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Bullying by siblings and peers: Poly setting victimisation and the association with problem behaviours and depression

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Abstract

Background

In recent times, sibling bullying has emerged of interest to researchers concerned with the emotional and behavioural implications for victimisation regardless of type and setting.

Aims

This research attempts to extend current knowledge on both peer and sibling bullying and to determine the effects of poly-setting victimisation. This paper is concerned with the following objectives: (1) determining the current rate of bullying and victimisation among siblings and peers in a large sample of adolescents; (2) investigating the relationship between sibling and peer bullying and depression and behaviour; (3) highlighting the carry over effects of bullying from one setting to another and (4) determining the overall association of poly-setting victimisation with depression and behaviour.

Sample and Methods

Over two thousand adolescents aged between 12 and 15 years participated in an online survey.

Results

Results found lower rates of sibling bullying compared to international studies. Sibling victims of bullying were at increased risk of becoming peer victims. Poor friendship quality, disliking school, along with peer and sibling bullying involvement predicted scores in the clinical range for outcome measures of internalising and externalising problem.

Conclusions

The current study has clinical and educational implications for working with all important stakeholders (i.e., schools, parents, siblings) to reduce bullying and improve mental health.

Key words: bullying; siblings; depression; problem behaviours

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Introduction

The burgeoning field of peer bullying research has provided much needed insights into child and adolescent development, such as the association with childhood adversity and psychopathology in later life (Arseneault et al., 2011). Regardless of the methods used, research has demonstrated a significant link between bullying experiences and social, behavioural and psychological problems. For peer bullying, exposure to such incidences has been associated with anxiety, depression, psychosis, lower self-esteem, borderline personality disorder and even suicide across all age groups (Fisher et al., 2013; Kelleher et al., 2013; Patchin & Hinduja, 2010; Winsper, Hall, Strauss & Wolke, 2017; Wolke, Copeland, Angold, & Costello, 2013). Other factors such as lower academic achievement and early school leaving are demonstrated outcomes of bullying (Cornell, Huang, Gregory & Xitao, 2013; Hammig & Jozkowski, 2013) and the impact has been shown to be long-lasting (Takizawa, Maughan & Arseneault, 2014).

While the literature is abundant with studies on the impact of peer bullying, bullying between brothers and sisters, is less researched. Sibling bullying is the term used to refer to bullying behaviour when occurring between siblings of any age and gender. For many, aggression between siblings is considered a normal part of childhood and individuals are generally more complacent about sibling violence compared to peer violence (Reese-Weber, 2008). One systematic review in 2015 found only 19 studies that specifically investigated risk factors, relationship to peer bullying and/or the mental health consequences of sibling bullying (Wolke, Tippett & Dantchev, 2015). The same review found the rate of sibling bullying to be generally higher than peer bullying (e.g., 10-40% compared to 2-20% respectively), with similar results documented elsewhere in the literature (Hoffman, Kiecolt & Edwards, 2005). It is astonishing that this research area has not developed more, especially when one considers that children spend more time with siblings than parents by the time they

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reach middle childhood (Faith, Elledge, Newgent & Cavell, 2015). Despite this, studies have recognised sibling bullying as one of the most prevalent, long lasting, and damaging experiences for young people (e.g., Hardy, 2001; Khan & Cooke, 2013; Bowes, Wolke, Joinson, Lereya & Lewis., 2014; Dantchev, Zammit & Wolke, 2018).

For the most part, sibling bullying is defined in the same manner that peer bullying is, only that it applies to the unique relationship between siblings of any age or gender. As such, there are particular elements specific to sibling bullying which separate it from aggression, harassment and fighting. These include repetition, intent to hurt, negative outcomes and a power hierarchy (Olweus, 1991). In general, research suggests that individuals involved in sibling bullying are more likely than those not involved to report mental health problems (Tucker, Finkelhor, Turner & Shattuck, 2013), abuse substances (Button & Gealt, 2010) and to engage in anti-social behaviour towards peers (Ensor, Marks, Jacobs & Hughers, 2010; Menesini, Camodeca & Nocentini, 2010). As the number of siblings increases there is also an increase in the likelihood of both bullying perpetration and victimisation (Bowes et al., 2014; Tippett & Wolke, 2015). In addition, the outcomes for those involved in *both* sibling and peer bullying can be particularly damaging (Duncan, 1999; Dantchev et al., 2018). Furthermore, the relationship between sibling and peer bullying appears to have the potential to predict, in that poor sibling relationships may influence and even determine, poor peer relationships (e.g., Defoe et al., 2013; Johnson et al., 2014).

While there have been some international investigations of sibling bullying elsewhere (e.g., Tanrikulu & Campbell, 2015; Wolke & Samara, 2004), this is the first large-scale study to investigate this issue with adolescents in the Republic of Ireland. For the most part, current research has established a link between sibling bullying and mental health problems (particularly to depression; Bar-Zomer & Brunstein Klomek, 2018) and on the role of social support in preventing internalising problems (e.g., Coyle, Demaray, Malecki, Tennant &

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Klossing, 2017). As such, this study aims to build on previous international research on the implications of sibling bullying, while investigating this issue with an Irish population.

We were specifically concerned with the following research questions: What is the current rate of bullying and victimisation among siblings and does it differ for specific types of bullying behaviour including physical, verbal and relational bullying? What are the carry-over effects between sibling and peer bullying? What is the relationship between involvement in sibling bullying and internalising and externalising problems? What is the relationship of poly-setting bullying and/or victimisation (i.e., sibling victimisation and peer victimisation) and internalising and externalising problems? And finally, is involvement in sibling and/or peer bullying associated with levels of internalising and externalising problems in a cross-sectional sample?

Method

This study involved a cross-sectional analysis of sibling and peer bullying involvement in teenagers aged 12-15 years [M(SD): 13.5(1)] and attending 1st to 3rd year in post-primary schools across Ireland. All post-primary schools in the country (N=811) were initially contacted by email asking them to take part in the study. A reminder email was sent two weeks later. Thirty-two schools initially responded and agreed to participate, two of which later declined, leaving 30 participating schools representing 3.7% of the entire post-primary population. Originally, 2,606 students were recruited from these schools, however 196 students declined to participate by selecting the relevant option when presented with the survey. This resulted in a final sample of 2,410 junior cycle post-primary students, 1018 males (43.2%) and 1338 (56.8%) females. Out of the final sample, 2,144 participants (87.7%) were Irish (see Table 1). The number of participants who reported having at least one sibling was 2,247 (93%). The mean number of siblings was 2.3.

TABLE 1 HERE

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Ethical issues

This study received ethical approval from the first author's university ethics review board. Principals were contacted initially and written information about the study was provided by email. Once consent was obtained at this level, parental information and consent forms were provided to parents by the participating schools. The survey was delivered online and took place during one class sitting. A unique link to complete the survey was given to each participating school and the principal shared it with the teachers of the respective class groups. Before the students were presented with the survey, they were first given a plain language statement about the research. Students were also informed that they do not have to complete the survey and were free to stop participating at any time. Students had to actively select a response saying they gave their consent before they were able to access the survey. Responses were completely anonymous at both the pupil and school level. Data collection took place between March-May 2017.

Survey Instruments

Demographic variables. Participants were first asked to provide information about their gender (male/female), year group (first, second or third year), nationality (stating it specifically) and the number of siblings they had.

Bullying questionnaires. Participants were presented with the following definition of bullying based on the Olweus Bullying Questionnaire (OBQ, 1996):

We say a student is being bullied when another student, or several other students: (a) say mean and hurtful things or make fun of him/her or call him/her mean and hurtful names; (b) completely ignore or exclude him/her from their group of friends or leave him/her out of things on purpose; (c) hit, kick, push, shove around or lock him/her inside a room; (d) tell lies or spread false rumours about him/her or send mean notes and try to make other students

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dislike him/her; (e) and any other hurtful things like that. When we talk about bullying, these things happen repeatedly, and it is difficult for the student being bullied to defend himself or herself. We also call it bullying, when a student is teased repeatedly in a mean and hurtful way. But we don't call it bullying when the teasing is done in a friendly and playful way. It is not bullying when two students of about equal strength or power argue or fight.

Peer Bullying Instrument. Involvement in peer bullying was determined using a modified version of the OBQ. This included three questions relating to physical bullying (e.g., I was hit, kicked, pushed, shoved around, or locked indoors); three questions relating to verbal bullying (e.g., I was called mean names, was made fun of, or teased in a hurtful way) and two relating to relational bullying (e.g., other students let me out of things on purpose, excluded me from their group of friends or completely ignored me). Response options were: "I haven't been bullied in school (0), It has only happened once or twice (1), 2 or 3 times a month (2), about once a week (3) and several times a week (4)". Responses were coded as not involved (0 and 1) and involved (2, 3,4) and then all questions relating to specific bullying type were combined to give an overall variable for involvement in three types of bullying: physical, verbal and relational. Similar questions and coding were asked in relation to peer bullying perpetration. We categorised the variable into pure bullies (frequently involved in bullying others (2, 3, 4) but never or rarely victimised 0, 1), pure victims (frequently involved in victimisation (2, 3, 4) but never or rarely bullied others (0, 1), bully-victims (frequently involved in bullying others and victimisation (2, 3, 4) and neutrals (never or rarely bullied and victimised 0, 1). This instrument had good internal consistency in the current study (Cronbach alpha coefficient was .78 for victimisation and .9 for bullying perpetration).

Happiness with school. Participants were asked a question relating to how much they liked school: "How much do you like school?" Participants chose the answer that applied to

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them the most from the following response options: I dislike school very much; I dislike school; I neither like nor dislike school; I like school; and I like school very much.

Sibling bullying. Involvement in sibling bullying was measured with a 7-item scale based on a modified version of the OBQ used in a previous study (Wolke & Samara, 2004). Participants were given the following instruction before being presented with the items: *During the last 3 months, please say if any of these things have been done to you by a brother or sister on purpose.* Two questions related to physical bullying (e.g., I was hit, kicked, pushed or threatened); one item measured verbal bullying (e.g., I was called bad or nasty names); and two measured relational bullying (e.g., I was tricked in nasty way). Response options were: never (0), It has only happened once or twice (1), 2 or 3 times a month (2), about once a week (3) and several times a week (4). Responses were coded as not involved (0 and 1) and involved (2, 3,4) and then all questions relating to specific bullying type were combined to give an overall variable for involvement in three types of bullying: physical, verbal and relational. Similar questions and coding were asked in relation to sibling bullying perpetration (e.g., during the last 3 months, please say if you have done any of the following things to a brother or sister on purpose). This instrument had good internal consistency in the current study (Cronbach alpha coefficient was .87 for sibling victimisation and .89 for sibling bullying). The same classification was done for sibling bullying to pure bullies, pure victims, bully-victims and neutrals.

Behaviour Questionnaire. The Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997; 2001) was administered to all pupils (www.sdqinfo.com). It includes five subscales which relate to conduct (e.g., I get very angry), emotional (e.g., I worry a lot), peer (e.g., I am usually on my own) and hyperactivity problems (e.g., I am easily distracted), as well as prosocial behaviour (e.g., I try to be nice to other people). Higher scores indicate higher levels of each category. Information about how the SDQ was coded and analysed is

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provided in the “Statistical Analysis” section. This instrument had satisfactory internal consistency in the current study for the total difficulties scale (Cronbach alpha coefficient was .77); emotional subscale (Cronbach alpha coefficient was .77); conduct problems (Cronbach alpha coefficient was .59); hyperactivity (Cronbach alpha coefficient was .6) and pro-social subscales (Cronbach alpha coefficient was .79). The reliability for the peer problems subscale (Cronbach alpha was .26) was considered too low to be included in further analysis but the conduct problems and hyperactivity subscales were retained.

Moods and Feelings Questionnaire. The Moods and Feelings Questionnaire short version (MFQ, Angold, Costello, Messer, Pickles, Winder & Silver 1995; Messer, Angold, Costello, Loeber, Van Kammen & Stouthamer-Loeber, 1995) was used to determine how participants were feeling in the past two weeks. Previous studies have found it to be a reliable and valid measure of depression in populations aged 6-17 years (e.g., Jeffreys et al., 2016). Answer options included: not true (0), sometimes true (1) and true (2). A higher overall score indicates higher depression. This instrument had good internal consistency in the current study (Cronbach alpha coefficient was .93).

Cambridge Hormones and Moods Friendship Quality Questionnaire. A modified version of this scale was included to investigate the quality of the friendships the participants reported having with their peers (Goodyer, Wright, & Altham, 1989, 1990). It contained five questions: (1) Are you happy with the number of friends you have? (2) Do your friends know what makes you happy or sad? (3) How often do you see your friends outside of school? (4) Do you talk to your friends about problems? (5) Overall, are you happy with your friends? Response options ranged from simple YES/NO answers (e.g., Q2) to Likert type answers where a higher number for the coded response represented poorer friendship quality (e.g., Q5: very happy (1); quite happy (2); quite unhappy (3) and unhappy (4)). This instrument had Cronbach alpha coefficient of .6.

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Statistical Analysis

The statistical software package SPSS version 24 was used to conduct all analysis. Chi square test for independence was used to determine if there were gender differences in involvement in the various types and roles of sibling bullying and victimisation, as well as to determine the carry over effects with peer bullying. To account for the nested data of the data, we used the complex samples module taking into account schools as a cluster level factor and conducted general linear model ANOVAs. This is to explore the relationship between involvement in different types of sibling bullying and behaviour and depression levels (measured by the MFQ, SDQ and SDQ sub-scales). We used the same method to investigate the association with depression and behaviour when individuals were involved in bullying with siblings, peers or both (i.e., poly-setting involvement). Bonferroni corrections with the significance value set to .01 were used.

We also conducted a two-level logistic regression analysis to investigate which variables predicted higher scores on the MFQ, SDQ and its sub-scales. The first level involved entering the variable 'school' only while the second level included the other independent variables. Scores on the SDQ were re-coded and split for the borderline and clinical range ($\geq 80^{\text{th}}$ percentile) versus normal range ($<80^{\text{th}}$ percentile) as dependent variables. Using the 80^{th} percentile as a cut of point for the borderline and clinical range is standard practice and has been demonstrated as having concordance with DSM-IV diagnosis (He, Burstein, Schmitz, & Merikangas, 2013). The independent variables included friendship quality, happiness with school, age, gender, number of siblings, nationality, involvement in peer or sibling bullying and/or victimisation. Multiple regression was used to investigate the role of the same variables in predicting scores on the MFQ (as this involved a continuous variable).

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Considering the nature of the student data reported (i.e., nested within schools), hierarchical linear modelling was also conducted to determine the role of school in the prevalence of bullying where bullying and victimisation by peers and siblings were considered as outcomes. For this analysis, four new *continuous* variables were created for: 1) sibling victimisation, 2) sibling bullying, 3) peer victimisation and 4) peer bullying, where a higher number indicated more of each. We then used HLM to generate a random-intercept model first with subsequent fixed predictors. A model containing only school and these four new continuous variables as outcomes was first generated to determine if school was significant. A second model was built with fixed predictor variables (e.g., gender, age). School was added as a random factor while the other predictors (e.g., age, gender, nationality, friendship) as fixed model factors. Interclass Correlation Coefficients (ICCs) were also calculated for each model. The ICC is the proportion of variance in the outcome variable that is explained by the grouping structure of the hierarchal model (see Heck et al., 2014). The ICC is used to determine whether there is a significant clustering of observations within higher level units or in this case, at the school level.

Results

Sibling victimisation and bullying

Involvement in sibling and peer bullying was categorised into four groups: bully, victim, bully-victim (both a victim and a bully) and neutrals (no involvement in bullying) for each bullying type (see Table 2). When asked who they were bullied by, 25.9% said older brother, 21.2% said older sister, 25.2% said younger brother, 24.9% said younger sister and 2.8% said a mixture of ages/siblings.

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Chi square analysis revealed a significant effect for gender and overall involvement in sibling bullying (not split for specific types) [χ^2 (3, n=2026) = 14.4, $p < .05$, $\phi = .083$]; physical sibling bullying [χ^2 (3, n=2030) = 11.2, $p < .05$, $\phi = .074$]; verbal sibling bullying [χ^2 (3, n=2040) = 19.9, $p < .001$, $\phi = .099$] but not relational sibling bullying ($p > .05$). There were more female victims and bully-victims across all types of sibling bullying involvement (see Table 2).

There was a significant effect for gender and overall involvement in peer bullying [χ^2 (3, n=2246) = 11.1, $p < .05$, $\phi = .07$], as well as in each of the types of peer bullying: physical bullying [χ^2 (3, n=2256) = 10.6, $p < .05$, $\phi = .068$]; verbal [χ^2 (3, n=2255) = 13.2, $p < .005$, $\phi = .076$]; and relational [χ^2 (3, n=2251) = 29.1, $p < .001$, $\phi = .114$]. More males were physical peer bullies, victims and bully-victims, while females were more likely to be verbal and relational peer victims compared to males.

TABLE 2 HERE

Overlap between sibling and peer bullying

Chi square analysis was used to determine if there were any carry over effects between the subgroups of peer and sibling bullying. Or to put it another way, we wanted to determine the odds of individuals being involved in peer bullying (across the different groups) while taking account of their role in sibling bullying. There was a significant carry over effect for all peer and sibling bullying subgroups relationships (all $ps < .001$). Odds Ratios demonstrated the relative risk of involvement in sibling bullying/victimisation and peer bullying/victimisation (see Table 3). This indicates that all sibling subgroups (bullies, victims and bully-victims) were more likely to be peer bullies, victims or bully-victims compared to neutrals. The strongest carry effect was for the bully-victim subgroup (sibling bully-victim to peer bully-victim; OR: 12.2) followed by those who are sibling victims and

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also peer bully-victims (OR: 7.34). The weakest carry over effect, although significant, was from sibling bully to peer victim (OR: 1.98; see Table 3).

Table 3 HERE

Sibling bullying, behaviour and depression

We conducted general linear model ANOVAs with Bonferroni corrections to determine the role of sibling bullying involvement on internalising and externalising problems (SDQ and MFQ). Due to the fact that there were several ANOVAs conducted, and an increased chance of a type 1 error, we set the significance level of .01 (instead of .05). In addition, as the data were nested among schools, we used the complex samples module in SPSS to conduct the general linear models and conduct means comparisons. A new plan file was first established with 'school' inputted at stage one as a 'cluster'. The results found significant differences between sibling *physical bullying* involvement on the MFQ [(Wald F (3, 23) =40.1, $p < .001$), total difficulties [(Wald F (3, 23) =34.4, $p < .001$), emotional problems [(Wald F (3, 23) =15.2, $p < .001$); conduct problems [(Wald F (3,23) =30.7, $p < .001$); hyperactivity [(Wald F (3, 23) = 9.93, $p < .001$); and prosocial behaviour [(Wald F (3, 23) =14.8, $p < .001$] scales (see Table 4).

There was a significant difference between involvement in *relational sibling bullying* subgroups on the MFQ [(Wald F (3, 23) =42.7, $p < .001$), total difficulties [(Wald F (3,23) =34.2, $p < .001$), emotional problems [(Wald F (3, 23) =15.2, $p < .001$); conduct problems [(Wald F (3, 23) =37.5, $p < .001$); hyperactivity [(Wald F (3, 23) =9.12, $p < .01$); and prosocial behaviour [(Wald F (3, 23)=14.8, $p < .001$] scales.

In addition, there was a significant difference for *verbal sibling* bullying subgroups on the MFQ [(Wald F (3, 23) =68.8, $p < .001$), total difficulties [(Wald F (3, 23) =28.9, $p < .001$), emotional problems [(Wald F (3, 23) =18.1, $p < .001$); conduct problems [(Wald F (3, 23)

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=30.9, $p < .01$]; hyperactivity [(Wald $F(3, 23) = 9.68$, $p < .001$]; and prosocial behaviour [(Wald $F(3, 23) = 5.01$, $p < .01$] scales. Post-hoc comparisons using Bonferroni indicated a range of significant differences between victims, bullies, bully-victims when compared to neutrals (see Table 4).

TABLE 4 HERE

Involvement in multiple settings and association with depression and behaviour

Using the same procedure as above we also investigated overall involvement, regardless of bullying type (e.g., physical, relational or verbal) and association with the SDQ, SDQ sub-scales and MFQ. Participants were split into four groups: neutrals, sibling only, peer only and poly for victimisation, perpetration and bully-victims (see Supplement 1).

Victimisation. General linear model analyses revealed significant differences between the four groups on the MFQ [($F(3, 23) = 157$, $p < .001$], total [($F(3, 23) = 20.7$, $p < .001$], emotional [($F(3, 23) = 25.4$, $p < .001$], conduct [($F(3, 23) = 13.2$, $p < .001$] and hyperactivity [($F(3, 23) = 6.01$, $p < .01$] subscales. The significance level was set to .01 or .001 and all differences from neutrals are noted in Supplement 1. Extra group comparisons indicated that poly victims scores were significantly higher than sibling victims on the MFQ ($p < .001$).

Bullying perpetration. There were significant differences for perpetration between the four groups on the MFQ [($F(3, 23) = 22.4$, $p < .001$], total difficulties [($F(3, 23) = 29.3$, $p < .001$], emotional [($F(3, 23) = 5.30$, $p < .01$], conduct [($F(3, 23) = 34.2$, $p < .001$], hyperactivity [($F(3, 23) = 8.05$, $p < .001$] and prosocial behaviour scale [($F(3, 23) = 4.93$, $p < .01$]. Extra group comparisons indicated that peer bullies had significantly less conduct problems compared to sibling and poly bullies ($p < .001$ and $p < .01$ respectively). Poly bullies demonstrated significantly higher depression scores than sibling bullies ($p < .001$). Poly bullies

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showed significantly higher scores than peer bullies on the total difficulties scale ($p < .001$; see Supplement 1).

Bully-victims. General linear model analyses revealed significant differences for the groups on the MFQ [$F(3, 23) = 85.2, p < .001$]; total difficulties [$F(3, 23) = 19.5, p < .001$]; emotional problems [$F(3, 23) = 11.3, p < .001$], conduct [$F(3, 23) = 25.2, p < .001$] and hyperactivity [$F(3, 23) = 8.73, p < .01$] and prosocial behaviour scale [$F(3, 23) = 4.55, p < .01$]. Extra group comparisons indicated sibling bully-victims were significantly more prosocial compared to poly bully-victims ($p < .01$), while poly bully-victims had significantly higher scores on the MFQ compared to sibling bully-victims ($p < .01$; see Supplement 1).

Predicting externalising and internalising problems

Taking into account the clustered nature of the data (within schools), two-level regression analyses were conducted to test the predictors of being in the borderline/clinical range for total difficulties, emotional problems, conduct problems, hyperactivity, and prosocial behaviour. The first level tested differences at the school level, while the second level in each model involved the addition of the predictor variables. The following variables were entered into the model at the second stage: friendship quality, nationality (Irish or non-Irish), happiness with school, age, gender, number of siblings, involvement in peer or sibling bullying (see Table 5). The school variable was significant at level one for total difficulties [$\chi^2(1, 1943) = 18, p < .001$], while the full model (with the predictors school, poor friendship quality, disliking school, being a peer victim, peer bully-victim, sibling victim and a sibling bully-victim) was also significant [$\chi^2(13, 1943) = 194, p > .001$], see Table 5. School was not significant at level 1 for the emotional subscale but the full model with six significant variables was significant [$\chi^2(13, 1943) = 211, p < .001$], see Table 5. Similar results were

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found for conduct problems where level 1 predictor school variable was not significant but the full model with eight significant variables was significant [χ^2 (13, 1943) = 155, $p < .001$]. School was a significant predictor at level 1 for hyperactivity [χ^2 (1, 1943) = 10.7, $p < .001$], as was the full model with six significant variables [χ^2 (13, 1943) = 105, $p < .001$]. School was not significant at level 1 for prosocial behaviour, but the full model with six significant variables was significant [χ^2 (13, 1943) = 146] (all $ps < .001$).

Multiple regression analysis (DV: total MFQ score) was employed to determine the role of friendship quality, happiness with school, age, gender, number of siblings, involvement in peer or sibling bullying and nationality on depression levels. Five significant contributing factors were significant (see Table 5). The final total model for depression was significant ($R^2 = .12$, adjusted $R^2 = .16$; $p < .001$).

TABLE 5 HERE

In terms of peer bullying, results from the HLM found that the first model indicated that school was significant for peer victimisation ($p < .05$), and not for peer bullying perpetration ($p > .05$). The second model indicated that school, poor friendship quality, disliking school and being of non-Irish nationality were significant predictor variables for peer victimisation, while only negative friendship quality, disliking school and non-Irish nationality were significant predictors of peer bullying (see supplement 2). For sibling victimisation, the first model with school only was not significant ($p > .05$) while the model for sibling perpetration was significant ($p < .05$). Being female, disliking school, and having poor friendship quality were significant predictors for sibling victimisation (all $ps < .01$). Being female, having higher number of siblings and disliking school were significant predictors for being a sibling bully (all $ps < .05$).

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Discussion

This study aimed to investigate bullying between siblings in Ireland and to provide a detailed analysis of prevalence for types of sibling and peer bullying (physical, verbal and relational). In addition, it documents the carry over effect of bullying involvement from one setting to another (i.e., sibling to peer) and demonstrates the mental health and behaviour implications of poly-involvement for all of the roles (victim, bully and bully-victim). The majority of this sample (93.5%) reported having at least one sibling and the average number of siblings was 2.3. The central statistics office in Ireland reported an average number of children per family as 1.38 in 2016, although it has been reported to be on the rise in recent years. This is considered one of the highest rates in Europe (European Commission, 2015). These differences may arise from the lack of a definition of sibling bullying provided in the current study. For example, the central statistics office refers to the number of ‘children per family’ (either for a couple or a single parent). Our study may suggest a higher number of children per family because participants were simply asked to report the number of brothers and sisters they had. No definition of ‘sibling’ was provided, and so participants could have reported on all brothers or sisters that they had (including step-siblings, half-siblings or foster siblings), as opposed to those connect to only one family unit (one or two parents). Future research needs to take this into account and ensure that all participants have a clear understanding of what the question refers to when using the terms sibling, half-sibling, step-sibling etc.

For sibling bullying, 13.2% reported being sibling victims, 3.2% reported being sibling bullies and 15.4% reported being bully-victims. These prevalence rates are generally much lower than international comparisons. For example, one study in the UK, reported rates as high as 45% for victims of sibling aggression (Tippett & Wolke, 2015). It is likely that the strict definition of bullying prohibited individuals from reporting sibling aggression or more

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general negative interactions with siblings. By providing a definition of bullying to the participants, we attempted to clearly articulate what this meant so that students did not confuse it with aggression or even fighting. Of course, our findings are limited in that we cannot say with absolute certainty that this is how participants interpreted the concept. Much like the peer bullying literature, the sibling bullying literature may struggle with definitional issues and with ensuring that all participants understand the concept in a similar manner.

For peer bullying, 14.7% reported being victims, 1.2% reported being peer bullies and 1.7% reported being bully-victims. The rate of peer victimisation is similar to that reported in a recent meta-analysis of all the studies published in Ireland on bullying in the last 20 years (Foody, Samara & O'Higgins Norman, 2017). However, for peer bullying perpetration, the rate appears much lower than the figure of 6.9% generated by the same meta-analysis. It is difficult to determine why this may be the case. One explanation is that the current study used a strict definition of bullying with regards to repetition and considered the first two Likert answer options (i.e., *I haven't been bullied in school* and *It has only happened once or twice*) as neutrals (no bullying involvement). Previous literature has highlighted that the coding of answers can greatly modify bullying rates from one study to the next (Foody et al., 2017).

In terms of gender, females were more likely to be sibling victims and sibling bully-victims for physical and verbal bullying when compared to males, while gender differences were minimal for sibling bullies with regards to all types of bullying perpetration. There were obvious gender differences for involvement in peer bullying (see Table 2). These results are generally in keeping with international comparisons in the peer bullying literature which demonstrate that males are more likely to be physical bullies (e.g., Silva, Pereira, Mendonça, Nunes, & de Oliveira, 2013) and females report more relational victimisation compared to males (Wang, Ionnotti & Nansel, 2009). However, the results from the sibling bullying data

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show that gender does not provide the same indicator of bullying involvement between brothers and sisters.

The carry-over analysis gave a clearer picture of the overlap between sibling and peer bullying. The strongest carry over effect was for the bully-victim subgroup (sibling bully-victim to peer bully-victim) followed by the sibling victim to peer bully-victim. The weakest carry over effect, although significant, was from sibling bully to peer victim. This is perhaps the most sobering result of this study and it clearly outlines the risk for further bullying experiences when there is previous exposure at home. It highlights the importance of parenting and the family unit in the prevention of bullying involvement (Bar-Zomer & Brunstein Klomek, 2018; Lereya et al., 2013). Furthermore, it suggests that the effectiveness of anti-bullying programmes at the school level may have limited effectiveness if not considered within the wider community context.

Interestingly, the prevalence of bully-victims varied a lot from sibling to peer bullying. The bully-victim group in the peer bullying is usually a small group but it seems that this is not the case in sibling bullying, where they represented the largest percentage. One explanation is that siblings exchange roles more regularly as they strive to gain more out of bullying including resources such as parental attention, affection, love and other material gains. In addition, the power imbalance changes more regularly amongst siblings (from bully to victims and vice versa) due to the interference of parents and other siblings, which could potentially play less of a role in peer interaction. There are many other developmental, psychological and logistical factors which may account for a changing imbalance of power between siblings such as age, conflict, time together and/or sibling spacing and location within the family unit. For example, some studies have suggested that sibling relationships become more egalitarian with age (e.g., Buhrmester, 1992), while others have suggested that

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firstborns maintain higher levels of control in family relationships than young siblings (Tucker, Updegradd & Baril, 2010).

Sibling bullying subgroups reported significantly more problems compared to neutrals in terms of depression and behavioural problems. For example, sibling relational bullies showed significantly more total difficulties, conduct and hyperactivity problems and less prosocial behaviour compared to neutrals. In addition, victims and bully-victims differed significantly from neutrals on measures of emotional problems, hyperactivity and depression (across all types of sibling bullying). This study adds to the growing literature demonstrating the negative implications of sibling bullying, specifically in terms of the link between sibling bullying involvement and depression. For example, Bowes, et al. (2014) found that children who were frequently bullied by a sibling were twice as likely to show symptoms of depression and self-harm in adulthood.

This is one of the few studies to use the SDQ with sibling bullying subgroups and to highlight the specific behavioural difficulties for these groups using the subscales. By so doing, we were able to look at the behavioural difficulties associated with sibling and peer bullying involvement in more detail. Poly-setting victimisation was associated with significantly more behaviour difficulties, depression, and emotional problems compared to neutrals, highlighting this issue as a serious concern for our adolescents. Similar negative outcomes were demonstrated for poly-setting bully-victims, raising concern over individuals who have problematic relationships with both siblings and peers. Interestingly, the individuals who were only peer bullies displayed few significant differences to neutrals in terms of internalising and externalising problems thus suggesting that problematic sibling relationships may in fact be key to negative outcomes. Sibling relationships need to be investigated in future research as potential predictors of poly bullying and victimisations. It is possible that interventions designed to reduce maladaptive social behaviour such as empathy

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and perspective-taking interventions could be helpful in this regard when implemented at home and at school (Foody & Samara, 2018).

For the most part, these conclusions are based on the SDQ being a valid instrument to measure internalising and externalising problems. However, we found extremely low reliability for the peer problems sub-scale in the current sample and decided to exclude it from the analysis. Two other sub-scales (conduct problems and hyperactivity), as well as the friendship questionnaire, had less than optimal internal reliability but we decided that they could be included in the analysis. We determined that the Cronbach alpha level was appropriate for this research study, even though a higher score is recommended for measures to be used in applied settings (Nunally, 1973). With this in mind, and the fact that the Cronbach alpha level for the subscales that were used in this study went from .60 to .77. it is important to note that some recent literature has suggested that it may not be the most ideal screening tool for such difficulties in young populations (Garrido et al., 2018). Future research will need to be conducted to determine the appropriateness of the SDQ for research purposes and these results will need to be considered in light of this new research agenda.

Regression analysis found that school, happiness with school, poor friendship quality, being a peer victim, peer bully-victim, sibling victim and sibling bully-victim were all predictors of being in the borderline-clinical range on the total difficulties scale. For the most part, being a victim of peer and sibling bullying and/or bully-victims were important predictors of overall behaviour problems and depression. In some cases, (e.g., with emotional problems and depression), gender, friendship quality and not liking school were also important predictors of outcomes when combined with bullying involvement. The predictor variables for significantly more conduct problems in the borderline-clinical range were unique in that they included being male, being younger in age, and being involved in both sibling and peer bullying (as victim, bully and bully-victim).

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Some limitations need to be mentioned when considering the current results. Firstly, while we report on a substantial sample size, it is by no means representative of the post-primary population in Ireland. Only 3.7% of all schools in the Republic of Ireland agreed to participate and many students from these schools did not complete the survey. In an attempt to ensure the feeling of anonymity for the schools, we did not collect information regarding school type, ethos, size, gender or location. It is important to note that our results should be considered in light of this.

A second limitation of this study is that it utilised a self-report tool to determine levels of bullying. While this is useful to allow us to compare prevalence rates with other countries, it is limited for many reasons. This method of data collection means our participants have to consider their answers subjectively, rather than objectively. Third, the results presented only demonstrated a cross-sectional relationship between bullying and psychological outcomes. Future research utilising longitudinal research methods would give a clearer picture of how these variables interact. Fourth, the definition provided to participants referred to peer bullying (and was inherently school-focused) and no definition of sibling bullying was provided. A clearer outline of what sibling bullying entails (i.e., intention, repetition, power hierarchy) needs to be included in future research. Finally, the standard OBQ asks students about bullying experiences in the current school year. The sibling bullying questionnaire asked about the previous 3 months. Given that data collection took place between the period of March-May, the timeframe for reporting peer bullying was greater than that for sibling bullying. While the negative association of involvement in either sibling or peer bullying would not be affected by this, it is important to consider the prevalence rates in light of this.

Despite the limitations, the current research extends knowledge on sibling bullying and adds to the poly-victimisation literature. It demonstrates novel findings in terms of the role of school, friendship quality as well as happiness in school as important predictors of

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behaviour problems within the clinical range (when combined with sibling and peer bullying involvement). The study also took into account the cluster nature of the data and included schools as a cluster variable. These findings are important for both mental health and school-based anti-bullying interventions and demonstrate that promoting positive siblingship, friendships, parental and school involvement are important factors in bullying prevention (Samara & Smith, 2008).

References

- Angold, A., Costello, E. J., Messer, S. C., Pickles, A., Winder, F., & Silver, D. (1995). The development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research*, 5, 237 – 249.
- Arseneault, L. P., Cannon, M. M. D. P., Fisher, H. L. P., Polanczyk, G. M. D. P., Moffitt, T. E. P., & Caspi, A. P. (2011). Childhood Trauma and Children's Emerging Psychotic Symptoms: A Genetically Sensitive Longitudinal Cohort Study. *The American Journal of Psychiatry*, 168(1), 65-72. DOI: [org/10.1176/appi.ajp.2010.10040567](https://doi.org/10.1176/appi.ajp.2010.10040567)
- Bar-Zomer, J., & Brunstein Klomek, A. (2018). Attachment to parents as a moderator in the association between sibling bullying and depression or suicidal ideation among children and adolescents. *Frontiers in Psychiatry*.
doi.org/10.3389/fpsy.2018.00072
- Bowes, L., Wolke, D., Joinson, C., Lereya, S.T., & Lewis, G. (2014). Sibling bullying and risk of depression, anxiety, and self-harm: A prospective cohort study. *Pediatrics*, 134(4), e1032-9. DOI: [10.1542/peds.2014-0832](https://doi.org/10.1542/peds.2014-0832)

Sibling and peer bullying: Associations with depression and behaviour

Button, D.M., & Gealt, R. (2010). High risk behaviors among victims of sibling violence.

Journal of Family Violence, 25, 131-140. DOI: 10.1007/s10896-009-9276-x

Cornell, D., Huang, F., Gregory, A., & Xitao, F. (2013). Perceived prevalence of teasing and

bullying predicts high school dropout rates. *Journal of Educational Psychology*,

105(1), 138-149. DOI:org/10.1037/a0030416

Coyle, S., Demaray, M.K., Malecki, C.K., Tennant, J.E., & Klossing, J. (2017). The

associations among sibling and peer-bullying, social support and internalizing

behaviors. *Child Youth Care Forum*, 46, 895-922.

Dantchev S, Zammit S, Wolke D. (2018). Sibling bullying in middle childhood and psychotic

disorder at 18 years: a prospective cohort study. *Psychological Medicine* [https://](https://doi.org/10.1017/S0033291717003841)

doi.org/10.1017/S0033291717003841

Defoe, I.N., Keijsers, L., Hawk, S.T., Branje, S., Dubas, S. J., Buist, K... Meeus, W. (2013).

Siblings versus parents and friends: Longitudinal linkages to adolescent externalizing

problems. *Journal of Child Psychology and Psychiatry*, 54(8), 881-889. DOI:

10.1111/jcpp.12049

Duncan, R. (1999). Peer and sibling aggression: An investigation of intra-and extra-familial

bullying. *Journal of Interpersonal Violence*, 14, 871–886.

Espelage, D.L., Hong, J.S., Kim, D.H. et al. (2018) *Child Youth Care Forum* 47,45.

<https://doi.org/10.1007/s10566-017-9416-z>

Ensor, R., Marks, A., Jacobs, L., & Hughes, C. (2010). Trajectories of antisocial behaviour

towards siblings predict antisocial behaviour towards peers. *The Journal of Child*

Psychology and Psychiatry, 51(11), 1208-1216. DOI: 10.1111/j.1469-

7610.2010.02276.x

Sibling and peer bullying: Associations with depression and behaviour

European Commission (2015). Eurostat Demography Report. European Union: Luxemburg.

Retrieved from: <https://ec.europa.eu/eurostat/documents/3217494/6917833/KE-BM-15-003-EN-N.pdf/76dac490-9176-47bc-80d9-029e1d967af6>

Faith, M.A., Elledge, L.C., Newgent, R.A., & Cavell, T.A. (2015). Conflict and Dominance between Siblings as Predictors of Children's Peer Victimization. *Journal of Child Family Studies*, 24(12), 3623-3635. DOI: 10.1037/a0020313

Finkelhor, D., Ormrod, R.K., & Turner, H.A. (2007). Poly-victimization: A neglected component in child victimization. *Child Abuse & Neglect*, 31, 7-26. DOI: 10.1016/j.chiabu.2006.06.008

Fisher, H. L., Schreier, A., Zammit, S., Maughan, B., Munafò, M. R., Lewis, G., & Wolke, D. (2013). Pathways Between Childhood Victimization and Psychosis-like Symptoms in the ALSPAC Birth Cohort. *Schizophrenia Bulletin*, 39(5), 1045-1055. DOI: 10.1093/schbul/sbs088

Foody, M., & Samara, M. (2018). Considering mindfulness techniques in school-based anti-bullying programmes. *Journal of New Approaches in Educational Research*, 7(1), 3-9. DOI: 10.7821/naer.2018.1.253

Foody, M., Samara, M., & O'Higgins Norman, J. (2017). A meta-analysis of bullying and cyberbullying studies on the island of Ireland. *The British Journal of Educational Psychology*. DOI: 10.1111/bjep.12163

Garrido, L.E., Barrada, J.R., Aguasvivas, J.A., Martínez-Molina, A., Arias, V.B., Golino, H.F., Legaz, E., Ferrís, G., & Rojo-Moreno, L. (2018). Is small still beautiful for the Strengths and Difficulties Questionnaire? Novel findings using exploratory structural equation modelling. *Assessment*. <https://doi.org/10.1177/1073191118780461>

Goodman, R. (1997). The Strength and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, 38, 581-586.

Sibling and peer bullying: Associations with depression and behaviour

Goodman, R. (2001). Psychometric properties of the Strength and Difficulties Questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*, 1337–1345. DOI: [org/10.1097/00004583-200111000-00015](https://doi.org/10.1097/00004583-200111000-00015)

Goodyer, I. M., Wright, C., & Altham, P. M. E. (1989). Recent friendships in anxious and depressed school age children. *Psychological medicine, 19*(1), 165-174.

Goodyer, I., Wright, C., & Altham, P. (1990). The friendships and recent life events of anxious and depressed school-age children. *The British Journal of Psychiatry, 156*(5), 689-698.

Hammig, B., & Jozkowski, K. (2013). Academic Achievement, Violent Victimization, and Bullying Among U.S. High School Students. *Journal of Interpersonal Violence, 28*(7), 1424-1436. DOI: [10.1177/0886260512468247](https://doi.org/10.1177/0886260512468247)

Hardy, M. S. (2001). Physical aggression and sexual behavior among siblings: A retrospective study. *Journal of Family Violence, 16* (3), 255–267. DOI: [org/10.1023/A:1011186215874](https://doi.org/10.1023/A:1011186215874)

He, J-P., Burstein, M., Schmitz, A., & Merikangas, K.R. (2013). The Strengths and Difficulties Questionnaire (SDQ): the factor structure and scale validation in U.S. adolescents. *Journal of Abnormal Child Psychology, 41*, 583-595.

Hoffman, K. L., Kiecolt, J., & Edwards, J. N. (2005). Physical violence between siblings: A theoretical and empirical analysis. *Journal of Family Issues, 26*(8), 1103–1130. DOI: [org/10.1177/0192513X05277809](https://doi.org/10.1177/0192513X05277809)

Jeffreys, M., Rozenman, M., Gonzalez, A., Warnick, E.M., Dauser, C., Scahill, L., Woolston, J., & Weersing, R. (2016). Factor structure of the Parent-report Mood and Feelings Questionnaire (MFQ) in an Outpatient Mental Health Sample. *Journal of Abnormal Child Psychology, 44*(6), 111-20. DOI: [10.1007/s10802-015-0108-6](https://doi.org/10.1007/s10802-015-0108-6)

Johnson, R.M., Duncan, D.T., Rothman, E.F., Gilreath, T.D., Hemenway, D., Molnar, B.E.,

Sibling and peer bullying: Associations with depression and behaviour

& Azrael, D. (2014). Fighting with siblings and with peers among urban high school students. *Journal of Interpersonal Violence, 30*(13), 2221-2237.

DOI: 10.1177/0886260514552440

Kelleher, I. M. D. P., Keeley, H. M. D., Corcoran, P. P., Ramsay, H. M. D., Wasserman, C. M. A., Carli, V. M. D. P., . . . Cannon, M. M. D. P. (2013). Childhood Trauma and Psychosis in a Prospective Cohort Study: Cause, Effect, and Directionality. *The American Journal of Psychiatry, 170*(7), 734-741.

DOI:org/10.1176/appi.ajp.2012.12091169

Khan, R., & Cooke, D.J. (2013). Measurement of Sibling Violence: A Two-Factor Model of Severity. *Criminal Justice and Behavior, 40* (1), 2639.

doi.org/10.1177/0093854812463349

Menesini, E., Camodeca, M., Nocentini, A. (2010). Bullying among siblings: The role of personality and relational variables. *British Journal of Developmental Psychology, 28*(4), 921-939. DOI: 10.1348/026151009X479402

Messer, S. C., Angold, A., Costello, E.J., Loeber, R., Van Kammen, W., & Stouthamer-Loeber, M. (1995). Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents: Factor composition and structure across development. *International Journal of Methods in Psychiatric Research, 5*, 251-262.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

Olweus, D. (1991). Bully/victim problems among schoolchildren: Basic facts and effects of a school based intervention program. In D. J. Pepler & K. H. Rubin (Eds.), *The development and treatment of childhood aggression* (pp. 411–448). Hillsdale, MI: Erlbaum.

Sibling and peer bullying: Associations with depression and behaviour

Olweus, D. (1996). The Revised Olweus Bullying Questionnaire [Mimeo]. Bergen, Norway:

Research Center for Health Promotion (HEMIL): University of Bergen, N-5015

Bergen, Norway.

Patchin, J. W., & Hinduja, S. (2010). Cyberbullying and Self-Esteem. *Journal of School*

Health, 80(12), 614-621. DOI: 10.1111/j.1746-1561.2010.00548.x

Reese-Weber, M. (2008). A new experimental method assessing attitudes toward adolescent

dating and sibling violence using observations of violent interactions. *Journal of*

Adolescence, 31(6), 857-876. DOI: 10.1016/j.adolescence.2007.11.002

Samara, M., & Smith, P. K. (2008). How schools tackle bullying, and the use of whole school

policies: changes over the last decade. *Educational Psychology*, 28(6), 663 - 676.

Silva, M. A. I., Pereira, B., Mendonça, D., Nunes, B., & de Oliveira, W. A. (2013). The

involvement of girls and boys with bullying: An analysis of gender

differences. *International Journal of Environmental Research and Public*

Health, 10(12), 6820-31. DOI: 10.3390/ijerph10126820

Skinner, J.A., & Kowalski, R. (2013). Profiles of sibling bullying. *Journal of Interpersonal*

Violence, 28(8), 1726-1736. DOI: 10.1177/0886260512468327

Spriggs, A.L., Iannotti, R.J., Nansel, T.R., & Haynie, D. (2007). Adolescent bullying

involvement and perceived family, peer and school relations: Commonalities and

differences across race/ethnicity. *Journal of Adolescent Health*, 41(3), 283-293.

DOI:10.1016/j.jadohealth.2007.04.009

Takizawa, R., Maughan, B., & Arseneault, L. (2014). Adult health outcomes of childhood

bullying victimization: Evidence from five-decade longitudinal British birth cohort.

The American Journal of Psychiatry, 171(7), 777-784. DOI:

org/10.1176/appi.ajp.2014.13101401

Tanrikulu, I., & Campbell, M.A. (2015). Sibling bullying perpetration: Associations with

Sibling and peer bullying: Associations with depression and behaviour

gender, grade, peer perpetration, trait anger and moral disengagement. *Journal of Interpersonal Violence*, 30(6), 1010-1024. DOI: 10.1177/0886260514539763

Tippett, N., & Wolke, D. (2015). Aggression between siblings: Association with the home environment and peer bullying. *Aggressive Behavior*, 41(1), 14-24. DOI: 10.1002/ab.21557

Tucker, C.J., Finkelhor, D., Turner, H., & Shattuck, A. (2013). Association of sibling aggression with child and adolescent mental health. *Pediatrics*, 132(1), 79-84. DOI:10.1542/peds.2012-3801

Turner, H. A., Finkelhor, D., & Ormrod, R. (2010). Poly-victimization in a national sample of children and youth. *American Journal of Preventive Medicine*, 38, 323-330. DOI:10.1016/j.amepre.2009.11.012

Wang, J., Iannotti, R.J., Nansel, T.R. (2009). School bullying among adolescents in the United States: Physical, verbal, relational and cyber. *Journal of Adolescent Health*, 45(4), 368-375. DOI: <http://dx.doi.org/10.1016/j.jadohealth.2009.03.021>

Winsper, C., Hall, J., Strauss, V.Y., & Wolke, D. (2017). Aetiological pathways to borderline personality disorder symptoms in early adolescence: Childhood dysregulated behaviour, maladaptive parentings and bully victimisation. *Borderline Personality Disorder and Emotion Dysregulation*, 4(10), 1-10. DOI: 10.1186/s40479-017-0060-x

Wolke, D., Copeland, W., Angold, A., Costello, E.J. (2013). Impact of bullying in childhood on adult health, wealth, crime and social outcomes. *Psychological Science*, 24(10), 1958-1970. DOI: 10.1177/0956797613481608

Wolke, D., & Samara, M. (2004). Bullied by siblings: association with peer victimisation and

Sibling and peer bullying: Associations with depression and behaviour

behaviour problems in Israeli lower secondary school children. *Journal of Child Psychology and Psychiatry*, 45(5), 1015-1029. DOI:10.1111/j.1469-7610.2004.t01-1-00293.x

Wolke, D., Tippet, N., & Dantchev, S. (2015). Bullying in the family: sibling bullying. *The Lancet Psychiatry*, 2(10), 917-929. DOI: 10.1016/S2215-0366(15)00262-X

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Table 1.

Gender, year group and nationality of the sample

	<u>N</u>	<u>% of sample</u>
<u>Gender</u>		
Male	1018	42.2
Female	1338	55.5
*Missing	54	2.3
<u>Post Primary School Year</u>		
First	1257	52.2
Second	1024	42.5
Third	21	.9
*Missing	108	4.4
<u>Nationality</u>		
Irish	2144	87.7
Non-Irish	274	11.4
*Missing	22	.9

*Questions did not include mandatory answers, so some questions left unanswered and labelled as missing

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Table 2. Frequency and prevalence for sibling and peer bullying type, bullying role and gender.

	<u>Sibling Bullying</u>				<u>Peer Bullying</u>			
	<u>Physical</u>	<u>Verbal</u>	<u>Relational</u>	<u>Overall</u>	<u>Physical</u>	<u>Verbal</u>	<u>Relational</u>	<u>Overall</u>
	<u>N/2030 (%)</u>	<u>N/2040 (%)</u>	<u>N/2039 (%)</u>	<u>N/2026 (%)</u>	<u>N=2258(%)</u>	<u>N=2255(%)</u>	<u>N=2251(%)</u>	<u>N=2246(%)</u>
<u>Bullies</u>	55/2030 (2.71)	66/2040 (3.24)	31/2039 (1.52)	64/2026 (3.16)	14/2258(.62)	25/2255 (1.11)	13/2251(.58)	26/2246(1.16)
Males	28/55 (50.9)	34/66 (51.5)	15/31 (48.4)	34/854 (3.98)	9/14(64.3)	8/25(32)	11/13(84.6)	13/26(50)
Females	27/55 (49.1)	32/66 (48.5)	16/31 (51.6)	30/1172 (2.56)	5/14(35.7)	17/25(68)	2/13(15.4)	13/26(50)
<u>Victims</u>	224/2030 (11)	208/2040 (10.2)	157/2039 (7.70)	268/2026 (13.2)	100/2258(4.43)	175/2255(7.76)	261/2251(11.6)	330/2246(14.7)
Males	92/224 (41.1)	66/208 (31.7)	50/157 (31.8)	97/854 (11.4)	51/100(51)	73/175(41.7)	77/261(29.5)	116/330(35.2)
Females	132/224 (58.9)	142/208 (68.3)	107/157 (68.2)	171/1172 (14.6)	49/100(49)	102/175(58.3)	184/261(70.4)	214/330(64.8)
<u>Bully-Victims</u>	213/2030 (10.5)	228/2040 (11.2)	68/2039 (3.34)	313/2026 (15.4)	9/2258(.40)	23/2255(1.02)	9/2251(.40)	38/2246(1.69)
Males	69/213 (32.4)	78/228 (34.2)	30/68 (44.1)	113/854 (13.2)	7/9(77.8)	18/23(78.3)	4/9(44.4)	21/38(55.3)
Females	144/213 (67.6)	150/228 (65.8)	38/68 (55.9)	200/1172 (17.1)	2/9(22.2)	5/23(21.7)	5/9(55.6)	17/38(44.7)
<u>Neutrals</u>	1538/2030 (75.8)	1538/2040 (75.4)	1783/2039 (87.4)	1381/2026 (68.2)	2135/2258(94.6)	2032/2255(90.1)	1968/2251(87.4)	1852/2246(82.5)
Males	668/1538 (43.4)	678/1538 (44.1)	762/1783 (42.7)	610/854(71.4)	894/2135(41.9)	862/2032(42.4)	864/1968(43.9)	804/1852(43.4)
Females	870/1538 (56.6)	860/1538 (55.9)	1021/1783 (57.3)	771/1172 (65.8)	1241/2135(58.1)	1170/2032(57.6)	1104/1968(56.1)	1048/1852(56.6)

*Answers were not mandatory so frequencies or percentages do not add to total sample number

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Table 3. Carry over effect from sibling bullying and peer bullying compared to no carry over effect.

	Carry over effect from sibling to peer bullying			No Carry over effect from sibling bullying to peer bullying		OR	CI	Sig (p)
	Peer Bully (%)	Peer victim (%)	Peer Bully-Victim (%)	No carry over effect				
<u>Sibling bully</u>	49.3			18.4	4.32	2.66-7.02	<.001	
		29.3		17.3	1.98	1.52-2.57	<.001	
			57.1	17.1	6.47	3.47-12.1	<.001	
<u>Sibling victim</u>	60			28.7	3.73	2.29-6.07	<.001	
		46.6		26.2	2.44	1.93-3.09	<.001	
			72.1	26.0	7.34	3.74-14.4	<.001	
<u>Sibling bully-victim</u>	56.9			18.2	5.93	3.36-10.5	<.001	
		33.1		16.8	2.44	1.82-3.27	<.001	
			71	16.6	12.2	5.57-26.9	<.001	

OR=Odds Ratio.

CI=Confidence Interval

Sibling and peer bullying: Associations with depression and behaviour

Table 4. Means (*M*) and standard error (*SE*) for the *SDQ* total difficulties, *SDQ* subscales and depression for sibling bullying subgroups and types

<u>Variable</u>	<u>Neutral</u> M (SE)	<u>Victim</u> M (SE)	<u>Bully</u> M (SE)	<u>Bully-Victim</u> M (SE)
		<u>Physical</u>		
Total difficulties	13.3(.28)	15.7(.62)**	15.8(1.08)	16.8(.34)***
Emotional problems	3.82(.15)	4.78(.29)**	3.76(.42)	4.63(.15)***
Conduct problems	2.32(.10)	2.79(.15)	3.48(.36)	3.65(.16)***
Hyperactivity	4.46(.09)	4.90(.23)	5.36(.30)	5.36(.15)***
Prosocial behaviour	7.45(.14)	7.43(.18)	6.5(.36)	6.9(.18)
MFQ	4.17(.20)	6.44(.50)***	6.06(.72)	6.34(.3)***
		<u>Relational</u>		
Total difficulties	13.5(.26)	17.2(.77)***	17(1.03)***	18.4(.97)***
Emotional problems	3.85(.14)	5.28(.34)***	4.50(.55)	4.86(.37)
Conduct problems	2.37(.10)	3.26(.24)**	4.47(.32)***	4.33(.38)***
Hyperactivity	4.52(.08)	5.17(.20)**	5.69(.34)**	5.54(.31)**
Prosocial behaviour	7.43(.13)	7.44(.25)	5.25(.37)***	6.66(.32)**
MFQ	4.31(.20)	7.28(.47)***	7.63(.69)***	6.70(.64)**
		<u>Verbal</u>		
Total difficulties	13.3(.28)	16.0(.56)***	15.3(.95)	17(.42)***
Emotional problems	3.77(.15)	5.05(.25)***	3.44(.47)	4.89(.19)***
Conduct problems	2.32(.11)	3.54(.34)	2.83(.13)	3.65(.19)**
Hyperactivity	4.47(.08)	4.99(.20)	5.33(.23)**	5.24(.15)***
Prosocial behaviour	7.42(.14)	7.50(.16)	6.18(.33)**	7.10(.18)
MFQ	4.02(.21)	6.8(.35)***	5.59(.57)	7.19(.35)***

** significant difference compared to neutrals ($p < .01$)

***significant difference compared to neutrals ($p < .001$)

Sibling and peer bullying: Associations with depression and behaviour

Table 5.

Two-level regression models at level 1 (school level only) and level 2 (all predictors) on the SDQ total difficulties, SDQ subscales and depression: Unstandardized coefficients

<u>Variable</u>	<u>B</u>	<u>S.E</u>	<u>Beta</u>	<u>Wald</u>	<u>df</u>	<u>95% confidence interval for B</u>		<u>Sig. (p)</u>
						<u>Lower</u>	<u>Upper</u>	
<u>Total difficulties</u>								
<u>Level 1:</u>								
School	.024	.006	1.03	17.6	1	1.01	1.04	<.001
<u>Level 2</u>								
School	.023	.006	1.02	14.3	1	1.01	1.02	<.001
Friendship quality (poorer)	.060	.020	1.06	8.88	1	1.06	1.02	<.01
Happiness with school (-/dislike)	-.33	.052	.72	40.1	1	.65	.80	<.001
Peer victim	1.01	.14	2.74	51.6	1	2.74	2.08	<.001
Peer bully-victim	.89	.39	2.43	5.11	1	2.43	1.13	<.05
Sibling victim	.50	.15	1.65	10.7	1	1.65	1.22	<.001
Sibling bully-victim	.38	.15	1.46	6.71	1	1.46	1.10	<.01
<u>Emotional</u>								
<u>Level 1:</u>								
School	.005	.005	1.01	.84	1	.99	1.02	>.05
<u>Level 2</u>								
Friendship quality (poorer)	.080	.020	1.08	16.4	1	1.04	1.13	<.001
Gender (Female)	.94	.11	2.56	71	1	2.06	3.18	<.001
How do you like school (-/less)	-.16	.051	.86	9.31	1	.78	.95	<.01
Peer victim	.10	.14	2.71	50.5	1	2.06	3.56	<.001
Peer bully-victim	.82	.39	2.26	4.32	1	1.05	4.89	<.05
Sibling victim	.52	.15	1.67	12	1	1.25	2.24	<.001
<u>Conduct Problems</u>								
<u>Level 1:</u>								
School	.010	.005	1.01	3.54	1	1.00	1.02	>.05
<u>Level 2</u>								
Gender (male)	-.502	.11	.61	22.4	1	.49	.75	<.001
How old are you (-/younger)	-.18	.068	.84	6.9	1	.73	.96	<.01
How much do you like school (-/less)	-.27	.051	.76	29.4	1	.69	.84	<.001
Peer victim	.53	.142	1.70	14	1	1.29	2.24	<.001
Peer bully	1.5	.46	4.48	10.8	1	1.83	11	<.01
Peer bully-victim	1.30	.41	3.66	10	1	1.64	8.17	<.01
Sibling bully	.56	.27	1.75	4.12	1	1.02	2.30	<.05
Sibling bully-victim	.77	.14	2.17	31.5	1	1.65	2.84	<.001
<u>Hyperactivity</u>								
<u>Level 1:</u>								
School	.017	.005	1.02	10.5	1	1.01	1.03	<.001
<u>Level 2</u>								
School	.016	.005	1.02	8.97	1	1.01	1.03	<.01
How much do you like school (-/less)	-.33	.048	.72	46.6	1	.66	.79	<.001

Sibling and peer bullying: Associations with depression and behaviour

Peer victim	.38	.14	1.46	7.75	1	1.12	1.91	<.01
Peer bully-victim	.97	.41	2.64	5.71	1	1.19	5.85	<.05
Sibling victim	.33	.14	1.39	5.24	1	1.05	1.83	<.05
Sibling bully	.85	.27	2.34	9.84	1	1.38	3.97	<.01
Prosocial								
Level 1:								
School	.002	.007	1.0	.13	1	.99	1.01	>.05
Level 2								
Nationality (non-Irish)	.45	.19	1.57	5.87	1	1.09	2.27	<.05
Friendship quality (poorer)	.057	.023	1.06	6.06	1	1.01	1.11	<.05
Gender (male)	-.77	.13	.46	36.1	1	.36	.59	<.001
How much do you like school (-/less)	-.43	.060	.65	50.7	1	.58	.73	<.001
Peer bully	1.00	.46	2.73	5.85	1	1.12	6.68	<.05
Sibling bully	.71	.29	2.04	5.91	1	1.15	3.62	<.05

Variable	B	S.E	Depression		95% confidence interval for B		Sig. (p)
			Beta	t	Lower bond	Upper bond	
Level 1:							
School	.019	.013	.040	1.4	.045	.007	>.05
Level 2							
Gender (Female)	1.83	.24	.21	7.69	1.36	2.30	<.001
How much do you like school (-/less)	-.51	.12	-.12	-4.30	-.74	-.27	<.001
Friendship quality (higher)	.36	.05	.19	7.22	.26	.46	<.001
Peer victim	3.01	1.02	.08	2.95	1.01	5.02	<.01
Sibling bully	.73	.15	.13	4.76	.43	1.03	<.001

*only significant p values reported for level 2

Supplement 1.

Mean scores and standard errors of SDQ, SDQ sub-scales and MFQ by overall bullying involvement in various settings: sibling, peer and poly

<u>Type</u>	<u>Neutral</u> M (SE)	<u>Sibling</u> M (SE)	<u>Peer</u> M (SE)	<u>Poly</u> M (SE)
		<u>Victimisation</u>		
Total difficulties (SDQ)	13(.30)	15.8(.41)***	17.4(.88)***	19.7(1.32)***
Emotional problems	3.59(.16)	4.66(.17)***	5.69(.34)***	6.08(.45)***
Conduct problems	2.30(.11)	3.07(.13)***	2.82(.24)	3.74(.50)
Hyperactivity	4.43(.085)	4.99(.15)**	5.16(.37)	5.72(.51)
Prosocial behaviour	7.39(.15)	7.30(.14)	7.52(.28)	6.64(.53)
MFQ	3.80(.20)	6.16(.25)***	7.81(.71)***	10.2(.46)***
		<u>Perpetration</u>		
Total difficulties (SDQ)	13.5(.27)	16.2(.37)***	12.6(2.45)	21.3(3.36)
Emotional problems	3.9(.15)	4.47(.19)**	3.73(1.10)	4.71(1.27)
Conduct problems	2.35(.10)	3.42(.14)***	1.27(.38) **	5.50(.98)
Hyperactivity	4.49(.088)	5.22(.13)***	4.27(1.01)	6.40(.78)**
Prosocial behaviour	7.47(.13)	6.92(.17)**	7.18(.97)	5.50(.83)
MFQ	4.30(.22)	6.28(.36)***	5.45(1.38)	11.1(1.13)***
		<u>Bully-Victims</u>		
Total difficulties (SDQ)	12.6(.24)	15.5(.52)***	18.5(2.27)	20.7(2.2)**
Emotional problems	3.47(.15)	4.33(.21)***	4.5(1.05)	5.06(.94)
Conduct problems	2.18 (.10)	3.27(.17)***	3.75(.64)	5.11(.58)***
Hyperactivity	4.3(.074)	5.05(.16)***	5.75(.58)	6.22(.52)***
Prosocial behaviour	7.47(.15)	7.09(.18)	5.51(.82)	5.39(.54)**
MFQ	3.48(.18)	5.53(.39)***	8.76(1.19)***	10.2(1.26)***

** significant difference compared to neutrals (p<.01)

***significant difference compared to neutrals (p<.001)

Supplement 2

Regression and HLM regression models 1 (school level only) and model 2 (all predictors) for peer and sibling bullying: Unstandardized coefficients

Predictors	Peer victimisation		Peer perpetration		Sibling victimisation		Sibling perpetration	
	Model 1 E (SE) ICC=,021	Model 2 E (SE) ICC=,028	Model 1 E (SE) ICC=,002	Model 2 E (SE) ICC=,004	Model 1 E (SE) ICC=,014	Model 2 E (SE) ICC=,017	Model 1 E (SE) ICC=,028	Model 2 E (SE) ICC=,026
School	.36 (.17)*	-.91(1.37)	.018(.028)	-.72(.72)	.29(.18)	.83(1.8)	.4(.18)*	1.57(1.54)
Nationality (-/Irish)		1.67(.24)* **		.57(.13)** *		.17(.31)		.25(.25)
Gender (-/male)		.33(.17)		-.14(.088)		1.0(.21)***		.52(.18)**
Friendship Quality (-/positive)		.19(.029)* **		.047(.016) **		.11(.038)**		.052(.031)
Happiness with schools (-/dislike school)		- .43(.075)* **		-.14(.04)*		- .39(.096)***		- .28(.079)* **
Number of siblings (-/fewer siblings)		.034(.049)		.024(.027)		.083(.067)		.11(.055)*
Age (-/younger age)		.05(.09)		.072(.049)		.041(.21)		-.021(.10)

ICC=Intraclass correlation coefficient

*p<.05

**p<.01

***p<.001