Involvement in bullying during high school: A Survival Analysis approach

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Knowledge about the risks of bullying involvement during any year of high school is an important element of interventions for changing the likelihood of being bullied. Three cohorts of Australian students (n = 1,382) were tracked from 7th to 11th grade. The study showed that some students have continued involvement in bullying, whilst in addition, new bullies and new victims emerge during each high school year. The findings indicated that the risk of bullying involvement ranged from 16% (as a bully) to 36% (as a victim), increasing to 54.5%, and 56.3% respectively, if a student was a bully or a victim in 7th grade. The risk to students of becoming victims, bullies, or bully-victims in each year of high school suggests that bullying prevention initiatives should be designed to suit students at different stages of adolescent development.

Keywords: survival analysis; bullies, victims- bully-victims; bullying prevention

Introduction

Involvement in bullying may be as a bully, a victim, a bully-victim (Haynie et al., 2001; Veenstra et al., 2005). Bullying occurs in most schools, with reported prevalence rates varying from nine per cent in Sweden to 54 per cent in Lithuania (Nansel, Craig, Overpeck, Saluja, & Ruan, 2004). Negative psycho-social outcomes are associated with such repeated, intentional and systematic abuse of power (Beaty & Alexeyev, 2008; Skrzypiec, Slee, Askell-Williams, & Lawson,

2012; Smith, Cowie, Olafsson, & Liefooghe, 2002; Turner, Finkelhor, Shattuck, & Hamby, 2012).

International studies of the prevalence of bullying show a peak in frequency of bullying around the end of primary (elementary) school and the beginning of high school (e.g., Eslea & Rees, 2001; Nansel et al., 2001). It has been suggested that the frequency of bullying in the later years of high school diminishes as students' growing social competencies enable the use of more prosocial strategies (Semrud-Clikeman, 2007). However, this does not mean that bullying will not be present at all in the later high school years. Some studies indicate that bullying and being a victim of bullying are roles that remain relatively stable for students as they transition from primary to middle school (Camodeca, Goossens, Terwogt, & Schuengel, 2002; Hanish & Guerra, 2004; Paul & Cillessen, 2003; Pellegrini & Bartini, 2000). Sourander, Helstela, Helenius and Piha (2000) concluded from their eight-year longitudinal study that bullying, and being a victim of bullying were persistent behaviours. Furthermore, being a victim was found to be the more persistent of the two (and strongly associated with emotional and behavioural problems).

However, other studies have reported mixed results. For example, in their review, Juvonen and Graham (2014) estimated that somewhat less than 10 per cent of youths maintained an involvement in bullying across their school years. Changes, as well as some stability in bullying others, were also reported in a seven-year longitudinal study of Canadian adolescents by Pepler, Jiang, Craig, and Connolly (2008). Similarly, a study by Barker, Arseneault, Brendgen, Fontaine and Maughan (2008), which examined the trajectories of students who were bullies and victims, indicated that involvement in bullying could change as students progressed across the high school years. Meanwhile, Rosen et al., (2009), in a longitudinal study of 'social victimization',

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reported that children victimized at one developmental period were not necessarily 'chronically' victimized at a later point in time. Later research by Nocentini, Menesini, and Salmivalli (2013), using multi-level growth models, showed that bullying experiences varied significantly across time at both the individual and classroom levels. Similarly, Ryoo, Wang, and Swearer (2014) found instability in being a victim or bully over time, particularly during school transition years. Likewise, a combined cohort study by Baly, Cornell and Lovegrove (2014) found a high degree of variance in self- and peer-reports of bullying other students across six waves of surveys across three years, and that the majority of the reported bullying was transient. Overall, extant research shows disparate findings about the trajectories that bullying other students and being victimized take, highlighting the need for further research.

In particular, studies concerned with stability and change largely trace the trajectories of bullies and victims following an *initial* identification of students' involvement in bullying. Typically, such studies do not indicate whether there are other students, who were not identified at a first data collection point, but who might have become involved in bullying at a later date - even relatively late into their high school years.

In addition, although gender has been widely studied in relation to the general field of school bullying, such as the study by Craig et al. (2009) which reported that boys are more likely than girls to bully other students, relationships between **onset** of bullying involvement during high school, with gender and bullying involvement in primary school, are infrequently studied. Research by Shute, Owens and Slee (2008) pointed to the vulnerability of post pubescent girls to victimization, thus raising the possibility that trajectories of bullying involvement, including onset, might change during adolescence.

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To examine the likelihood of students becoming involved in bullying for the first time during the high school years we used survival analysis to describe students' involvement as bully, victim or bully-victim over an extended period of schooling, according to gender, and according to involvement in bullying in primary school. This study of the timing of onset of involvement in bullying has the potential to identify whether patterns reported in current literature may mask late onset of becoming a bully, victim, or bully-victim. Late onset might require different types of preventative and supportive interventions. The timing of involvement in bullying is therefore of significant interest and the main focus of this paper.

Objectives

The objectives of the current study were to investigate:

1. The risk of being a bully, victim or bully-victim:

    a. **at any time** during high school, that is, either repeated or for the first time (onset);

    b. **for the first time (onset)**, having not been involved in bullying in any previous years of high school.

2. The predictors of being a bully, victim or bully-victim in high school with regard to:

    a. the influence of students' bully, victim or bully-victim status in 7th grade (the final year of primary school in South Australia) on bully, victim or bully-victim status in high school;

    b. the influence of gender on bully, victim or bully-victim status in high school.

Method

Ethics approvals were obtained from the Department of Education and our

University Ethics committee. The study was approved by each school principal.

Participants and their parents/carers provided informed consent. Participation was

voluntary and confidential.

Schools were self-selected, as they had requested a survey of their students'

experiences with bullying and other facets of school life. Two schools were rated as

minimum disadvantage schools on the Department for Education Index of Educational Disadvantage

(which groups schools into one of seven ranks of educational disadvantage based on

four measures: parental income; parental education and occupation; Aboriginality; and

student mobility) with, respectively, 12% and 17% of students receiving school fee

relief. The third school was rated as high disadvantage with approximately 79% of

students receiving school fee relief.

Participants

Over 3,000 primary and high school students participated in the study. Students' ages

ranged from 11 to 16 years ($M = 13.4$ years; $SD = 0.94$), with 50.8% males and 91%

indicating that they only spoke English at home. The proportion of students identifying

as Aboriginal or Torres Strait Islander was less than one per cent in each of the first two

schools, and approximately nine per cent in the third school.

Measures

We used the 16-item Peer Relations Questionnaire (PRQ, Rigby & Slee, 1991), which

has been widely used and validated (e.g., see Tabaeian, Amiri, & Molavi, 2012). It

includes six questions about being a bully (e.g., 'I enjoy upsetting wimps'), six questions about being victimized (e.g., 'I get picked on by others'), and four pro-social behaviour questions (e.g., 'I enjoy helping others'). The PRQ asks respondents to report the frequency of their involvement in bullying using a four-point Likert-type scale which ranges from 'never', 'once in a while', 'pretty often' to 'very often'.

In addition to the PRQ, we asked students to indicate their gender, age, cultural background, and how often they had been a bully or a victim in the current school year. This latter simple frequency question provided a cross-check to the PRQ factor items.

Participant flow

We tracked three cohorts of students (n = 3,020) for five years (see Table 1). In the first year this included 7th grade students from approximately 30 feeder schools who were attending a transition day at their prospective high school, plus students who were in their first (8th grade) or second year (9th grade) of high school. During the five-year period, new students entered the study due to their beginning high school or changing schools.

With the exception of the final wave of data collection, over one thousand students participated in the study each year (see Table 1). In each year, participation involved students from the previous cohort as well as one new cohort. For example, as shown in Table 1, in the first year (cohort 1) 548 7th grade students, 442 8th grade students, and 380 9th grade students completed questionnaires. Of these students, 413 7th graders, 294 8th graders, and 237 9th graders completed questionnaires in the following year in 8th, 9th, and 10th grades respectively. In addition, there were 553 new 7th graders, 52 new 8th graders, 87 new 9th graders, and 108 new 10th graders that joined the

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longitudinal study in the second year; they comprised cohort 2. Table 1 shows the pattern of participation in subsequent years.

INSERT Table 1: Number of students who started and participated in the longitudinal study over a 5-year period

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Participant attrition occurred over the five years due to a number of factors, including students leaving the study sites, and some classes not being available on data collection days (e.g., due to exams; sporting commitments; teacher availabilities; etc.). As shown in Table 1, only 577 students participated in the final wave of data collection. For this reason, a decision was made not to include the fifth wave of data in the survival analyses.

Furthermore, not all participants had data that could be included in the survival analyses. To be included, each student's data needed to have been present in two or more consecutive waves, or have been in one wave and no more (i.e., censored data). For example, a student who participated in just one wave of data collection, and for whom bullying involvement information was known for that year but for no other year, was included in the analysis (as censored data). However, a student for whom data was available in Year 1 and Year 3, but missing for Year 2, for example, was not included in the analysis. This is because it was not known whether the student had been involved in bullying during the missing year. Overall data was available for 1,462 (89.05%) of participants who completed questionnaires by the fourth wave of data collection. Of

these students, 1,382 had data that met the survival analysis data criteria. In summary, nearly half of the original sample (45.76%) was included in the survival analyses.

There were significant differences between students who were not included and those for whom sufficient data was available for the survival analysis. Students from the school of high disadvantage were more likely to have had insufficient data for analysis. This reflects a problem in social science research whereby data from vulnerable groups is difficult to collect, and this must be held in mind when interpreting our results.

Research Design

We administered the PRQ during regular class lessons near the end (November) of each academic year. Almost 100 per cent of students present in class on the days of data collection completed their questionnaires.

We undertook survival analysis of the questionnaire data using SPSS v23. A strong feature of survival analysis is that it permits the inclusion of censored data. Censored data is information obtained from individuals who leave or drop out before the full study period has been completed, but who have not yet experienced the "event". For example, if individuals provide questionnaire data in their first and second year of high school, but none in their third year, and they had not experienced the "event" before that time, then their data is included in the analysis as censored data (using a specific algorithm). This is because whether or not they would have experienced the "event" in their third year had they continued with the study is unknown, although the time until they did not experience the event (i.e., their survival time) is known. Use of the censored data algorithm allows information to the time of "drop out" to be included in the analysis.

Survival analysis has proved useful in other domains of research, such as in criminology. For example, Skrzypiec (2006) used survival analysis to estimate the likelihood of completing a drug court intervention, while Hill, Habermann, Klusmann, Berner, and Briken (2008) used survival analysis to examine the recidivism of sexual offenders.

In the present study, we wished to investigate the onset (the first time) of bullying other students, of being a victim, and of being a bully-victim. In doing so, we conducted an analysis not previously undertaken (to our knowledge) in relation to involvement in bullying. We collected longitudinal data to track students as they progressed through their high school years, each year asking students to report their involvement in bullying as victims or perpetrators. This approach enabled identification of any periods within the time frame where the risk of bullying events was higher or lower. The survival analysis approach also permitted an examination of predictor variables using Cox Regression. We used gender and bullying involvement in 7th grade (primary school) to predict the likelihood of persistently being a bully, being a victim, or being a bully-victim in high school.

Determining Involvement in Bullying

We investigated the factor structure of the PRQ using confirmatory factor analysis (CFA) robust maximum likelihood (type = complex) in MPlus v 17.0. All items of the PRQ were analysed separately as one-factor congeneric models of bully or victim, to determine convergent validity, and then together in one model to determine construct validity. The PRQ showed good construct validity (see Appendix, Figure A). We used Hancock and Mueller's (2001) coefficient H to measure scale reliability.

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The CFA for the bully model showed good fit and good reliability (H = 0.81) with the data (see Appendix, Figure B). The regression coefficients in the bully model were used to calculate a bully factor score for each student. The CFA for the victim model showed good fit and good reliability (H = 0.90) with the data when one item was dropped ('Others leave me out') (see Appendix, Figure C). The regression coefficients in the victim model were used to calculate a victim factor score for each student. Bully factor scores and victim factor scores were used to determine involvement in bullying for each student as a bully, victim, bully-victim or not involved, as described in the following sections.

Bullies

The PRQ scores for being a bully ranged from three to 13. Students with scores greater than or equal to seven were classified as bullies. This cut off point was supported by a comparison of students' PRQ bully scores with the questionnaire item that asked students to self-report how often they bullied other students. As shown in the Appendix, Table A, participants who reported low levels of bullying other students (i.e., where the 'pretty often' or 'very often' occurrences of bullying others were zero) had PRQ bully scores that were less than seven. In contrast, students with PRQ bully scores greater than or equal to seven also self-reported two or more experiences of bullying other students 'pretty often' or 'very often'.

Victims

The PRQ scores for being a victim ranged from four to 16. Participants with PRQ victim scores greater than eight were classified as victims of bullying. This cut off point was supported by a comparison of students' PRQ victim scores with the questionnaire

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item that asked students to self-report how often they had been a victim. As shown in the Appendix, Table B, participants who reported low levels of being victimized (i.e., the number of 'pretty often' or 'very often' occurrences were zero) had PRQ victim scores of less than nine. In contrast, students with high PRQ victim scores also reported that they had been victims of bullying 'pretty often' or 'very often'.

Bully-Victims

Students with PRQ victim scores greater than eight *and* PRQ bully scores greater than seven were classified as bully-victims. In our sample, only one person was classified as a bully-victim in the last year of primary school and so this category of primary school bullying involvement was not included as a 7th grade predictor variable in the regression analyses.

Not Involved in Bullying

Students with PRQ victim scores less than nine and PRQ bully scores less than seven were classified as not involved in bullying.

Survival Analysis

Survival analysis examines the time taken until an event happens, such as a death or a failure in a mechanical system, or in the present study, involvement in bullying as a bully, victim or bully-victim. This procedure permits an estimation of the proportion of a population that will 'survive' past a certain time, and for those people who do not experience the event (e.g., survive), the rate at which they will fail (e.g., die). Survival analysis provides an estimation of the probability that an event will occur during a given time period. It permits information from participants involved in a study for various

amounts of time to be included as useful data in the analysis (Tabachnick & Fidell, 2007).

Survival Analysis Parameters

Events: We investigated the event identified as 'involvement in bullying'. Therefore we undertook three survival analyses, and defined the event (based on students' responses to the PRQ) in each successive analysis as:

1) at least one occurrence during the study period of being classified as a bully,

2) at least one occurrence during the study period of being classified as a victim of bullying,

3) at least one occurrence during the study period of being classified as both a bully and victim of bullying.

Time: Event occurrences were measured in time units of 'one school academic year', which began at 8th grade when students entered high school.

Predictors: We used Cox Regression analysis with gender and bullying-status in the final year of primary school (7th grade) as predictors of the likelihood of being a bully, victim, or bully-victim in high school.

The likelihood of involvement in bullying either repeatedly or for the first time

Figure 1 shows the likely prevalence of involvement in bullying as a victim, bully or bully-victim in each year of high school again, or for the first time. For example, 15% of 8th grade students were likely to be victims of bullying, while 4% were likely to be bullies, and 2% bully-victims. Overall, 21% of students were likely to have some

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involvement in bullying in the 8th grade, increasing to just over one-quarter (26%) of students in the 9th grade.

Figure 1 also shows that the likelihood of being a bully (again or for the first time) remained relatively stable during each of the high school years, varying from three to four per cent. The likelihood of being a victim of bullying was greatest in 9th grade (18%), decreasing to 11 to 12 per cent in 10th and 11th grades. The likelihood of being a bully-victim during high school was lowest in 8th grade, at two per cent. However, being a bully-victim was three times more likely (6%) in 11th grade than in 8th grade.

INSERT Figure 1 The likelihood of being involved in bullying again or for the first time, as a Victim, Bully or Bully-Victim, in each year of high school.

First time involvement in bullying (onset)

Figure 2 shows the likelihood that a student would become involved in bullying **for the first time**, not having been involved in bullying in any previous years in high school.

As a bully

As shown, the total likelihood of bullying other students for the first time (onset) during the first four years of high school was 16%, while the likelihood of the onset of bullying other students was highest (4%) during 8th grade, and varied from 2%-3% during 9th-11th grades.

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As a victim

The total likelihood of being a victim of bullying (onset) during the first four years of

high school was 36%. As shown in Figure 1, the risk of the onset of being a victim of

bullying (i.e., being a victim for the *first* time) in high school was greatest in the first

year of high school, namely, 8th grade (15%). For students who had *not* been victimized

in 8th grade, the risk of onset of being a victim of bullying decreased by about half in 9th

grade (8%) and remained at a low level for grades 10, and 11. For students who had not

been a victim of bullying in 8th grade or 9th grade, the likelihood of onset in 10th grade

was 5% For students who had not been victimized in 8th grade, 9th grade or 10th grade,

the likelihood of onset in 11th grade was 6%.

As a bully-victim

The total likelihood of being both a bully of other students and a victim of bullying

(onset) by the end of the first four years of high school was 13%. Although this

likelihood of first onset was relatively small, it increased from 2% in 8th grade to 4% in

11th grade (see Figure 2).

INSERT Figure 2 The risk of becoming a Victim, Bully or Bully-Victim for the first

time (onset) during each year of high school.

Predictors of Bullying Involvement in High School

Our analysis next turned to the question concerning the predictors of involvement in

bullying.

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Bullies

As shown in Table 2, the significant predictors of being a bully during high school were gender (male) and being a bully in 7th grade. Being a victim in 7th grade was not a significant predictor of being a bully in high school. Exp(B) is the ratio of hazard rates that are one unit apart on the predictor variable. So the difference of one unit in gender (e.g., changing focus from girls to boys), increases the hazard rate by 338.5%.

INSERT Table 2 Predictors of being a bully of other students at any time in high school

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Figures 3 and 4 show the proportion of individuals who experienced the event of 'being a bully'. As shown in Figure 3, the likelihood that students who had been bullies in 7th grade would subsequently bully other students, at some time, by 11th grade was 40.5 %, compared to 11.5% for students who had been victims of bullying, and 10.7% for students not involved in bullying. Figure 4 shows that the likelihood of males being a bully at some time by the end of 11th grade, was 14.2 %, compared to 4.5% for females. The important message to take from Figures 2 and 3 is that each step-up of the line in the Figures represents new bullies and victims in each high school year.

INSERT Figure 3: The likelihood of being a bully in high school based on bullying status in the last year of primary school

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INSERT Figure 4: The likelihood of males and females bullying other students in high school

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Victims

As shown in Table 3, a significant predictor of being a victim of bullying during high school was being a victim in 7th grade. Neither bully status in 7th grade nor gender were significant predictors of becoming a victim.

INSERT Table 3: Predictors of being a victim of bullying in high school

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Figure 5 illustrates that the risk of becoming a victim of bullying by 11th grade for students who had been victims in 7th grade was quite high (56.3%). Similarly, the likelihood of becoming victims of bullying, for students who had bullied other students in primary school, was also high at 54.9 %. For students not involved in bullying in 7th grade, the likelihood of becoming a victim was 17.5 %. The likelihood of victims in 7th grade becoming victims during 8th grade was 47.9%, while for bullies in 7th grade there was a risk of 23.8% of becoming a victim in 8th grade. For students not involved in bullying in 7th grade, the risk of becoming a victim in 8th grade was 6.9%. No significant gender differences in the likelihood of becoming a victim were found.

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INSERT Figure 5: The likelihood of being a victim of bullying in high school based on involvement in bullying in the last year of primary school

Summary of Findings

Table 4 displays a summary of our findings about the risk of becoming involved in bullying during 8th to 11th grade. The risk during any given year of being a bully or a bully-victim (again or for the first time) was relatively low, but for being a victim (again or for the first time) the risk was much higher, ranging from 11 to 18%. By grade 11, the overall risk of involvement in bullying as a bully was 16%, as a victim was 36%, and as a bully-victim was 13%.

The likelihood of becoming a bully during high school for students not involved in bullying in their last year of primary school (7th grade) was slightly lower than the risk for students who had been victims of bullying in 7th grade. However, this risk increased to 40.5% if students had been bullies in 7th grade.

Involvement in bullying as a victim or bully in 7th grade carried a high risk of becoming a victim of bullying at some point during high school, varying from 54.9% for students who had been bullies in 7th grade to 56.3% for students who had been victims in 7th grade. The risk of becoming a bully in high school was also increased if students were males.

INSERT Table 4: Risk of involvement in high school as a bully, victim or bully-victim

Discussion

Our results indicate that although the likelihood of onset of bullying other students during high school is relatively low, new bullies emerged during each high school year. Hanish and Guerra (2004) reported an increase in bullying behaviour over the primary school years, attributing such change to an increase in physical and cognitive abilities relative to younger or weaker children. It is possible that this increase in social competencies continues to better equip, albeit in undesirable ways, bullies in high school. McQuade, Achufusi, Shoulberg, and Murray-Close (2014) found that 4th-6th grade children who had an over- or under-estimation of their own social competence when compared to their peers, showed higher rates of physical aggression if their peer status was low, but higher rates of relational aggression if they had higher peer status (i.e., were popular). McQuade et al's study shows the complexity of associations between social competence and different forms of aggression. The study indicates that the association of biased self-perceptions, popularity and aggression, particularly in the adolescent years, warrants further investigation. Furthermore, the relatively stable *proportion* of bullies in the current study (even though new bullies emerge each year) suggests that some bullies either desist from bullying other students, or become bully-victims or victims. The degree to which this is the case remains to be investigated in future longitudinal studies that track individual cohorts of students across the high school years. Longitudinal studies with measures of social competence, popularity and different forms of peer aggression (e.g., physical and relational) would enlighten our understanding of this complex issue.

For victims, while it is known (e.g., Rosen et al., 2009), and our study confirms, that victimization is likely to continue for existing victims, new victims also emerged in each year in our sample. Our study has shown that overall, the likelihood that a student

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will become of victim of bullying at some point in high school, was 36%. This suggests that one in three students will be bullied at some point in high school, irrespective of whether or not they have been previous victims of bullying during 7th grade. Alarmingly, the likelihood of being a victim significantly increases to 54.9% if the student was a victim of bullying during his or her last year of primary school (irrespective of gender). In other words, one in two students bullied in the 7th grade are also likely to be bullied at some point in high school.

There are various suggestions about why victims are chronically victimized (e.g., social competence, Cook, Williams, Guerra, Kim, & Sadek, 2010; disability, Humphrey & Symes, 2010). A question raised by our study concerns the reasons that individuals are targeted as victims when they have not previously attracted the attention of bullies. One possibility is that relational bullying increases as students get older, as discussed by several researchers (e.g., Tremblay & Nagin, 2005; Vaillancourt, 2005). Early research (Slee & Rigby, 1993) and more recent research (de Bruyn, Cillessen, & Wissink, 2010) has established that bullying other students is positively associated with popularity amongst peers, while being victimized is negatively associated with popularity. Research by Puckett, Aikins, and Cillessen (2008) of 7th and 8th grade adolescents investigated the moderating role of prosocial behaviours and self-efficacy on relational aggression and popularity. The authors found that relational aggression correlated with perceived popularity, social self-efficacy, leadership and cooperation, as well as with high functioning within the peer group. In light of these findings, Puckett et al. suggested that "relational aggression cannot simply be seen as a behaviour that is always maladaptive or pathological (although it may be in many cases)" (p. 572). Whether this is the case at later ages is unknown. Such findings suggest that the role of popularity with relational aggression (in particular) is not simple, and that future studies

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that seek to examine this relationship must consider many other social factors, including perceived social competence and social self-efficacy.

Pepler et al. (2006) noted that "adolescents can readily acquire power over another by identifying vulnerabilities related to sexuality and, in turn, use these as a means to bully, through sexual harassment" (p. 377). Similarly, Shute, Owens and Slee (2008) highlighted issues of sexuality in the post pubescent years as a factor in victimization. The field of research into sexualized and gendered experiences of bullying, harassment and aggression (e.g., Rivers & Duncan, 2013) is potentially relevant to our findings about the emergence of new victims in the latter high school years. Further research is required to investigate this supposition.

New bully-victims also emerged in each year of high school, and increasingly so, as students progressed into the senior years of high school. It may be that students who had been victims of bullying responded by bullying other students as they matured. This aligns with social cognitive theory (Bandura, 1986), which would predict a link between students' observations of bullying behaviours and potential adoption of such behaviours. Alternatively, it may be that students who had bullied other student became victims of bullying as the limitations of their self-regulatory social and emotional capabilities were manifested. For example, Cook et al. (2010), in a meta-analysis of 153 studies, found that both bullies and victims displayed internalising symptoms – providing one indicator of a shared characteristic that might manifest itself through what, on the surface, appear to be quite different behaviours by bullies and victims.

In the present study, males were three times more likely than females to become bullies irrespective of bullying involvement in the 7th grade. This finding is consistent with other studies (e.g., Camodeca, Goossens, Terwogt & Schuengel, 2002; Skrzypiec

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Slee, Murray-Harvey & Pereira, 2011). Developmental research shows that adolescent males are more likely to engage in problematic behaviours, attributed by Moffitt (1993) to the "maturity gap" that accompanies puberty and the years before adulthood. Such behaviour she suggests, comes about by motivation, mimicry and reinforcement, and is triggered when individuals sense that engaging in such behaviour is personally profitable. More research is needed to investigate the link between involvement in bullying and the "maturity gap" during adolescence.

Limitations

Only schools in the southern metropolitan area of South Australia were involved in this study. Furthermore, the study relied upon students' self-reports, with recognised problems of potential participant blind spots and social desirability bias (Muijs, 2011). However, with respect to reports about the (often hidden) experience of being a bully or victim, self-reports are arguably an important source of information.

Students from the participating school of high disadvantage, with its greater rates of school drop-out, were more likely to have had insufficient data for analysis. This reflects a known problem in social science research whereby data from vulnerable groups is difficult to collect (Bonevski et al., 2014). This must be held in mind when interpreting our results.

Relatively few bully-victims were identified in the 7th grade cohort. Therefore it was not possible to make predictions about the potential influence of being a bully-victim in 7th grade on bullying involvement high school. Future studies would require a larger sample of primary school students to allow the identification of a sufficient number of bully-victims to enable statistical analyses.

Further research which records the exact time during the year when bullying involvement occurs would provide more accurate statistics and probability levels than our method using the academic year as a time interval.

Conclusions

There are important implications for school-based interventions arising from our findings. A number of researchers (e.g., Espelage & Swearer, 2003) have highlighted how transitions across primary and secondary school, and associated issues of dominance status and peer group affiliations, impact on bullying and victimization. The present findings indicating some stability in bullying involvement suggest there is more to such behaviours than the disruption of peer networks. Schools should take this into account in the delivery of anti-bullying programs. Specific attention might be given to bullying status during the transition between primary and secondary schools. This is particularly important for students who have been victims of bullying in primary school. Furthermore, the emergence of new victims in each year of high school suggests that interventions should continue and be implemented accordingly for each age group, in every year of high school.

The finding that new bullies, victims, and bully-victims emerged during each high school year points to the complexity of bullying involvement in high school and the need to undertake longitudinal studies that track students and measure bullying interactions. School-based interventions and policies that aim to break bullying trajectories and minimise harm for recurrent victims should take into account later onset bullying involvement. Such interventions would best be designed by considering the maturity and cognitively complex nature of senior students, and the sophisticated types of bullying that might occur during this stage of their development. It is important to

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nuance types of bullying prevention interventions, taking into account the intensity and

severity of the bullying, and the understanding that older students are more likely to

seek the support of peers rather than teachers or parents. As such peer support programs

may have a greater role to play in interventions with senior students.

Bullying is a phenomenon that needs to be addressed in all years of schooling.

The identification of late emerging bully, victim, and bully-victim status has

implications for the development and maintenance of bullying prevention policies and

practices, including the timing, duration and modifications of policies and practices to

suit students at different stages of pre-adolescent and adolescent development.

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Tables

Table 1: Number of students who started and participated in the longitudinal study over a 5-year period

Cohort	Grade	Year 1	Year 2	Year 3	Year 4	Year 5
cohort 1	7th grade	548	→ 413	→ 392	→ 331	→ 280
cohort 2	7th grade (new in Yr 2)		553	→ 466	→ 376	→ 0
cohort 3	7th grade (new in Yr 3)			463	→ 0	→ 0
cohort 1	8th grade	442	→ 294	→ 285	→ 228	→ 154
cohort 2	8th grade (new in Yr 2)		52	→ 38	→ 27	→ 21
cohort 3	8th grade (new in Yr 3)			59	→ 34	→ 2
cohort 1	9th grade	380	→ 237	→ 232	→ 187	→ 1
cohort 2	9th grade (new in Yr 2)		87	→ 62	→ 43	→ 23
cohort 3	9th grade (new in Yr 3)			51	→ 32	→ 24
cohort 4	9th grade (new in Yr 4)				31	→ 0
cohort 2	10th grade (new in Yr 2)		108	→ 70	→ 44	→ 0
cohort 3	10th grade (new in Yr 3)			78	→ 33	→ 22
cohort 4	10th grade (new in Yr 4)				29	→ 8
cohort 3	11th grade (new in Yr 3)			62	→ 22	→ 1
cohort 4	11th grade (new in Yr 4)				36	→ 9
cohort 5	11th grade (new in Yr 5)					21
cohort 4	12th grade (new in Yr 4)				9	→ 0
cohort5	12th grade (new in Yr 5)					11
	New		*800*	*713*	*105*	*32*
	Total	**1370**	**1744**	**2199**	**1462**	**577**

Note: 7th grade: ages 12-13; 8th grade: ages 13-14; 9th grade: ages 14-15; 10th grade: ages 15-16; 11th grade: ages 16-17

Table 2: Predictors of being a bully of other students at any time in high school

n=352	B	SE	Wald	df	Sig.	Exp (B)
Gender	1.219	.416	8.600	1	.003	3.385
7th grade bully involvement group			9.736	3	.021	
Bully in 7th grade	1.991	.746	7.125	1	.008	7.324
Victim in 7th grade	-.618	1.042	.352	1	.553	.539

Table 3: Predictors of being a victim of bullying in high school

n=352	B	SE	Wald	df	Sig.	Exp(B)
Gender	.276	.266	1.074	1	.300	1.318
7th grade involvement in bully group			17.744	3	.000	
Bully in 7th grade	-.022	.779	.001	1	.977	.978
Victim in 7th grade	1.434	.354	16.430	1	.000	4.194

Table 4: Risk of involvement in high school as a bully, victim or bully-victim

	Risk of becoming a bully %	Risk of becoming a victim %	Risk of becoming a bully-victim %
During any year, again or for the first time	3-4	11-18	2-6
For the first time (onset) in high school	2-4	6-15	2-4
By the end of four years of high school:	16	36	13
• If student was not involved in bullying in 7th grade	10.7	17.5	na
• If student was a bully in 7th grade	40.5	54.9	na
• If student was a victim in 7th grade	11.5	56.3	na
• If the student was Male	14.2	n.s.	na
• If the student was Female	4.5	n.s.	na

ns= not significant; na = not available

Figures
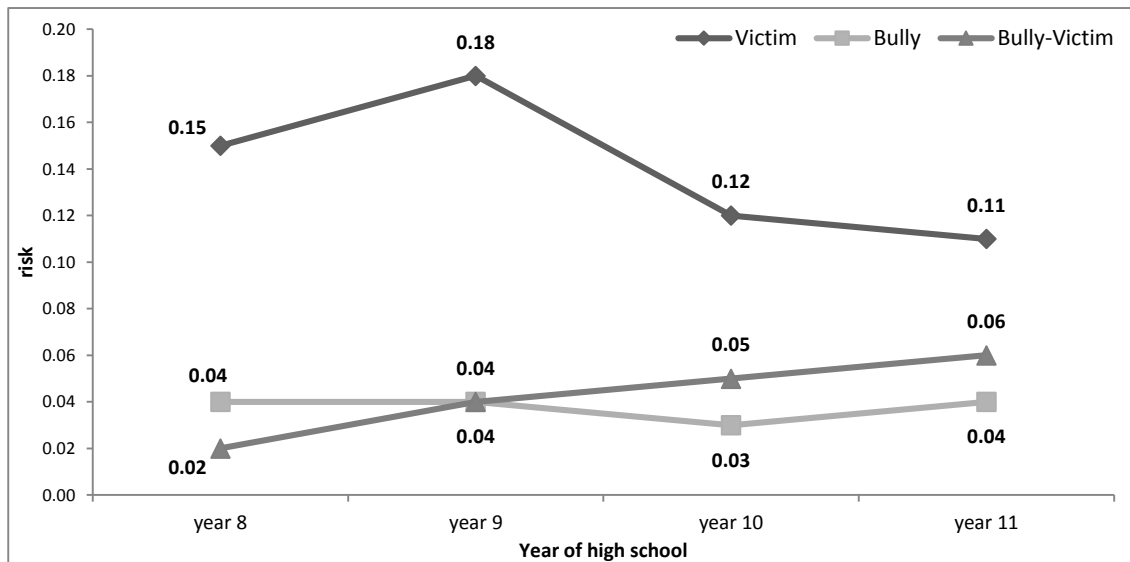
Figure 1: The likelihood of being involved in bullying in high school, again or for the first time, as

a Victim, Bully or Bully-Victim, in each year of high school.

Figure 2: The risk of becoming a Victim, Bully or Bully-Victim for the first time (onset) during each year of high school.
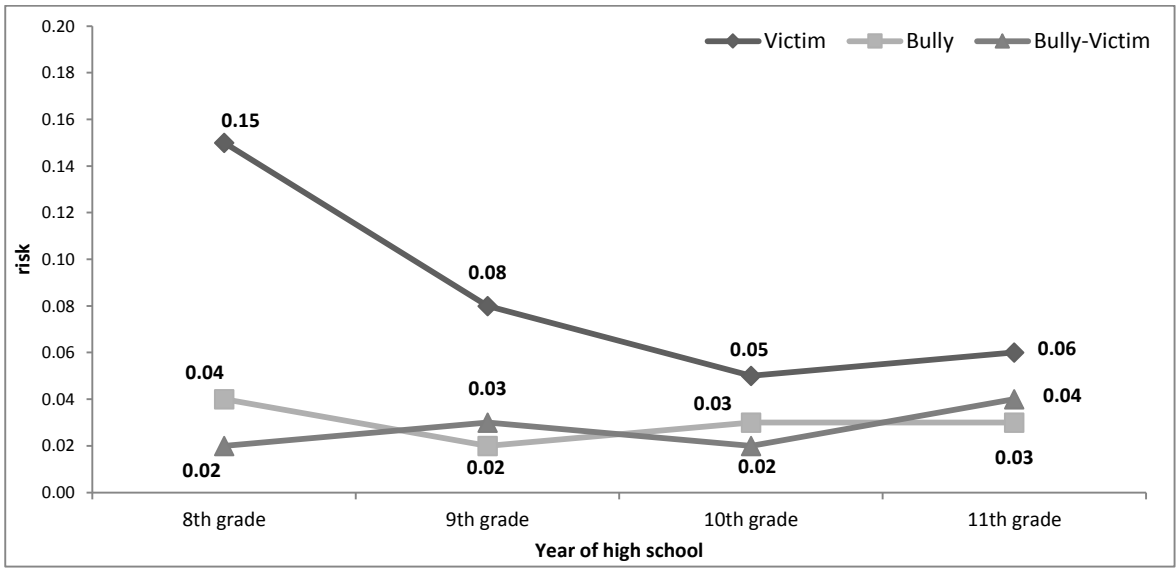
One Minus Survival Functions of becoming a bully in high school
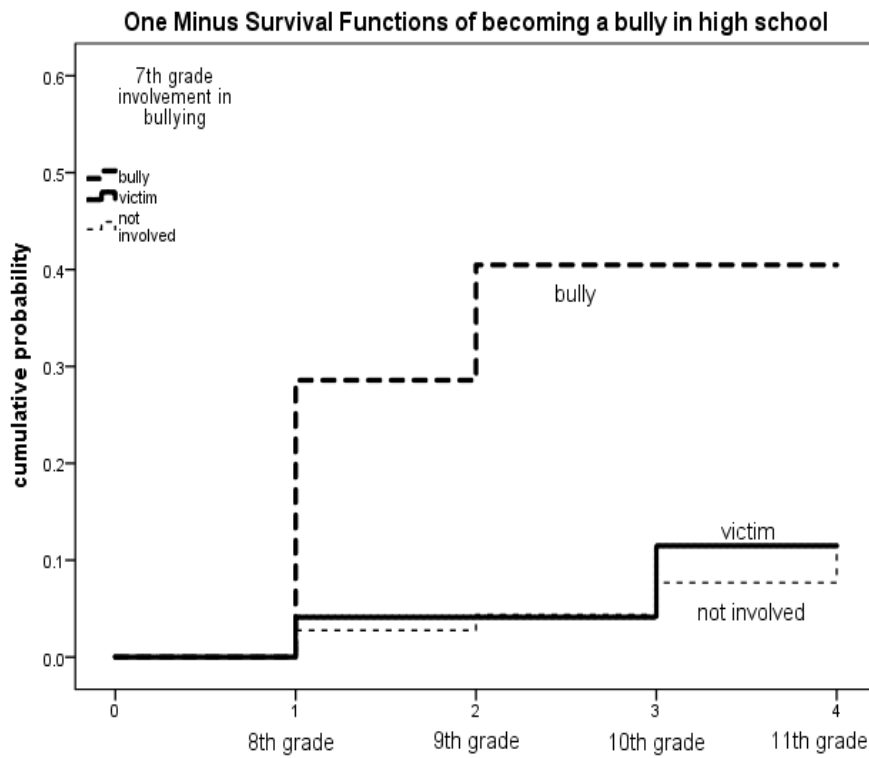
Figure 3: The likelihood of being a bully in high school based on bullying status in the last year of primary school
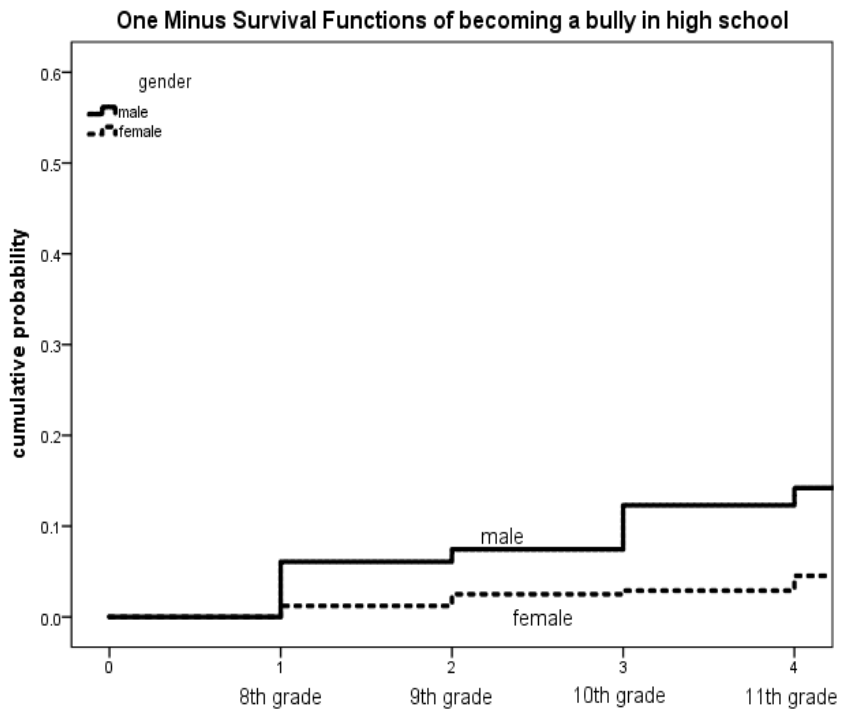
Figure 4: The likelihood of males and females bullying other students in high school
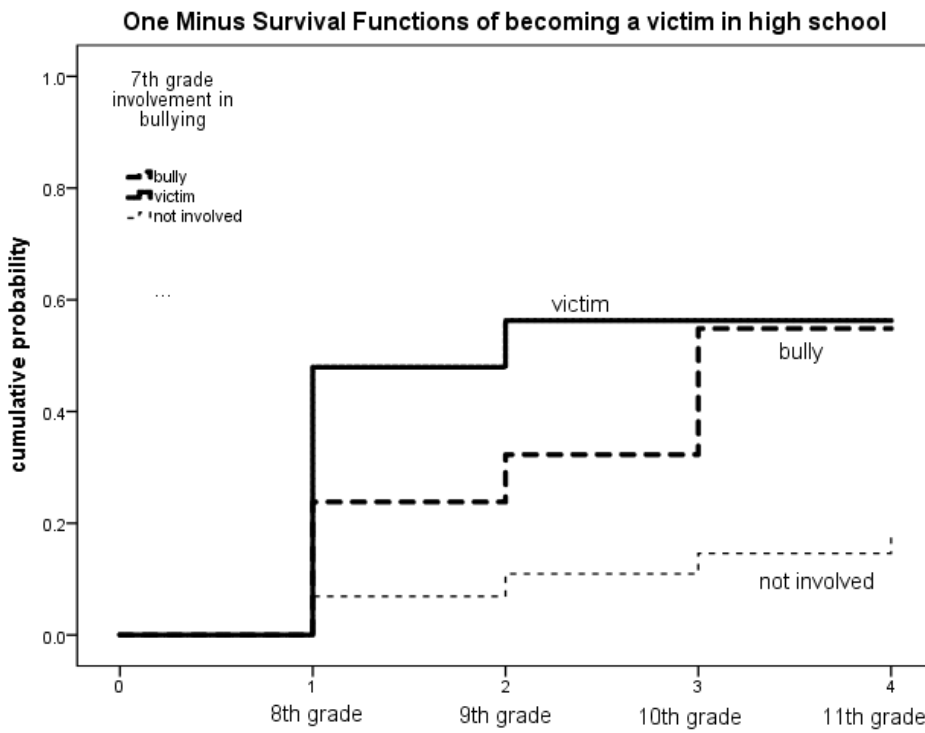
Figure 5: The likelihood of being a victim of bullying in high school based on involvement in bullying in the last year of primary school

Appendix

Table A: Comparison of Factor Bully Scores by the number of self-reported "pretty often" /
"very often" victim experiences, showing factor bully cut-off score of 7.

|		Number of "pretty often" / "very often" responses for bully scale						
		0	**1**	**2**	**3**	**4**	**5**	**6**
		Count	Count	Count	Count	Count	Count	Count
Factor	3	550	1	0	0	0	0	0
Bully Score	4	467	8	0	0	0	0	0
	5	113	31	3	0	0	0	0
	6	44	37	6	0	0	0	0
Bullies	7	0	19	11	4	0	0	0
others ↓	8	0	2	12	8	3	0	0
	9	0	0	3	2	5	0	0
	10	0	0	0	4	2	1	3
	11	0	0	0	0	1	3	0
	13	0	0	0	0	0	0	2

Table B: Comparison of Factor Victim Scores by the number of self-reported "pretty often" / "very often" victim experiences, showing factor victim cut-off score of 8.

		Number of "pretty often" / "very often" responses for victim scale						
		0	**1**	**2**	**3**	**4**	**5**	**6**
		Count	Count	Count	Count	Count	Count	Count
Factor Victim	4	285	3	0	0	0	0	0
Score	5	218	4	0	0	0	0	0
	6	191	10	0	0	0	0	0
	7	117	15	2	0	0	0	0
	8	213	71	10	1	1	0	0
Victim of	9	0	20	17	3	1	0	0
bullying	10	0	5	18	14	2	0	0
↓	11	0	0	0	15	8	3	0
	12	0	0	1	7	14	10	0
	13	0	0	0	2	4	2	0
	14	0	0	0	6	2	13	1
	15	0	0	0	0	3	9	4
	16	0	0	0	0	0	0	12

Chi-Square Test of Model Fit

Value	258.672
Degrees of Freedom	101
P-Value	0.0000

RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.034
90 Percent C.I.	0.029 0.039
Probability RMSEA <= .05	1.000

CFI/TLI

CFI	0.971
TLI	0.966

SRMR (Standardised Root Mean Square Residual)

Value	0.043

There is a significant positive relationship between being a bully and victim (r=0.29). This could be an indication that some students are bully-victims.

There is a significant negative relationship between being a bully and being pro-social (r=-0.379). Students who are pro-social are less likely to be bullies (and vice versa).

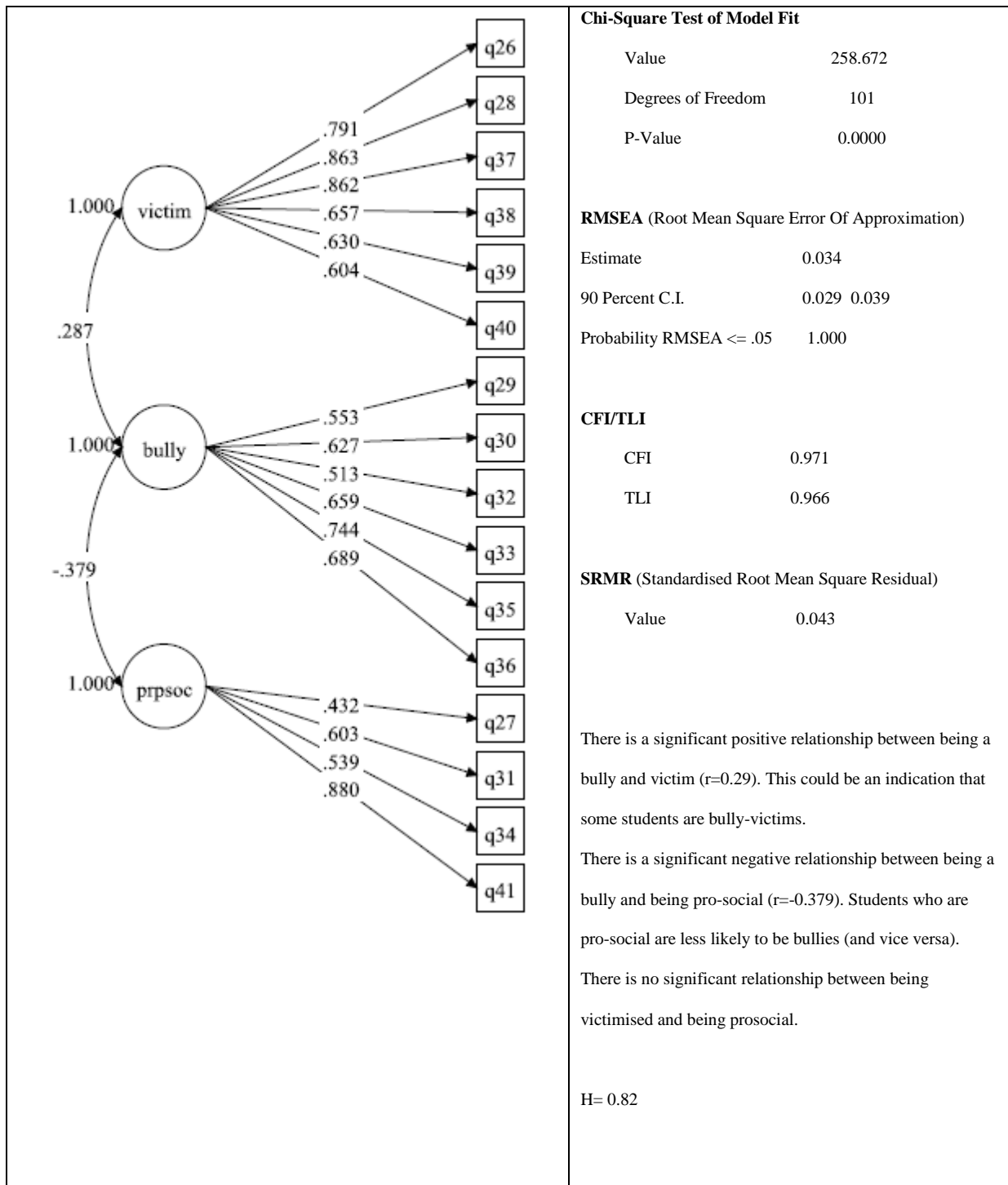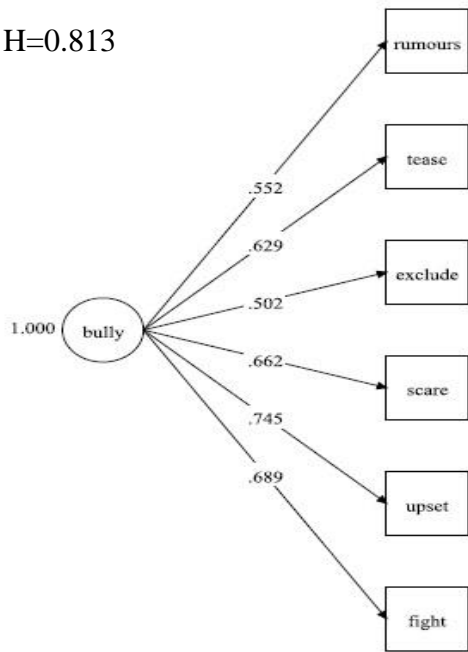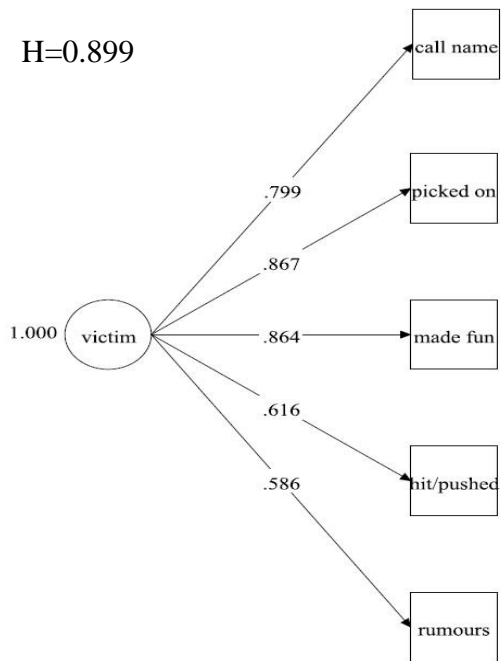There is no significant relationship between being victimised and being prosocial.

H= 0.82

Figure A: Factor structure of constructs in the Peer Relations Questionnaire (PRQ) (Rigby & Slee, 1991).

H=0.813

7a χ^2 (9) = 13.294, p > 0.05; RMSEA = 0.019; 90% C.I. [0.000 - 0.039]; Probability RMSEA < = .05 is 0.997; CFI = 0.991; TLI = 0.985; SRMR = 0.023

Figure B: Item loadings and fit indices of the Bully Factor from the PRQ

H=0.899

.799
.867
.864
.616
.586

1.000 victim

call name
picked on
made fun
hit/pushed
rumours

7b χ^2 (5) = 11.538, p < 0.05; RMSEA = 0.031; 90% C.I. [0.006 - 0.055]; Probability RMSEA < = .05 is 0.899;

CFI = 0.998; TLI = 0.996; SRMR = 0.017

Figure C: Item loadings and fit indices of the Victim Factor from the PRQ