational bullying. Unlike boys, who were more often rejected by classmates and were more often nominated as bullies, girls received more positive nominations. Girls were nominated more often than boys as defenders and as behaving prosocially toward others. With regard to peer acceptance, peer nominations showed no gender differences. The number of given-out nominations showed that girls had higher relational, verbal and material victimization scores. We found no gender differences with regard to physical victimization scores.

Consistency of Peer Report With Other Measures

We examined the consistency of peer-reported bullying with other measures of behavioral problems. During the administration of the PEERS Measure we had been unable to collect additional measurements of bullying—such as observations of peer interactions or teacher reports of bullying—at the same time as collecting the PEERS data. We therefore compared peer reports of bullying with two other measures available in the Generation R Study: teacher reports of aggressive behavior and child self-report of aggressive behavior. These teacher reports and child self-reports of aggression were related to the bullying data obtained with the PEERS Measure. These additional assessments were carried out independently of the PEERS Measure—at a different time, by different observers, and using different methods (i.e., self-report by child interview and mailed teacher questionnaires). We examined the correlation between the peer-reported bullying and teacher report of aggression on the TRF *Aggressive Behavior* scale. The correlations between the two was .32 ($p < .001$). As Table 3 shows, the correlations became stronger when the interval between the assessments was shorter (i.e., $r = .42$, $p < .001$). The correlation between aggression reported by a child in the BPI interview and peer-reported scores of bullying was .27 ($p < .001$). We also examined the correlation coefficients between the scores from the

Table 1
Intercorrelations Between Peer-Nomination Scores

Peer-nomination scores	Peer rejection	Peer acceptance	Prosocial behavior	Defending	Victimization
Bullying	.51***	−.08***	−.14***	−.01	.26***
Peer rejection		−.38***	−.34***	−.25***	.22***
Peer acceptance			.66***	.61***	−.08***
Prosocial behavior				.71***	−.04*
Defending					−.03

Note. $N = 4017$. Peer-nomination scores were based on ratings by multiple peers.
* $p < .05$.   ** $p < .01$.   *** $p < .001$.

Table 2
Gender Differences in Peer-Nomination Scores

Peer-nomination scores	Boys (N = 1,998)		Girls (N = 2,019)			
	M	*SD*	*M*	*SD*	*p*	η^2
Reported by peers						
Bullying others	0.08	0.07	0.05	0.04	<.001	0.07
Verbal bullying	0.10	0.10	0.06	0.07	<.001	0.06
Material bullying	0.04	0.05	0.02	0.04	<.001	0.03
Physical bullying	0.10	0.10	0.03	0.05	<.001	0.13
Relational bullying	0.07	0.07	0.07	0.07	*ns*	0.001
Peer rejection	0.22	0.16	0.17	0.14	<.001	0.02
Positive nominations	0.15	0.08	0.17	0.09	<.001	0.01
Peer acceptance	0.22	0.14	0.22	0.14	*ns*	0.0003
Prosocial behavior	0.17	0.11	0.23	0.13	<.001	0.06
Defending	0.14	0.10	0.17	0.11	<.001	0.01
Self-report						
Victimization	0.06	0.09	0.07	0.09	<.001	
Verbal victimization	0.07	0.13	0.09	0.14	<.01	
Material victimization	0.02	0.08	0.03	0.08	<.05	
Physical victimization	0.06	0.11	0.07	0.11	*ns*	
Relational victimization	0.06	0.12	0.08	0.13	<.001	

Note. N = 4,017. Peer-nomination scores were based on ratings by multiple peers. *p* values are derived from analysis using robust standard errors (Huber-White sandwich method) to adjust for the clustered structure of the data.

BPI and the PEERS Measure that were carried out closer in time (Table 3). Again, the correlations between child-reported aggression and peer-reported bullying was stronger in the group of children with a shorter interval between the interviews and the PEERS Measure ($r = .37$, $p < .001$).

Last, we examined the associations of the child and maternal sociodemographic characteristics with bullying and victimization scores obtained by the PEERS Measure (Table 4). Children of non-Western extraction were more likely to be nominated as bullies and to report more bullying and victimization than children of Dutch national origin (e.g., the mean score for bullying in Dutch children was 0.04 ($SD = 0.05$), and the bullying score in children of non-Western extraction was 0.07 ($SD = 0.06$; $p < .001$).

Some additional analyses involved further examination of the differences in bullying and victimization scores among children of non-Western extraction. The bullying scores in children of Dutch national origin were significantly lower than those in Moroccan and Turkish children and in other children of non-Western extraction (e.g., Cape Verdeans and Dutch Antilleans). Children of Moroccan, Surinamese, and other non-Western extraction also had higher victimization scores. However, after adjustment for the child and maternal sociodemographic covariates presented in Table 4, the only bullying scores that remained statistically significant were those for children of Moroccan extraction; those in victimization were no longer statistically significant. Bullying and victimization scores were both higher in children born to mothers with a low intermediate or low educational level (Table 4). Children living in households with lower net monthly income and children of single mothers scored higher on bullying and had higher victimization scores. Table S1 in the supplemental materials

Table 3
Correlations Between Peer, Teacher, and Child Reports

Child's bullying score based on classmates' nominations (PEERS Measure)	Aggressive behavior			
	Teacher report (TRF)		Child report (BPI)	
	r	*N*	*r*	*N*
Bullying	.37***	1,160	.27***	1,330
Bullying (time between assessments <10 months[a])	.42***	460	.37***	210
Bullying (time between assessments ≥10 months[b])	.32***	700	.24***	1,120

Note. Teacher report was obtained using the Teacher Report Form (TRF; Achenbach & Rescorla, 2001; n = 1,160). Child interviews were conducted using the Berkeley Puppet Interview (BPI; Ablow et al., 2003; n = 1,330). Peer-nomination scores were based on ratings by multiple peers. Values presented are Pearson's correlation coefficients.
[a] Analyses conducted in the group of children for whom the time interval between the assessments was <10 months. [b] Analyses conducted in the group of children for whom the time interval between the assessments was ≥10 months.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Child and Maternal Sociodemographic Characteristics and Bullying Involvement

	Bullying				Victimization			
Sociodemographic characteristic	N	M	SD	p	N	M	SD	p
Child's age	1,590	7.64	9.12	<.001	1,552	7.68	9.12	<.01
Gender								
Boy	777	0.07	0.06	Ref	758	0.06	0.09	Ref
Girl	813	0.04	0.04	<.001	794	0.06	0.08	*ns*
Child's national origin								
Dutch	895	0.04	0.05	Ref	874	0.05	0.07	Ref
Other Western	161	0.05	0.04	*ns*	161	0.06	0.10	*ns*
Non-Western	462	0.07	0.06	<.001	447	0.07	0.09	<.001
Mother's education								
Low	258	0.07	0.07	<.001	246	0.08	0.11	<.001
Low intermediate	427	0.06	0.06	<.001	414	0.06	0.09	<.05
High intermediate	336	0.04	0.04	*ns*	333	0.05	0.07	*ns*
High	399	0.04	0.04	Ref	393	0.04	0.07	Ref
Income								
Below social-security level: <€1200 (approx. U.S. $1,500)	177	0.07	0.06	<.001	169	0.08	0.10	<.001
Average: €1200 to €2000 (approx. U.S. $1,500–$2,500)	220	0.06	0.06	<.001	213	0.06	0.09	<.05
Modal income: >€2000 (approx. U.S. $2,500)	796	0.04	0.04	Ref	784	0.04	0.07	Ref
Marital status								
Married/living together	1,255	0.05	0.05	Ref	1,229	0.05	0.08	Ref
Single	165	0.07	0.06	<.001	158	0.08	0.11	<.01

Note. Values presented are mean and standard deviation. Peer-nomination scores were based on ratings by multiple peers. *p* values are derived from regression analyses adjusted for the clustered structure of the data. Ref = reference category.

shows that mutual adjustment and an additional adjustment for the indicators of family structure (e.g., child birth order) and cultural background (e.g., maternal national origin) reduced the number of factors associated with involvement in bullying. Four variables remained statistically significantly associated with bullying: child age and gender, maternal national origin, and maternal educational level. We also examined correlation between maternal age and children's bullying and victimization scores. Maternal age was negatively correlated with bullying scores ($r = -.20, p < .001$) and victimization scores ($r = -.13, p < .001$).

Discussion

In this study we evaluated the psychometric properties of the PEERS Measure, a computerized instrument that takes a novel approach to using the peer-nomination method with elementary school children in Grades 1–2 to assess children's bullying involvement. Children are helped with the peer-nomination process by illustrations and audio instructions; the assessment is made appealing by its animated and interactive features. By combining the individual reports of multiple peers, the PEERS Measure obtains reliable information on peer acceptance, peer rejection, bullying, defending and prosocial behavior from the perspective of the entire group. Whereas most previous research was carried out with older children and used questionnaires or interviews, our study demonstrates how a dyadic peer-nomination method embedded in an age-appropriate computerized instrument can be used with young children.

Occurrence of Victimization

The PEERS Measure is developed to assess bullying and peer relations from a group perspective. As measured by this instrument, bullying involvement reflects the extent to which each child is perceived as a bully by the rest of his or her peers. However, it does not necessarily reflect the prevalence or severity of bullying. The percentages of self-reported victimization obtained using our instrument were rather high (range = 19%–37%), especially relative to the prevalence reported in studies of older children. For example, in a large study of 11- to 16-year-old children across 25 countries, approximately 10% reported involvement in bullying as bullies, and about 11% reported their involvement as victims (Nansel et al., 2004). In the case of our study, however, two factors deserve particular consideration: the young age of children and the lack of a specific time-frame in our definition of bullying. The high percentages of victimization reported using our instrument may be attributed to the specifics of the peer relationships at young age: Earlier research also found a higher prevalence of bullying involvement in younger children (Boulton & Underwood, 1992). For example, in their study of kindergarten children, Kochenderfer and Ladd (1996) reported percentages of victimization ranging from 42% to 54%. Although the children participating in our study were given a clear definition of bullying, we did not specify a time-frame (other than "often"). This differed from survey studies among older children that defined bullying involvement only if it occurred more than twice during the current term (Nansel et al., 2004; Solberg & Olweus, 2003). Because, at an early age, children's comprehension of the concept of time is not fully developed (Siegler & Richards, 1979), first-grade children may find it diffi-

cult to make precise time distinctions over recent months. Instead, the PEERS Measure emphasized the intentional and repeated nature of the aggressive acts that typify bullying. As children may therefore have reported their overall experience with peers, this may have contributed to the high rates of self-reported victimization.

The Interrelationships Between the Constructs of the PEERS Measure

Examination of the peer-nomination scores obtained with the PEERS Measure showed that children who are positively evaluated by their peers (i.e., nominated as defenders or as those who behave prosocially toward others) are the most popular children—in other words, those who are most accepted by their peers. Most of the children, who were involved in bullying, either as bullies or victims, were rejected by their peers, or were not nominated in questions about positive behaviors, such as peer acceptance, defending or behaving prosocially toward classmates.

The patterns of peer relationships we found are consistent with earlier research showing associations between constructs such as defending and peer acceptance (Sainio, Veenstra, Huitsing, & Salmivalli, 2011; Salmivalli et al., 1996), bullying and peer rejection (Boulton & Smith, 1994), and victimization and peer acceptance (Boulton & Underwood, 1992; Kochenderfer & Ladd, 1997).

Reliability and Consistency of the PEERS Measure

High correlation coefficients and ICC coefficients between the test–retest measures suggest that the PEERS Measure has good reliability. Like our own findings, the study of Kochenderfer and Ladd (1997) reported only a moderate correlation between test–retest assessments of peer victimization. The young age of our participants and the interval of 3 months between the test–retest data collection should also be borne in mind. Altogether, the test–retest results demonstrated that the instrument had sufficient reliability.

In the behavioral sciences, the correlations between the reports of different informants on the same construct are typically low (Achenbach, McConaughy, & Howell, 1987; Laird & De Los Reyes, 2012). A meta-analysis of 269 samples in 119 studies using concurrent assessments and the same instruments reported an r of .44 between peer-reported and teacher-reported behavioral problems, and an r of .26 between peer-reports and child-reports of behavioral problems (Achenbach et al., 1987). Also, a study by Perren and Alsaker (2006) that is similar to ours reported a correlation between teacher-reports and peer-reports on victimization of $r = .08$, and on reports of bullying of $r = .23$. Thus, the correlations we report between the peer-reported bullying scores obtained with the PEERS Measure and teacher ($r = .42$) and child ($r = .37$) reports of aggressive behavior are acceptable and well within the range that can be expected if different informants' reports are used. Although the interval between these data collections and the use of different instruments might have resulted in somewhat lower correlations than one might otherwise expect, we showed that the correlations between the constructs were stronger once we correlated data with a shorter interval between the data collections. Also, teachers' limited awareness of the peer interactions (Atlas & Pepler, 1998; Craig, Pepler, & Atlas, 2000), com-

pared to the peers, may have influenced the correlation between the peer- and teacher-reports.

Child and Maternal Sociodemographic Characteristics and the PEERS Measure

Children's bullying experiences within a school context are influenced by several important factors, including gender, child ethnicity, and family socioeconomic background. As girls are more frequently involved in indirect forms of bullying and are also more likely to be victims of relational aggression, involvement in specific forms of bullying differs according to gender (Crick & Grotpeter, 1995; Jimerson et al., 2010).

In the context of cross-gender and same-gender bullying involvement, gender is important. For instance, children often choose to bully same-sex classmates who are rejected by other same-sex classmates (Veenstra, Lindenberg, Munniksma, & Dijkstra, 2010). Also, boys and girls differ in their responses to bullying: Boys are more likely to react by "fighting back" and have different ideas with regard to the resolution of bullying. Girls are more likely to suggest "changing the bully" or "helping the victim," unlike boys, who are more likely to "punish the bully" (Jimerson et al., 2010). Gender differences are also important to intervention in bullying incidents. While both genders intervene equally often to stop bullying and do so equally successfully, boys tend to intervene more in bullying incidents among boys, and girls to intervene more in incidents among girls (Hawkins et al., 2001).

The gender differences reported in our study are consistent with earlier research findings that demonstrated more bullying involvement in boys (Boulton & Smith, 1994; Boulton & Underwood, 1992; Salmivalli et al., 1996), more peer rejection toward boys (Dijkstra, Lindenberg, & Veenstra, 2008; Veenstra et al., 2008), and more positive nominations for girls (Salmivalli et al., 1996). Our study was also consistent with previous studies in older children and with studies using other instruments that found that girls are often victimized relationally (Crick & Grotpeter, 1996; Dukes, Stein, & Zane, 2010): In our study, girls had somewhat higher scores of relational victimization than boys.

Ethnicity is another important factor related to children's bullying experiences. For example, studies in Finland and the Netherlands showed that immigrant children and ethnic-minority groups are more often involved in bullying (Strohmeier, Kärnä, & Salmivalli, 2011; Vervoort, Scholte, & Overbeek, 2010). Bullying and victimization related to immigrant, ethnic or racial characteristics may be underlain by children's being different from the situationally "dominant" group (Jimerson et al., 2010). In the Netherlands, some of the largest minority ethnic groups are Turkish, Moroccan, and Surinamese. A study of 10- to 13-year-olds in the Netherlands showed that ethnic-minority children underwent more victimization at school than Dutch ones (Verkuyten & Thijs, 2002). Another study among 5- to 6-year-olds in the Netherlands showed that most non-Dutch ethnic-minority children were more likely to be involved in bullying than Dutch children (Jansen et al., 2013). In line with earlier research (Jansen et al., 2013; Veenstra et al., 2005; Verkuyten & Thijs, 2002), we found that children of non-Western extraction were more likely to be involved in bullying and to be victimized.

Bullying involvement is related to family socioeconomic background. Parents' income and educational level are important indi-

cators of a family's socioeconomic status, and it has been shown that children from lower socioeconomic status families are more likely to be involved in bullying, especially those with a single parent and parents of a low educational level (Jansen et al., 2012). Possible mechanisms explaining the relation between these factors and involvement in child bullying may be attributable to the parental knowledge, skills, norms and values that are transferred to a child during its upbringing. The effect of single parenthood may be explained by limited parent–child interactions, less parental control, and less time or fewer opportunities to address the child's possible difficulties in peer relationships (Jansen et al., 2012). In our study, factors such as maternal age, lower income, lower educational level, and marital status (i.e., being single) were related to more involvement in bullying. These findings are also consistent with the findings of earlier studies in older children, which found that children of single parents and of parents with a lower education and a lower family income are more likely to be involved in bullying (Due et al., 2009; Nordhagen, Nielsen, Stigum, & Köhler, 2005; von Rueden et al., 2006). In sum, our data show that the child and maternal characteristics associated with bullying and victimization scores obtained with the PEERS Measure are similar to those reported in earlier studies.

Study Limitations

In our view, our study has four potential limitations. First, sociodemographic data, the Berkeley Puppet Interviews, and the TRF data were available for only part of our sample, i.e., children participating in the Generation R Study (Jaddoe et al., 2010). This may suggest that this information was available only for a selective group of children. However, substantial variations in all sociodemographic characteristics remained.

The second potential weakness is that the definition of bullying we gave to children did not explicitly use the term "power imbalance" and did not describe the victim as being "weaker" and a bully as "stronger." Young children tend to associate these concepts primarily with physical strength, while power imbalances can also result from other characteristics of a bully, such as popularity. When describing bullying incidents we therefore emphasized victim's struggle and inability to defend him or herself or to stop bullying, thereby implying the power imbalance between bully and victim.

The third weakness was that we operationalized the concept of relational bullying as social exclusion. As the concept of relational bullying is broader, and includes activities such as manipulating friendships or spreading rumors (Crick & Groetpeter, 1996), our findings have to be interpreted using a rather narrow operationalization of this concept.

The final potential limitation of our study concerns our use of photos of the interactions between peers that were used as illustrations of the questions in the PEERS Measure. The actors were children of the same age as our target population and showed white children of both genders for different illustrations. We acknowledge that children's reports may have been influenced by the actors' physical appearance (e.g., age, gender). Several earlier studies used stick-figures (Monks & Smith, 2006; Smith et al., 2002) when describing bullying. These are more neutral and minimize any effects of physical appearance. However, we anticipated that using stick-figures in order to describe less overt types of

bullying (such as verbal bullying or social exclusion) to young children could have been ambiguous. To describe different forms of peer interaction, we therefore used actors with neutral physical characteristics.

Other Important Methodological Considerations

As the prevalence of bullying involvement is highest in elementary school Grades 1–2 (Kärnä et al., 2011), identifying bullying in the first grades of elementary school is key to the primary and secondary prevention of bullying and victimization. In other words, it is crucial to detect bullying problems early, and to intervene early in the school curriculum. In our view, the development of the PEERS Measure can help to assess bullying involvement and peer relations among young children. We also believe that, directly or indirectly, all the parties involved in our study benefited from their participation: after the PEERS Measure, teachers at the participating schools were given tailored reports containing general findings at class level and an information package on bullying, its detection, and prevention. Participation in the study enhanced teachers' knowledge about peer relationships in the class and teachers' awareness of bullying.

Another issue that should be considered here is the use of passive consent. In this study, obtaining it improved the feasibility of the large-scale data collection we required. The consent procedure ensured the high participation rates per school class that are crucial to the use of sociometric methods such as peer nomination. But while the passive-consent procedure was used to test the feasibility of the PEERS Measure in the Netherlands, different regulations may not always allow the use of such procedures in other countries. Nonetheless, even in situations where passive consent cannot be used, we anticipate no difficulties with the use of the instrument in situations where active consent must be obtained.

The PEERS Measure treats the entire school class as a source of information on who bullies whom. For this method a high participation rate is crucial. In school-based research, an active consent procedure may result in lower response rates and more selection bias than a passive consent procedure (Anderman et al., 1995; Ellickson & Hawes, 1989; Esbensen, Miller, Taylor, He, & Freng, 1999; Esbensen et al., 1996; Pokorny, Jason, Schoeny, Townsend, & Curie, 2001; Tigges, 2003). A reduced participation rate can limit the identification of bullies and victims. Nevertheless, even when active consent is used, the participation rates can be raised to an acceptable level by researchers' multiple and extensive follow-up efforts; however, these additional efforts tend to be rather costly and time-consuming (Ellickson & Hawes, 1989; Johnson et al., 1999). Importantly, as long as a high participation rate is reached (e.g., ≥70%) the risk of bias can be minimized (Eaton, Lowry, Brener, Grunbaum, & Kann, 2004).

A possibility of selective nonresponse is a potential drawback of every observational study. Children who do not receive parental consent to participate in the study may be more likely to have problematic peer relationships (Beck, Collins, Overholser, & Terry, 1984; Frame & Strauss, 1987). This could pose a challenge for identification of bullies in a class. However, it is unlikely that this has impacted our results, as in the school-based research the use of passive consent procedure usually results in a relatively

unbiased sample (Hollmann & McNamara, 1999). Furthermore, in our study, only 1.7% of children (across 190 school classes) did not participate as a result of their parents refusing to allow participation.

The PEERS Measure assesses peer relationships in a class setting, and the nominations are restricted to the (participating) children from the same class. Using this measure to identify bullying outside the class was not feasible, especially at this young age. However, at a young age, most of the bullying/victimization occurs among children from the same class (Beaty & Alexeyev, 2008; Wolke, Woods, Stanford, & Schulz, 2001), and thus this measure can be effectively used to identify bullying to the extent that it occurs within a class.

In some countries it may be difficult to use photos of children, due either to local regulations or to parental reluctance to provide their consent. In such cases, an alternative way to use the peer-nomination method with young children whose reading skills are not good enough for the use of peer-nomination questionnaires would be through interviews.

Our purpose in describing the child and maternal sociodemographic correlates of bullying involvement obtained with the PEERS Measure lay in our desire to examine the consistency of these associations with earlier findings. We did not intend to use various child and maternal characteristics to predict bullying or victimization or to infer any causal associations. To examine these associations, future studies aiming to identify predictors of bullying involvement in young children could use longitudinal designs, adjusting the association for possible confounders, such as children's language ability, working memory, and cultural background.

As technology and the social media are becoming increasingly important in the lives of children and adolescents, future research should bear in mind that the nature of bullying is changing: as it adopts new forms—such as through e-mail, text messages, or the social media—children can become even more susceptible to bullying (O'Keeffe, Clarke-Pearson, & Council on Communications and Media, 2011). The increase in cyberbullying is likely to affect the prevalence rates of bullying or a child's perception of its severity. As cyberbullying is an increasing problem among children older than our study participants, this problem should be addressed in research focusing on bullying among adolescents.

In summary, our findings suggest that the PEERS Measure is a reliable and age-appropriate instrument that can be used to collect dyadic/network data as early as the first grades of elementary school. It is therefore a suitable alternative to common methods such as interviews and live observations.

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