Trajectories of Bullying Victimization and Perpetration in Australian School Children and their Relationship to Future Delinquency and Conduct Problems

Glenn D. Walters

Kutztown University

Author Note

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Abstract

Objective: Joint trajectories of bullying victimization and perpetration were extracted in a large representative sample of Australin schoolchildren for the purpose of gauging the prevalence of bully only, victim only, and bully-victim growth trajectories. Results were then correlated with delinquency and conduct disorder measures to determine whether the trajectories differed with respect to these antisocal outcomes.

Method: A large sample of schoolchildren (N = 3,460, 49.4% female) was assessed at three different points in time—age 12/13 (Wave 5), age 14/15 (Wave 6), and age 16/17 (Wave 7). A sequential process growth mixture modeling analysis was then performed on Wave 5–7 bullying victimization and perpetration data.

Results: Six separate trajectories were identitied, the largest of which (84.1% of the sample) was characterized by very low levels of bullying victimization and perpetration. The other five trajectories consisted of two victim-only trajectories (accelerating and decelerating) and three bully-victim trajectories (moderate stable, high accelerating, and high decelerating). No bully-only trajectories were identified. Comparing the trajectories against Wave 7 measures of self-reported delinquency and parent-report conduct problems revealed results consistent with predictions (bully-victim accelerating/decelerating/stable > victim-only > low stable) for the delinquency outcome only.

Conclusions: These results suggest that bullying perpetration frequently accompanies bullying victimization. For this reason, assessment protocols should be expanded to cover both behaviors and treatment programs are required that provide services to both the perpetrators and victims of bullying. There is also a need for more research on the question of whether bullying-only trajectories exist.

Key Words: bullying victimization; bullying perpetration; delinquency; trajectories; prospective

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The results of several cross-sectional studies clearly demonstrate that bullying and delinquency are meaningfully connected (Baldry & Farrington, 2000; Nansel et al., 2008; Sigfusdottir et al., 2010). This is supplemented by findings from a growing number of longitudinal studies implying that the connection may be causal. In a meta-analysis of 28 published and unpublished prospective studies on bullying perpetration and delinquency, Ttofi and colleagues (2011) determined that prior bullying perpetration consistently predicted subsequent delinquency several months to 11 years later, after controlling for anywhere from 1 to 20 covariates. Despite the significance of the Ttofi et al. (2011) meta-analysis, there were several limitations in many of the original studies. First, there were no controls for prior offending or delinquency in the majority of these studies, making it difficult to determine the direction of the effect between bullying perpetration and delinquency. Second, the Ttofi et al. (2011) meta-analysis failed to identify any studies that tested the alternate pathway, running from delinquency to bullying perpetration, to determine whether the relationship was bidirectional. Walters and Espelage (2019) sought to improve on these studies by using a lagged dependent variable and testing the alternate pathway running from delinquency to bullying. Results from this study identified a unidirectional relationship between bullying perpetration and delinquency that ran from bullying to delinquency but not from delinquency to bullying. Walters and Espelage (2019) further surmised that bullying perpetration was capable of predicting a change in delinquency from pretest to posttest.

A principal question for which there are few definitive answers in research on bullying is the role of victimization in promoting future delinquency. Although studies have shown that

bullying victimization is more likely to lead to internalizing problems like depression than to externalizing problems like delinquency (Eastman et al., 2018) and that victimization does not always predict future delinquency (Bender & Lösel, 2011; Farrington et al., 2011), there is some indication that when accompanied by bullying perpetration, in a pattern commonly referred to as bully-victim, victimization can predict a number of negative life events (Sourander et al., 2007; Stein et al., 2007). Moreover, when it comes to antisocial behavior, those classified as bully-victims may be at even greater risk for future involvement in delinquency, crime, and aggression than those classified as pure bullies (Dantchev & Wolke, 2019; Perren & Hornung, 2005). Rather than assessing bullying victimization and perpetration at a single point in time, however, it may be more fruitful to examine bullying victimization and perpetration across several different developmental periods. The principal aim of this study was to assess bullying victimization and perpetration during the developmentally sensitive years starting in early adolescence and ending in mid-adolescence for the purpose of ascertaining whether the resulting trajectories correlate differentially with future delinquency and conduct problems.

Over the past decade, several trajectory studies have been conducted on bullying victimization and perpetration. Pepler, Jiang, Craig, and Connolly (2008), for instance, used 8 waves of data collected within a period of seven years to assess bullying perpetration in a group of white Canadian middle-school students. Results from this study led to a four-trajectory bullying perpetration model. The smallest of the four groups engaged in high levels of bullying throughout the 8 waves and the largest group engaged in virtually no bullying over the entire course of the study. Of the two remaining groups, one exhibited a consistent pattern of moderate bullying over the study period, and the other displayed a decelerating pattern that started out at a moderate level but fell to a very low level by the end of the study. More recently, Espelage, Van

Ryzin, and Holt (2018) applied group-based semiparametric mixture modeling to a sample of 1,565 middle school students as they transitioned into high school. Five waves of data, with a year between waves, produced five trajectories. Over 90% of the students fell into either a no bullying or moderate flat bullying trajectory. The three smaller trajectories were labeled high declining, middle school peak, and moderate escalating. Although the author is unaware of any trajectory studies exclusive to bullying victimization, there are at least two studies that have examined a combination of bullying victimization and bullying perpetration trajectories.

In the first of two studies anatomizing bullying victimization and perpetration using a trajectory approach, Barker, Arseneault, Brendgen, Fontaine, and Maughan (2008) identified three bullying victimization and two bullying perpetration trajectories. Youth in the high/increasing bullying perpetration trajectory and low or high/increasing victimization trajectories, identified as pure-bullies and bully-victims, respectively, engaged in the most delinquency. Using four cycles of data and semiparametric group-based growth mixture modeling, Haltigan and Vaillancourt (2014) determined that early adolescents in a trajectory marked by declining rates of victimization and rising rates of perpetration and a trajectory characterized by low levels of perpetration and moderate/decreasing levels of victimization experienced higher rates of parent- and child-reported psychopathology than youth whose involvement in bullying and peer victimization was more limited.

Study Goals and Hypotheses

The current study used an approach similar to Haltigan and Vaillancourt's (2014) to probe a subject (delinquency) explored in the earlier Barker et al. (2008) study. The contribution made by this study and the gap it attempts to fill is the relationship between joint trajectories of

bullying victimization and perpetration and involvement in delinquent and conduct disordered behavior. To address these issues, three hypotheses were test:

H1: Joint sequential process growth mixture modeling of bullying victimization and perpetration data will produce a distinct class in each of the following four categories: a no bullying group, a bully-only group, a victim-only group, and a bully-victim group.

H2: The no bullying group will be the least delinquent, followed by the victim-only group, the bully-only group, and the bully-victim group, the last of which will be the most delinquent (i.e., differences in magnitude).

H3: Decelerating trajectories will be marked by less delinquency than stable and accelerating trajectories (i.e., differences in direction).

Method

Participants

The sample for the current investigation came from the Longitudinal Study of Australian Children (LSAC: Australian Institute of Family Studies, 2018), a large stratified random sample of Australian children and youth organized into two cohorts (B and K). Cohort K was selected for the present study because at the time the investigation was being conducted, it was complete through age 16/17, whereas Cohort B was only complete through age 12/13. Of the 4,048 Australian youth enrolled in the LSAC-K at Wave 5 (age 12/13), 3,460 (85.5%) qualified for inclusion in the present study. Inclusion criteria consisted of bullying victimization and perpetration data on at least two of the three waves examined as part of this study: i.e., Wave 5 (age 12/13), Wave 6 (age 14/15), and Wave 7 (age 16/17). The average age of participants at Wave 5 was 12.41 years (SD = 0.49), the gender distribution was 1734 males (50.6%) and 1692 females (49.4%), and the vast majority of participants were non-indigenous persons (97.8%),

with the indigenous portion of the sample being either Aboriginal (2.0%) or Torres Strait Islander (0.2%). In addition, only 0.4% of the sample had a history of serious mental illness, as reported by one or both parents.

Procedure

Approximately 86% of the original sample of K cohort participants from the LSAC served as participants in this study. The original sample was constructed using multi-stage cluster sampling in which postcodes were randomly selected, followed by a random sampling of participants from each selected postcode. Sample weights designed to adjust for non-response and a child's probability of being included in the study were incompatible with the latent growth procedure utilized in this study and so were only used in analyses of outcome differences between the latent classes. Most of the interviews for the LSAC were conducted face-to-face and the research team relied extensively on computer-assisted self-interviewing technology and follow-up phone interviews, particularly with older children. Prior to conducting this secondary analysis of data from the LSAC-K, the research protocol was approved by the Kutztown University Institutional Review Board. One prior study has been published by the current author using these same data to address a different aspect of the bullying victimization and perpetration relationship (Walters, 2020b).

Measures

Bullying Victimization. One of the two independent variables included in this study was a six-item index of school bullying victimization assessed over three waves of data: Wave 5 (age 12/13), Wave 6 (age 14/15), and Wave 7 (age 16/17). Participants were asked if they had experienced any of the following six forms of bullying victimization at school within the past month: "kids hit or kicked me;" "kids grabbed or shoved me;" "kids threatened me;" "kids said

mean things to me;" "kids stopped others from being my friend;" and "kids stopped me from joining in." Each item was scored on a four-point scale (1 = *never*, 2 = *once or twice*, 3 = *about once a week*, 4 = *several times a week*) and scores on the six items were combined to create a scale score that could range from 6 to 24. The internal consistency of this scale, assessed over Waves 5-7 of the LSAC-K, ranged from adequate to good (α = .75–.86). There are no validity data available on this or any of the other measures included in this study, as they were constructed specifically for the LSAC-K.

Bullying Perpetration. The second independent variable for this study was bullying perpetration, once again assessed over Waves 5 through 7 of the LSAC-K. The bullying perpetration construct was measured with a six-item self-report scale that asked respondents if they had engaged in any of the following bullying behaviors at school ("hit or kicked someone;" "grabbed or shoved someone;" "threatened someone;" "said mean things to someone;" "told others not to be someone's friend;" and "stopped someone from joining in an activity") during the past month using the same 4-point rating scale employed with the bullying victimization scale (1 = *never*, 2 = *once or twice*, 3 = *about once a week*, 4 = *several times a week*):). Scores for each item were summed to create a total score that could range from 6 to 24. The bullying perpetration scale achieved adequate internal consistency across Waves 5 through 7 of the LSAC-K (α = .70–.80).

Self-Reported Delinquency. Two outcome measures were included in this study. Self-reported delinquency at Wave 7 (age 16/17) was one such measure. The delinquency scale used in the current investigation encompassed 19 delinquent acts: got into a physical fight in public, skipped school, stole from a shop, drew graffiti in a public place, carried a weapon, took a motor vehicle for a ride, stole money from a person, ran away from home, purposely damaged property,

damaged a parked car, ran around with a group that damaged property, suspended or expelled from school, broke into a house/flat/vehicle, stole something from a parked car, started a fire, used force or threat of force to get money or things from someone, caught by police for something done wrong, sold illegal drugs, and attacked someone with the idea of harming them. Each item was rated on a six-point scale (0 = *not at all*, 1 = *once*, 2 = *twice*, 3 = *three times*, 4 = *four times*, 5 = *five or more times*) and the items summed to produce a total score that could range from 0 to 95 (α = .89). Because of extreme non-normality in the self-reported delinquency measure (skew = 6.68), raw scores on this scale were transformed into fractional rank normalized scores (skew = 0.40).

Parent-Reported Conduct Problems. The second outcome measure included in this study was a parent-reported inventory of child conduct problems. Like the self-reported delinquency outcome measure, parent-reported conduct problems were assessed at Wave 7 of the LSAC-K. One (52.8%) or both (47.2%) parents rated the child on the four items that make up this scale ("bad temper," "often fights/bullies other children," "often lies or cheats," "steals"). Ratings were made on a three-point scale (1 = *not true*, 2 = *somewhat true*, 3 = *certainly true*). Inter-rater agreement between parents was moderate (absolute agreement ICC = .553) and internal consistency between items after the two sets of parental ratings were averaged was modest (α = .62).

Control Variables. The present study contained five control variables: age (in years), sex (1 = *male*, 2 = *female*), indigenousness (1 = *non-indigenous*, 2 = *indigenous*), parental report of child mental illness (0 = *no*, 1 = *yes*), and whether both parents or just one parent rated the child for conduct problems (0 = *no*, 1 = *yes*). Mental illness was included as a control variable based

on research showing that psychiatric disorder may play an important role in the bullying–delinquency nexus (Sourander et al., 2007).

Data Analytic Plan

A semi-parametric sequential process growth mixture modeling (GMM) analysis for two latent variables was performed with MPlus 8.3 (Muthén & Muthén, 1997-2017) on participants with bullying victimization and perpetration scores on at least two of the three waves (Waves 5-7 of the LSAC-K). The stopping rule for this analysis was an increase in both the Akaike information criterion (AIC) and Baysian information criterion (BIC), signaling reduced model fit. This is a common stopping rule (Jung & Wickrama, 2008) and was considered the best option given that the likelihood ratio test (Lo et al., 2001) is not available with sequential GMM. Moreover, solutions from 3x3 onward either had empty cells, multiple cells with fewer than 10 cases, or both.

After identifying the number of classes and assigning participants to a single class based on posterior probability estimates for bullying victimization and perpetration, the classes were contrasted on the two outcome measures—self-reported delinquency and parent-reported conduct problems—using sampling weights and multivariate analysis of covariance (MANCOVA). The MANCOVA was performed with Version 26 of SPSS (IBM, 2019) and controlled for age, sex, indigenousness, parent-reported mental illness, and whether one or both parents rated the child on the conduct problems scale. A series of Bonferroni post hoc tests, a procedure that corrects for experiment-wise error, were then calculated between the trajectory groups.

Monte Carlo simulations in MPlus were used to conduct a power analysis in light of research showing that this is an effective means by which to determine sample size in both

single- and multiphase growth mixture models (Kim, 2012). Adapting the sequential process example (mcex8.7) from the Monte Carlo Counterparts subfile of the MPlus 8.3 User's Guide (Muthén, 2004), a power analysis of a 3x2 sequential process GMM with 3 and 3 indicators, modest to moderate separation between classes, 10% missing data, and 5,000 Monte Carlo simulations was performed. Using a criterion of Power $\geq$ .800 for the means of the slope factors (S1 and S2) in all six classes yielded a required sample size of 2,019 participants. The observed power achieved in the full sample of 3,460 participants when SPSS was used to calculate the multivariate general linear model for the MANOVA was 0.999.

Missing Data

Over three-quarters of the sample had complete data on all 8 study variables (81.4%). Another 4% of participants were missing data on one or two variables and 14.5% were missing data on three variables. The two variables with more than 5% missing data were self-reported delinquency (16.0%) and parent-reported conduct problems (15.1%). Missing data were handled with expectation maximization (EM), a procedure that imputes values for missing data by approximating the maximum likelihood function. In the present study, EM was performed with 25 iterations. Research indicates that EM and the related procedure of full information maximum likelihood (FIML) generate significantly less biased results than those produced by more traditional missing data procedures like listwise deletion and mean imputation (Allison, 2002).

Results

Preliminary Analyses

Descriptive statistics for age, bullying victimization (Waves 5 through 7), bullying perpetration (Waves 5 through 7), and the two Wave 7 outcome measures (self-reported

delinquency and parent-rated conduct problems) are listed in Table 1. Correlations between the control variables, criterion measures, and trajectory (posterior probabilities) assignments can be found in the Appendix. The significant negative correlation between sex and the posterior probability group assignment variable indicates that girls were significantly more likely to occupy the less serious trajectories than boys

Growth Mixture Modeling

Employing a stopping rule of a uniform decrease in model fit, a semi-parametric sequential process GMM analysis was performed, the results of which identified a 3x2 model (6 classes) as optimal, in that both AIC and BIC increased (poorer fit) rather than decreased (better fit) from 3x2 to 2x3 (see Table 2). The largest class (low stable) accounted for 84.1% of all cases in the LSAC. Two classes were victim-only trajectories—accelerating (2.2%) and decelerating (4.5%)—and the other three classes were bully-victim trajectories—moderate stable (5.2%), high accelerating (1.4%), and high decelerating (2.5%). The presence of a no bullying trajectory and several victim-only and bully-victim groups was consistent with Hypothesis 1, but the absence of a bully-only group ran counter to this hypothesis. The bullying victimization and bullying perpetration trajectories for these six latent classes are reproduced in Figures 1 and 2, respectively.

Multivariate Analysis of Covariance

A multivariate analysis of covariance (controlling for age, sex, indigenousness, mental illness, and whether one or both parents completed the child conduct problems rating scale) revealed a significant overall effect, Pillai's Trace = .076, $p < .001$, and significant individual effects for self-reported delinquency, $F (5, 3639) = 44.20$, $p < .001$, and parent-reported conduct problems, $F (5, 3639) = 23.22$, $p < .001$. There were no significant changes in results when a

three-item conduct problems scale with the bullying item removed was used instead of the four-item scale. Table 3 provides a summary of the Bonferroni post hoc test results.

According to the results outlined in Table 3, Hypothesis 2, which assessed differences in magnitude (no bullying < victim-only < bully-victim), received support when normalized self-reported delinquency scores were analyzed but not when parent-reported conduct problem scores were assessed, although participants in the no bullying group were rated as having significantly fewer conduct problems than participants in three of the other five groups. Hypothesis 3, which predicted an effect based on trajectory direction (decelerating < accelerating), failed to receive support in this study, regardless of whether self-reported delinquency or parent-reported conduct disorder scores were analyzed.

Supplemental Linear Regression Analysis

A supplemental linear regression analysis was performed whereby the six posterior probability groups were ordered a priori from theoretically lowest risk (low stable) to theoretically highest risk (high accelerating). This 6-point variable was then regressed, along with Wave 5 bullying victimization and Wave 5 bullying perpetration, onto Wave 7 delinquency. Including overlapping predictors (the ordered posterior probability variable was derived, in part, from Wave 5 bullying victimization and perpetration scores) in the same regression equation could be construed as a violation of the independence assumption of regression analysis (Antonakis & Dietz, 2011), although there was no evidence of multicollinearity between the three predictor variables (tolerance = .680–.778; variance inflation factor = 1.29–1.47). The results of this supplemental analysis revealed that the 6-point posterior probabilities measure ($t = 10.07$, $p < .001$), the Wave 5 bullying perpetration scale ($t = 6.03$, $p < .001$), and the Wave 5

bullying victimization scale ($t = 2.43$, $p < .05$) all correlated significantly with Wave 7 delinquency.

Discussion

Three hypotheses were tested in this study. The first hypothesis held that trajectories would conform to the following four categories—a no bullying class, a victim-only class, a bully-only class, and a bully-victim class—when bullying perpetration and victimization were assessed over three time periods in a large sample of early to mid-adolescents. Results revealed the presence of six latent classes: one very large no bullying group that comprised 84% of the sample (low stable), two victim-only groups (accelerated and decelerated), and three bully-victim groups (moderate stable, high accelerated, and high decelerated). Contrary to what had been hypothesized, there were no bully-only groups. Furthermore, in all three bully-victim classes the bullying and victim trajectories grew in the same direction rather than in opposite directions. The second or magnitude hypothesis predicted that the low stable trajectory would be associated with the least amount of self-reported delinquency and parent-reported conduct problems at Wave 7, followed by the victim-only patterns, and that the bully-victim groups would exhibit the highest levels of delinquency and conduct disorder. Bonferroni post hoc results from a multivariate analysis of covariance were largely consistent with this hypothesis in the case of self-reported delinquency but not in the case of parent-reported conduct disorder. On the other hand, there was no support for the third or directional (decelerating < accelerating) hypothesis with respect to either self-reported delinquency or parent-reported conduct disorder.

Limitations

There were several limitations to this study, one of which was that the data came from a single nation (Australia) with a more homogenous population than is found in a country like the

United States. This may accordingly limit the cross-population generalizability of the results. Overlap at Wave 7 between the trajectories and outcome measures is a second concern. Such overlap could create criterion contamination, which might then weaken the internal validity of the results and limit our ability to draw even cautionary causal conclusions from the post hoc results. Even so, it was unavoidable because bullying perpetration was not assessed at Wave 4 of the LSAC-K. A third limitation of this study is that bullying perpetration and victimization were only assessed over a period of one month. The use of such a short time frame for assessing bullying may be why the current study failed to identify a single bullying-only trajectory when Barker et al. (2008) and Haltigan and Vaillancourt (2014), both of whom utilized recall periods of 6 to 12 months, observed two and one bullying-only trajectories, respectively. In addition, there were no validity data on these measures given that they were constructed specifically for the LSAC-K, whereas the parent-rated conduct measure suffered from poor reliability. Finally, bullying can take several forms (physical aggression, verbal bullying, and social exclusion), although there were too few items on each form to conduct meaningful secondary analyses.

Research and Theoretical Implications

Predominate among the research and theoretical implications of the current study is the fact that developmental trajectories appear to provide useful information above and beyond what is available from a static single-wave measure of bullying victimization or perpetration. This was most clearly evident in the supplemental regression analysis reported in the final paragraph of the Results section. An accelerating or decelerating developmental pattern of bullying victimization and perpetration, according to these results, can be considered a risk factor for future delinquency that, in turn, is capable of predicting future delinquency above and beyond the capacity of static measures of bullying victimization and perpetration to predict such an

outcome. An additional theoretical/research implication is that victimization frequently accompanies perpetration in children identified as bullies. Accordingly, ascertaining and categorizing the risk factors that these two patterns embody, represent, and share—from impaired self-esteem (Cho, 2017), to low self-control (Cho & Lee, 2018), to being in close proximity to other bullies, delinquents, and negative peer influences (Walters, 2020a)—could go a long way toward assisting those interested in deciphering the complex relationship that exists between bullying victimization and perpetration with a research agenda for future studies. Finally, serious effort needs to be directed at determining whether a bullying-only trajectory exists, based on the fact that in the current study multiple victim-only and bully-victim trajectories were obtained, yet not a single bully-only trajectory was identified. In the event bully-only trajectories cannot be verified, we may need to rethink how we conceive of bullying victimization, perpetration, and their overlap.

The current findings also appear to shed light on the results of several prior investigations in which bullying victimization was found to correlate with and predict juvenile delinquency (Aldridge et al., 2018; Kim et al., 2019; Wong & Schonlau, 2013). Despite the potential such a relationship holds for future research and clinical practice, there were methodological and conceptual problems that raised the specter of model misspecification in each of the three prior studies. Chief among the concerns was the fact that none of the studies controlled for bullying perpetration. Thus, while two of the studies analyzed prospective data (Kim et al., 2019; Wong & Schonlau, 2013), the models in each of these studies were limited by the absence of a bullying perpetration control variable. Given how intimately related bullying perpetration and victimization seem to be, there is a need for more research on exactly how they are connected. It will also be important to determine whether the joint experience of bullying victimization and

perpetration exists only at the dyadic level (victimization and perpetration directed at the same person), only at the global level (victimization and perpetration as general patterns of behavior), or at both levels. A qualitative study in which intensive interviews are conducted with bully-victims may be an effective way of clarifying this issue. Beyond this, it is recommended that researchers seeking to investigate the nexus between bullying victimization and delinquency employ longitudinal designs and make sure that their models are properly specified by controlling for bullying perpetration before drawing any conclusions about the complex relationships that apparently exist between bullying victimization, bullying perpetration, and delinquency.

Clinical Implications

As previously stated, none of the six latent class groups identified in the current investigation showed evidence of significant bullying in the absence of victimization. The degree to which bullying victimization and bullying perpetration co-exist in various individuals has important practical implications for those working with children identified as bullies, victims, and bully-victims in school and community settings. First, it is important that a thorough evaluation be conducted. One of the reasons why prior research may have identified large groups of pure bullies is that they did not adequately assess for victimization in children identified as bullies. There is also the possibility that the victimization occurred outside of school, in the home or in the neighborhood. Even though the current study restricted itself to bullying in school, there was still no evidence of a latent class of pure bullies. Once a comprehensive evaluation has been conducted, the next step is to provide treatment and intervention services to at risk children. Unfortunately, many programs and agencies seem to operate under the tacit assumption that children identified as bullies and who also experience

victimization have brought the victimization upon themselves (Chan & Wong, 2015) and are therefore less deserving or in need of victimization services than pure victims (Cornell & Limber, 2015). Given the inter-related nature of perpetration and victimization, however, bullying perpetrators may require victimization services just as much as pure victims (van Dijk et al., 2017).

Conservation of treatment and intervention services could be facilitated by taking the dual trajectory patterns observed in the present study into account when developing treatment protocols for youth who have been exposed to bullying behavior. The large subgroup of youth falling into the low stable trajectory should require minimal bullying perpetration and victimization services given that they are at low risk for both behaviors, though they may benefit from psychological interventions designed to teach them how to be more socially aware and responsible bystanders. Students assigned to one of the two victimization trajectories observed in this study, specifically the accelerating pattern, could benefit from services designed to reduce their risk of victimization and ameliorate the negative consequences of prior victimization (Sigurdson et al., 2015); and while they do not appear to be at risk for future bullying perpetration, some may be at risk for future delinquency. In the current study, high accelerating and decelerating bully-victim trajectories were more criminogenic than the victim decelerating pattern. As a result, youth who displayed a rising slope or chronically high pattern of bullying perpetration and victimization from age 12/13 to age 16/17 were at greatest risk for self-reported delinquent involvement at age 16/17. Children and adolescents in these small to moderately sized trajectories require psychological services designed to ameliorate current childhood conduct problems and prevent future adolescent delinquency by instructing them in basic social, coping, communication, assertiveness, and decision-making skills (Botvin et al., 2006).

Conclusion

The results of the current study indicate that there is a significant amount of overlap between bullying victimization and bullying perpetration and that this overlap may have important implications for the relationship between bullying and self-reported delinquency. Of particular note is the fact that victimization and perpetration paralleled one another in the bully-victim trajectories (i.e., as one went up the other went up, and as one went down the other went down). This suggests that bullying victimization and perpetration may be part of the same general process rather than bifurcating into separate or semi-independent processes. Although clearly speculative at this point, such a possibility could be considered fertile thought for future investigation.

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Table 1

Descriptive Statistics for the 9 Continuous Variables Included in the Present Investigation

Variable	*n*	*M*	*SD*	Range
1. Age	3426	12.41	0.49	12–13
2. Bullying Victimization-5	3391	7.89	2.98	6–24
3. Bullying Victimization-6	3374	6.87	1.97	6–23
4. Bullying Victimization-7	3304	6.67	1.68	6–22
5. Bullying Perpetration-5	3391	6.71	1.59	6–24
6. Bullying Perpetration-6	3374	6.32	1.08	6–18
7. Bullying Perpetration-7	3004	6.34	1.15	6–20
8. SR Delinquency-7	2906	0.46	0.27	0.26–1.00
9. PR Conduct Problems-7	2936	4.66	1.03	4–12

Note. Age = age in years at Wave 5; Bullying Victimization-5 = bullying victimization at Wave 5; Bullying Victimization-6 = bullying victimization at Wave 6; Bullying Victimization-7 = bullying victimization at Wave 7; Bullying Perpetration-5 = bullying perpetration at Wave 5; Bullying Perpetration-6 = bullying perpetration at Wave 6; Bullying Perpetration-7 = bullying perpetration at Wave 5; SR Delinquency-7 = self-reported delinquency fractional rank score at Wave 7; PR Conduct Problems-7 = parent-reported conduct problems at Wave 7; *n* = number of participants with complete data on this measure; *M* = mean; *SD* = standard deviation; Range = range of scores in current sample.

Table 2

Growth Mixture Modeling Results for 2x2, 3x2, and 2x3 Class Models

Model	AIC	BIC
2 Classes x 2 Classes	65,921.18	66,130.25
3 Classes x 2 Classes	64,114.39	64,378.79
2 Classes x 3 Classes	64,361.75	64,626.16

Note. Model = number of classes in the model, with the first number representing the number of bullying victimization classes and the the second number representing the number of bullying perpetration classes; AIC = Akaike Information Criterion; BIC = Bayesian information criterion.

Table 3

Post Hoc MANCOVA Differences in Outcome Between the Six Trajectories

Self-Reported Delinquency (rank normalized scores)					
Low Stable	V Decel	V Accel	BV Mod Stable	BV High Decel	BV High Accel
$0.48(.004)_{a}$	$0.56(.019)_{b}$	$0.66(.028)_{b,c}$	$0.67(.018)_{c}$	$0.66(.025)_{c}$	$0.69(.034)_{c}$
Parent-Reported Conduct Problems					
Low Stable	V Decel	V Accel	BV Mod Stable	BV High Decel	BV High Accel
$4.62(.02)_{a}$	$5.11(.08)_{b,c}$	$5.39(.11)_{c}$	$4.82(.07)_{a,b}$	$5.16(.10)_{b,c}$	$4.80(.13)_{a,b}$

Note. MANCOVA = multivariate analysis of covariance using age, sex, indigenousness, and mental illness as covariaetes; means are listed from lowest to highest from left to right (followed by the standard error in parentheses); means with different letter subscripts are significantly different from one another ($p < .05$) using a Bonferroni correction for multiple comparisons; Outcome measures are self-reported delinquency and parent-reported conduct problems; Low Stable = low stable trajectory (*n* = 2,911; 84.1%); V Decel = victim decelerating trajectory (*n* = 157; 4.5%); V Accel = victim accelerating trajectory (*n* = 75; 2.2%); BV Mod Stable = bully-victim moderate stable trajectory (*n* = 181; 5.2%); BV High Decel = bully-victim high decelerating trajectory (*n* = 88; 2.5%); BV High Accel = bully-victim high accelerating trajectory (*n* = 48; 1.4%).

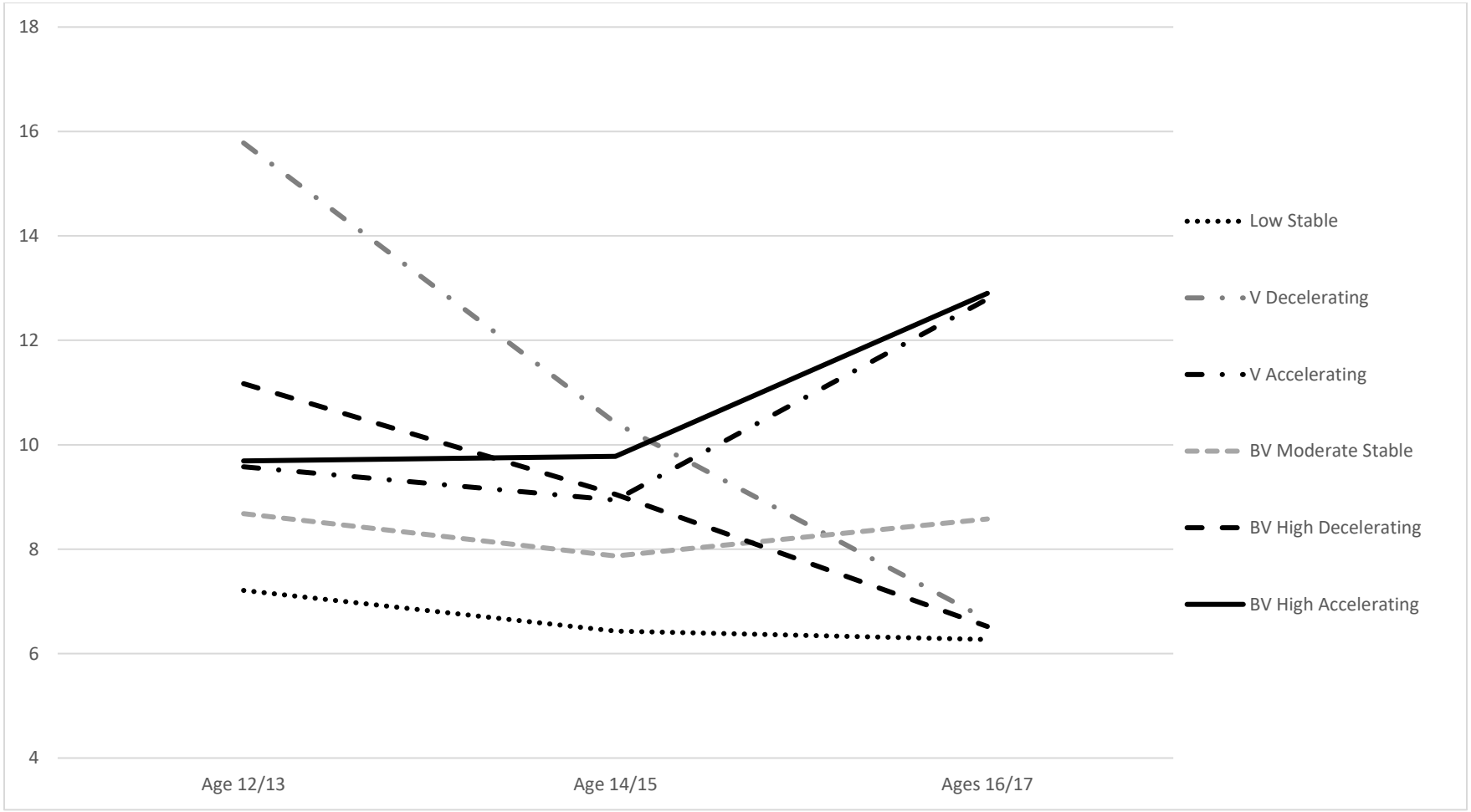

Figure 1. The bullying victimization portion of each of the six trajectories.

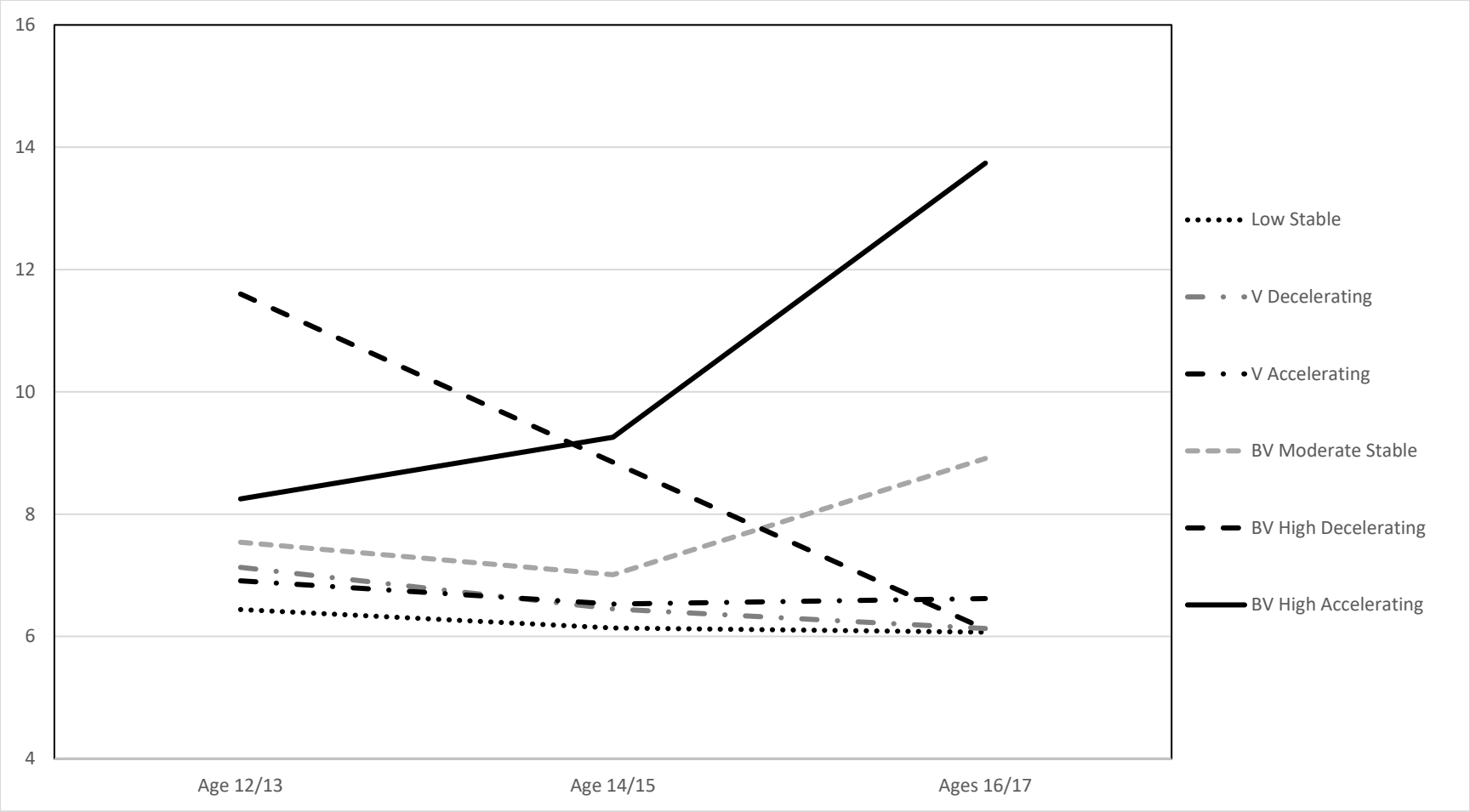

Figure 2. The bullying perpetration portion of each of the six trajectories.

Appendix

Correlational Matrix of Control, Criterion, and Posterior Probability Variables

Variable	2	3	4	5	6	7	8
1. Age	.00	.02	.01	-.02	.04	.02	-.00
2. Sex		.01	-.01	-.00	-.14	-.01	-.13
3. Race			- .01	-.07	.06	.02	.02
4. Mental Illness				.02	.01	.05	-.00
5. One or Both Parents					-.24	-.10	-.02
6. Delinquency-Rank						.27	.24
7. Conduct Problems-4							.13
8. Posterior Probabilities							

Note. Age = chronological age in years; Sex (1 = male, 2 = female); Race (1 = non-indigenous, 2 = indigenous), Mental Illness = parental rating of mental illness in the child; One or Both Parents = whether one or both parents completed the child conduct problems scale; Delinquency-Rank = fractional rank-ordered transformed self-reported delinquency score; Conduct Problems-4 = parent-rated conduct problems full scale (“bad temper,” “often fights/bullies other children,” “often lies or cheats,” “steals”); Posterior Probabilities = ordered posterior probability group assignment (1-6); *N* = 3,460.