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Does Bullying Others at School Lead to Adult Aggression? The Roles of Drinking and University
Participation during the Transition to Adulthood

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Abstract

This study uses a three-wave longitudinal study of young Australians to identify developmental processes underlying the relationship between school bullying and physical aggression in early adulthood. The central question is whether and how drinking and participation in work or university study disrupt or entrench aggressive pathways from school bullying to adult aggression. Self-report data was collected from 88 females and 63 males (N=151) during childhood (age 10), adolescence (age 14) and early adulthood (age 20). Participants who bullied other students during childhood and adolescence, or during adolescence only, reported more physical aggression during early adulthood than those who never bullied. However, those who had bullied during adolescence only reported significantly higher adult aggression if they were also drinking at above-average frequencies. Conversely, participation in university, compared to being in the workforce, was associated with significantly *less* adult aggression amongst the at-risk groups. Findings suggest that particular contexts during early adulthood can offer youth on aggressive trajectories (as evidenced by bullying at school) unique opportunities to turn their behaviour around. Other contexts, however, may exacerbate aggressive behaviour patterns.

Keywords: aggression, bullying, drinking, emerging adulthood, longitudinal

Does Bullying Others at School Lead to Adult Aggression? The Roles of Drinking and University Participation during the Transition to Adulthood

Bullying is a common form of aggression during childhood and adolescence, but researchers have only recently begun to examine bullying as a direct predictor of adult problem behaviour. Analyses of several major longitudinal studies reported in *Criminal Behaviour and Mental Health*, 21 (e.g., Farrington & Ttofi, 2011) show that bullying during childhood or adolescence was strongly associated with aggression in early adulthood, after controlling for a wide range of childhood risk factors. However, important questions about the nature of the longitudinal relationship between bullying and adult aggression remain unanswered. For example, how do different developmental trajectories of bullying during the school years relate to different levels of adult aggression? What are the short- and long-term risk and protective factors that may account for continuity and discontinuity in the relationship between bullying and later aggression? This study uses data from a sample of young Australians resident in Canberra, surveyed at ages 11, 14 and 20, to examine how young adult physical aggression relates to different histories of school bullying, with a particular focus on how experiences with drinking, employment and study during the transition to adulthood may account for variation in aggression.

Although there is considerable continuity from early to later aggression (Farrington, 2007), there is also significant heterogeneity. In general, research supports a broad distinction between a group of individuals who aggress at a high level across childhood and adolescence, and other groups who generally behave with less severity and whose aggressive behaviour peaks during adolescence (Moffitt, 2007; Roisman, Aguilar, & Egeland, 2004). Pepler and colleagues (2008) show similar patterns for bullying. They identified several trajectory groups for students from ages 10 to 17, including a small group who engaged in consistently high levels of bullying, a larger group who bullied at a consistently moderate level, and a small group who started high but declined during adolescence. Moreover, individuals in the high bullying group reported significantly more physical aggression than other groups, supporting the possibility that 'persistent' bullies may already be physically aggressive young people during the school years. These findings suggest that factors

shown in the wider aggression literature to be related to desistance and persistence in antisocial behaviour during the transition to adulthood within different trajectory groups may also be relevant for understanding the adult behaviour of children who bullied at school. Therefore, this study considers outcomes for four groups of children: *never-bullied*, who did not report bullying in either childhood or adolescence, *child-limited* bullying whose behaviour occurred in childhood only, *adolescent-onset* bullying who first reported bullying during high-school, and a *persistent* group, bullying in both childhood and adolescence.

Combining established findings from the developmental aggression literature with what is known about longitudinal patterns of bullying, it seems reasonable to expect that those who bully others during childhood, and continue to do so in adolescence, will be most likely to be physically aggressive as young adults. Yet, this prediction fails to take into account potential mediating and moderating effects of the substantial changes in social and institutional context that occur after high-school. Longitudinal studies of crime (Moffitt, 1993; Laub, Nagin & Sampson, 1998) identify the early adult period as a critical juncture in desistance and persistence in offending. This literature implicates two broad sets of early adult transition experiences that can either disrupt or intensify trajectories of aggressive and antisocial behaviour. The first set is positive life events embedded within institutional transitions, like marriage and stable employment. Several major longitudinal studies have found that these adult events or ‘turning points’ are associated with desistance from offending (e.g., Farrington, 2007; Laub, et al, 1998). The other set of factors include activities that actively retard reductions in antisocial behaviour during adulthood. Referred to by Moffitt (1993) as ‘snares’, these factors exert short-term, contemporaneous effects on antisocial behaviour, beyond the risk conveyed by developmental histories of such behaviour.

Drawing on this literature, this study examines the role of two key aspects of the experience of emerging adulthood. The first aspect is drinking. Although the mechanisms underlying the association between drinking and aggression are complex, longitudinal studies suggest that alcohol is most likely to lead to aggression for adolescents who are already predisposed to behave aggressively (Felson, Teasdale & Burchfield, 2008). Thus, it is possible that heavy drinking is a snare that increases the risk of aggression for former bullies.

The second aspect is participation in the world of work and vocational training versus the world of university study, a basic social marker in the post-high-school Australian population. Employment and university may be regarded as social institutions that are defined by specific sets of norms, regulations, and routines; are characterised by different physical environments and relationships; impose different demands upon young people; and are entered into by young people who hold different expectations about their current and future roles in society.

Research on desistance in offending suggests that the new occupational options available during emerging adulthood could open up many opportunities for youth who bullied others at school. Adolescents who bully others generally also exhibit poor school adjustment and academic difficulties (Stein et al., 2007). Work experiences that provide these young people with opportunities to experience success and develop competence in this new adult domain may enable them to escape the accumulated failures of past school contexts and discontinue associated patterns of aggressive behaviour. Another possibility is that employment could contribute to the development of a mature adult identity and engender the sorts of social bonds and related informal social control that findings from longitudinal studies of offending suggest underlie the association between stable employment and desistance (Laub et al., 1998; Uggen, 2000).

However, one limitation is that these propositions are based on findings from longitudinal surveys of crime and violence that were initiated some decades ago (e.g., Sampson & Laub, 1993, using a sample of boys who were adolescents in the 1940s), when university study was much rarer and full-time employment in a 'career track' job upon leaving school more common. Another issue is that the earlier research has little to say about the role of adult study experiences for changes in problem behaviour. Several North American longitudinal studies using contemporary samples (e.g., Roisman et al., 2004) have found that full-time engagement with work and/or study during the early adult years tends to be associated with less violence for those who were aggressive during adolescence. However, because few studies consider employment and study separately, no clear picture emerges regarding the effects, if any, of university participation for continuity in aggression.

To summarise, findings from longitudinal investigations of aggression and delinquency suggest that early adult experiences with drinking and the different institutional contexts of work and

study may account for variation in aggression amongst individuals who bullied others during the school years. An important issue, however, is whether and how these effects may differ depending upon developmental history of school bullying. For example, Felson and colleagues (2008) found that drinking was most strongly associated with violence for adolescents who had been most violent in the past. With regard to effects of work and study, Moffitt (2007) argues that any positive ‘turning point’ effects associated with early adult life events will be most applicable to individuals who first begin to be antisocial during adolescence. This is because those who are antisocial across childhood and adolescence are characterised by pervasive social and behavioural dysfunction, and this will decrease the likelihood that they will encounter positive events. Others, however, argue that the most aggressive individuals will derive the *most* benefit from positive adult occupational experiences, even if they are least likely to encounter them (Roisman et al, 2004).

The Current Study

This study addresses two questions. First, to what extent do different developmental histories of bullying in primary-school and high-school predict emerging adult physical aggression? Based on the literature, it was expected that members of the adolescent-onset bullying and persistently bullying groups would be more aggressive than members of the child-limited or never-bullied groups, and that those who persistently bullied would be most aggressive. Second, do drinking and work/study roles have any additional effects on aggression, and if so, are such effects additive or interactive with a history of bullying? To test this, possible moderating effects of drinking and work/study role on aggression for members of different bullying groups are modelled.

Method

Participants

Participants were members of the Life at School study (Ahmed, 2001). The study includes three waves of self-report questionnaire data collected from children and one of their parents during primary-school (Time 1, T1, 1996), high-school (Time 2, T2, 1999), and early adulthood (Time 3, T3, 2006). The original sample included 571 child-parent pairs drawn from 32 primary-schools in Canberra. At this time children ranged in age from 9 to 13 (modal age =10). At T2 children were aged 13 to 15 and were in grades 7 to 10 ($n= 354$), and at T3 all had left school and were aged 18 to 22

years ($n = 177$). The final sample included 151 participants (63 men and 88 women) with complete data at each wave. Twenty-six participants who lacked T2 data were not included.

Measures

Bullying (T1 and T2): Bullying was assessed using two items developed by Rigby (1998), based on Olweus' (1993) Bully-Victim Questionnaire. After reading the definition of bullying: "*We call it bullying when someone repeatedly hurts or frightens someone weaker than themselves on purpose. Remember that it is not bullying when two young people of about the same strength have the odd fight or quarrel. Bullying can be done in different ways: by hurtful teasing, threatening actions or gestures, name-calling or hitting or kicking.*" students were asked (1) 'How often have you been part of a group that bullied someone during the last year?' and (2) 'How often have you, on your own, bullied another child during the last year?' Responses were (0) never (1) once or twice (2) sometimes (3) once a week (4) several times a week. The two items were averaged to create the bullying scale (T1 $r = .62$, $\alpha = .76$; T2 $r = .74$, $\alpha = .84$).

Identification of longitudinal bullying groups: Participants were classified as having bullied at T1 and/or T2 if they scored one or greater on the bullying scale. As the scale averaged over the two items, scores of one and greater indicate that the participant had bullied others at least 'sometimes or more often' over the past year, rather than 'once or twice' or 'never'. This cut-point was chosen because a key defining feature of bullying is behaviour that is repeated over time (Stein et al., 2007). Four groups were identified: *Never-bullied*: Participants who never met the criteria for bullying ($n = 78$, 23 males, 55 females); *child-limited bullying*: Participants bullying in primary-school only ($n = 26$, 11 males, 15 females); *adolescent-onset bullying*: Participants bullying in high-school only ($n = 24$, 12 males, 12 females); and *persistent bullying*: Participants bullying in primary-school and high-school ($n = 23$, 17 males, 6 females).

Drinking frequency (T3): Frequency of drinking was assessed with one item: 'In the last 12 months, how often did you have an alcoholic drink of any kind?' Responses were (1) every day; (2) 5-6 days a week; (3) 3-4 days a week; (4) 1-2 days a week; (5) 2-3 days a month; (6) about 1 day month; (7) less often (AIHW, 2007). Items were reversed such that higher scores indicated more frequent drinking.

Work/study role (T3): *University-oriented* role refers to the 76 participants who were either a) current full- or part-time university students (N=71), or b) workers who had recently completed a university degree (N=5). *Employment-oriented* role refers to the remaining 75 participants who were either a) individuals who had not undertaken any post-secondary study or training (N=32), or b) who were undertaking, or had completed, a vocational training course (N=43). The data support the validity of the university-employment distinction. First, university students accounted for 75% of all students. Second, while 90% of all participants had a job, Vocational Education and Training (VET) students were more likely to be working full-time and worked significantly more hours per week than university students (27 and 14 hours respectively, $t(96)= 3.8, p=.001$). However, they did not work significantly less hours than non-students (27 and 33 hours respectively, $t(73)= 1.8, p=.008$). Third, VET students were much more likely to study part-time (35% compared with 4% of university students). Finally, in response to the question ‘Do you consider yourself mainly as (1) a worker, or (2) a student?’ 50% of VET students responded ‘worker’ compared with 4% of university students. This indicates a greater proportion of participants with a workplace-orientation within the VET group.

Physical aggression (T3): Participants were asked how often in the last 12 months they had a) attacked someone to physically hurt them, b) threatened someone with violence, and c) been involved in a fight. The aggression scale was constructed using the variety score method (Bendixen, Endresen, & Olweus, 2003), in which scores are calculated by summing the number of different types of behaviours engaged in within the reference period, regardless of the frequency of occurrence. This produced a variety score that ranged from 0 to 3.

Attrition Analyses

A series of t-tests and chi-square analyses were performed to examine whether participants who dropped out of the study after T1 or T2 differed from those who remained at T2 with regard to T1 bullying, sex, and parental education. Attrition after T2 (but not T1) was associated with less parental education ($\chi^2(1)=3.90, p=.048$) and male gender ($\chi^2(1)=3.95, p=.046$), but groups did not differ with regard to T1 bullying. A comparison of T3 variables for the 26 participants excluded because they lacked T2 data did not reveal any significant differences to the final sample in level of

drinking, likelihood of attending university, or physical aggression, suggesting that excluding this group would not bias the sample.

Results

Bullying Group Differences on Drinking, Aggression, and Work/Study Role

Table 1 summarises bullying group differences on physical aggression, drinking frequency, and work/study role. One-way ANOVAs and pairwise comparisons showed that members of the persistent bullying group reported significantly more aggressive incidents and more frequent drinking than the never-bullied group, but there were no other significant differences between the groups on aggression or drinking. Although those who persistently bullied also reported the lowest university participation rate, a chi-square test showed that this difference was not significant. These descriptive analyses show that there was continuity from school bullying to adult aggression, and confirm that the persistently bullying group did report the most aggression as young adults. Consistent with the developmental aggression literature, members of the persistently bullying group also drank most often. However, many participants on bullying trajectories did *not* report adult aggression, nor was adult aggression restricted to participants who had some experience of bullying during school.

The Effects of Young Adult Drinking and Work/study roles on the Relationship between Developmental History of Bullying and Young Adult Aggression

Correlations between variables are shown in Table 2. Adult aggression was positively associated with bullying, drinking and male gender, and negatively associated university participation. Men also drank more frequently and were less likely to attend university than women. University participation was not significantly correlated with drinking or bullying.

A moderated hierarchical regression model was constructed to examine (a) the relative significance of past bullying vs. the proximal effects of drinking and work/study roles in accounting for variance in adult aggression, and (b) whether any effects of drinking and work/study were the same or different across bullying groups. Variables¹ were entered in four steps as follows: Sex and three dummy variables representing bullying group² on step 1, work/study roles and drinking frequency on step 2, three variables representing the interaction between bullying group and

work/study roles on step 3 (i.e. child-limited dummy*work/study role, adolescent-onset dummy*work/study role and persistent dummy*work/study role), and three variables representing the interaction between bullying group and drinking on step 4. Drinking frequency was mean-centred in order to reduce multicollinearity and facilitate interpretation.

Results of this analysis are shown in Table 3. The omnibus test of significance for an interaction involving a categorical variable with more than two levels is given by the value of the ΔF statistic (with $k-1$ *df*) for the step at which the terms are entered. This was significant for both two-way interactions, indicating that the association between bullying group membership and adult aggression varied depending on work/study role and level of drinking in young adulthood³.

Moderating Effect of Drinking Frequency

The bullying group*drinking interaction is shown in Figure 1. Predicted aggression scores for the four bullying groups are shown at low, average and high drinking frequencies, pooling across sex and work/study role. The values of drinking were two standard deviations below the mean, at the mean, and two standard deviations above the mean, respectively. Simple slopes analysis was used to further understand the interaction. As outlined by West, Aiken and Krull (1996), this involves tests of whether the slopes for drinking differ significantly between pairs of bullying groups. For example, in the final model in Table 3 the coefficient for the persistent bullying*drinking interaction term (.30) is the difference between the slope for drinking in the persistent bullying group and the slope for drinking in the reference group (the never-bullied), holding sex and work/study role constant. The associated *t*-value tests whether this difference is significant⁴. By re-running the model and varying the reference group, it is possible to test all pairwise differences between slopes. However, as the developmental aggression literature has mostly highlighted differences between persistent and adolescence-onset trajectories, I chose to conduct four comparisons: (1) persistent vs. never-bullied, (2) adolescent-onset vs. never-bullied, (3) child-limited vs. never-bullied (4) persistent vs. adolescent-onset. To protect against an inflated Type I error rate, alpha was set at $.05/4=.0125$. These comparisons showed that, holding sex and work/study role constant, the regression of aggression on drinking was significantly greater for the persistent bullying group compared with the never-bullied

group (see Table 3, final step), but neither the adolescent-onset slope nor the child-limited slope was significantly different to the never-bullied slope. Neither was the drinking slope for members of the persistent bullying significantly greater than the adolescent-onset slope ($B = .17, t(137) = 1.30, p = .19$).

Moderating effect of work/study role

Figure 2 shows the bullying group*work/study role interaction. Predicted aggression scores for the four bullying groups are shown for those at university and not at university at T3, with sex and drinking held constant. Comparisons between groups on the slope for work/study role were carried out as described above for drinking. Results showed that, holding sex and drinking constant, the regression of aggression on work/study role was significantly greater for the persistent and adolescent-onset bullying groups compared with the never-bullied group (see Table 3). However, the difference between the slopes for the persistent and adolescent-onset bullying groups did not reach significance ($B = .44, t(137) = 1.37, p = .17$).

Alternatives to University-oriented vs. Employment-oriented Roles

The analyses suggest that experience of a university-oriented role was particularly beneficial for reducing the likelihood of aggression amongst members of the persistent and adolescent-onset bullying groups. It was beyond the scope of this study to examine exactly what it was about university that was beneficial for these young people. It is, however, necessary to consider the possibility that the apparent promotive effect of university study might be due instead to some other institutional factor common to the students and workers in this study. Two factors were investigated in analyses not shown, vocational study and the degree of exposure to the workplace, but neither analysis reduced the importance of university study or revealed new patterns.

The role of sex

Given the correlations between sex, bullying and aggression, additional analyses assessed whether effects of bullying reported in Table 3 might be attributable to sex. The interaction of bullying group*sex did not reach significance ($p = .08$ entered first, $p = .14$ entered last), and the interactions of bullying group with drinking and work/study role remained significant. This shows

that the two-way interactions reported were significant even after controlling for sex differences in the relationship between bullying group and aggression.

Discussion

This study examined the significance of drinking and work and study roles during the transition to emerging adulthood for continuity and discontinuity in aggression amongst young people with different developmental histories of school bullying. Consistent with research on delinquency and problem behaviour, individuals who were aggressive during adolescence, as evidenced by bullying at school, were significantly more likely to report physical aggression during early adulthood. As expected, the most aggressive were those who reported bullying during both childhood and adolescence.

However, the association between history of bullying and physical aggression during emerging adulthood was dependent on both work/study roles and frequency of drinking. First, the persistent bullying group reported more aggression than those who never bullied only if they were drinking quite frequently. In other words, the few members of the persistent bullying group who did not drink frequently were less aggressive than those who did, and indeed were no more aggressive than the sample average. Second, university participation was associated with significantly less aggression for both persistent and adolescent-onset groups (compared to those who never bullied). That is, young people who bullied during adolescence and later attended university were less aggressive than those who did not attend university, and once again, their levels of aggression were not significantly greater than the sample average.

These findings are interesting for several reasons. First, while this study did not examine continuity in serious violence or delinquency, the findings nevertheless suggest that the early adult 'turning point' or 'ensnaring' effects that have been identified in the offending literature may extend to school bullying. Second, the proximal correlates of varied behavioural outcomes during early adulthood within adolescence-limited and life-course persistent groups have been less thoroughly examined than have the distal predictors of continuity and discontinuity in antisocial behaviour between the groups (Roisman et al., 2004). In terms of the consequences of school bullying for adult aggression, the present study showed that the effects of the adult transition experiences were most

consistent for those who bullied in both childhood and adolescence. Only these persistently bullying youth were more aggressive when drinking more, and both persistent and adolescent-onset bullying groups were less aggressive when at university.

On the one hand these patterns are consistent with findings from the literature on problem behaviour during the transition to adulthood. For instance, Felson and colleagues (2008) showed that the effect of frequent drinking on violence was strongest for adolescents who had been most violent in the past. On the other hand, the work/study finding in particular is at odds with Moffitt's prediction that turning point experiences will only apply to adolescent-limited antisocial behaviour. However, it is broadly consistent with longitudinal studies of childhood adversity in which childhood protective factors predict positive adult outcomes most strongly for groups who suffered the most severe early adversity (Rutter, 1987). Though university study is not a childhood protective factor, its effects may nonetheless reflect a more general mechanism by which the greatest benefits of positive life events are reaped by those at greater risk. That is, the association between university study and less aggression was strongest for the adolescent-onset and persistent bullying groups, who were at greater risk for adult aggression.

Although the results of the present study suggest that lower levels of drinking and university participation were beneficial for young adults who bullied during adolescence, it is acknowledged that it is not possible to be certain about the direction of causal effects, given that work and study transitions, drinking frequency and aggression were measured concurrently. It is possible that physical aggression decreased the likelihood of attending university and increased drinking frequency, rather than the reverse. For example, physically aggressive young adults might tend to associate with other troubled young people who also drink frequently. Despite this limitation, the finding that the transition experiences were not broadly associated with lower or higher levels of physical aggression across the sample, but were specific to the persistent and adolescent-onset bullying groups, suggests that they did have some effect on aggression, as these groups were aggressive prior to emerging adulthood.

There are two broad explanations for an association between university study, drinking and the aggressive behaviour of the adolescent bullying groups. The first possibility is that drinking and

different employment and study situations exerted some proximal effects on aggression above and beyond earlier factors, actively exacerbating or ameliorating aggressive tendencies amongst members of the adolescent-onset and persistence bullying groups. Alcohol, for instance, has been shown to have detrimental effects on cognitive functioning and decision-making, and the social and physical features of emerging adult drinking settings may act to trigger aggression as well as escalate minor incidents into violence (Graham & Homel, 2008). Moreover, these effects may be greater for individuals who have been aggressive in the past (Felson et al, 2008). With regard to the proximal effects of work and university study, it is possible that the social and institutional features of employment might be risky for individuals with a history of aggression. In the desistance literature, stable employment is seen as crucial because it provides formal and informal social control, opportunities to form conventional ties, and so on (Rutter, Kim-Cohen, & Maughan, 2006). However, employment choices for 18–20 year-olds with no tertiary qualifications in 21st century Australia tend to be low-status, short-term and casual positions that seem unlikely to convey such benefits. Aseltine and Gore (2005) also suggest that young workers may be more likely than mature adults to accept negative features of workplaces, like high rates of interpersonal conflict and lack of autonomy. School bullies, perhaps accustomed to striking out impulsively in response to interpersonal conflict, might find in the work environment continued opportunities to do so (Homel, 2007).

By contrast, although most of the university-oriented participants had a job, their main vocational focus was the acquisition of qualifications for eventual higher-status careers. Thus, university may have provided former bullies with some ‘buffering’ from difficulties associated with the workplace. Changes in peer contexts is another possibility. Although the participants in this study remained largely Canberra-based, university would have exposed these individuals to a broad range of young people from interstate and overseas, probably with developmental backgrounds characterised by positive school adjustment and low levels of problem behaviour. Therefore, members of the persistent and adolescent-onset bullying groups who went to university may have been presented with a sudden increase in opportunities to form relationships with prosocial others and make a break with past friendships.

The second possible explanation for the moderating effects of drinking and work/study is that they are simply markers of processes already well underway before these young people finished school. It is probable, for instance, that frequent drinking amongst members of the persistent bullying group was an indicator of individuals within this group who were relatively more troubled during the school years. These individuals probably started drinking during high-school (when drinking was deviant) and associated with similarly deviant peers, all of which would increase the likelihood of both drinking *and* aggression in early adulthood.

These suggested processes should be considered in the light of this study's several limitations. Apart from the concurrent measurement problem at T3, limitations include, first, that the study focused on one small cohort in one part of Australia. Secondly, due to the small sample size, this study did not directly consider sex differences in bullying, aggression, or the adult transition experiences. Although the interaction of bullying group with sex was not significant and did not reduce the importance of the drinking and work/study effects, this might have been because of low power. Future research with larger samples should explore pathways from bullying to adult outcomes separately for men and women. Thirdly, as is typical of problem behaviour measures, the distribution of adult aggression was skewed, with many participants scoring zero. As residuals analysis showed good conformity to OLS assumptions, reported results can be regarded as robust. Nonetheless, future work with similar outcomes should consider non-parametric models. Finally, studies consistently show that children who bully the most are also victimised the most and exhibit the poorest social functioning, so future work should assess the adult aggression outcomes of different profiles of bullies and bully-victims.

Despite the study's limitations, it is clear that children who bully others, especially during adolescence, are at increased risk of being physically aggressive as young adults. However, this study does suggest that this relationship need not be inevitable. New possibilities for preventive interventions are opened up if future research confirms the moderating effects of drinking and university participation or uncovers other features of emerging adulthood with similar effects.

Footnotes:

¹ Preliminary analyses controlled for parental education but it was removed from the final model because it did not predict aggression, and its removal did not alter other coefficients.

² Each dummy was coded 1 = member of group, 0= not member of group.

³ The three-way interaction between bullying group, work/study role and drinking was not significant, nor was the two-way interaction between work/study role and drinking. Note also that the same results were found when the bullying group*drinking interaction terms were entered before the bullying group*work/study interaction terms. That is, each two-way interaction was significant when fitted last.

⁴ Inspection of residuals revealed some heteroscedasticity of variance. Therefore, Huber-White standard errors are reported, which are robust to heteroscedasticity (Hayes & Cai, 2007).

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Figure Legends

Figure 1:



Table 1

Bullying Group Differences on Young Adult Aggression, Drinking, and Work/Study Role

	Bullying group					<i>F</i> (3, 147)
	Sample (<i>N</i> =151) <i>M</i> (<i>SD</i>)	Adolescent-				
		Never bullied (<i>N</i> = 78) <i>M</i> (<i>SD</i>)	Child-limited (<i>N</i> = 26) <i>M</i> (<i>SD</i>)	onset (<i>N</i> = 24) <i>M</i> (<i>SD</i>)	Persistent (<i>N</i> = 23) <i>M</i> (<i>SD</i>)	
Aggression	.51 (.83)	.29 (.65) _a	.57 (.76) _{ab}	.58 (.88) _{ab}	1.07 (1.13) _b	6.12***
Drinking	3.45 (1.43)	3.18 (1.23) _a	3.54 (1.33) _{ab}	3.5 (1.67) _{ab}	4.26 (1.51) _b	3.61*
		<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	χ^2 (3)
University- oriented role	76 (50.33%)	42 (53.85%)	14 (53.85%)	13 (54.17%)	7 (30.43%)	4.29

Note: Means that do not share a subscript are significantly different at $p < .05$ based on Scheffé's test. * $p < .05$ *** $p < .001$

Table 2

Correlation Matrix

Variable	1	2	3	4	5
1. Bullying in primary school (T1)	-				
2. Bullying in high school (T2)	0.31***	-			
3. Sex (1=male)	0.21**	0.23**	-		
4. Work/study role (1=university) (T3)	-0.11	-0.11	-0.21*	-	
5. Drinking frequency (T3)	0.18*	0.21**	0.29***	-0.09	-
6. Aggression (T3)	0.34***	0.35***	0.43***	-0.28***	0.45***

Note: N=151 for all correlations. * $p < .05$ ** $p < .01$ *** $p < .001$

Table 3

Hierarchical Regression Examining whether Variation in Aggression in Adulthood was Associated with Bullying Group, Drinking, Work/Study Role, and their Interactions

	Step 1	Step 2	Step 3	Step 4
	B(SE)	B(SE)	B(SE)	B(SE)
Sex ¹	0.62 (0.15)***	0.44 (0.15)**	0.50 (0.14)***	0.52 (0.14)***
<i>Bullying group²</i>				
Child-limited	0.20 (0.17)	0.16 (0.17)	0.42 (0.21)	0.48 (0.23)*
Adolescent-onset	0.16 (0.16)	0.14 (0.14)	0.56 (0.20)**	0.57 (0.19)**
Persistent	0.52 (0.25)*	0.33 (0.21)	0.77 (0.26)**	0.60 (0.21)**
Work/Study role		-0.30 (0.11)**	0.09 (0.14)	0.09 (0.14)
Drinking frequency		0.18 (0.05)***	0.18 (0.04)***	0.11 (0.06)
<i>Bully group*work/study role</i>				
Child*work/study			-0.50 (0.33)	-0.56 (0.32)
Adolescent*work/study			-0.80 (0.26)**	-0.79 (0.26)**
Persistent*work/study			-1.23 (0.29)***	-1.23 (0.27)***
<i>Bully group*drinking frequency</i>				
Child*drinking				-0.07 (0.16)
Adolescent*drinking				0.13 (0.09)
Persistent*drinking				0.30 (0.13)*
Constant	0.11 (0.06)	0.38 (0.09)***	0.15 (0.10)	0.12 (0.10)
R^2	0.23***	0.35***	0.42***	0.46***
ΔR^2	-	0.12	0.07	0.04
$\Delta F(df)$	-	13.01 (2, 144)***	5.78 (3, 141)***	3.56 (3, 138)*

¹ male=1. ² omitted category=never bullied. * $p < .05$ ** $p < .01$ *** $p < .001$

Note: N for all steps= 151.

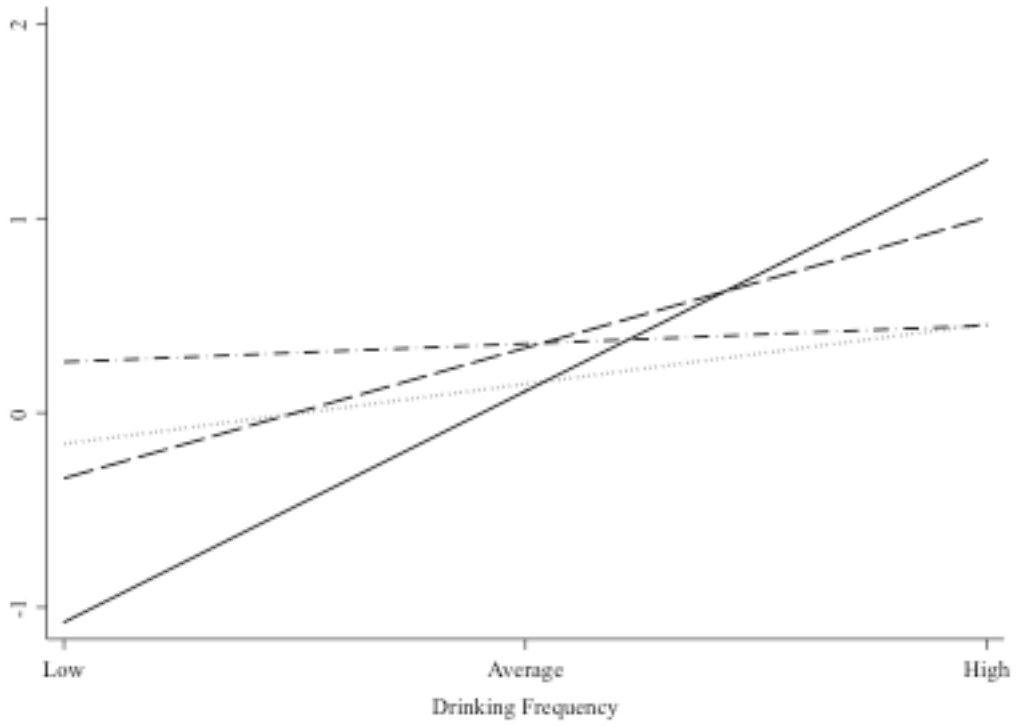


Figure 1: Interaction between bullying group and drinking

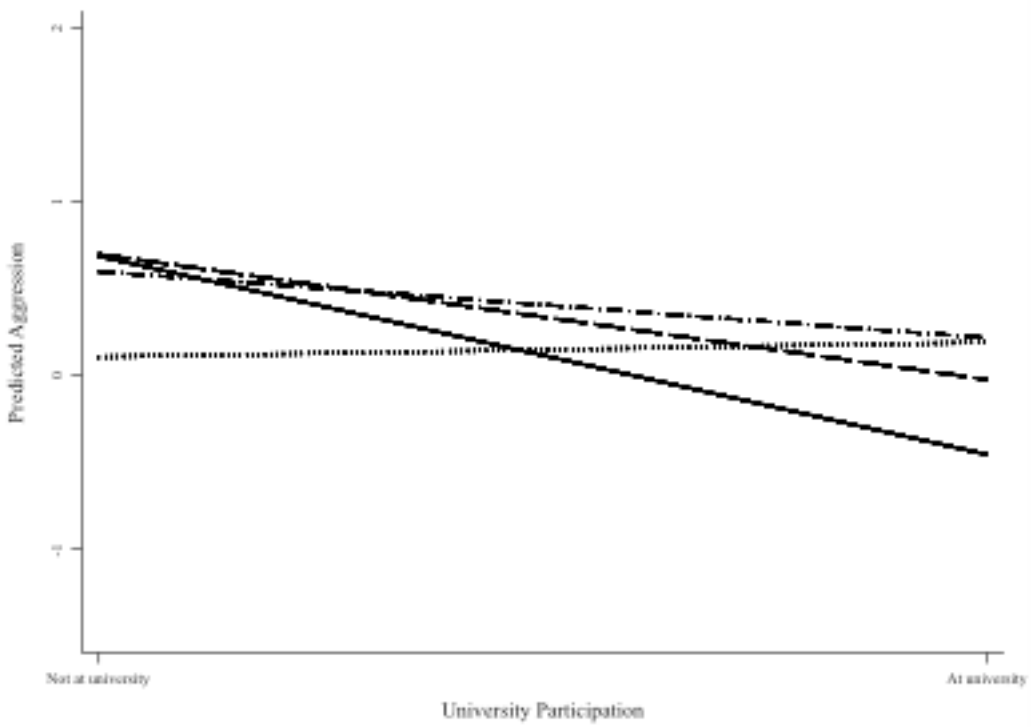


Figure 2: Interaction between bullying group and work/study role