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# Concurrent and prospective associations between bullying victimization and substance use among Australian adolescents

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ABSTRACT

*Background:* Adolescence is a vulnerable time for both substance use and bullying involvement; however, there is limited research on substance use among adolescent victims of bullying. This study aimed to examine concurrent and prospective associations between bullying and substance use, differentiating between passive-victims, bully-victims and 'pure' bullies.
*Method:* Associations between bullying involvement and substance use at baseline and 24 months post-baseline were examined in a cohort of adolescents in Australia. Bullying victims were divided into passive-victims (those who get bullied and do not bully others) and bully-victims (those who both get bullied and bully others). Perpetrators of bullying were divided into 'pure' bullies (those who bully others but do not get bullied), and bully-victims (as above). Outcomes examined were past six month use of alcohol (any drinking; risky drinking), tobacco, and cannabis.
*Results:* While there was no evidence of an association between bullying victimization and/or perpetration and substance use at baseline, there was evidence of an association between bullying and substance use 24 months post-baseline. Specifically, there was evidence of increased odds of risky drinking and cannabis use for the bully-victim group.
*Conclusions:* Bully-victim status at age 13 was associated with substance use at age 15, controlling for concurrent bullying involvement at age 15. Bully-victims are a particularly high-risk group that could benefit from targeted substance use preventive interventions. Reducing bullying is of great importance in reducing substance use and other harms among adolescents.


## 1. Introduction

Adolescence is a time of substantial structural and functional development; importantly, it is also a period of heightened vulnerability for risky behaviours (Stanis and Andersen, 2014; Steinberg, 2007). One such behaviour often initiated during adolescence is substance use (AIHW, 2014). Early initiation of substance use has been associated with an increased risk for substance use disorders in adolescence and adulthood (Hingson et al., 2006; Magid and Moreland, 2014; Ystrom et al., 2014). Substance use disorders can result in significant harm to both the individual and wider society. Findings from the 2010 Global Burden of Disease study indicate that illicit drug use disorders combined with alcohol use disorders accounted for two percent of disability-adjusted life years worldwide (Whiteford et al., 2013).

Another problem behaviour often seen among adolescents is bullying. Bullying is a specific form of aggression that involves repeated negative actions with the intent of causing harm, and typically involves an imbalance of power (Olweus, 2000; Smith and Brain, 2000). Bullying during childhood and adolescence has been associated with negative impacts on social, psychological and physical wellbeing, even into adulthood (Arseneault et al., 2010; Copeland et al., 2013, 2014; Currie et al., 2012; Nansel et al., 2004; Sigurdson et al., 2014; Stapinski et al., 2014). Bullying during adolescence is of particular importance, due to the significant role of peer relationships during this stage of development (Perren et al., 2010; Steinberg and Morris, 2001). Clearly, bullying can be

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considered a significant stressful or negative life event, which is one of the key risk factors for substance use disorders (Stanis and Andersen, 2014).

A thorough understanding of the relationship between bullying and substance use has important implications for the reduction of harm among those involved, as well as the wider society. There is good evidence that bullying perpetration is associated with substance use (Berthold and Hoover, 2000; Carlyle and Steinman, 2007; Hemphill et al., 2011; Kim et al., 2011; Luukkonen et al., 2010; Moore et al., 2014; Nansel et al., 2001; Niemala et al., 2011; Sigurdson et al., 2014; Sourander et al., 2000; Vieno et al., 2011; Wang et al., 2012). However, the association between bullying *victimization* and substance use remains unclear. While there is evidence of general externalizing problems among victims of bullying, research specifically examining the association between bullying victimization and substance use is inconclusive, with limited and often conflicting research in this area (Cook et al., 2010; Espelage et al., 2013; Ivarsson et al., 2005; Kelly et al., 2015; Reijntjes et al., 2011). While some studies have found an increased risk of substance use among victims (Peleg-Oren et al., 2012; Sigurdson et al., 2014; Tharp-Taylor et al., 2009; Topper et al., 2011; Vieno et al., 2011), others have found a negative association or no association at all (Alikasifoglu et al., 2007; Archimi and Kuntsche, 2014; Copeland et al., 2013; Desousa et al., 2008; Forero et al., 1999; Hemphill et al., 2011; Kaltiala-Heino et al., 2000; Liang et al., 2007; Moore et al., 2014; Nansel et al., 2004, 2001).

Further research is needed to clarify the relationship between bullying victimization and substance use. It is possible that the inconsistency in the literature is partly due to the lack of differentiation between 'passive-victims' (those who get bullied and do not bully others) and 'bully-victims' (those who both get bullied and bully others). Bully-victims have been found to be a particularly disordered group, frequently shown to have more externalizing problems than passive-victims and 'pure' bullies (Burk et al., 2011; Cook et al., 2010; Copeland et al., 2013; Forero et al., 1999; Haynie et al., 2001; Ivarsson et al., 2005; Kelly et al., 2015; Klomek et al., 2011; Kumpulainen and Räsänen, 2000; Nansel et al., 2001; Schwartz, 2000; Sourander et al., 2007). It may be the case that passive-victims are not at increased risk of substance use, but bully-victims are. Therefore, these groups need to be examined separately. Another limitation in research on substance use and bullying is the lack of longitudinal research, precluding the examination of temporal relationships between bullying and substance use. This study aims to extend previous research in the area by examining longitudinal associations between bullying victimization and substance use among adolescents, differentiating between passive-victims, bully-victims and 'pure' bullies.

## 2. Methods

### 2.1. Participants

The current study examined concurrent and prospective associations between bullying involvement and substance use among the control group of the *Climate and Preventure* (CAP) study, a trial of a comprehensive substance use prevention intervention for adolescents (Newton et al., 2012). Of the 2608 eligible students invited into the CAP study, 2268 provided consent and completed the baseline survey between February and May 2012. Participation in the study was voluntary and the students were made aware that the surveys were anonymous and confidential. Further information on the CAP study can be found in Newton and colleagues (2012). The control group included 527 secondary school students from two independent, three catholic and two state schools in New South Wales and Victoria, Australia, at baseline. There was an 85% follow-up rate at 24 months.

### 2.2. Measures

*2.2.1. Bullying.* Bullying prevalence was measured using an amended version of the Revised Olweus Bully/Victim Scale (Olweus, 1996). This scale has good psychometric properties and demonstrated internal consistency in the current sample that was similar to previous studies ($\alpha = 0.82$) (Kyriakides et al., 2006). The bullying questionnaire provided the respondents with a definition of bullying, and asked them to indicate how often they had been involved in bullying in the past six months (encompassing general bullying victimization and perpetration, as well as verbal, relational and physical victimization and perpetration). Participants were classified as uninvolved if they reported no or infrequent (less than fortnightly) involvement in bullying victimization and perpetration; as recommended by Solberg and Olweus (2003). Participants were classified as victims if they reported fortnightly or more frequent involvement in any of the types of victimization measured. Victims were then further divided into two groups:

- 'Passive-victim': frequent (fortnightly or more) bullying victimization but no/infrequent bullying perpetration;
- 'Bully-victim': frequent (fortnightly or more) involvement in both bullying perpetration and bullying victimization.

Participants were classified as bullies if they reported fortnightly or more frequent involvement in any of the types of bullying perpetration measured. Bullies were then further divided into two groups:

- 'Pure bully': frequent (fortnightly or more) bullying perpetration but no/infrequent bullying victimization;
- 'Bully-victim': as above.

*2.2.2. Substance use.* Past six month substance use was measured, including any drinking (at least a standard drink), risky drinking (5 or more standard drinks in one episode as defined by the National Health and Medical Research Council (2009); this is a subset of 'any drinking'), any use of tobacco, and any use of cannabis. The substance use outcomes were examined at baseline to examine concurrent relationships, and at 24 months post-baseline to examine longer term outcomes. The 24 month follow-up survey encompasses a time period in which adolescents have greater exposure to alcohol and other drugs, but is prior to the average age of initiation for tobacco, alcohol and cannabis in Australia (AIHW, 2014).

### 2.3. Statistical analysis

SPSS 22 was used for statistical analyses. The CAP study utilized a cluster randomized design (clustered by school). Accounting for clustering is not deemed necessary if less than 10% of systematic variance exists at the between school level (Lee, 2000). Analyses showed that intra-class correlations for the outcome variables were trivial (accounting for 0–3% of the variance); therefore analyses used more parsimonious single-level models. Chi-square analyses were conducted to identify gender differences between the bullying groups. Logistic regression analyses were used to examine associations between baseline bullying involvement and substance use at baseline and 24 months post-baseline (controlling for concurrent bullying involvement), compared to uninvolved students. The analyses were first conducted for the total victim group (including both passive-victims and bully-victims), and then were conducted separately for the two bullying victim subtypes,

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**Table 1**
Characteristics of the bullying groups at baseline.

| Characteristic | Total victim group[a] (*n* = 127) | Total bully group[b] (*n* = 37) | Passive-victims[c] (n = 102) | Bully-victims[d] (*n* = 25) | Pure bullies[e] (*n* = 12) | Uninvolved students[f] (*n* = 369) |
|---|---|---|---|---|---|---|
| Male (%) | 50 | 65 | 45 | 72 | 50 | 25 |
| Age (mean years) | 13.5 | 13.5 | 13.4 | 13.5 | 13.4 | 13.4 |
| Any drinking (%) | 7 | 5 | 8 | 4 | 8 | 8 |
| Risky drinking (%) | 2 | 3 | 2 | 4 | 0 | 4 |
| Tobacco use (%) | 9 | 11 | 8 | 16 | 0 | 4 |
| Cannabis use (%) | 9 | 11 | 9 | 12 | 8 | 5 |

Note: Group numbers do not total 527; 19 missing cases.
[a] Classified as students who reported fortnightly or more frequent victimization (included both the passive-victim and bully-victim groups).
[b] Classified as students who reported fortnightly or more frequent perpetration (included both the 'pure' bully and bully-victim groups).
[c] Classified as students who reported fortnightly or more frequent victimization but no/less than fortnightly perpetration.
[d] Classified as students who reported fortnightly or more frequent involvement in both victimization and perpetration.
[e] Classified as students who reported fortnightly or more frequent perpetration but no/less than fortnightly victimization.
[f] Classified as students who reported no/infrequent involvement in both victimization and perpetration.

passive-victims and bully-victims. Similarly, the analyses were first conducted for the total bully group (including both 'pure' bullies and bully-victims), and then were conducted separately for the two bully subtypes, 'pure' bullies and bully-victims. A Benjamini and Hochberg (1995) correction was applied to avoid error rate inflation due to the number of comparisons being conducted (using a false positive rate of 0.1).

## 3. Results

### 3.1. Characteristics of the sample

Approximately two thirds of the participants were female (67%), and the mean age of the participants was 13.4 years (SD 0.4). One quarter (25%) of the sample was classified as victims; of these 80% were classified as passive-victims and 20% as bully-victims (Table 1). Frequent bullying was less frequent, with 7% of the sample classified as bullies; of these 32% were classified as 'pure' bullies and 68% as bully-victims. Males were more likely to be victims (38.8% vs. 18.5%; $\chi^2(1, n = 506) = 24.405$, $p = 0.000$), bullies (14.5% vs. 3.8%; $\chi^2(1, n = 505) = 18.808$, $p = 0.000$), passive-victims (27.9% vs. 16.4%; $\chi^2(1, n = 506) = 9.068$, $p = 0.003$) and bully-victims (10.9% vs. 2.1%; $\chi^2(1, n = 506) = 18.492$, $p = 0.000$) than females, but there was no significant difference in sex for 'pure' bullies (3.6% and 1.8%; $\chi^2(1, n = 506) = 1.692$, $p = 0.193$). The prevalence of substance use among the bullying victim groups at baseline is shown in Table 1.

### 3.2. Associations between baseline bullying and baseline substance use

Baseline associations between bullying victimization and substance use were first examined among the total victim group (including both passive-victims and bully-victims). There were no significant differences between the total victim group and uninvolved students at baseline (Table 2). Next, the analysis was separated into the two subtypes of victims: passive-victims and bully-victims. There was no evidence of increased odds of substance use among passive-victims or bully-victims at baseline (Table 2). Similarly, there were no significant differences in substance use between the total bully group (including both 'pure' bullies and bully-victims) and uninvolved students (Table 2). The results for the bully-victim group were described above. Due to low numbers in the 'pure' bully group it was not possible to examine the associations for risky drinking or tobacco for this group. The remaining models for the 'pure' bully group were not significant (OR [95% CI]: any drinking 1.2 [0.2–9.9]; Cannabis 2.2 [0.3–18.6]).

### 3.3. Associations between baseline bullying and 24 month substance use

Associations between baseline bullying victimization and substance use 24 months post-baseline were first examined among the total victim group. The increased odds of cannabis use for the total victim group was no longer significant when adjusting for

**Table 2**
Logistic regression analyses for substance use among the bullying groups compared to uninvolved students: baseline and 24 month associations[e].

| Substance use | Total victim group[a] (*n* = 127) OR (95% CI) | Total bully group[b] (*n* = 37) OR (95% CI) | Passive-victims[c] (*n* = 102) OR (95% CI) | Bully-victims[d] (*n* = 25) OR (95% CI) |
|---|---|---|---|---|
| *Baseline* | | | | |
| Any drinking | 1.1 (0.5–2.4) | 0.8 (0.2–3.8) | 1.1 (0.5–2.6) | 0.6 (0.1–4.9) |
| Risky drinking | 0.7 (0.2–2.4) | 0.8 (0.1–6.3) | 0.5 (0.1–2.5) | 1.1 (0.1–9.6) |
| Tobacco | 2.0 (0.9–4.4) | 2.1 (0.6–7.2) | 1.7 (0.7–4.1) | 3.2 (0.9–11.0) |
| Cannabis | 2.5 (1.1–5.5) | 3.5 (1.0–11.9) | 2.3 (1.0–5.4) | 4.0 (1.0–15.8) |
| *24 months* | | | | |
| Any drinking | 1.6 (0.9–2.7) | 1.7 (0.6–4.7) | 1.3 (0.7–2.3) | 3.8 (1.3–11.5) |
| Risky drinking | 1.2 (0.7–2.2) | 1.7 (0.6–4.9) | 0.8 (0.4–1.6) | 5.1 (1.7–15.1)* |
| Tobacco | 1.5 (0.7–3.2) | 2.4 (0.6–9.1) | 1.3 (0.6–2.9) | 3.0 (0.8–11.6) |
| Cannabis | 2.9 (1.3–6.6) | 1.8 (0.4–7.2) | 2.2 (0.9–5.4) | 7.4 (2.1–26.0)* |

Note: The results for the 'pure' bullies are reported in text.
[a] Classified as students who reported fortnightly or more frequent victimization (includes both the passive-victim and bully-victim groups).
[b] Classified as students who reported fortnightly or more frequent perpetration (included both the 'pure' bully and bully-victim groups).
[c] Classified as students who reported fortnightly or more frequent victimization but no/less than fortnightly perpetration.
[d] Classified as students who reported fortnightly or more frequent involvement in both victimization and perpetration.
[e] Baseline analyses adjusted for gender; 24 month analyses adjusted for gender, baseline substance use, and bullying victimization at 24 months (reference group was uninvolved students).
* Significant ($p < 0.005$; adjusted *p*-value for multiple comparisons).

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multiple comparisons (Table 2). Next, the analysis was separated into the two subtypes of bullying victims, passive-victims and bully-victims. As with the baseline analysis, there was no evidence of increased odds of substance use at 24 months among the passive-victims (Table 2). There was evidence of increased odds of risky drinking for the bully-victims compared to the uninvolved students (Table 2). There was also evidence of increased odds of cannabis use among bully-victims (Table 2). Associations between baseline bullying perpetration and substance use 24 months post-baseline were examined separately for the total bully group, 'pure' bullies and bully-victims. There was no evidence of increased odds of substance use the total bully group or the 'pure' bullies (Table 2). The results for the bully-victims were described above. Due to low numbers in the 'pure' bully group it was not possible to examine the associations for cannabis use for this group. The remaining models for the 'pure' bullies were not significant (OR [95% CI]: any drinking 0.8 [0.2–3.1]; risky drinking 0.4 [0.0–3.3]; tobacco 1.9 [0.4–10.3]).

## 4. Discussion

The current findings support a prospective relationship between bullying and substance use; specifically, bully-victim status at age 13 was associated with substance use at age 15, independent of concurrent bullying at age 15. This suggests that bullying involvement during adolescence may lead to a delayed impact on substance use. Such a finding is important, as it supports the findings of previous studies demonstrating lasting effects of bullying during childhood and adolescence (Copeland et al., 2013, 2014). In addition, it provides evidence that substance use can begin very early, and suggests that substance use prevention should be implemented during early adolescence. However, further research is needed to determine a causal relationship between bullying involvement during adolescence and substance use. As discussed, adolescence is a critical period of development, during which peer relationships are of great importance, and risky behaviours such as substance use are likely to be initiated (Stanis and Andersen, 2014; Steinberg, 2007). Therefore, it is important that research on consequences of adolescent bullying includes a focus on substance use, in addition to its current focus on psychological wellbeing.

The association between bullying involvement and substance use was only evident for those adolescents involved as both victims and perpetrators of bullying, known as 'bully-victims'. Importantly, bully-victim status at age 13 was associated with five times the odds of risky drinking, and seven times the odds of cannabis use at age 15, compared to uninvolved adolescents. These findings support the notion that bully-victims are a distinct group, with poorer functioning than those involved in either bullying victimization or perpetration alone (Haynie et al., 2001). There are numerous possible explanations for the greater risk of substance use among bully-victims than among passive-victims. One possible explanation is the influence of peer factors; affiliation with antisocial peers increases the risk of substance use among adolescents (Cleveland et al., 2008). Bully-victims may be more likely to associate with deviant peers than passive-victims, and therefore have more opportunity to use alcohol or other drugs (Haynie et al., 2001). As suggested by Topper and colleagues (2011), it may be that passive-victims do not use alcohol until later, once alcohol is normative among peers. Another possible explanation is that bully-victims are higher in general psychopathology than passive victims; previous research has found bully-victims tend to be the most disordered group involved in bullying (Burk et al., 2011; Copeland et al., 2013; Forero et al., 1999; Haynie et al., 2001; Kelly et al., 2015; Nansel et al., 2001; Schwartz, 2000). General psychopathology has been defined as "one underlying factor that summarizes individuals' propensity to develop any and all forms of common psychopathologies" (Caspi et al., 2014). Further research is needed to examine the differences between bully-victims and passive-victims.

It was proposed that the inconsistent findings in the literature in regard to bullying victimization and substance use were partly due to the confounding of results for passive-victims and bully-victims. In the current study the association between bullying victimization and substance use was driven by the bully-victims. This highlights the importance of examining these groups separately. In addition, the current study found an increased risk of substance use among bully-victims at the 24 month follow-up, but not at baseline. It appears that the inconsistent findings in the literature may also be partly due to the lack of longitudinal research. More longitudinal research is needed to further clarify these relationships.

There was no evidence of an association between bullying perpetration and substance use in the current study. This finding was inconsistent with previous literature in the area (Berthold and Hoover, 2000; Carlyle and Steinman, 2007; Hemphill et al., 2011; Kim et al., 2011; Luukkonen et al., 2010; Moore et al., 2014; Nansel et al., 2001; Niemala et al., 2011; Sigurdson et al., 2014; Sourander et al., 2000; Vieno et al., 2011; Wang et al., 2012). The current findings should be interpreted with caution due to the small group sizes. In particular, there were very few 'pure' bullies in the sample, which greatly limited the interpretability of these results. Further research is needed to differentiate the associations between bullying perpetration and substance use for 'pure' bullies and bully-victims.

The current study has significant implications for substance use prevention among adolescents. It has been suggested that involvement in bullying be seen as a marker by which school personnel and parents can identify those at risk of substance use (Vieno et al., 2011). The current findings indicate that bully-victims should be considered to be at high-risk for substance use. Identifying those involved in bullying victimization and perpetration can provide an opportunity to deliver targeted substance use prevention interventions for these high-risk adolescents. This is particularly important as it has been suggested that substance use is often more difficult to detect for teachers and parents than other forms of negative behaviour, such as bullying involvement (Vieno et al., 2011). Even though the current results do not provide evidence of an increased risk of substance use among passive-victims or 'pure' bullies, such associations may be borne out in larger samples and/or later in development.

While the prospective associations found in the current study point to a temporal relationship between bully-victim status and substance use, they do not establish causation. Further research is needed to understand the mechanisms involved in the relationship between bullying and substance use. For instance, there may be an indirect relationship between bully-victim status and substance use, mediated by mental disorders. As it is has been substantiated that bully-victim status is associated with mental disorders such as depressive and anxiety disorders, and that such disorders are associated with substance use, preventive efforts focused on reducing such mental disorders are likely to reduce the onset of substance use disorders among adolescents involved in bullying (Copeland et al., 2013; Moore et al., 2014; Scott et al., 2014). It should be noted that the relationships found in the current study may be confounded by factors such as socioeconomic status and family background, as found in previous research (Copeland et al., 2013). Although, Moore and colleagues (2014) found that bullies and bully-victims were still at increased risk of substance use when controlling for family income, sex, mother's mental health and family structure. Future research investigating a causal relationship between bullying and substance use should take into account potential confounders.

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The current study adds to the literature on the association between bullying and substance use, by examining longitudinal associations, including a range of substances, and improving upon previous studies in the area in the measurement of bullying. Specifically, this study employed a widely used and psychometrically sound measure of bullying, and clearly differentiated between passive-victims, bully-victims and 'pure' bullies. Previous research has often neglected bully-victims, or used inadequate methods of measuring this group, such as in the case of Moore and colleagues (2014). In addition, the current study used a cut-off of fortnightly or more frequent involvement in bullying, as recommended by Solberg and Olweus (2003), as this is a more valid measure of bullying than 'any' bullying as used in many previous studies (Hemphill et al., 2011; Moore et al., 2014). The use of 'any' involvement in these studies means that it is impossible to know whether the students were only involved in isolated incidents of peer aggression/victimization, or if they did fit the criteria of bullying in being involved in *repeated* peer aggression/victimization. Further, the current study controlled for concurrent bullying involvement at 24 months, which provides clearer evidence of a temporal relationship between bullying and substance use. Previous studies reporting prospective relationships between bullying and substance use that did not control for concurrent bullying at the follow-up point cannot unequivocally demonstrate a temporal relationship, in that the association may have been at least partly due to current involvement in bullying at the follow-up time point (Hemphill et al., 2011; Moore et al., 2014).

For some time it has been known that bullying is problematic for the mental health of victims, with evidence for an association with problems such as depression, anxiety and suicide (Arseneault et al., 2010; Copeland et al., 2013; Nansel et al., 2004; Sigurdson et al., 2014; Stapinski et al., 2014). This current paper adds to the literature by showing that those involved in bullying are also at increased risk of substance use. Substance use in adolescence is of great concern, associated with an increased risk of a wide range of problems, such as morbidity and mortality, mental disorders, blood borne viral infection, criminal involvement, poor social functioning, and academic difficulties, as well as a risk of progression to chronic substance use and dependence in adulthood (Hingson et al., 2006; Magid and Moreland, 2014; Sussman et al., 2008; Whiteford et al., 2013; Ystrom et al., 2014). Therefore, there is a great need to reduce bullying, and to intervene as early as possible with those involved in bullying, in order to reduce some of this harm.

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## Contributors

Maree Teesson, Patricia Conrod, Nicola Newton and Tim Slade are the Chief Investigators on the CAP study NHMRC grant in Australia. Maree Teesson, Nicola Newton, Tim Slade, Emma Barrett and Erin Kelly were responsible for the study design, ethics and clinical trial submission, data collection, and recruitment of schools for the CAP study. Erin Kelly prepared the manuscript and conducted the data analyses for the current paper, with the assistance of all of the authors. All authors have read and approved the final article.

## Conflict of interest

No conflict declared.

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