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Characteristics of effective schools in facing and reducing bullying

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Abstract

This article examines whether variation in school effectiveness in terms of reducing bullying can be attributed to differences in their classroom and school learning environment. All 6th grade students ($n = 1504$) of 35 primary schools in Cyprus participated in this study. The revised Olweus bully/victim questionnaire was used to measure bullying at the beginning and at the end of the school year. A questionnaire measuring the classroom learning environment was also administered to the student sample. A teacher questionnaire was used in order to measure school policy and actions taken to improve the school learning environment. Multilevel modelling techniques were used to analyse our data. Almost all factors concerned with the school and the classroom learning environment and school evaluation were found to be associated with reduction of bullying. Implications of findings for research on bullying are drawn.

Keywords

Bullies, bullying, classroom learning environment, prevention, school evaluation, school learning environment, victims

School bullying, as a form of aggressive behaviour, involves many factors (Arora, 1996; Richard, Schneider, & Mallet, 2011). Olweus (1993) provided a holistic definition of the phenomenon of bullying as it is expressed within the school environment:

> A student is being bullied or victimized when he/she is exposed, repeatedly and over time to negative actions on the part of one or more other students. It is a negative

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> action when someone intentionally inflicts, or attempts to inflict, injury or discomfort upon another. (Olweus, 1993: 9)

The term 'negative actions' refers not only to physical contact but also to other methods, such as making faces or obscene gestures. Therefore, the second type of bullying is verbal such as spreading rumours, teasing, and threatening. The third type of bullying is the social exclusion from a group (Arora, 1996; Smith & Ananiadou, 2003). The most common form of bullying for both boys and girls is verbal bullying (Lind & Maxwell, 1996; Smith et al., 1999; Wei, Williams, Chen, & Chang, 2010; Whitney & Smith, 1993). However, not every negative act could be considered as bullying as this presupposes an imbalance in strength between the participants. Specifically, the basic characteristics of bullying are the repetition of the action and the imbalance of power between the victim and the bully.

This definition of bullying by Olweus became the basis for the development of a worldwide research activity on school bullying which examined the causes, influences, and ways of measuring school bullying in order to realize the nature of bullying and minimize its negative impacts on students' physical and mental health (Larochette, Murphy, & Craig, 2010; Murray-Harvey & Slee, 2010). These studies show that victims of the aggressive behaviour may feel useless, experience depression, and this feeling has a negative effect on their learning and on their achievement (Kochenderfer & Ladd, 1996; Woods & Wolke, 2004). Moreover, bullying has a negative effect on the development of positive self-esteem in the victims (Boulton & Smith, 1994; Farrington, Loeber, Stallings, & Ttofi, 2011). Victims of bullying may also regard themselves as responsible for what is happening to them. This attitude affects their concentration and consequently their learning (Ladd, 1990; Sharp & Smith, 1994). As for the bullies, they soon realize that bullying is an easy and effective way to get what they want (Besag, 1989) and may present other forms of antisocial behaviour (Sharp & Smith, 1994).

Bullying has been increasingly described as a group process that involves and is enabled by many players in addition to the individual bullies and victims (e.g. Craig, Pepler, & Blais, 2007; Richard et al., 2011; Salmivalli, 1999). Bullying is more likely to occur in the presence of peers, who can adopt a variety of roles, such as remaining neutral during a bullying incident, assisting and encouraging the bully, or aiding or consoling the victim (O'Connell, Pepler, & Craig, 1999). The fact that bullying is a group process seems to reveal the importance of investigating the impact of improving the classroom and school learning environment on reducing bullying. Longitudinal studies show that students who are victimized feel a sense of helplessness that increases over time (Craig et al., 2007). These students, therefore, need adult help at school in responding to the bullying, including support to the victims, and the modelling of appropriate social behavior.

Whole school approaches to bullying have been developed which support that interventions should be directed at the entire school context and aim to improve the classroom and school learning environment. Efforts to implement whole-school approaches to prevent bullying have been taken in various countries (e.g. Gini,

2006; Olweus, 1997; Richard et al., 2011; Rigby & Griffiths, 2011; Smith & Ananiadou, 2003). During the last five years, research syntheses of the effectiveness of this approach have been conducted. These syntheses show that whole-school approaches have limited success in reducing bullying although they are sometimes useful in increasing understanding and awareness of the problem (Ferguson, San Miguel, Kilburn, & Sanchez, 2007; Merrell, Gueldner, Ross, & Isava, 2008; Rigby, 2004; Smith, Schneider, Smith, & Ananiadou, 2004). These syntheses also recommend theoretically-grounded interventions which are able to disentangle the effectiveness of different programme components, in order to increase the effects of comprehensive school based programmes (Baldry & Farrington, 2007; Rigby, Smith, & Pepler, 2005). Thus, this article argues for the need to integrate research on bullying with research on educational effectiveness and identify characteristics of effective teachers and schools in reducing bullying. The study gives emphasis to the impact of the classroom and school learning environment on reducing bullying and investigates the role of teachers as well as other school stakeholders in reducing bullying.

Taking into account findings of educational effectiveness research, a broader perspective to the role of teacher and school with respect to the classroom and school learning environment can be adopted. This approach does not give emphasis only to the development of a policy on bullying that every school stakeholder is expected to implement but to the actions that should be taken to support teachers and other stakeholders deal with bullying incidents. It is taken into account that high-quality collegial communication, togetherness, and mutual respect are required in order to agree on a clear policy, to communicate it convincingly to parents and children, and to implement it with the consistency that makes it meaningful. Thus, factors concerned with teacher collaboration and partnership policy are taken into account in defining the school learning environment and investigating its impact on bullying. Modin and Ostberg (2009) argue that the extent to which bullying occurs in school is not only a matter of differences in the composition of students of different background, it has also been empirically linked to school characteristics such as school climate, school culture, and the organization of the school. In addition, Espelage and Swearer (2004, 2010) have written extensively on the importance of understanding bullying from a social-ecological framework. A school with cohesive interpersonal relationships at all levels, where the teaching staff believe in the students' potential, where academics are taken seriously, and where students feel a sense of belonging promotes learning outcomes and reduces bullying (Craig et al., 2007). Also, physical aspects of the learning environment like the general upkeep and physical cleanliness of the school grounds contribute to more positive student behaviors.

In this context, the following three aspects which define the School Learning Environment (SLE) factor are seen as possible predictors of facing and reducing bullying at school level: (a) student behaviour outside the classroom; (b) teacher collaboration; and (c) partnership policy (collaboration with school stakeholders). Since most bullying incidents occurred outside the classroom, the development

of a policy on student behaviour outside the classroom may help schools collect valuable information about bullying incidents and targets (e.g. bullies, victims, bystanders, isolated students). Increased monitoring of student behaviour during recesses and also before the beginning of the lessons can also help to identify and intervene when bullying occurs (George & Thomas, 2000). Beyond monitoring student behaviour outside the classroom, schools can also organize activities during the break time (e.g. playing in cooperative groups, table games, music) which can calm students' aggressive emotion and increase students' feelings of safety, happiness, and liking of school (see Swearer, Espelage, & Napolitano, 2009).

With regard to the teacher collaboration factor, research has shown that in effective schools, teachers are encouraged to interact on issues associated with learning and teaching in order to create a businesslike school and classroom environment (Creemers & Kyriakides, 2008). Olweus (1997) argues that the teaching staff should be encouraged to learn from each other by exchanging ideas and experiences about bullying. By working collaboratively, teachers can discuss what they observe, exchange opinions, workout solutions, and even present to the whole faculty the efforts that they found as effective in reducing bullying.

Finally, structures based on authentic partnership and collaboration with other stakeholders (e.g. parents, school community, school psychologists) may contribute to the implementation of the actions to reduce and manage bullying and develop a safe, caring, respectful, and supportive school environment (Murray-Harvey & Slee, 2010). Research evidence shows that this aspect of the school learning environment factor is strongly associated with cognitive and affective learning outcomes (Fan & Chen, 2001; Waterman & Walker, 2009). By including staff, students, and parents in the creation and implementation of anti-bullying policies, the school management team may receive valuable input from all those directly affected (Smith & Brain, 2000). School psychologists may provide guidelines for helping teachers and parents to deal with bullying when individual cases need to be addressed. School psychologists could also offer courses concerning critical issues like anger management and emotion regulation skills, empathy, non-judgemental attitude, trust building, and communication skills (Modin & Ostberg, 2009).

This article gives emphasis not only to the school but also to the classroom learning environment. Many studies have identified teachers as a key factor of change in bullying prevention (Hirschstein, Edstrom, Frey, Snell, & Mackenzie, 2007; Kallestand & Olweus, 2003). There is evidence that teacher classroom management not only promotes or inhibits academic attainment but also contributes to the overall relational climate of the classroom (Keller & Tapasak, 1997). Moreover, Chang (2003) found that although students as a whole reject aggressive behaviour in school, peer rejection varied across classes as a function of teachers being warm or supportive of students overall. Furthermore, studies show that opportunities for students to experience success in school are linked to a low incidence of student misbehaviour and bullying (Rutter, Giller, & Hagell, 1998). When teachers provide clear explanations, students' perceptions of the meaningfulness of schoolwork may

be improved and a commitment to learning may be enhanced. Moreover, effective teachers are expected to use different teaching strategies in order to keep different groups of students involved in the classroom interactions which promote student learning and establish better relations among students and teachers. In this context, the contribution of the teacher in creating a safe and businesslike classroom environment is examined by investigating his/her relation with the students and his/her contribution in creating relations among students. Specifically, we investigate teacher behaviour in establishing rules, persuading students to respect and use the rules, and maintaining them in order to facilitate teacher-student and student-student interactions (see Kyriakides & Creemers, 2008).

Research aims

The study reported here is looking at the extent to which some teachers and schools are more effective than others in reducing bullying inside and outside the classroom. We also search for characteristics of effective teachers and schools in reducing bullying. Specifically, this study aims to identify the impact of the classroom and school learning environment on reduction of bullying.

Method

Procedure

The study was approved by the Ministry of Education in Cyprus and 35 out of 192 primary schools were randomly selected. Once the headteacher and teachers had given consent to participate in the study, written information about the study and a non-consent form (parents were asked to sign if they did not want their child to participate in the study) was passed to all parents of 6th grade students via their children in sealed envelopes.

Participants

Almost all the 6th grade students (1504 of 1609) from each class ($n = 68$) of the 35 primary Cypriot schools participated in the study. Students with missing prior attainment or background data (fewer than 7% of the original sample) were excluded from the analyses. The chi-square test did not reveal any statistically significant difference between the research sample and the population in terms of students' gender ($X^2(1) = 0.99$, $p = 0.32$). The t-test did not reveal any statistically significant difference between the research sample and the population in terms of the size of class ($t(421) = 1.41$, $p = 0.16$). Although this study refers to other variables such as the socio-economic status of students, there are no data about these variables at national level; therefore, it was not possible to examine whether the sample was nationally representative in terms of any other characteristic than students' gender or the size of their class grouping.

Measures

Dependent variables: Reduction of levels of 'being victimized' and of levels of 'bullying others'. The Greek version of the revised Olweus Bully/Victim Questionnaire (OBVQ) was administered to the student sample at the beginning of the school year. Taken individually, eight items of the OBVQ can be used to interpret the responses with respect to the extent to which students are victims of bullying whereas a second set of eight items refers to the extent to which students initiate an act of bullying against other students. It is important to examine whether performance on each of these two sets of items could be reducible to a scale that enables the specification of a hierarchy of item difficulty (Kyriakides, Kaloyirou, & Lindsay, 2006). The Rasch model is appropriate for the specification of this scale because it enables researchers to test the extent to which the data meet the requirement that both students' performances on each set of items of the OBVQ and the difficulties of the relevant items form a stable sequence (within probabilistic constraints) along a single continuum (Bond & Fox, 2001). Thus, the data were analysed by using the computer program *Quest* (Adams & Khoo, 1996) to create two relevant scales, based on the log odds of pupils' opinions about the extent to which they are either being bullied (Scale A) or they bully other children (Scale B). The two main dimensions of the OBVQ were found to have satisfactory psychometric properties (see Kyriakides, Creemers, & Charalambous, 2008) and, thereby, they were used to estimate the extent to which each student of our sample was a victim of bullying (Scale A) and the extent to which he/she initiated acts of bullying against other children (Scale B). The same procedure was followed in order to analyse the results which emerged from student responses to the OBVQ at the end of the school year. For each scale, there was a good fit to the Rasch model (see Kyriakides et al., 2008). Thus, for each scale, differences in person Rasch estimates between the two administration periods of the OBVQ were treated as dependent variables for measuring the extent to which bullying among students was reduced.

Student background. Information was collected on two student background factors: gender (0 = boys; 1 = girls), and socio-economic status (SES). Five SES variables were available: Father's and mother's education level (i.e. graduate of a primary school, graduate of secondary school, or graduate of a college/university); the social status of father's job; the social status of mother's job; and the economical situation of the family. Following the classification of occupations used by the Ministry of Finance, Cyprus, it was possible to classify parents' occupations into three groups which have relatively similar sizes: Occupations held by working class (36%); occupations held by middle class (40%); and occupations held by upper-middle class (24%). Relevant information for each child was taken from the school records. Then, standardized values of the above five variables were calculated, resulting in the SES indicator.

The school and the classroom learning environment factors. Five measurement dimensions were used to describe the functioning of each school and classroom learning environment factor: *Frequency*, *focus*, *stage*, *quality*, and *differentiation*. *Frequency* is a quantitative way to measure the functioning of each factor. The other four dimensions examine qualitative characteristics of the functioning of the factors and help us describe the complexity of dealing with bullying at the classroom and school level (Creemers & Kyriakides, 2006). A brief description of these four dimensions is given below.

Two aspects of the *focus* dimension are taken into account. The first one refers to the specificity of the activities associated with the functioning of the factor whereas the second one with the number of purposes for which an activity takes place. The *stage* at which tasks associated with a factor take place is also examined. It is expected that the factors need to take place over a long period of time to ensure that they have a continuous direct or indirect effect on reducing bullying (Rigby et al., 2005). The *quality* refers to properties of the specific factor itself, as these are discussed in the literature. Finally, *differentiation* refers to the extent to which activities associated with a factor are implemented in the same way for all the subjects involved with it (e.g. all bullies, victims, teachers, parents). It is expected that adaptation to specific needs of each subject or group of subjects will increase the successful implementation of a factor and ultimately maximize its effect on reducing bullying.

A student questionnaire measuring teacher behaviour in establishing the classroom learning environment was administrated. Students were asked to indicate the extent to which their teacher behaves in a certain way in their classroom, and a Likert scale was used to collect data. For example, one item examined whether students felt that their teacher made them feel that they can ask him/her for help or advice if they need it. A Generalizability Study (Shavelson, Webb, & Rowley, 1989) on the use of students' ratings was conducted. It was found that the data that emerged from almost all the questionnaire items (28 of 30) could be used for measuring the classroom as a learning environment factor. Thus, the score for each teacher in each of the questionnaire item found to be generalizable was the mean score that emerged from the responses of the students of his/her class. Confirmatory factor analysis provided support to the construct validity of the questionnaire and shows that each of the five dimensions can be used to measure the two overarching factors of the classroom learning environment concerned with teacher-student and student-student relations (see Kyriakides et al., 2008). Therefore, for each teacher, ten factor scores were generated.

The explanatory variables which refer to the school learning environment factors were measured by asking all the teachers of the school sample to complete a questionnaire. This questionnaire was designed in such a way that information about each school factor could be collected. For example, in the case of the partnership policy, an item refers to actions which parents are expected to undertake in dealing with bullying (i.e. discuss the problem with the teacher, inform the school of any observed bullying incidents, implement practices at home which facilitate

the school policy for facing and reducing bullying). The teacher questionnaire was administered to all teachers of the school sample. Of the 341 teachers approached, 253 responded, a response rate of 74%. Moreover, the missing responses to each questionnaire item were very small (i.e. less than 5%).

The approach used to test the validity of the student questionnaire was also used in order to demonstrate the validity of the teacher questionnaire. The findings of the first order factor SEM analysis generally affirmed the assumption that each aspect of the school learning environment factor could be measured in relation to each of the five measurement dimensions (see Kyriakides et al., 2008). Thus, for each school factor, five scores were generated by aggregating at the school level the factor scores emerged from teacher responses to the questionnaire.

Statistical analysis

Multilevel modelling methods (also known as hierarchical linear modelling, random effects models, general linear mixed models, and random components models) have emerged over the past two decades as a highly flexible and useful approach to analysing hierarchically structured data (Goldstein, 2003; Snijders & Bosker, 1999). Multilevel modelling requires the data to be described in levels. These levels are numbered in ascending order, beginning with the most elementary level. The levels describe the clustering within the hierarchy and thus the sources of random variation and covariation to be modelled. In the present study, the data were conceptualized as a three-level model, consisting of student at the first level, class at the second level, and school at the third level. Two separate multilevel analyses were conducted to identify the effects of the classroom and school factors upon reduction of student estimates to the two Rasch scales concerned with the extent to which students are being bullied (Scale A) or bully other children (Scale B) during the school year. The first step in each analysis was to determine the variance at individual, class, and school level without explanatory variables (empty model). In the baseline model, the variance concerned with reduction of the extent to which students are being bullied is 1.25. Of the total variance 0.69 [Standard Error (SE) = 0.18], 0.32 (SE = 0.05), and 0.24 (SE = 0.04) is accounted for the individual, class, and school level respectively. Thus, 55.2% of the variance is at the student level, 25.6% of the variance is at the class level, and 19.2% is at the school level. Also, the variance at each level reaches statistical significance ($p < 0.05$) and this implies that multilevel modelling techniques can be used to identify the explanatory variables which are associated with reduction of bullying. Similar results emerged from the analysis concerned with the reduction of levels of 'bullying others'. Specifically, 56.4% of the variance in reduction of levels of bullying others was at the student level, 24.8% of the variance was at the teacher level, and 18.8% was at the school level.

In subsequent steps, explanatory variables at different levels were added. Explanatory variables, except grouping variables, were centred as Z-scores with a mean of 0 and a Standard Deviation (SD) of 1. This is a way of centring around

the grand mean (Raudenbush & Bryk, 2002) and yields effects that are comparable. Grouping variables were entered as dummies with one of the groups as baseline (e.g. boys = 0).

Results

The results emerged from the two separate multilevel analyses are presented in Tables 1 and 2. The models presented in these two tables were estimated without the variables that did not have a statistically significant effect at 0.05 level.

The following observations arise from the figures of the second column of Tables 1 and 2. First, Model 1 explains approximately 17% of the total variance in each outcome measuring reduction of bullying, and most of the explained variance is at the student level. Second, the likelihood statistic (X^2) shows a significant change between the empty model and Model 1 ($p < 0.001$) which justifies the selection of model 1. Third, student background factors (i.e. SES and gender) were not found to be associated with reduction of bullying. The only factor which was found to be associated with reduction of bullying was prior levels of being victimized (see Table 1) and prior levels of bullying others (see Table 2) when aggregated either at the level of classroom or school. The negative sign of their effects implies that less reduction in bullying is observed in schools and classrooms where bullying at the beginning of the school year was found to be a very important problem.

At the next step of the analysis, for each dependent variable, five different versions of Model 2 were established. In each version of Model 2, the factor scores which refer to the same dimension of measuring the classroom and school factors were added to Model 1. Thus, the fitting of these five models was tested against Model 1, and the likelihood statistic (X^2) shows a significant change between the Model 1 and each version of Model 2 ($p < 0.001$). This implies that variables measuring each of the five dimensions of the classroom and school factors have significant effects on the reduction of bulling. The following observations arise from the figures of the different versions of Model 2. First, by looking at the impact that each classroom factor has on reduction of bullying in the two scales of the OBVQ, we can observe that the frequency, stage, and quality dimensions of each aspect of the classroom as a learning environment factor was associated with reduction of bullying. Furthermore, the focus dimension of the establishment of relations among students and the differentiation dimension of the establishment of teacher-student relations had an effect on reducing bullying irrespective of the scale used to measure reduction of bullying. This finding provides support for our assumption that measures of the classroom as a learning environment factor are associated with reduction of bullying.

Second, almost all school level factors were found to be associated with reduction of bullying. These findings provide support to our assumption that school level factors and their measurement dimensions are associated with reduction of bullying. Third, both tables reveal that the quality dimension of the school evaluation factor had stronger effects upon reduction of bullying than any other measurement

Table 1. Parameter estimates and (Standard Errors) for the analyses concerned with reduction in levels of being victimized

Factors	Model 0	Model 1	Model 2a	Model 2b	Model 2c	Model 2d	Model 2e
Fixed part/intercept	0.26(0.05)	0.24(0.05)	0.09(0.03)	0.09(0.03)	0.11(0.04)	0.07(0.03)	0.08(0.03)
Student Level							
Gender (boys = 0, girls = 1)		−0.05(0.04)	−0.04(0.04)	−0.05(0.04)	−0.05(0.04)	−0.04(0.04)	−0.05(0.04)
SES		0.07(0.05)	0.07(0.06)	0.07(0.05)	0.07(0.05)	0.08(0.05)	0.07(0.05)
Classroom Level							
Context							
Average initial levels of 'being victimized'		−0.09(0.04)*	−0.09(0.04)*	−0.08(0.04)*	−0.10(0.04)*	−0.10(0.04)*	−0.09(0.04)*
Average SES		0.02(0.04)	0.02(0.04)	0.03(0.04)	0.02(0.04)	0.02(0.04)	0.02(0.04)
Percentage of girls		−0.01(0.05)	−0.01(0.06)	−0.01(0.05)	−0.01(0.05)	−0.02(0.05)	−0.02(0.05)
Learning Environment							
Teacher-student relation			0.16(0.04)*	0.10(0.04)*	0.07(0.06)	0.13(0.05)*	0.12(0.04)*
Student relations			0.21(0.05)*	0.11(0.03)*	0.10(0.04)*	0.15(0.05)*	0.07(0.06)
School level							
Context							
Average SES							
Average initial levels of 'being victimized'		−0.07(0.03)*	−0.07(0.03)*	−0.07(0.03)*	−0.06(0.03)*	−0.07(0.03)*	−0.07(0.03)*
Percentage of girls		−0.02(0.04)	−0.01(0.03)	−0.02(0.04)	−0.02(0.04)	−0.01(0.03)	−0.01(0.03)

(continued)

Table 1. Continued

Factors	Model 0	Model 1	Model 2a	Model 2b	Model 2c	Model 2d	Model 2e
Policy for SLE							
Behaviour outside the class			0.18(0.04)*	0.17(0.05)*	0.10(0.04)*	0.21(0.05)*	0.05(0.05)
Teacher collaboration			0.14(0.04)*	0.16(0.05)*	0.07(0.05)	0.10(0.07)	0.04(0.03)
Partnership policy			0.18(0.04)*	0.08(0.05)	0.11(0.03)*	0.19(0.04)*	0.24(0.04)*
Evaluation of SLE			0.10(0.04)*	0.08(0.03)*	0.06(0.04)	0.18(0.04)*	0.14(0.04)*
Variance components							
School	19.2%	18.3%	7.5%	9.0%	10.5%	5.7%	7.8%
Class	25.6%	24.9%	14.4%	13.0%	15.0%	10.0%	11.0%
Student	55.2%	40.0%	28.0%	29.6%	31.7%	31.5%	32.1%
Explained		16.8%	50.1%	48.4%	42.8%	52.8%	49.1%
Significance test							
X^2	1824.3	1705.2	1199.0$^+$	1308.8	1443.6$^+$	1163.0$^+$	1387.1$^+$
Reduction		119.1	506.2	396.4	261.6	542.2	318.1
Degrees of freedom		2	6	5	3	5	3
p-value		0.001	0.001	0.001	0.001	0.001	0.001

* = Statistically significant effect at 0.05 level was found.

$^+$Each alternative Model 2 (i.e. Models 2a up to 2e) investigates the effect of each measurement dimension of effectiveness factors (i.e. frequency, stage, focus, quality, and differentiation respectively). Thus, the reduction of each model is estimated in relation to the deviance of Model 1.

Table 2. Parameter estimates and (Standard Errors) for the analyses concerned with reduction in levels of 'bullying others'

Factors	Model 0	Model 1	Model 2a	Model 2b	Model 2c	Model 2d	Model 2e
Fixed part/intercept	−0.31(0.05)	−0.24(0.05)	−0.17(0.04)	−0.20(0.04)	−0.23(0.04)	−0.15(0.04)	−0.16(0.04)
Student Level							
Gender (boys = 0, girls = 1)		−0.06(0.04)	−0.06(0.04)	−0.05(0.04)	−0.06(0.04)	−0.06(0.04)	−0.06(0.04)
SES		0.08(0.05)	0.08(0.06)	0.08(0.05)	0.07(0.05)	0.08(0.05)	0.08(0.05)
Classroom Level							
Context							
Average initial levels of "bullying others"		−0.11(0.04)*	−0.10(0.04)*	−0.11(0.04)*	−0.10(0.04)*	−0.10(0.04)*	−0.11(0.04)*
Average SES		0.03(0.04)	0.02(0.04)	0.03(0.04)	0.03(0.04)	0.02(0.04)	0.03(0.04)
Percentage of girls		0.04(0.05)	0.04(0.06)	0.05(0.05)	0.05(0.05)	0.04(0.05)	0.04(0.05)
Learning Environment							
Teacher-student relation			0.11(0.04)*	0.09(0.04)*	0.07(0.05)	0.10(0.05)*	0.12(0.04)*
Student-student relations			0.18(0.05)*	0.10(0.03)*	0.12(0.04)*	0.15(0.05)*	0.08(0.05)
School level							
Context							
Average SES		0.02(0.04)	0.02(0.04)	0.03(0.04)	0.02(0.04)	0.02(0.05)	0.03(0.04)
Average initial levels of "bullying others"		−0.10(0.04)*	−0.09(0.04)*	−0.09(0.04)*	−0.10(0.04)*	−0.10(0.04)*	−0.10(0.04)*
Percentage of girls		−0.02(0.03)	−0.02(0.03)	−0.02(0.03)	−0.02(0.03)	−0.02(0.03)	−0.02(0.03)

(continued)

Table 2. Continued

Factors	Model 0	Model 1	Model 2a	Model 2b	Model 2c	Model 2d	Model 2e
Policy for SLE							
Behaviour outside the class			0.15(0.04)*	0.10(0.03)*	0.11(0.04)*	0.20(0.05)*	0.12(0.07)
Teacher collaboration			0.08(0.06)	0.03(0.05)	0.10(0.04)*	0.22(0.04)*	0.11(0.07)
Partnership policy			0.19(0.04)*	0.06(0.05)	0.12(0.03)*	0.21(0.04)*	0.25(0.04)*
Evaluation of SLE			0.10(0.04)*	0.08(0.03)*	0.05(0.04)	0.19(0.04)*	0.11(0.04)*
Variance components							
School	18.8%	17.3%	8.2%	9.0%	9.1%	7.8%	10.4%
Class	24.8%	22.0%	13.0%	14.0%	14.1%	10.0%	12.0%
Student	56.4%	43.0%	28.1%	28.6%	28.7%	29.0%	30.1%
Explained		17.7%	50.7%	48.4%	47.8%	53.2%	47.5%
Significance test							
X^2	1824.3	1700.2	1254.0$^+$	1304.0$^+$	1339.2$^+$	1158.0$^+$	1392.1$^+$
Reduction		124.1	446.2	396.2	361.0	542.2	308.1
Degrees of freedom		2	5	4	4	6	3
p-value		0.001	0.001	0.001	0.001	0.001	0.001

* = Statistically significant effect at 0.05 level was found.

$^+$Each alternative model 2 (i.e. Models 2a up to 2e) investigates the effect of each measurement dimension of effectiveness factors (i.e. frequency, stage, focus, quality, and differentiation respectively). Thus, the reduction of each model is estimated in relation to the deviance of Model 1.

dimension of this factor. This implies that school evaluation can contribute to the reduction of bullying when valid and reliable data are collected and used for formative reasons. Finally, for each outcome, less than 55% of the total variance is explained by each version of Model 2. However, one should bear in mind that in each version of Model 2 only one dimension of each factor was taken into account.

Thus, at the final stage of this analysis we added to Model 2a, which was concerned with the frequency dimension of the school and classroom factors, the other four measurement dimensions of these factors. Therefore, the fitting of Model 3 was tested against the Model 2a and the likelihood statistic (X^2) shows a significant change ($p < 0.001$). Moreover, for each scale measuring reduction of bullying, more than 70% of the variance situated either at the school or at the classroom level was explained. This implies that all five dimensions should be taken into account in order to explain as much variance as possible in outcomes used to measure teacher and school effectiveness in reducing bullying. However, Model 3 does not explain more than 65% of the total variance in each scale concerned with reduction of bullying. Thus, further studies looking at other factors should be conducted which may explain more variance in reduction of bullying (see Larochette et al., 2010).

Discussion

The study reported here was conducted in Cyprus and one could argue that the findings are restricted to that culture. However, the similar findings regarding bullying problems in some very different cultural surroundings such as Finland (Sairanen & Pfeffer, 2011), France (Richard et al., 2011), Hong Kong (Wong, Lok, Lo, & Ma, 2008), South Africa (Liang, Flisher, & Lombard, 2007), and the US (Bauman, Rigby, & Hoppa, 2008), suggest that the nature and dynamics of the problem are relatively comparable from one cultural context to another. Although a great number of studies have focused on student level factors and characteristics that explain aggression and bullying (e.g. Gini, 2006), the findings of this study reveal that teacher and school factors should also be examined. Specifically, it is shown that there are teachers and schools which are more effective than others in facing and reducing bullying and variation in their effectiveness status can be explained by classroom and school level factors measuring the classroom and the school learning environment. These findings are in line with those that emerged from studies which were conducted in different countries and examined classroom level differences in bullying. These studies indicated that classroom-level differences explained 11% to 14% of the total variance in change in student self-reported aggression and victimization (Mercer, Mcmillen, & Derosier, 2009). A similar figure about the teacher effect was obtained by this study which also investigates the impact of school factors on reduction of bullying. The study reported here reveals that there is also variation at the school effectiveness in reducing bullying. Richard et al. (2011) have identified a school effect on reduction of bullying by conducting a study in France. Their study shows that specific school climate

variables can explain a significant percentage of school level variance in verbal/relational bullying. The study reported here takes into account both the teacher and the school effect on reduction of bullying and shows that both the classroom and the school learning environment are associated with reduction of bullying. In this way, we raise the importance of investigating simultaneously the impact of both the classroom and school learning environment and designing interventions that address factors operating at both levels. For example, Hirschstein et al. (2007) show that, teachers' efforts in coaching and supporting corresponded to observed changes in student aggression, victimization, and bystander behaviour. However, in order to deal effectively with bullying you also need to address factors operating at the school level which may have an impact on improving the learning environment of the whole school rather than only supporting teachers to improve their own classroom learning environment. This study seems to provide support for the use of whole school approaches in facing bullying. In addressing the problem of bullying, not only support to individual victims and bullies should be provided but also actions should be taken to improve the functioning of the classroom and school learning environment (Smith et al., 2004; Wilson, Lipsey, & Derzon, 2003).

Second, the findings of this study reveal that the quality dimension of the school evaluation factor was associated with reduction of bullying. This implies that support should be provided to schools in order to establish valid and reliable evaluation mechanisms and identify those aspects of the classroom and school learning environment that need to be improved (i.e. their priorities for improvement). This is in line with previous research which pointed to the importance of including predictors at multiple levels as initial teacher-reported aggression predicted change in student self-reported aggression differently at the student and classroom level (Mercer et al., 2009). Thus, support could be provided to teachers and other school stakeholders in order to establish school self-evaluation mechanisms, identify their improvement priorities, and develop action plans aiming to improve the learning environment at the school and classroom level (Baldry & Farrington, 2007). By improving these factors, schools may create conditions for effective implementation of a whole-school intervention aiming to face and reduce bullying.

Third, this study reveals the added value of using different dimensions to measure the classroom and school factors associated with reduction of bullying. Specifically, for each dependent variable measuring reduction of bullying, the five alternative models used to examine the impact of each of the five measurement dimensions fit the data better than Model 1 which was concerned with the impact of contextual factors (see Tables 1 and 2). Moreover, taking into account the combination of frequency dimension with other dimensions of the classroom and school level factors increases the explained variance on reduction of bullying. Furthermore, there are factors which were found to have no statistically significant effect on reduction of bullying by measuring the impact of their frequency dimension but had a significant impact on reducing bullying when other dimensions were taken into account. This implies that both the quantitative and qualitative

characteristics of these factors should be taken into account for improvement purposes. For example, the school management team may realize that more emphasis should be given not only to the quantitative presence of each factor concerned with the school policy on bullying but also to some qualitative characteristics of the tasks associated with each factor concerned with dimensions such as the focus, stage, and differentiation. Implications for research can also be drawn. Further research may evaluate the impact of whole school based interventions which address improvement priorities of schools concerned with specific classroom and/or school learning environment factors and their dimensions. In this way actions could be taken by school stakeholders in order to help them design school self-evaluation mechanisms which will help schools to identify improvement areas. Supporting schools in designing and implementing their action plans is also an important type of support that should be offered to school stakeholders.

Fourth, one could claim that the identified relationships between each factor and bullying through cross-sectional studies are bidirectional and that bullying may alter the school and classroom learning environment. However, this study is concerned with reduction of bullying during a school year and not with the bullying incidents in schools at the end of the school year. Thus, the study demonstrates that there are associations between the school and teacher factors and reduction of bullying. Nevertheless, we acknowledge the limitations of this study in demonstrating cause and effect relations between the teacher and school factors and the reduction of bullying. Experimental studies could be conducted to find out if the identified relations can be treated as cause and effect relations. In these studies, support could be provided to schools and the impact of this approach on reduction of bullying could be compared with the reduction of bullying in schools and teachers employing alternative approaches to reducing bullying. By conducting a group randomization study, we may draw some strong arguments on the importance of improving the school and the classroom factors and through that on reducing bullying.

Finally, implications for the role of school psychologists can be drawn. This study seems to reveal that school psychologists can be instrumental in fostering positive classroom and school learning environment and could be proactive in this endeavor (Lehr & Christenson, 2002; Richard et al., 2011). Therefore, we encourage school psychologists to work with the school management team to improve the school learning environment and visit the classrooms in order to derive an understanding of both the classroom and school learning environments in which they work. In addition, the importance of the school evaluation factor reveals that school psychologists can play an active role in helping schools develop instruments and measure their classroom and school learning environment. Support could also be provided in order to help school stakeholders identify their improvement priorities, develop action plans to improve their classroom and school learning environment, and ultimately reduce the bullying incidents. School psychologists have positive attitudes towards whole school interventions which aim to improve the school learning environment (Woods, Bond, Tyldesley, Farrell & Humphrey, 2011).

Conclusion

Results from this study show that there are teachers and schools which are more effective than others in reducing bullying. Factors concerned with the classroom and the school learning environment were found to explain variation in teacher and school effectiveness in reducing bullying. These findings provide strong arguments for establishing school-based initiatives for reducing bullying which incorporate interventions supporting teachers, the school management team, and other school stakeholders to improve their learning environment. The formative function of school evaluation was also found to explain variation on the effectiveness status of schools in reducing bullying. Thus, school psychologists can make use of the findings and support this approach by helping schools to develop instruments measuring their learning environment and identify priorities for improvement. Support should also be provided to schools in their attempt to develop and implement action plans aiming to reduce bullying through improving their classroom and school learning environment.

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