

**Alcohol, Aggression and Violence Among Young People:  
A Volatile Mix**

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BPsychSc/Crim (Hons)

A thesis submitted in fulfilment of the requirements for the degree of

**Doctor of Philosophy**

The Matilda Centre for Research in Mental Health and Substance Use

Faculty of Medicine and Health

**The University of Sydney**

Sydney, Australia

January, 2021

## **Declaration of Originality**

This is to certify that to the best of my knowledge, the content of this thesis is my own work. This thesis has not been submitted for any other degree or other purposes.

I certify that the intellectual content of this thesis is the product of my own work and that all the assistance received in preparing this thesis and sources have been acknowledged.



Siobhan Lawler

5 January 2021

## Author Attribution Statement

This thesis contains four empirical chapters that have been prepared for publication in peer-reviewed journals. Two papers have been published, one has been submitted and one is under review. I am the sole first author of three of these publications (Papers 1, 2 and 3) and the joint-first author with EB on Paper 4.

Paper 1 is published as: **Lawler, S.**, Stapinski, L., Barrett, E., Newton, N., Sunderland, M., Slade, T. & Teesson, M. (2020). Is adolescent alcohol use linked to spikes in aggressive behaviour? A growth curve analysis. *Prevention Science*, 0(0), 1–11.

- For this paper, I made the following contributions. I conceived the idea and designed the study. I learnt and applied the statistical procedures. This involved participating in an intensive Mplus workshop, run over five days (Melbourne University, 2018). I interpreted the results and wrote all parts of the manuscript. I extracted data from the output to complete the tables and created all figures. I prepared the manuscript for publication. I then submitted the manuscript to *Prevention Science* (July 2019). The first submission was returned with an invitation to revise and resubmit (October 2019). I addressed the reviewers' concerns and resubmitted the manuscript in January 2020. It was returned in June after being sent to two different reviewers, who provided additional comments. The second round of revisions were complex; they required learning and applying several new statistical procedures (e.g., zero-inflated poisson models). The second response was submitted to *Prevention Science* in August. The paper was accepted for publication in October 2020.
- For this paper, my co-authors made the following contributions. LS provided statistical guidance and support and checked that the analysis had been performed correctly. EB and MT provided advice and troubleshooting support in weekly meetings. MS provided

statistical support in the second round of revisions to *Prevention Science*. LS, EB, MT, NN, TS and MS provided multiple rounds of feedback on drafts of the manuscript prior to submission.

Paper 2 is submitted as: **Lawler, S., Stapinski, L., Teesson, M., Prior, K., Basto-Pereira, M., Newton, N. & Barrett, E. (2020).** Unpacking violent behaviour in young adulthood: The relative importance of hazardous alcohol use. *Journal of Interpersonal Violence* (submitted).

This manuscript analyses data from the Australian arm of the International Study of Prosocial and Antisocial Behaviour, involving 10 countries. The study is longitudinal, with three waves of data collection planned between 2018 and 2021. This study analyses baseline data collected in 2018–2019. MB is the coordinator of the international study. SL is the project coordinator and EB is the project lead for the Australian research team.

- For this paper, I made the following contributions: I coordinated the study, which included preparation and submission of the ethics applications to the University of New South Wales and University of Sydney Human Research Ethics Committees. I developed the survey in Qualtrics and coordinated data collection from 582 young adults in the Australian community. I designed the targeted advertisements online to recruit participants. Further, I conceived and designed a substudy within this broader study and identified appropriate measures to include in the survey to align with my research questions. I cleaned the dataset and liaised with international collaborators to contribute data from the Australian arm to the international study. I conceived of the idea for this paper and designed the analysis. I analysed the data and interpreted the results. I wrote the manuscript in full and liaised with co-authors, including international collaborators (MP). I finalised the paper and submitted the manuscript to the *Journal of Interpersonal Violence* (December 2020).

- For this paper, my co-authors made the following contributions. As project lead, EB provided support through regular meetings, assisted in the preparation and submission of the ethics application and liaised with international research partners. EB, LS and MT provided ongoing support and feedback on drafts prior to submission.

Paper 3 is published as: **Lawler, S.**, Barrett, E., Stapinski, L., Bright, D. & Teesson, M. (2020). Themes in sentencing young adults charged with violent crime involving alcohol and other drugs. *Australian and New Zealand Journal of Criminology* 53(3), 411–432.

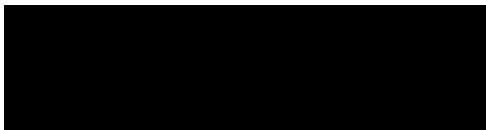
- For this paper, I made the following contributions. I conceived of the idea for this paper and designed the methodological approach, which included a comprehensive coding system (see Table [S4](#) in the Supplementary Materials). I collected the data and conducted all qualitative and quantitative data analyses. I interpreted the findings and wrote all parts of the manuscript. I submitted the manuscript to the *Australian and New Zealand Journal of Criminology* in May 2019 and it was accepted in January 2020 after two rounds of revisions.
- For this paper, my co-authors made the following contributions. EB, LS and MT supervised the development and planning process for the study design. All co-authors provided feedback and support during the write-up of the manuscript and provided feedback on drafts prior to submission.

Paper 4 is prepared as: **Lawler, S.\*** & Barrett E. \*, Kelly, E., Slade, T., Teesson, M., Conrod, P., Newton, N. & Stapinski, L. (2021). The long-term effectiveness of a selective, personality-targeted alcohol use prevention program on adolescent aggression. *Journal of the American Academy of Child and Adolescent Psychiatry* (In prep).

This paper was planned as part of the long-term follow-up protocol of a randomised controlled trial beginning in 2012 (Climate and Preventure study).

- For this paper, I made the following contributions. I was involved with grant preparation and submission of ethics applications. I collected long-term follow-up data by contacting study participants to complete follow-up surveys (2017–2019). I designed the study protocol and analytic strategy and included the violence measurement in the survey instrument. I ran the analysis and interpreted the results. I wrote all parts of the manuscript and prepared all tables and figures. I liaised with international project members for feedback on the draft (PC).
- For this paper, my co-authors made the following contributions. EB as co-first author co-designed the study protocol and analysis plan and co-wrote the introduction of the paper. EK assisted with early stages of development. LS provided statistical support to apply the analytic strategy and interpret findings. All co-authors provided feedback on drafts.

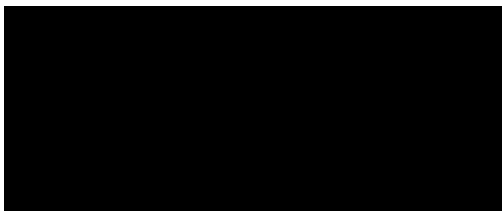
I am the corresponding author on all published material contained in this thesis.



Siobhan Lawler

5 January 2021

As supervisor for the candidature upon which this thesis is based, I can confirm that the authorship attribution statements above are correct:



Lexine Stapinski

5 January 2021

## **Abstract**

Hazardous alcohol use and aggression in youth are substantial global challenges associated with significant social, emotional and economic burdens across health, school and justice systems. To date, understanding in these areas is limited for several reasons: the lack of prospective longitudinal research examining how these behaviours develop and influence each other over time; the limited number of studies examining justice responses and the relative role of alcohol in youth violence; and a lack of evidence-based prevention programs addressing both alcohol use and aggression. This thesis sought to address these gaps.

Specifically, this thesis aimed to: 1) examine the developmental relationship; 2) explore criminal justice responses; and 3) evaluate an intervention for preventing harmful alcohol use and aggression among young people. Developmental trajectories of alcohol use and aggression were modelled in parallel (see Paper 1). The findings indicated reciprocal contemporaneous associations between alcohol and aggression and demonstrated a prospective link between heightened aggression and subsequent hazardous alcohol use. Paper 2 situated hazardous alcohol use as the most significant proximal influence on violence, demonstrating a robust association even after accounting for individual and early environmental risk factors. Paper 3 explored the intersections between youth alcohol use and violent crime in the criminal justice system, finding that alcohol was commonly implicated in violent crime by young adults. Papers 1–3 provided strong evidence that adolescence and emerging adulthood are critical periods for the co-development of alcohol and aggression. Thus, the final study (Paper 4) examined the impact of a prevention program that targets high-risk personality styles associated with both alcohol use and aggression in early adolescence. Outcomes showed sustained reductions in aggression for youth who received the intervention over a seven-year period (from age 13–20).

This thesis contains a series of rigorous, novel studies that collectively contribute a mixed-methods account of the nature and correlates of aggression and violent behaviour among young people and provide critical evidence for prevention.



## **Acknowledgements**

It has been a wonderful privilege to pursue a PhD and I am extremely grateful to have had this opportunity. Completing my candidature over 2020 was full of unforeseen events, revelations and gifts. Trying to tie together a thesis amidst natural disasters and a pandemic was a challenge but it is hard to imagine what else it could have been like. Quips about isolated PhD students being unaffected by COVID spring to mind, but I am sure I would not have made it to the end without the support and kindness of important people.

I would like to acknowledge my supervisory team for their ongoing, unwavering support: Associate Professor Lexine Stapinski; Dr Emma Barrett and Professor Maree Teesson. Lexine, you are the blueprint of what an ideal mentor and supervisor could be. You always pushed me to a higher standard and showed me kindness and patience while I was learning. Thank you for supporting me right from the start. Emma, your passion, experience and knowledge of the field is inspiring. You facilitated many rewarding growth opportunities and you made sure I was recognised for my efforts. Thank you for being an encouraging and understanding mentor to me. Maree, despite being a busy professor, you always made a real effort to come to my PhD meetings and engage with my work. Your belief that we can change the system, your ardent devotion to your vision and your generosity with your time seems to be boundless. Thank you for showing me what real leadership is.

Thank you to the young people in the Climate and Preventure (CAP) study, the International Study of Pro/Antisocial Behaviour and those whose stories are retold by judges in the sentencing remarks. People lead such busy lives, yet many individuals contribute their time and experience to research so we can understand how to make a difference.

I was fortunate to be awarded the University of New South Wales (UNSW) Scientia PhD Scholarship which provided a great number of opportunities and experiences I would not

have had otherwise. I am grateful to UNSW and acknowledge the head start it provided me with. In 2018, our research centre moved from the National Drug and Alcohol Research Centre to establish the Matilda Centre at the University of Sydney. I am indebted to Professor Teesson and the senior leadership group at the Matilda Centre for transferring my scholarship and allowing me to retain my supervisory team and complete my studies with the Centre.

Thank you to my co-authors for providing additional guidance to a researcher in training. For a PhD student deep diving into the world of stats, the Stats drop-in centre was a godsend. Thank you to Associate Professor Tim Slade, Dr Matt Sunderland and Professor Andrew Baillie for hosting the sessions each week and providing treasured support to a novice like myself.

Life as a PhD student is intellectually and emotionally demanding, and no one understands that better than other PhD students. My candidature has been enriched by those who rode with me along the way – Anna, Bri, Ivana, Jack, Jen, Logan, Lucy, Peter and Sam. I extend special acknowledgment to Jen, whose friendship and kindness I won't forget. Thank you to Professor Kath Mills, Dr Chris Marel and Dr Nat Peach who provided us with an extra space to ask questions, share knowledge and access professional development opportunities through the PhD group.

Lastly, thank you to my friends and family for understanding when I was off the grid and helping me to stay in touch. Humphrey and Brian, for keeping me company. My sister Caitie, for our trips, chats and forever having 'one more thing' to share. My brother Joe, with you I am always laughing and learning something new. My dad Luke, your benevolence and intellectual curiosity is apparently limitless. And to my mum Jill, thank you for your love, support and belief in me – you inspired this, so it's dedicated to you.

This thesis was professional edited by Elite Editing. Editorial intervention was restricted to Standards D and E of the *Australian Standards for Editing Practice*.

*Cultivating non-aggression is cultivating peace*

- Pema Chödrön

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## **Presentations Arising From This Thesis**

- Lawler, S.** Barrett, E., Stapinski, L., Bright, D. & Teesson, M. (2019). *Themes in sentencing young adults charged with serious violent crime*, Matilda Centre Webinar Series, November, University of Sydney.
- Lawler, S.,** Barrett, E., Stapinski, L., Bright, D. & Teesson, M. (2019). *Understanding the developmental relationship between adolescent alcohol use and aggression*. APSAD, November, Hobart.
- Lawler, S.,** Barrett, E., Stapinski, L. & Teesson, M. (2019). *Themes in sentencing violent crime involving alcohol and other drugs*, Working with Violence, October, Italy.
- Lawler, S.** Barrett, E., Stapinski, L. & Teesson, M. (2019). *Themes in sentencing young adults charged with serious violent crime*, Australian Institute of Criminology seminar, August, Canberra.
- Lawler, S.** Barrett, E., Stapinski, L. & Teesson, M. (2019). *Themes in sentencing young adults charged with serious violent crime*, Matilda Centre Seminar Series, August, University of Sydney.
- Lawler, S.,** Stapinski, L., Barrett, E., Newton, N., Slade, T. & Teesson, M. (2019). *Is adolescent alcohol use linked to spikes in aggressive behaviour? A growth curve analysis*, Creating Synergy, June, Wollongong, NSW [poster].
- Lawler, S.,** Stapinski, L., Barrett, E. & Teesson, M. (2018). *Understanding the developmental relationship between adolescent alcohol use and aggression*, APSAD Conference, November, Auckland, NZ [poster].
- Lawler, S.,** Barrett, E., Stapinski, L. & Teesson, M. (2018) *Understanding the relationship between alcohol and other drug use in the judicial context*, UNSW Critical Criminology Conference, September, Sydney.

**Lawler, S.,** Stapinski, L., Barrett, E. & Teesson, M. (2018). *Understanding the relationship between trauma, alcohol and other drug use and violent crime*, SBM Conference, April, New Orleans USA [poster].

**Lawler, S.,** Stapinski, L., Barrett, E. & Teesson, M. (2017). *Using judges sentencing comments to understand the link between trauma, substance use and violence*, ANZSOC Conference, December, Canberra [poster].

**Lawler, S.,** Stapinski, L., Barrett, E. & Teesson, M. (2017). *The trauma related psychopathology of serious violent offenders*, NDARC Annual Symposium, October, Sydney.

**Lawler, S.,** Stapinski, L., Barrett, E. & Teesson, M. (2017) *Trauma, substance use and violence in the judicial context*. IVAT 22nd Summit on Violence, Abuse & Trauma. September, San Diego, USA [poster].

**Lawler, S.,** Stapinski, L., Barrett, E. & Teesson, M. (2017). *Substance use and violence in NSW courts*. Victorian Postgraduate Criminology Conference, July, Melbourne.

**Lawler, S.,** Stapinski, L., Barrett, E. & Teesson, M. (2017). *Using judges sentencing comments to understand the link between trauma, substance use and violence*, ANZSOC Conference, December, ACT [poster].

## **Publications Arising From This Thesis**

- Lawler, S.,** Barrett, E., Stapinski, L., Bright, D. & Teesson, M. (2020) Themes in sentencing young adults charged with violent crime involving alcohol and other drugs. *Australian & New Zealand Journal of Criminology* 53(3), 411–432.
- Lawler, S.,** Stapinski, L., Barrett, E., Newton, N., Sunderland, M., Slade, T. & Teesson, M. (2020). Is adolescent alcohol use linked to spikes in aggressive behaviour? A growth curve analysis. *Prevention Science* 0(0), 1–11.
- Lawler, S.,** Stapinski, L., Teesson, M., Prior, K., Basto-Pereira, M. Newton, N. & Barrett, E. (2020). Unpacking violent behaviour in young adulthood: the relative importance of hazardous alcohol use. *Journal of Interpersonal Violence* (Submitted).
- Lawler, S.\*** & Barrett E.\*, Kelly, E., Slade, T., Teesson, M., Conrod, P., Newton, N. & Stapinski, L. (2021). The long-term effectiveness of a selective, personality-targeted alcohol use prevention program on adolescent aggression. *Journal of the American Academy of Child and Adolescent Psychiatry* (In prep).

## **Summary of Literature Review and Thesis Aims**

Aggression and violence are behaviours that cause significant harm to individuals and the community. Violence is a leading cause of death for young people and experiencing violence is associated with a range of long-term negative health outcomes, including future victimisation, and mental health and substance use disorders (Turanovic & Pratt, 2015). Normative aggression peaks in early childhood and declines as young people mature and develop higher-order cognitive and social skills. While steady desistence during adolescence is the norm, some young people continue to engage in aggressive behaviours throughout adolescence and into young adulthood. Heightened and persistent aggression during this time signals risk for later violent and antisocial behaviour, indicating that preventing aggression during adolescence can have wide-reaching interpersonal and aggregate benefits (Farrington, 2003; Loeber & Hay, 1997).

Individual and environmental factors interact to increase risk for persistent aggression and antisocial behaviour (Moffitt et al., 2002). These include early adverse childhood experiences, personality styles (such as impulsivity), mental health problems, engagement with the criminal justice system and hazardous alcohol use. Hazardous alcohol use is a particularly important risk factor for violence; research shows that young people who binge-drink are up to five times more likely to be violent than those who do not (Williams et al., 2009). Alcohol is commonly implicated in aggression and is the drug most strongly and consistently associated with violent crime (Boles & Miotto, 2003; Briscoe & Donnelly, 2001a; Doherty & Roche, 2003; Payne & Gaffney, 2012; Poynton et al., 2005). It is important to prevent violence in the community because violent crimes are the most common offences for which people are imprisoned in Australia. Further, imprisonment for such crimes has increased over the past decade (Australian Bureau of Statistics, 2020). Given the wide social acceptability of alcohol use and the strong relationship between alcohol and violence, clearly these are two closely

related, significant social challenges that require renewed rigorous and careful focus.

However, there is a lack of agreement on the strength of the relationship between alcohol and aggression in youth and the extent to which these behaviours influence each other over time relative to their common causes. Reviews of the research report an unequivocal dose-dependent relationship between alcohol, aggression and violence, but recognise the complexity and breadth of other contributing factors (Boles & Miotto, 2003; Tomlinson et al., 2016). Research on the developmental nature of the relationship is mixed and much of the evidence is based on the experiences of young people in the United States, Europe and the United Kingdom. This limits current knowledge and has implications for the relevance of violence-prevention interventions for young people in Australia (Kovalenko et al., 2020). Evidence for school-based violence prevention programs in Australia is mixed and there are a lack of data regarding the most effective interventions for high-risk young people (Cox et al., 2016). Few studies have explored the benefits of targeting shared risk factors for alcohol and aggression. Alcohol use and aggression are closely related and have many of the same shared risk factors, including personality styles. Thus, prevention programs that target these common underlying factors may prove an efficient and effective way to reduce both alcohol and aggression. Further clarification is needed to understand how best to respond to these challenges. This thesis aims to address existing gaps in the literature by answering four critical questions:

1. What is the nature and timing of the developmental relationship between alcohol and violence during adolescence?
2. What is the independent contribution of alcohol to violence in young adulthood, after accounting for individual and early environmental risk factors?
3. What is the role of alcohol in violent offending, and is the intersection between alcohol and violence accounted for in sentencing decisions?
4. Can a substance use prevention program targeting shared personality risk factors for

alcohol and aggression effectively reduce aggressive behaviours during adolescence into young adulthood?

This chapter reviews the existing literature on the relationship between alcohol use, aggression and violence among young people. The first part of the review overviews what is known about the prevalence and impact of aggression and violence in adolescence and young adulthood. The second part critically summarises the evidence on the developmental relationship between alcohol and aggression, focusing on important correlates, causes and conflicts in the literature. The final section outlines the need for investigation of novel and effective approaches to prevent aggression among high-risk young people.

## Introduction

### Section 1: Aggression and Violence Among Young People

Aggression and violence are often examined in tandem because they share various characteristics that separate them from other antisocial behaviours, such as vandalism and theft. While similar, aggression and violence are not indistinguishable. Aggression and violence have been described as two parts of a whole that differ by degree and severity, with aggression being less severe and violence more severe (Anderson & Bushman, 2002). Despite commonly being conceptualised as interrelated concepts that sit on the same spectrum of harm, aggression and violence are not interchangeable. Some experts have argued that fundamentally, aggression and violence share an *intention* to harm. However, this is subject to debate in some contexts (Eisner & Malti, 2015). Aggressive and violent behaviours in adolescence are often conceptualised as components of an externalising spectrum or antisocial trait, which is characterised by behaviours directed externally, or out into the environment, rather than internally (e.g., psychological distress and rumination). Among young people, they are often examined under the umbrella term of ‘antisocial behaviour’, referring to a set of behaviours that violate social norms of what is considered appropriate conduct (Allen & Anderson, 2017). However, it is important to distinguish between aggression as an underlying trait that all people experience to some extent (i.e., hostility, anger and impulsivity) and serious violent criminal behaviour that is by nature more severe and rare (i.e., assault and homicide). At one end, the behaviours are less frequent or severe, whereas at the other, they represent a consistent pattern of antisocial behaviour that is associated with criminal justice engagement (Buchmann et al., 2014).

#### Aggression and youth

Aggression is a common behaviour among children and young people. However, it can also indicate serious psychopathology and maladjustment. Aggressive behaviour is commonly defined as an action or the threat of an action perpetrated with the intention of hurting another

person who is motivated to avoid such harm (Anderson & Bushman, 2002; Farrington, 2009). It may be physical (i.e., hitting or fighting) or non-physical (sometimes called *indirect* aggression), which can present via attempts to harm someone's relationships with others, such as through social exclusion or rumour spreading (Crick & Grotpeter, 1995). Aggression can be verbal (i.e., swearing, yelling and name calling) or non-verbal (i.e., physical gestures intended to intimidate; Stangor et al., 2017). Among young people, aggression is often conceptualised in two ways: (i) aggression that is reactive, impulsive and often hostile in nature; and (ii) aggression that is proactive, premeditated and instrumental in nature (Buchmann et al., 2014; Dodge, 1991). Reactive aggression occurs in response to an event or stimulus in the environment and is related to difficulty reading social situations and overattributing hostile intent to others in ambiguous situations (Connor et al., 2003; Fite et al., 2010). Proactive aggression, in contrast, is strongly linked to a perception that aggressive behaviour will lead to positive outcomes; it is non-defensive and goal-oriented (Fraser, 1996). While reactive and proactive subtypes have distinct characteristics, they are highly correlated and together they reflect the forms and functions of a single construct of aggression (Raine et al., 2006; Vitaro et al., 2006). Reactive and proactive motivations can be conceptualised as drivers of aggressive behaviour (the 'why'), whereas overt aggression (e.g., physical violence and coercive control) is the manifestation of these drivers in the real world (the 'what'; Fite, Stauffacher, et al., 2008; Little et al., 2003). Within relationships, aggression may be exercised through coercive control, through which subtle abusive behaviours build over time to manipulate, control and instil fear (Dichter et al., 2018). Importantly, aggression may be the threat of, or precursor to, physical violence; aggression that is physically extreme, resulting in severe injury or death, is instead conceptualised as violence (Stangor et al., 2017).

### **Violence and youth**

The World Health Organization (WHO; 2014) defined violence as 'the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a



group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation'. While this definition highlights deliberation and intention, these behaviours can occur in the absence of clear intent (e.g., in the context of neurological and mental health disorders, including substance use disorders; American Psychiatric Association, 2013; Buchmann et al., 2014). Some experts have defined violence by rage and hostility, the exercise of force to injure, hurt or incapacitate another person (Archer & Browne, 1989). While the exercise of force is relevant, anger is not a necessary predetermining factor for aggression or violent behaviour (Allen & Anderson, 2017). Aggression does not always lead to physical violence and motivations behind violent behaviour can be either impulsive or goal directed. In this thesis, violence is conceptualised as criminal behaviours, including simple and aggravated assault, robbery, fighting and sexual violence (Elliott & Huizinga, 1989). The diverse nature of these behaviours is acknowledged; however, it is beyond the thesis scope to examine specific typologies in depth. The precise nature of intimate partner violence and sexual violence during adolescence and young adulthood has been explored in detail elsewhere (Jennings et al., 2017; Tharp et al., 2013).

As previously discussed, aggression and violence sit along a continuum, with aggression commonly displayed in childhood and adolescence, and violence more severe and rare prior to young adulthood when it peaks in prevalence (Australian Bureau of Statistics, 2020; Piquero et al., 2007). The importance of examining aggression and violence in young people is described later in this thesis. However, it is noted here that these behaviours should be examined in a way that is developmentally appropriate. This body of work examines aggression during adolescence and violent behaviour in young adulthood. Early aggression levels are a marker of later violent behaviour, so preventing aggression during adolescence has significant potential to affect related problems later in life.

**Why is it important to examine aggression and violence in youth?**

This thesis examines the development of aggression and violence among young people, specifically adolescents and young adults. As stated, the aim in this body of work is to capture aggressive and violent behaviours in a developmentally relevant way. An adolescent is typically defined as a person aged between 10 and 19 years and a young adult is a person aged 18 to 24 (United Nations, 2013). However, it is recognised that the definition of youth can extend to age 30 (Bonnie et al., 2014). Adolescence is a period characterised by rapid psychological and physical changes through which young people first begin to seek independence from the family unit (Curtis, 2015). While normative aggression declines steadily during adolescence, it is also a time when young people are more prone to risk-taking behaviour, such as heavy alcohol use, which is strongly associated with increased likelihood of aggressive behaviour (Hall et al., 2016). Similarly, young adulthood represents a typical threshold change in social roles and expectations, such as increased autonomy, intensification of intimate relationships, peak onset and maintenance of alcohol and other drug use, mental health problems, delinquent behaviour and engagement with police and the criminal justice system (Australian Bureau of Statistics, 2020; Teesson et al., 2009).

It is critical to focus on preventing aggressive and violent behaviours because of the devastating impacts of these practices on victims, perpetrators and communities around the world. Youth violence has significant financial consequences that affect health, welfare and justice services (World Health Organization, 2015). A 2017 study examining 167 countries calculated the global economic cost of violence (including both interpersonal and collective violence, such as war) to be \$US14.8 trillion and 12.4% of global gross domestic product (Iqbal et al., 2019). Other estimates have suggested that the cost of interpersonal violence alone (\$US1,240 billion) is 7.5 times higher than costs from war and terrorism (\$US167 billion; Hoeffler, 2017) and is equivalent to 3.3% of gross domestic product in the United States (US; Waters et al., 2005). Aggressive behaviours such as bullying in school have lifelong impacts on

productivity and chronic health conditions, which are estimated to cost \$A1.8 billion for each year group post-school completion (Alannah and Madeline Foundation, 2018). Young people aged 20–29 years commit most violent offences in Australia at significant social expense, with the estimated annual overall cost of assault alone to be \$A1.4 billion (Mayhew, 2003). Sexual assault is also associated with significant cost (\$A720 million per year). However, the greatest financial impact individually is related to homicide (\$A950 million annually; \$A1.9m per incident; Mayhew, 2003; Rollings, 2008).

Research from Australia and internationally shows a small number of repeat offenders commit a significant proportion of violent offences (Bland & Ariel, 2015; Sherman et al., 2016). A Queensland study found that a minority group of chronic offenders (approximately 5% of offenders) account for almost half (41.1%) the social and criminal justice costs of crime (Allard et al., 2014). Each of these individuals are estimated to incur an expense of over \$A250,000 by the time they reach young adulthood. These people typically have histories of early onset aggressive behaviour, personality and mental health disorders, and drug and alcohol problems (Falk et al., 2014). Experiencing violence is also associated with a range of mental health problems, including depression, suicide and post-traumatic stress disorder (PTSD; Barrett, Mills, Teesson, et al., 2013; Felitti et al., 1998). For example, young people who are exposed to community violence and school shootings experience far higher rates of PTSD than do soldiers returning from war (35–77% v. 20%; Kilpatrick et al., 2003; National Research Council, 2012). More than half of all children aged 12–17 in the world (> 1 billion) are exposed to violence each year (Hillis et al., 2016). In addition to the health, social and psychological impacts, surviving violence is associated with long-term inequalities in academic achievement and educational outcomes for young people. A global systematic review and meta-analysis indicated that experiencing violence as a child is associated with a 13% increased probability of not graduating from high school (Fry et al., 2018). This highlights the importance of intervening early and providing targeted support to young people who

experience these problems. Further investment is needed in evidence-based violence prevention to reduce this inequality and ensure safe environments in which young people can learn and grow. Reducing harms from violence and aggression is a significant public health priority and there is strong evidence to support a preventive approach to youth violence (Sharp et al., 2014).

## **Prevalence of aggression and violence in youth**

### ***How common is aggression among young people?***

Prevalence estimates within and across studies suggest that rates of aggression among young people are relatively stable across time and place (Murray et al., 2018; Olweus, 1979). Rates of aggression and violence are commonly measured through self-report surveys, interviews and official or administrative data routinely collected by healthcare providers, schools, police and courts (Marcus, 2007c). In Australia, national population surveys show rates of clinical range aggression (as defined by a pattern of behaviours, including losing temper, being angry, vindictive etc.) among 13–17-year-olds in Australia are around the 5% mark, with higher rates among boys (5% boys v. 4% girls) and younger children (5.2% to 5.9% between ages 4 and 12; Lawrence et al., 2015). Australian longitudinal cohort studies have traditionally measured aggression through self-reported fighting, finding higher rates among boys (12.3%) compared with girls (4.2%) aged 13–14 (McMorris et al., 2007; Williams et al., 2009). International data suggest higher prevalence in other countries, with some studies indicating rates of fighting among adolescents to be one in six (17.4% in Norway; Henriksen et al., 2020) and others reporting rates approaching one in three (22%~28% in the US and UK; Centers for Disease Control and Prevention [CDC], 2019; Patalay & Gage, 2019). Taken together, the wealth of evidence from around the world highlights that rates of aggression and violence among young people are highly prevalent and remain a serious social challenge, yet evidence on effective violence-prevention initiatives in Australia is lacking.

Aggression among young people is commonly measured in relation to reactive and

proactive aggression subtypes. While few studies examining reactive and proactive aggression provide point prevalence estimates, those that do show higher rates and levels of reactive aggression compared with proactive aggression among children and adolescents (Colins, 2016; Fite, Colder, et al., 2008). A large study of 9,958 young people in China reported that 11.2% of youth in study engaged in reactive aggression, 2.6% engaged in proactive aggression and 5.9% engaged in both reactive and proactive aggression (Fung & Wong, 2007). Diverging gender trends have also been observed, with higher scores of total aggression and proactive aggression among boys but similar rates of reported reactive aggression in male and female adolescents (Fung et al., 2009; Tuvblad et al., 2016). A sample of early adolescents in the US has indicated high rates of aggression in this age group, with half of males (58.7%) and females (55.9%) reporting reactive aggression, and one in five males (19.0%) and females (20.6%) reporting proactive aggression (Connor et al., 2003). However, the generalisability of these findings is limited by the small sample size ( $n = 323$ ) and the fact that the analysis examined a group of young people in inpatient and outpatient treatment.

### ***How common is violent behaviour in young adulthood?***

Prevalence of violent behaviour is typically measured through self-report surveys that contain items to measure the frequency of specific acts, such as attacking another person verbally, emotionally or physically, hurting someone so badly they need treatment or threatening someone with a weapon (Elliott & Huizinga, 1989). Research supports the validity and reliability of the self-report of aggression and violence provided that young people are assured of confidentiality and privacy (Brenner et al., 2003; Marcus, 2007c; Piquero et al., 2014). Rates of violent behaviour increase significantly during adolescence, reaching a peak in young adulthood and then declining (Australian Bureau of Statistics, 2020; Cairns & Cairns, 1994; Loeber et al., 2008; Piquero et al., 2007). Official crime statistics indicate that population prevalence in violent offending (e.g., homicide and acts intended to cause injury) peaks between the ages of 20 and 29 (Australian Bureau of Statistics, 2020). Findings from the

Australian Temperament Study suggest that one in seven (16%) young adults aged 19–20 reported being in a physical fight in the past year (25% of males v. < 10% females; Smart et al., 2003). International studies suggest similar rates; one in nine (11%) young adults in the US aged 18–19 reported past-year serious violent behaviour such as sexual violence, assault or robbery (Loeber et al., 2017). This is somewhat comparable with young adults in New Zealand (9.6%). However, only people who reported at least two serious violent behaviours or had a conviction were included in the estimate (Arseneault et al., 2000). Of benefit, the latter two studies used the same brief violence measurement tool, which examines seven common violent behaviours including simple assault (i.e., hitting someone), aggravated assault (attacking someone with a weapon), sexual violence (i.e., rape), robbery and gang fighting (Elliott & Huizinga, 1989), enabling a more reliable comparison across studies.

Antisocial, aggressive and violent behaviour is more common among men than among women; this is reflected around the world (Archer & Côté, 2005; Australian Bureau of Statistics, 2020; Smart et al., 2003). However, evidence suggests females are more likely to use indirect aggression (e.g., rumours) than are males (Denson, O’Dean, et al., 2018). Further, laboratory research indicates that the gender divide is reduced in situations of provocation and in the context of interpersonal relationships, in which both men and women commonly use aggression, but men cause significantly more harm (Denson, O’Dean, et al., 2018). Australian national survey data suggest that men and women are equally likely to have experienced violence (20%; Australian Bureau of Statistics, 2018b). However, men are more likely to experience violence by a stranger whereas women are more likely to experience sexual violence and violence perpetrated by a current or former partner (Australian Bureau of Statistics, 2018b). New Zealand literature also reports higher rates of self-reported violent offending (defined as two or more different violent offences) among males (5.5%) compared with females (2.1%; Arseneault et al., 2000).

In summary, while aggression is prevalent among young people, violent behaviour is

less common, more frequently perpetrated by young men and equally experienced by men and women. Unfortunately, recent self-report data on the nature, correlates and prevalence of violent behaviour among young adults are lacking, particularly in Australia. It is crucial to build an understanding of violence during young adulthood because this is a critical transitional time with heightened risk for harm but reduced access to developmentally relevant support (Bonnie et al., 2014; Williams et al., 2009).

### **Developmental trajectories of aggression and violence**

It has been suggested that the normative decline in general aggression throughout adolescence is related to the emergence of emotion regulation, delayed gratification and other cognitive maturation indicators (Röll et al., 2012; Tremblay et al., 2004). Aggression is a relatively common strategy used by young children to ‘establish a social order’. However, as people develop and become more socially aware, they rely increasingly on alternative, more adaptive prosocial problem-solving skills (Huesmann et al., 2009; Tremblay, 2000; Vitaro et al., 2006). Young people who learn (early) to adopt non-aggressive forms of dispute resolution are more likely to be accepted by their peers, whereas those who continue to use aggression are more likely to be rejected. Young people who demonstrate heightened levels of aggression in childhood relative to other children have a greater likelihood of demonstrating continued high levels of aggression during adolescence and into adulthood (Tremblay, 2015). Persistent aggression that peaks later in adolescence isolates young people from prosocial learning opportunities, increasing the risk of negative outcomes such as violence, engagement in crime, difficulties with relationships and unemployment (Buchmann et al., 2014; Fraser, 1996; Huesmann et al., 2002).

Early aggression levels in childhood and adolescence are a developmental precursor to later violent acts, so it is important to understand patterns and correlates of aggression during adolescence (Marcus, 2007a). Research has employed diverse methods of data collection, including self-reports, school records, parent, teacher or peer ratings and direct observation

(Edwards et al., 2013; Ensor et al., 2010). Most studies examining trajectories of aggression and violence report between three and four pathways of interest with variations in nature (e.g., behaviour demonstrated) timing (e.g., onset), severity and frequency (Farrington & Ttofi, 2015; Jennings & Reingle, 2012). Longitudinal research examining antisocial pathways among Australian young people identified three groups: violent only, non-violent only and dual pathway (which exhibited a combination of violent and non-violent behaviours). Compared with the non-violent group, both violent groups were more ‘attracted to sensation seeking, were more “reactive” (were more volatile and had difficulties controlling emotions) and experienced more difficulties in interpersonal relationships’ (Smart et al., 2003).

Research examining pathways of reactive and proactive aggression have found that while they share many similarities, these subtypes are associated with diverse precursors, pathways and outcomes (Card & Little, 2006; Hubbard et al., 2010). Reactive aggression is linked to a wide range of indicators of maladjustment, including internalising behaviours, emotional dysregulation, inattention-hyperactivity-type symptoms, delinquent behaviour, prosocial behaviour, socio-economic status and peer victimisation. In contrast, proactive aggression uniquely predicts greater delinquency, peer rejection, callous and unemotional traits and lower levels of peer victimisation (Babcock et al., 2014; Dodge & Coie, 1987; Fite et al., 2010; Ostrov et al., 2013; Poulin & Boivin, 2000; Vitaro et al., 2006). Unfortunately, past efforts to understand aggressive behaviour in adolescence, particularly in the Australian context, have traditionally measured antisocial or externalising behaviours generally, rather than aggression specifically (Herrenkohl et al., 2007; McMorris et al., 2007; Piquero, 2008). One limitation of this approach is that inferences about aggression are based on the construct of general delinquency, rule breaking or violence (e.g., ‘Ever beat someone up badly’) rather than sensitive and validated measures of aggression. Partly because aggression is often conceptualised under the umbrella of externalising or antisocial behaviour, conflicts in the literature suggest various points at which such behaviour peaks in prevalence between



childhood to young adulthood. This makes it difficult to compare child, adolescent and adult developmental literature that examines these behaviours (aggression, delinquency, violent crime) through the proxy term of ‘externalising behaviour’. The accepted pattern of development for aggression over the life span is that it typically peaks during early childhood and then declines as age increases. In this thesis, the interest is how alcohol contributes to non-normative patterns of aggression, such as spikes in aggressive behaviour during adolescence and young adulthood. The importance of examining aggression during adolescence in particular is described later in this section. However, it is relevant to note that aggression is a complex behavioural trait that should be conceptualised as such. It is a predictor of violent behaviour, an indicator of personality style and a risk marker for current and future psychopathology (Allen & Anderson, 2017).

As outlined, persistent aggression in childhood and adolescence increases the risk of continued aggression, violence and associated negative sequelae into adulthood. However, there is considerable variability in pathways of aggressive behaviour in youth. Certain individual and environmental factors, such as hazardous alcohol use, coincide with and influence trajectories towards escalation or desistence in violence. Much remains unknown about the development of aggression and violence because of the confounding nature of co-occurring risk factors and broad conceptualisations of antisocial behaviour in the literature. Section 2 summarises the extant research on these influences, focusing specifically on the role of alcohol use.

## **Section 2: Correlates, Causes and Conflicts**

This section provides a background of the current research on what is known about how and why aggressive behaviour occurs and develops during adolescence and young adulthood. Evidence on known causes and correlates of aggression and alcohol use in youth, research on the nature of the relationship and theories for the interaction between alcohol use and aggression during adolescence and young adulthood are critiqued below.

**Correlates: Factors that influence the development of aggression and violence**

This review will focus on several key established risk factors for aggression and violence. However, it is beyond the scope of this thesis to cover all conceivable influences on the development of these behaviours. As will be discussed, risk factors for aggressive behaviour tend to cluster and overlap. Many of the experiences and individual characteristics that increase risk for aggression and violence also increase risk for related problems, such as mental health and substance use disorders. The most important correlates of aggression and violence are neighbourhood, family and early life experiences, personality and substance use— primarily alcohol. These will be reviewed below.

***Neighbourhood, family and early life influences on youth violence***

Research examining the correlates of youth violence has examined factors associated with individual, environmental and system-level variables and the interaction between these. These include neighbourhood and family factors (i.e., family conflict and poverty), peer influences and adverse childhood experiences (ACEs; Herrenkohl, Lee, et al., 2012; Reyes et al., 2015; Stice et al., 1998). Findings from the Seattle Social Development project highlighted the relative importance of neighbourhood factors in risk for violence, above other individual, family, school and peer factors (Herrenkohl, Lee, et al., 2012). However, a recent meta-analysis of prospective studies of family predictors reported that socio-economic status was a relatively weak predictor of violence (Derzon, 2010). While lower socio-economic status has frequently been associated with higher levels of criminal behaviour, this appears to be stronger for the general construct of antisocial behaviour rather than aggression specifically (Piotrowska et al., 2015). Further, while young people in disadvantaged neighbourhoods are more likely to engage in antisocial behaviour, a significant proportion of violent offences are committed by young people residing in high socio-economic locales (Beyers et al., 2001). It has been suggested that genetic influences play more of a role in violence among people from more privileged backgrounds, whereas environmental factors may be more influential for people

growing up in more disadvantaged communities (Loeber et al., 2017). This demonstrates that while neighbourhood factors are important, they are not everything. Individual-level characteristics can influence the development of violence over and above local-contextual characteristics and other environmental influences.

Experiences of maltreatment and violence early in life are estimated to have moderate-to-large effects on future antisocial behaviour such as aggression (Fox et al., 2015; Maas et al., 2008). Meta-analyses of prospective longitudinal studies have concluded that the relationship between ACEs and later antisocial behaviour is strong, with sexual and physical abuse being the strongest predictors of aggressive behaviour (Braga et al., 2017). Other reviews have cautioned that the relationship between ACEs and violence perpetration may be better explained by other factors, such as family factors and genetic confounding (Jaffee et al., 2012). Antisocial behaviour such as aggression may be heritable. However, it is difficult to tease apart the impact of environment v. genes because the same genes that influence how parents interact with their children may influence children's temperament and behaviour. One way to disentangle the influence of nature v. nurture is through twin studies, in which genetic heritability and family environment factors can be examined separately. Children's risk of antisocial behaviour, conduct problems and aggression may be influenced by both: (1) parent genetic characteristics that shape the environment and (2) genes passed down from parents to children. This work has shown that less than 10% of the variation in children's experiences of maltreatment is accounted for by their genes (Jaffee et al., 2004; Schulz-Heik et al., 2009).

Family factors (such as experiences of emotional neglect) can strengthen or attenuate the association between early substance use (including alcohol) and delinquency on later violence and mental health problems (Goodrum et al., 2020). Unfortunately, the generalisability of current research is limited by high attrition and lack of long-term follow-up in longitudinal studies. Importantly, few studies have examined the relative role of early life and environmental risk factors in violence after also considering individual-level traits in risk for

violent behaviours across developmental periods of importance.

### ***Personality and mental health correlates of youth violence***

Current models propose that some psychological risk factors, such as certain personality styles, increase vulnerability across a range of conditions including aggression, mental health and substance use disorders. This shared vulnerability is often conceptualised across internalising (i.e., anxiety, depression or psychological distress) and externalising (i.e., impulsivity, delinquency or aggression) dimensions. These domains overlap and high-risk personality characteristics commonly co-occur with substance use problems and aggressive behaviour during adolescence. Alongside other problem behaviours in adolescence—such as delinquency, rule breaking and substance use—aggression is often conceptualised under the common externalising factor, spectrum or trait (Krueger et al., 2009). Internalising behaviours are strongly correlated with some externalising behaviours, such as substance use, but the link between internalising behaviours and aggression is less consistent (Marcus, 2007b). Mental disorders such as schizophrenia are associated with violent offending in young adulthood (Arseneault et al., 2000), whereas the research is mixed on the unique and relative impact of depression on violence (Elbogen & Johnson, 2009; Fazel et al., 2015). An umbrella review of 22 systematic reviews and meta-analyses on risk factors for interpersonal violence among adults reported neuropsychiatric disorders, including personality substance use disorders, as among the strongest predictors (Fazel et al., 2018).

Personality is defined as individual differences in cognition, emotions and behaviour and a key motivating force behind whether people will behave aggressively. The ‘big five’ personality dimensions found across people in the general community are extraversion, conscientiousness, agreeableness, openness and neuroticism (Ehrler et al., 1999). Traits strongly associated with antisocial personality and behaviour in adulthood are avoidance, impulsivity and attentional problems, antisocial attitudes, rigidity and emotional dysregulation (Shiner, 2009). It is critical to consider personality in relation to aggression during adolescence

because certain traits predict aggressive behaviour during this time. Further, personality is still developing throughout youth and there is potential for positive influences across common psychopathology (Adshead et al., 2012). Four personality types associated with internalising and externalising problems in adolescence are impulsivity, sensation seeking, hopelessness and anxiety sensitivity (Castellanos-Ryan et al., 2016; Newton, Barrett, et al., 2016). Research has shown strong links between traits of impulsivity and sensation seeking with both reactive and proactive aggression (Pérez Fuentes et al., 2016). However, there is less evidence for associations between internalising traits, such as hopelessness and anxiety, with aggression during adolescence (Castellanos-Ryan & Conrod, 2011; Marcus, 2007b). Taken together, these findings support calls for prevention efforts to target the shared risk factors for common psychological problems experienced by young people, including mental health symptoms, alcohol and other drug use, and other underlying psychopathology related to personality (Teesson et al., 2009).

### ***Developmental research on substance use and violence***

Alcohol and drug use are significant predictors of violent behaviour during adolescence and young adulthood, but the nature of the relationship is not straightforward. Alcohol and drug use commonly co-occur during adolescence and studies often examine them together (under the term ‘substance use’) in relation to risk for aggression and violence. Initiation to substance use typically occurs during adolescence, so a common approach to investigating the impact of substance use on the development of aggression and violence has been through pathway or trajectory analyses. Evidence from developmental studies has suggested direct and reciprocal relations between alcohol and aggression during adolescence (Tomlinson et al., 2016; White et al., 2019). Trajectory research demonstrates that young people with high levels of aggression are at increased risk of a pattern of increasing substance use over adolescence. However, substance use trajectories do not consistently predict aggression (Lynne-Landsman et al., 2011). While this may be explained by relative prevalence (e.g., onset of alcohol use in

adolescence is normative, heightened aggression less so), current evidence is limited by small sample sizes, the use of non-validated measurement tools and the confounding of outcomes. For example, a summary score for the outcome of both alcohol and drug use is commonly used, in which ‘substance use’ is defined as the quantity and frequency of alcohol use, cannabis, cigarettes and inhalants (Lynne-Landsman et al., 2011). This approach is problematic in three key ways. First, a summary score is reflective of consumption rather than hazardous use per se, the latter of which is important to capture in accordance with evidence of dosage effects that will be discussed in the following section of this review. Second, the methodology muddles the influence of distinct alcohol and drug use behaviours. Last, this compounds previously considered limitations associated with the measurement of aggression, which is commonly conceptualised either as part of a general externalising trait and conglomerate of antisocial behaviours or measured through simplistic one-item response variables (i.e., hitting someone; White & Hansell, 1996).

Other work examining the development of substance use in adolescence highlights significant variability in developmental pathways (Marti et al., 2010). Distinct pathways of use across adolescence have been identified: normative users (52%) and non-abusers (66%; most common), late users (24%), moderate-escalating abusers (19%), late-heavy users (16%), moderate decreasing abusers (10%), early heavy users (7%) and adolescent limited heavy abusers (4%)<sup>1</sup>. Trajectories characterised by early heavy use showed the highest elevations on delinquency (including aggression) during adolescence and young adulthood (Marti et al., 2010). This work provides some support for a developmental relationship between early heavy use specifically and subsequent aggression. Unfortunately, the authors did not clarify classes beyond the categorisations specified (e.g., the ‘normative’ level of use is not defined). Further, the application of compositive measures of delinquency (including externalising and rule-breaking behaviours) means that it cannot be concluded from this study alone that early heavy

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<sup>1</sup> Classifications accounted for most but not all participants therefore numbers do not add to 100 (Marti et al., 2010).

use is associated with high levels of aggression specifically. They also examined substance use generally (tobacco, alcohol, and illicit drug use) rather than examining different drug types separately. Nonetheless, the value of such trajectory research is that it highlights the interrelationship between substance use and violence during adolescence. This is particularly pertinent in the transitional stage between adolescence and adulthood, which can mark desistence or persistence in antisocial behaviours.

### ***Alcohol as a key risk factor for aggression and violence in youth***

Alcohol is the drug most implicated in violent crime and alcohol-related violence places a significant burden on health, justice services and systems (Donnelly, 2018). Harmful alcohol use is a leading cause of burden of disease among young people and is associated with a range of negative short- and long-term consequences, including injury, accident, violent behaviour, victimisation, blackouts, unwanted sexual experiences, mental illness and problems at school and with family (Bonomo et al., 2001). The height of the disability associated with alcohol use occurs between the ages of 15 and 24 alongside typical age of initiation (Andrews et al., 2001; Chapman et al., 2015; Teesson et al., 2009). Late adolescence and young adulthood are characterised by an escalation in alcohol use and onset of alcohol-use disorders (Brown et al., 2008; Li et al., 2004; Teesson et al., 2000). Initiation to alcohol use peaks at age 16, again at age 18 and declines after 25. This is similar across high-income countries (Australian Institute of Health and Welfare, 2020; Degenhardt et al., 2016). Over half of young Australians aged 14–17 have reported consuming alcohol (66%), with higher rates among older adolescents (76% of 17-year-olds) than younger (17% of 12-year-olds; Guerin & White, 2018).

Any consumption of alcohol is considered harmful for children and adolescents, as reflected in the National Health and Medical Research Council (NHMRC) guideline that young people under the age of 18 years should not drink alcohol (National Health and Medical Research Council, 2009). For adults, the guidelines state that drinking five or more drinks on a single occasion is associated with higher risk of harm, such as injury and assault (National

Health and Medical Research Council, 2009). In the empirical chapters of this thesis, high-risk drinking behaviours such as this will be referred to as hazardous alcohol use, in line with the Alcohol Use Disorders Identification Test (AUDIT) developed to identify hazardous and harmful alcohol use (World Health Organization, 2001). In the wider literature, hazardous alcohol use is variously defined as binge-drinking, heavy alcohol use, risky drinking and heavy episodic drinking. In Australia, 9% of 16-year-olds and 13% of 17-year-olds have reported binge-drinking (5+ drinks on one occasion) in the past week and one-third of all Australian high school students have reported binge-drinking at least once in their lifetime (Guerin & White, 2018). While prevalence of alcohol use among young people has been declining steadily over the past 15 years, rates of binge-drinking alcohol among 12–15-year-olds have remained relatively stable (Guerin & White, 2018). Research examining binge-drinking specifically among a large sample of adolescents and young adults ( $n = 6,527$ ) has identified a developmental association with violence (Tucker et al., 2005). Researchers concluded that early users and those who steadily increased their use over time were at a higher risk of poor outcomes, such as violence in young adulthood, compared with low-level users and non-users. Other work has shown that hazardous drinking in adolescence predicts violent offending in young adulthood, independent of internalising and externalising problems (Jordan & Andersen, 2017; Silins et al., 2018; Wells et al., 2004). However, evidence from the Australian context tends to focus on antisocial behaviour more broadly (Miller et al., 2015; Silins et al., 2018). Thus, further examination of the relationship between hazardous alcohol use and aggressive and violent behaviour specifically is required.

Hypothesised explanations for the relationship between alcohol and aggression will be discussed in detail in the next part of this review, but it is important to acknowledge that alcohol use affects young people differently than it does adults. Younger brains have higher levels of neurological plasticity. The frontal and temporal brain regions undergo significant maturation during adolescence while some connections are refined and others pruned



(Fuhrmann et al., 2015). Most research on the impact of drugs on the developing brain has focused on alcohol because of its high prevalence among young people, social acceptability and accessibility (Squeglia et al., 2009). This work has shown that heavy alcohol use in adolescence can have a profound long-term impact on the developing brain through accelerating decreases in grey matter and increases in white matter, which are associated with development of cognitive abilities and information processing (Squeglia & Gray, 2016). Consequences of heavy early use also include poorer neuropsychological functioning on inhibition and memory tests, brain matter abnormalities and altered brain activation during inhibition, working memory, reward and resting state (Squeglia & Gray, 2016). Alcohol also interferes with synaptic communication within and between different brain regions. Research has indicated that young people with abnormal or delayed development in the prefrontal areas of their brain (related to executive control) are at increased risk of binge-drinking. These regions are further damaged by heavy drinking behaviours (Lees et al., 2019). Impairment to these regions (involved with memory, judgement and impulse control) increases vulnerability to future harmful use and other related problems in adulthood (Jones, 2015). Taken together, this evidence indicates that effective prevention interventions must be prioritised over responses implemented after the damage has been inflicted.

This section of the review has discussed the range of factors associated with risk for aggression and violence, but the research paints a complicated picture. Both environmental and individual-level factors are important, but tend to cluster and interact, which makes it difficult to determine the unique contribution of these influences at different developmental periods. Studies have consistently shown that adverse early life experiences, family factors and internalising and externalising symptoms (particularly hazardous alcohol use) all increase risk, but there are multiple explanations for how and why this occurs. This will be explored in the following section.

**Causes: Theories for the relationship between alcohol, aggression and violence**

Alcohol is the most used psychoactive substance and a drug that is consumed regularly by a significant proportion of people around the world (Australian Institute of Health and Welfare, 2020; Degenhardt et al., 2008). However, most of those who drink alcohol do not become aggressive or violent as a result (Greenfeld, 1998). A review of seven meta-analytic studies examining experimental research on the link between alcohol and aggression confirmed a causal relationship but cautioned that such behaviour is more likely to manifest in some people and situations (Exum, 2006; Tomlinson et al., 2016). In their review of quantitative findings from 32 meta-analyses, Duke and colleagues (2018) calculated an overall medium effect size ( $d = 0.39$ ) for the relationship between alcohol and violence. In this section, current models that conceptualise the relationship between alcohol, aggression and violence will be discussed, distinguishing between direct-cause and common-cause approaches. Evidence from experimental and neuropsychological research on hypothesised mechanisms underlying the alcohol–aggression association will first be critiqued. Two key frameworks that will be examined are the tripartite framework (Goldstein, 1985) and the *snares* hypothesis (Moffitt, 1993), which have direct relevance to the research questions investigated in this thesis.

***Evidence from experimental and laboratory studies***

There is strong evidence for the psychopharmacological effects of alcohol on aggression (Tomlinson et al., 2016). A meta-review of experimental findings on the relationship between alcohol and aggression confirms the association between blood alcohol levels and aggression (Exum, 2006). Statistically significant increases in aggression have been demonstrated at a dose of 0.75 g/kg and above (Kuypers et al., 2018). The disinhibition hypothesis posits that the normal cognitive control that sobriety allows is reduced after drinking alcohol, making people more prone to impulsive and violent behaviour (Boles & Miotto, 2003). Four behavioural responses to drug use have been identified that make aggression more likely after drinking. These relate to changes to the psychomotor system

(affecting approach and attack behaviours), the anxiety/threat system (reducing inhibition responses) and the pain system (dampening of pain sensitivity, reducing deterrent impact of pain). The last is the effect of alcohol on higher-order processes (planning and processing of distress cues) that would usually inhibit inappropriate behaviour such as aggression (Kuypers et al., 2018). Specific brain regions have been implicated in intoxicated aggression, including the medial and dorsolateral prefrontal cortex, areas understood to be related to angry rumination and biased processing of hostile cues following provocation (Denson, Blundell, et al., 2018; Denson et al., 2009). Accordingly, intoxication significantly increases the risk of being both a perpetrator and victim of violence, as demonstrated by evidence from analysis of coronial data for ‘king hit’ assault cases in Australia (Pilgrim et al., 2014). This research found that 80% of victims were male and three-quarters of the fatalities examined involved alcohol, with a median post-mortem blood alcohol concentration of 0.191/100 mL (Pilgrim et al., 2014). For context, binge-drinking is also defined as a blood alcohol concentration of 0.08/100 mL or above, which typically occurs after consuming four or more drinks for women and five or more drinks for men within a two-hour period (National Institute on Alcohol Abuse and Alcoholism, 2016).

A pure disinhibition model cannot adequately explain the effect of alcohol on aggressive behaviour in some people. In the laboratory, the alcohol–aggression relationship is often measured through validated and sophisticated methodological designs that involve participants being administered alcohol then delivering electric shocks to a fictitious partner after experiencing some affront (Giancola & Chermack, 1998). However, even in highly controlled conditions such as these, most studies have recognised the importance of moderators in the relationship. For example, reviews of the research have suggested that only women high on trait aggression experience heightened aggression under the influence of alcohol (Denson, O’Dean, et al., 2018). Bushman (2002) reviewed three explanations for alcohol-related aggression, including disinhibition, expectancy and indirect causes. According to expectancy

theory, people become aggressive after using alcohol because they expect they will. While alcohol expectancies predict initiation to alcohol use and drinking patterns over time (Smit et al., 2018), evidence shows alcohol expectancies play a limited role in affecting aggressive behaviour (Giancola et al., 2005). Indirect theories have suggested other factors that are crucial moderators in the relationship, such as provocation, which commonly precedes aggressive behaviour (Exum, 2006). Angry rumination following provocation reduces self-control and increases aggression, so interventions that target cognitive biases specific to aggression and focus on developing self-control capacity in young people may be most suitable (Denson et al., 2011a; Denson et al., 2011b).

Collectively, the findings described above support the position that alcohol indirectly causes aggression by creating changes in the brain that increase vulnerability to aggressive behaviour. However, alcohol may affect aggression just as much as it may affect other behaviours, such as sex, mood and judgement (Bushman, 2002).

### ***Goldstein's tripartite framework***

One of the most well-known theories for the interrelationship between drug use and violence is Goldstein's (1985) tripartite model. This framework outlines that the association between substance use, violence and crime is direct and can be explained in three ways: (i) *psychopharmacological* effects; (ii) *economic-compulsive* motivations; and (iii) *systemic* influences. The *psychopharmacological* model argues that some people will become aggressive or violent as a direct result of using psychoactive substances (Goldstein, 1985). Alcohol has the strongest links to violent behaviour, while drugs such as stimulants (methamphetamine and cocaine), cannabis and opiates are indirectly related through third-party mechanisms, such as personality styles or environmental influences (Tomlinson et al., 2016). The strongest evidence for the direct, *psychopharmacological* relationship between alcohol and aggression comes from experimental and laboratory research, which was discussed in detail in the preceding section. While the *economic-compulsive* argument suggests that alcohol and

drug-related violent crime is committed to acquire funds to fuel further substance use, the *systemic* view focuses on the role of environmental factors influencing behaviour. Previous research has typically found stronger evidence for *psychopharmacological* models when predicting alcohol-related crime, and links between *economic-compulsive* and *systemic* models with drug-related crime (White et al., 2019). *Economic-compulsive* rationalisations are supported by evidence that most young people in custody have reported committing crime to obtain alcohol and other drugs (Dean et al., 2015). A significant proportion of adult detainees have attributed their offending directly to their substance use, with alcohol more frequently cited than all other illicit drugs combined (Payne & Gaffney, 2012). Among those who have ascribed their substance use as underlying their criminal behaviour, intoxication has been reported as the cause by almost half (40%), with fewer (25%) reporting economic motivations (Payne & Gaffney, 2012).

The drug trade is a common example used to support the *systemic* argument because it is an environment characterised by high levels of drug use and violence, one in which violence is frequently employed to manage risk (Lawler & Bright, 2019). *Systemic* violence is the aggression and violence that occurs as part of drug distribution markets and systems (Goldstein, 1985). This *systemic* approach suggests that if changes are made to the prevalence of drug use or availability of drugs in the community, this would have a direct impact on violence. While underground supply disruption efforts by law enforcement are unlikely to have an impact on violence in the drug trade (Werb et al., 2011), research has consistently shown that reduced opening hours for licensed premises are associated with lower rates of assault, domestic violence and unintentional injury (Livingston, 2010; Nepal et al., 2020). However, violence is not commonly observed in most licensed venues (Boles & Miotto, 2003) and Goldstein's original understanding of *systemic* violence related to street dealing within illicit drug markets. Therefore, *systemic* rationalisations arguably have less weight in explaining alcohol-related violence than do the *psychopharmacological* effects of the drug, as indicated by

reports of police detainees (Payne & Gaffney, 2012). However, this is yet to be explored from the perspective of legal experts, or among young adults specifically.

While somewhat removed from the traditional conceptualisation of *systemic* violence proposed by Goldstein (1985), it is argued that the function of the formal criminal justice system also influences the relationship between drug use and violence for individuals. Involvement in the criminal justice system can compound the disadvantage related to early life adversity, mental and substance use disorders. After imprisonment, a person is a target for future surveillance and arrest (McCausland & Baldry 2017). Efforts on behalf of such people to socially reintegrate and access support are further hampered by the lack of cooperation and communication between services and systems (Dowse et al., 2014). Taking a preventative approach is likely to significantly reduce the burden on individuals and the broader system. However, further in-depth analysis of the experiences of justice involving young people and systemic responses to these youth is required to develop understanding of how best to prevent and respond to alcohol and drug-related violence.

The research summarised above shows that current understanding around the role of alcohol in violent crime is mainly correlational, originating from prisoner self-report samples and police data. A large proportion of violent crime is drug related however deeper investigations into criminal justice responses to such crime committed by young people is lacking (Dean et al., 2015; Payne & Gaffney, 2012). Further research examining how and why the relationship between alcohol and aggression appears across people is needed to better understand this relationship.

### ***The snares hypothesis***

As previously explained, hazardous alcohol use has a causal influence on aggression but not everyone is affected in the same way. It is vital to acknowledge both direct and indirect associations between alcohol and aggression. Common-cause models recognise the limitations of direct-cause theories like Goldstein's and acknowledge the role of early shared risk factors

and interrelated processes that increase the risk of aggression during adolescence and violent behaviour in young adulthood. Theory on the causes of stability and change in aggression over development has distinguished between population-heterogeneity and state-dependent approaches (Nagin & Paternoster, 2000). The former relates to typically stable factors that influence continuity of aggression over time (i.e., genetic and neuro-cognitive impairments, stable personality characteristics like psychopathy, callous and unemotional traits). The latter relates to more dynamic environmental and social contextual influences, such as the presence of prosocial or antisocial relationships with others, early social learning experiences, adverse life events and *snares* (Eisner & Malti, 2015).

The *snares* hypothesis builds upon life-course criminology research (Laub & Sampson, 2001; Moffitt, 1993), in which certain factors are identified as protective and hasten crime desistence while others are ensnaring and interfere with the expected deceleration of antisocial behaviour (Hussong et al., 2004). According to Moffitt's developmental taxonomy, there are two types of young people who may demonstrate aggressive and antisocial behaviours: the life-course-persistent group, which is less common and characterised by more severe offending; and the adolescent-limited group, which is more common and characterised by less severe offending (Moffitt, 1993). It is estimated that most adolescent limited offenders naturally desist by young adulthood. However, certain factors (such as substance use) are theorised to interfere with this process (McGee et al., 2015). These factors (called *snares*) are time-specific, potentially modifiable individual-level risk factors that can entrap young people into antisocial pathways by limiting future opportunities, reducing protective buffers and producing cascading negative consequences (Craig et al., 2015; Moffitt et al., 2002). Other examples of *snares* include engagement with the criminal justice system, neighbourhood dysfunction, early school leaving and teenage parenthood (Bushman et al., 2016; Moffitt, 1993).

The *snares* hypothesis provides a potential explanation for the association between hazardous alcohol use and later aggression or violent behaviour, in that heightened alcohol

consumption may interfere with the normative developmental desistence of antisocial behaviour. One approach to testing the *snares* hypothesis is through disaggregating person-specific (also known as *between person*) and time-specific (also known as *within person*) changes over time. This allows for comparison of patterns of behaviour across people in a population (i.e., person-specific change) and examination of individual variation in behaviour over time (i.e., time-specific change; Curran et al., 2014). Recent research analysing changes in antisocial behaviour and alcohol use between adolescence and young adulthood has reported that when young people drink more than they normally would, they engage in more antisocial behaviour than usual (Hammerton et al., 2017). However, evidence for the relationship (and support for the *snares* hypothesis) was found during young adulthood (18–21 years) but not during adolescence (15–18 years; Hammerton et al., 2017). Previous research testing this *snares* hypothesis has also discovered that heavy substance use (alcohol and cannabis) creates time-specific elevations in antisocial behaviour during young adulthood (18–21 years; Hussong et al., 2004). However, adolescents were not included in the analysis. These studies indicate the relevance of hazardous alcohol use as an ensnaring factor, but findings are limited by the exclusion of females and broad conceptualisations of antisocial behaviour, including both violent and non-violent crime (e.g., assault, vandalism and stealing). It is not known whether evidence supporting the *snares* hypothesis can be extended to explain the relationship between aggression and alcohol use among Australian adolescents.

### **Conflicts: Developmental research findings**

While a direct and causal relationship between alcohol and aggression is evident, the relationship is not uniform across people and contexts in society, nor is it as straightforward as a cause-and-effect hypothesis suggests (Tomlinson et al., 2016). There are three main schools of thought on the developmental relationship between alcohol and aggression in youth: that heavy alcohol use causes developmental changes in aggression; that young people who are more aggressive drink more alcohol; and that alcohol and aggression are reciprocally linked



over time. The following section reviews research on bidirectional associations between alcohol use and aggression during adolescence and young adulthood.

### ***Increases in alcohol use leads to increased aggression***

Evidence for the direct, psychopharmacological effects of alcohol on aggression was discussed in the previous section. The extant literature shows that alcohol causes time-specific changes in the brain that make aggression more likely. Further, heavy alcohol use, rather than any use of alcohol, is most strongly associated with aggression and violence perpetration, consistent with a dose-dependent relationship (Kuypers et al., 2018; Waterman et al., 2019). Some studies have suggested that alcohol use, particularly heavy use, causes developmental changes in aggression and violence during adolescence. Australian research examining the developmental association between heavy alcohol use and interpersonal violence between ages 13 and 17 found that heavy alcohol use at age 13 was associated with interpersonal violence at age 15 (Scholes-Balog et al., 2013). No other associations were identified after accounting for covariates. However, the authors measured the relationship at two-year intervals rather than at adjacent time points (Years 7, 9 and 11). Further, internalising symptomology was included as a confounder (depressive symptoms), but key personality risk factors associated with aggression (i.e., impulsivity) were not examined (Scholes-Balog et al., 2013). Other work has indicated that hazardous alcohol use predicts contemporaneous but not subsequent delinquent behaviour in adolescence (Miller et al., 2015). However, a composite measure of delinquency was used, so it cannot be determined if the results extend to aggressive behaviour specifically.

There is mixed evidence regarding the strength of adolescent alcohol use in predicting later violence. There is evidence that how young people use alcohol at age 16 is consistently and independently predictive of violent offending in young adulthood (ages 21–25; Wells et al., 2004). The relationship was robust, even after controlling for many covariates spanning sociodemographic, family, peer and individual risk factors. However, other work has yielded

conflicting findings. While young people who drink heavily during adolescence desist more slowly from dating aggression and antisocial behaviour generally, the strength of the relationship decreases with time, sometimes to the point of non-significance by young adulthood (Hussong et al., 2004; McGee et al., 2015; McNaughton Reyes et al., 2011). Similarly, other studies have shown that violence in young adulthood is best predicted by co-occurring heavy alcohol use in young adulthood rather than in adolescence (Lim & Lui, 2016; Marcus & Jamison Li, 2013). However, this work is limited by disregard for the influence of personality-related risk factors, such as internalising or externalising symptomology more generally, or the influences of ACEs aside from poverty and parent education (Marcus & Jamison Li, 2013). Also, violence is typically measured through single-item indicators, such as fighting and use of weapons, rather than through the underlying construct of aggression. The limitation of this approach is that it captures severe manifestation of violence instead of trait aggression; the latter is more developmentally appropriate to adolescence and broadly relevant. Therefore, current findings cannot conclude that alcohol does not influence later aggression levels, but it does appear that co-occurring risk factors play an important role.

### ***Increased aggression leads to increases in alcohol use***

As outlined, aggression levels peak early in life. Therefore, they usually precede initiation to alcohol use, which typically occurs in mid-adolescence (Australian Institute of Health and Welfare, 2020; Guerin & White, 2018). Developmental research has shown that young people who are naturally more aggressive are at an increased risk of hazardous alcohol use and substance use disorders in adolescence and young adulthood (Conegundes et al., 2020; White et al., 2019). Young people with high levels of aggression are more likely to drink heavily (Felson et al., 2008). This may be because young people who are more aggressive receive differential reinforcement from alcohol use, which places them at increased risk of future harmful drinking behaviours (Colder et al., 2002). Aggression may lead to alcohol use through a self-medication model in which people who are more aggressive drink alcohol to

self-sooth (Khantzian, 1985). However, there is weak evidence for this position because young people high on aggression are more likely to drink for enhancement than to drink to cope with feelings of distress (Kuntsche et al., 2006; Ostrowsky, 2009; White, 2002). Nonetheless, these findings highlight the importance of acknowledging shared underlying psychopathology of problem behaviours during adolescence and young adulthood.

Some studies have provided no support for a prospective relationship between early aggression and subsequent alcohol use. However, this work is limited to the dating context and it is not known whether the findings are generalisable to other types of aggressive behaviour (McNaughton Reyes et al., 2012). Another study examining specific aspects of aggression between mid-adolescence and emerging adulthood found that verbal anger expression, but not aggressive anger expression predicted subsequent alcohol use (Swaim et al., 2004). However, this was only identified among a subset of students and the study was limited by narrow conceptualisations of aggression and high attrition (> 50% across two time points; Swaim et al., 2004). In studies showing a significant relationship between aggression and associated increases in alcohol use, it is not clear whether this is better explained by shared underlying causes. For example, young people high on aggression are more likely to be rejected or excluded from prosocial peers and associate in antisocial networks in which heavy drinking is normalised (Fite et al., 2007). Recent research examining four Australasian longitudinal cohort studies suggested that aggression in early to mid-adolescence predicts later heavy episodic drinking in young adulthood (Najman et al., 2019). However, the authors also identified bidirectional relationships in which heavy alcohol use predicted violent behaviour in young adulthood.

### ***Aggression and alcohol use influence each other over time***

Reviews of the literature have often deduced that the developmental relationship between alcohol and aggression is reciprocal—both behaviours influence each other over time (White et al., 2019). An analysis of four Australian cohort studies ( $n = 6,706$ ) following young

people from adolescence to young adulthood reported that after adjusting for a range of covariates, aggressive young people were more likely to engage in hazardous drinking (defined by the authors as heavy episodic drinking). Hazardous drinking in turn strongly predicted subsequent aggressive behaviour (Najman et al., 2019). However, they only examined early adolescents (aged 14–15) and young adults (aged 20–21), so it not known whether the findings generalise to other developmental periods, such as late adolescence and emerging adulthood (aged 15–19). Identifying developmental windows of opportunity is critical for informing relevant and effective prevention efforts (Hemphill et al., 2009; Marcus, 2007d).

Developmental evidence suggests that the relationship between alcohol and aggression is stronger in earlier adolescence than in late adolescence and early adulthood. Sacco and colleagues (2015) identified overall decreasing associations between aggression and alcohol during adolescence but highlighted significant time points in the developmental relationship (ages 12, 15 and 18). They argued that early initiation to alcohol use (e.g., age 12) is rare and associated with worse outcomes, including violence and criminal behaviour in emerging adulthood (Ellickson et al., 2003). In contrast, peaks in initiation to alcohol use at 15 and 18 years is more common and less related to comorbidity with other problem behaviours like aggression (Sacco et al., 2015). This suggests that the concurrent relationship between alcohol and aggression may be strongest early in adolescence when use is less normalised. However, this is yet to be tested among Australian young people.

Huang and colleagues (2001) also discovered that the strength of the developmental relationship between alcohol and aggression decreased between mid and late adolescence. After accounting for shared risk factors, two bidirectional prospective associations remained: age 15 aggression predicted age 16 alcohol use; and age 16 alcohol use predicted age 18 aggression (Huang et al., 2001). A strength of the design was the consideration of a range of individual and environmental confounders; however, these were all measured years before the developmental period of interest (age 10). Young people experience significant developmental

change between the ages of 10 and 15 that likely affects the relevance of these confounding factors to their current behaviour. Further, the study was limited by a narrow definition of aggression, which focused on three behaviours (throwing rocks, picking fights and hitting people; Huang et al., 2001).

Hazardous alcohol use may play a more important role in violence during young adulthood, when prevalence and levels of use peak alongside legal drinking age and increasing engagement with the night-time economy (Lim & Lui, 2016). Evidence for a decline in the strength of the relationship may also relate to the cultural context in which the study is conducted. Research comparing young people in the US and Australia found that the developmental relationship between alcohol and drug use and violence was stronger among 12–14-year olds than among 15–17-year-olds in the US sample. In the Australian sample, the relationship remained constant across time (Hemphill et al., 2007). Evidence also suggests cultural differences in risk for violence relating to alcohol use. For young people in the US, any alcohol use predicts violent behaviour while for Australian young people, only binge-drinking predicts violence (Herrenkohl, Hemphill, et al., 2012). Research from European samples suggests similar trends, in which heavy drinking—but not any use of alcohol—is associated with alcohol-related aggression. However, this study was limited by cross-sectional designs (Siciliano et al., 2013). Most longitudinal research examining alcohol and violence comes from the US, so it is also important to consider the role of local-contextual variables. Gun violence is a central challenge for violence-prevention efforts in the US. However, this is not the case for Australian young people. Further, the purchase of alcohol is legal at age 18 in Australia, whereas it is legal at age 21 in the US. Given these important cross-cultural differences in the nature and presentation of alcohol use and aggression among young people, further work is needed to understand the specific needs of young people in the Australian context. Current evidence internationally and from Australian samples is limited by a focus on substance use and delinquent behaviour more broadly and reliance on single-item indicators

for alcohol use and violence (e.g., attacked someone). It is critical to determine if similar associations exist for aggression to inform developmentally relevant responses.

### **Section 3: Responses and Prevention Initiatives**

Problem behaviours in youth, such as hazardous alcohol use, aggression and violence, are preventable public health challenges. It is vital to intervene early to prevent aggression because it is a strong predictor of later violence, antisocial behaviour and criminal justice involvement. As outlined previously, there is a strong relationship between alcohol, aggression and violence—acutely and developmentally. However, there remain complexities. This is demonstrated among young people in the community and in clinical and justice samples (Cox et al., 2016; Dean et al., 2015). Recent reviews on comorbidity between substance use and violence have concluded that targeted alcohol interventions for young people who demonstrate aggressive traits could significantly reduce violent behaviour (White et al., 2019). However, traditionally, treatment effectiveness for co-occurring substance use problems and aggression has been limited by lack of coordination between services and systems and few developmentally appropriate interventions (Doran et al., 2012). Evidence from school-based personality-targeted prevention programs shows promise for affecting conduct problems and alcohol use but this is yet to be tested for aggression specifically (Edalati & Conrod, 2019). A streamlined approach targeting risk factors shared by hazardous alcohol use and aggression has potential benefits across a range of emotional and behavioural problems experienced by adolescents (White, 2002). Initiatives targeting common underlying mechanisms may have complementary effectiveness for both sets of behaviours, given the tendency for these problems to interact and exacerbate one another.

#### **What works in violence prevention?**

Violence-prevention initiatives occur at various levels in society, including community, health and school settings, with effects ranging from small to moderate across contexts (Cox et al., 2016; Hahn et al., 2007; Knight et al., 2017; Kovalenko et al., 2020; McGuire, 2008). Best

practice guidelines for violence prevention suggest programs should take advantage of developmental windows of opportunity (Hemphill et al., 2009; Marcus, 2007d). A meta-review of 52 reviews reported that violence-prevention programs targeting family factors produce stronger effects, followed by school-based programs targeting peers and impulsivity (Matjasko et al., 2012). However, only reviews published prior to 2009 were examined, there was an overrepresentation of family interventions and many programs were evaluated in multiple studies, which could have driven the effects (Matjasko et al., 2012). Mediation analyses also highlight peer delinquency and peer rejection as important in the pathway between substance use and aggression in adolescence (Fite et al., 2007). However, reviews have identified iatrogenic effects for prevention programs targeting peers (Ttofi & Farrington, 2011). Programs that utilise cognitive behavioural therapy (CBT) and focus on developing coping and social problem-solving skills among young people are demonstrated to be most successful for reducing mental health, substance use and related behavioural problems among adolescents (Conrod et al., 2006; Marcus, 2007d; Teesson et al., 2012). Interventions that target known risk factors such as alcohol, impulsivity, hyperactivity, emotional regulation, self-control and social competency are associated with reduced aggression and interpersonal violence (Matjasko et al., 2012; McGuire, 2008; Wilson et al., 2001).

Programs delivered in the community target a wider range of risk factors but tend to be more intensive and expensive than school-based approaches (Knight et al., 2017). The evaluation of community-based interventions can also be more challenging because the environment is less controlled, particularly compared with the school setting. Research has consistently shown the importance of the school environment in influencing antisocial behaviour. Young people spend a significant proportion of their lives at school (over one-third of their waking hours; Baxter, 2018), so it is not surprising that school belonging and achievement are protective factors against problems in adolescence and early adulthood (Vassallo et al., 2016). Research examining the relationship between early onset alcohol use

and subsequent alcohol-related harm (including violent behaviour) has highlighted the protective effect for school attachment over and above family influences (Kim et al., 2017).

School is an ideal setting for prevention and early intervention efforts because there is potential to reach large numbers of young people simultaneously. Given the importance of the school environment and the role of school connectedness in predicting positive outcomes, there are clear advantages to implementing prevention initiatives within this context. Further, there is capacity to deliver developmentally targeted interventions without the stigma sometimes associated with other traditional criminal justice and welfare-based approaches.

### **Prevention of violence in the school setting**

Past research demonstrates the potential for school-based mental health and substance use prevention programs to address aggressive and violent behaviour (Catalano et al., 2012; Kelly et al., 2020; Matjasko et al., 2012). The two main approaches to substance use prevention in schools are universal and selective prevention. Universal prevention programs are delivered to everyone regardless of risk, while selective prevention programs are delivered to subpopulations of people identified as high risk of behavioural and emotional problems (Toumbourou et al., 2015). Both universal and selective prevention approaches are important to:

delay onset in both adolescents with low-risk profiles who may be influenced to take up alcohol and other drugs due to peer influence and social conformity, and adolescents with high-risk profiles whose underlying vulnerability to psychopathology can lead to substance misuse. (Newton et al., 2012)

International research supports universal school-based violence prevention (Hahn et al., 2007). However, reviews of the literature have suggested that violence-prevention programs implemented in Australia have produced mixed results (Cox et al., 2016). Programs targeting high-risk young people were found to be generally ineffective; however, few evaluations were assessed ( $n = 5$ ; Cox et al., 2016). Importantly, these studies were limited by quasi-



experimental designs (pre and post-test), measurement of violence through broad constructs of risk-taking behaviours (Buckley et al., 2010), small sample sizes ( $n = < 100$ ; Baker & Jones, 2006; Bretherton et al., 1993) and a focus on young people in clinical settings or youth who had been excluded from mainstream schooling (Rey et al., 1998; Wheatley et al., 2009). Reviews of international literature on school-exclusion programs to reduce antisocial behaviour have reported that these are generally ineffective and some interventions have had iatrogenic effects (Valdebenito et al., 2018). An international review of 28 randomised controlled trials of school-based violence-prevention interventions for high-risk young people found small but significant intervention effects. However, no programs targeted high-risk personality (Mytton et al., 2002). Pooled across studies, receiving an intervention had a moderate effect in reducing aggression compared with not receiving an intervention. Unfortunately, the bulk of these evaluations were from the US and assessed programs delivered to boys only (Castillo-Eito et al., 2020; Gavine et al., 2016; Mytton et al., 2002). There is a critical need to assess the effectiveness of school-based interventions for preventing aggression and violence in the Australian context. Some studies have shown that substance use prevention programs can have affect aggressive behaviour positively (Botvin et al., 2006; Cox et al., 2016). However, a lack of evaluations of selective prevention interventions targeting high-risk personality traits and absence of long-term follow-up studies (i.e., after three years post baseline) has limited current evidence (Averdijk et al., 2020; Kovalenko et al., 2020).

### **Personality-targeted prevention programs have the potential to concurrently address alcohol use and aggression**

Unlike universal programs that are delivered to everyone regardless of their risk, personality-targeted programs focus on young people with personality profiles that increase their risk of substance use and mental health problems, including aggression (Conrod et al., 2013). The Preventure program is a substance use prevention program that targets high-risk personality profiles of impulsivity, hopelessness, sensation seeking and anxiety sensitivity and

associated maladaptive coping strategies. Preventure utilises CBT and motivational interviewing through brief intervention to support young people to make connections between behaviours, emotions and cognitions. Young people are encouraged to identify and explore triggers for problematic behaviours related to their specific personality style, such as aggression and substance use (Conrod et al., 2013). The approach acknowledges that shared risk factors, such as situational and personality factors, influence both alcohol use and aggressive behaviour in adolescence, and targets them together. While the program has demonstrated effectiveness in reducing conduct problems, truancy, bullying and alcohol use (Castellanos-Ryan & Conrod, 2006; Conrod et al., 2006; Kelly et al., 2020), the impact of personality-targeted prevention for aggression has not yet been examined empirically.

Evidently, there is a significant gap in the literature regarding effective targeted prevention of alcohol use and violence among high-risk young people in Australia. There is currently insufficient evidence to confirm whether school-based programs targeting shared risk factors—such as harmful alcohol consumption—can also affect aggression and violence (Averdijk et al., 2020). Research that addresses this gap is critically needed to ensure young people are provided with avenues of support to develop into healthy, secure adults. Aggression and alcohol use are strongly related during the adolescent years, so it is most efficient to target both behaviours together and deliver prevention interventions early (Marcus, 2007d). There are significant potential cost benefits associated with the prevention of substance use problems and violent behaviour through school-based approaches, with some estimates suggesting savings of \$US42.13 for every dollar spent (Aos et al., 2011).

## **Summary and Aims of the Present Thesis**

Aggression and violence among young people are significant social challenges that require renewed, rigorous focus. The developmental approach examines individual-level trends that occur over the lifespan. Normative aggression (i.e., the expected or most common

trajectory) peaks in early childhood and declines throughout late childhood and adolescence (Nagin & Tremblay, 1999). Some young people show escalation in aggression and violence during adolescence and young adulthood (Farrington, 2009; Jennings & Reingle, 2012). Young people in the latter groups are at a higher risk of perpetrating violent behaviour into adulthood. Therefore, they should be provided with targeted support that is developmentally appropriate (Nagin et al., 1995). As demonstrated in this review, alcohol is strongly implicated in the commission of aggression and violence around the world, creating an enormous burden for social, health and justice systems. Lack of agreement around the nature and timing of the developmental relationship limits the relevance of current approaches to reduce harm. It is clearly important to build evidence around the nature and antecedents of hazardous alcohol use, aggression and violence during adolescence and young adulthood to prevent significant suffering in the community.

This review has identified several gaps in the literature, specifically: a lack of prospective studies examining the co-development of alcohol use and aggression; limited studies on the relative role of alcohol in youth violence; the lack of understanding of justice responses to alcohol-related violence among youth; and the lack of resulting effective evidence-based prevention responses that target both alcohol use and aggression early in life. This thesis aims to address these gaps through four original research projects. Each paper in the four succeeding chapters has been conducted and designed for publication in academic journals. However, the thesis is presented as a single body of work.

# **PAPER ONE: Is Adolescent Alcohol use Linked to Spikes in Aggressive Behaviour? A Growth Curve Analysis**

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Paper one has been published as: Lawler, S., Stapinski, L., Barrett, E., Newton, N., Sunderland, M., Slade, T. & Teesson, M. (2020). "Is adolescent alcohol use linked to spikes in aggressive behaviour? A growth curve analysis." Prevention Science 0 (0): 1–11.

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Siobhan Lawler

5 January 2021

## **Preamble**

The introductory chapter to this thesis has highlighted the interrelationship between hazardous alcohol use, aggression and violence in youth. As demonstrated, current knowledge is limited by inconsistencies in evidence denoting the interaction between hazardous alcohol use and aggression over the course of adolescence. Studies frequently find positive reciprocal (concurrent) associations however there is also documentation of directional prospective relations, indicating distinct developmental pathways. There is a real need to clarify the specific nature and timing of this relationship with specific focus on aggression to inform prevention and early intervention efforts. The following study aims to do just this.

## **Abstract**

**Objective.** A relationship between alcohol use and aggression is well established however less is known about how these factors develop and influence each other over time. This study examined the immediate and delayed effects of alcohol use on aggression during adolescence.

**Method.** Alcohol use and aggression were measured in a subset of students ( $n = 1,560$ ) from the Climate and Preventure study, Australia. Participants completed self-report surveys across five assessments (ages 13, 13.5, 14, 15 and 16). In a two-stage analysis, parallel and auto-regressive latent growth curve models were applied to investigate person-specific trajectories (or *between-person* effects) of alcohol use and aggression and identify the time-varying impact (or *within-person* effects) of alcohol use on aggression.

**Results.** Average alcohol consumption increased between ages 13 and 16, while average aggression levels decreased over time. Overall growth in alcohol use was positively related to heightened aggression at age 16, and vice versa. Spikes (time-varying increases) in alcohol use were linked to corresponding increases in aggression at each timepoint. There was evidence of a prospective effect where aggression was associated with hazardous alcohol use a year later, but no evidence that alcohol use was associated with subsequent aggression.

**Conclusions.** Change in hazardous alcohol consumption and aggression beginning early in adolescence are interrelated and are predictive of one another at age 16. The time-varying effects of alcohol on aggression appear to be immediate rather than delayed, however there is evidence for a prospective relationship where aggression influences later alcohol use. Implications for the timing and nature of novel harm reduction intervention approaches for young people are discussed.

## Introduction

Aggression is a common behaviour displayed by children and adolescents however it can also be a marker of more serious issues, including psychiatric disorders. Children may use aggression adaptively to express frustration or solve problems, and not necessarily with an intention to harm others. However, heightened and persistent aggression during adolescence can indicate delayed cognitive and developmental processes which hinder normal socialisation process (Buchmann et al., 2014). Aggressiveness peaks in early childhood and then declines throughout adolescence (Loeber et al., 1998) alongside the emergence of cognitive maturation indicators such as emotion regulation and delayed gratification (Röll et al., 2012; Tremblay et al., 2004). As young people become more socially aware, most ‘grow out’ of aggressive behaviours and adopt alternate skills to solve problems and achieve goals (Huesmann et al., 2009; Tremblay, 2000). Despite this overall downward trend in aggression and average pattern of desistence in problem behaviour during adolescence, a minority of high-risk adolescents demonstrate a persistence in such behaviours (McGee et al., 2015; Moffitt et al., 2002). A number of potentially modifiable risk factors or ‘*snares*’ (Moffitt et al., 2002) have been identified that interfere with the normal desistence in problem behaviours typically observed across a population level. These include involvement with the criminal justice system, early parenthood, victimisation, early school dropout and alcohol and other drug use (Hussong et al., 2004).

Alcohol is the drug most implicated in aggressive behaviour and violent crime (Tomlinson et al., 2016) with estimates it is directly linked to at least one-third of all violent crimes committed (Payne & Gaffney, 2012). Theories that explain the mechanism through which alcohol leads to aggression outline the causal or disinhibiting effects of the drug (i.e., psychopharmacological), people’s expectations of acceptable behaviour when drinking (i.e.,



social, cultural, environmental contextual) and underlying vulnerabilities, such as personality, temperament and pre-existing conditions (i.e., individual) (Bushman, 2002; Heinz et al., 2011). A review of 167 studies indicated a significant, positive, dose-dependent relationship between alcohol use and aggression (Kuypers et al., 2018; Tomlinson et al., 2016) however the majority of this research has examined adult rather than adolescent samples. Previous research on aggression in young people has prioritised incarcerated, treatment and single gender samples (Walters, 2014; White et al., 2013) and while these populations provide important insights into the more vulnerable or high-risk young people, it is vital to examine the development of aggression and co-occurring risk behaviours among adolescents in the general community. Relatively few studies have closely examined the co-development of alcohol and aggression in adolescence and these findings have been mixed. While some demonstrate a positive reciprocal relationship (Huang et al., 2001; Scholes-Balog et al., 2013) others show evidence for a unidirectional relationship, where increased alcohol use predicts later aggression or vice versa (Conegundes et al., 2020; Najman et al., 2019; White, 2002). Other studies suggest that a direct prospective relationship between alcohol and aggression in adolescence is at best weak and unlikely after accounting for shared risk factors (McNaughton Reyes et al., 2012; Scholes-Balog et al., 2013; White, 2002). Recent work examining psychopathic traits (Hawes et al., 2015) and antisocial behaviour (Hammerton et al., 2017) more broadly have emphasised the importance of distinguishing between stable (*between-person*) and time-varying (*within-person*) effects of alcohol use. A critical gap in the current evidence base is disaggregating the stable and time-varying associations between alcohol use and aggression among young people (Hussong et al., 2004). Initiatives aimed at intervening early to reduce heightened aggression have significant potential to prevent harm, however these efforts need to be developmentally appropriate and informed by evidence. This research will be the first to identify developmental windows for intervention by exploring the time-varying impact of alcohol use on aggressive behaviour among Australian adolescents. This study has two aims, firstly, to examine how

alcohol use in mid-adolescence is related to the development of aggression and secondly, to examine the time-varying relations (within-person) between alcohol use and aggression during this critical life stage.

## **Methods**

### **Study design**

Participants were a subset of the sample of the Climate and Preventure (CAP) Study, a large Australian cluster randomised controlled trial of school-based substance use prevention (Newton et al., 2012). The original CAP study included 26 schools however the current study examined students from the 17 independent schools (median number of students per school = 95) as students from public schools did not complete aggression measures due to restrictions in ethical requirements. The study cohort included students who had received drug education as usual (control group) and students who received a universal, selective or combined (universal + selective) drug prevention program. While universal drug prevention programs are delivered to everyone regardless of risk, selective programs are targeted towards young people who meet specific criteria (i.e. high risk). In the combined intervention, both the universal (Climate Schools) and selective (Preventure) interventions were delivered to all young people. The trial outcomes have been published elsewhere (Teesson et al., 2017) and intervention effects were not investigated in the current study; however type of drug education received was included as a covariate in all analyses to control for any potential intervention effects on student alcohol use or aggression<sup>2</sup>. Participants completed a baseline assessment and follow-up assessments at six months, one year, two years and three years post intervention. The current study analyses data across five time points from the first follow-up at baseline (Time 1, age 13) to the third year follow-up (Time 5, age 16). Participation in the study was voluntary and students who provided consent and parental consent completed self-

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<sup>2</sup> To assess any impact of the intervention on study results, a sensitivity analysis was performed with principal analyses run again within the control sample only.

report questionnaires about their mental health and substance use in a classroom setting.

Ethical approval was obtained through the UNSW Human Research Ethics Committee (HC 11274).

## **Measures**

### ***Demographic information***

Socio-Economic Status was operationalised through the Index of Community Socio-Educational Advantage (ICSEA). ICSEA scores are calculated based on a number of factors including socio-economic census characteristics (e.g., location and education) where higher scores indicate high comparative advantage with an average score of 1,000 across Australian schools. ICSEA scores allow for meaningful comparisons among schools with similar students and translate to the socio-economic background of students attending a school rather than a rating of the school itself. Intervention type was operationalised as a binary variable specifying whether students had received a drug prevention intervention (i.e., Climate Schools, Preventure, or Climate + Preventure combined) or no intervention (i.e., Control).

### ***Aggression***

Aggression is measured using the self-report Reactive–Proactive Aggression Questionnaire (RPQ) (Raine et al., 2006). The brief scale consists of 23 questions (range 0–46) including 11 reactive aggression items (“damaged things because you felt mad”) and 12 proactive aggression items (“had fights to show who was on top”) to which there are three potential responses coded as 0 (never), 1 (sometimes), or 2 (often). The scale has been extensively validated as reliable among school-aged children across different cultures and settings (Fung et al., 2009). Scores are summed to provide measures of reactive, proactive and total aggression with higher scores indicating higher levels of aggression (Raine et al., 2006). In the current study, internal reliability for the scale was strong (Cronbach alpha = 0.92). For the purposes of this analysis a total (composite) score was used.

### ***Alcohol use***

Young people in the intervention were provided with a Standard Drinks Guide Chart which provided a summary of the approximate number of standard drinks in different alcoholic beverage categories. Alcohol use was measured using three items aligned with the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) (Bush et al., 1998), a modified three item version of the original 10 item Alcohol Use Disorders Identification Test (AUDIT) scale (Bradley et al., 1998). The three items measured *alcohol use quantity* (standard drinks), coded as 0 (none), 1 (1–2), 2 (3–4), 3 (5–6) and 4 (7+), *alcohol use frequency* was coded as 0 (never), 1 (less than monthly), 2 (2–4 times a month), 3 (2–4 times a week) and 4 (4 or more times a week) and *binge drinking frequency*, coded as 0 (never), 1 (less than monthly), 2 (monthly), 3 (weekly) and 4 (daily or almost daily) in the previous six months. The total maximum score for the three questions is 12.

### **Statistical analyses**

This study builds on previous research (Curran et al., 2014; Hammerton et al., 2017; Hussong et al., 2004; McNaughton Reyes et al., 2012) to estimate the relationship between alcohol use and aggression using a two-stage analysis. Descriptive statistics were performed in the statistical analyses package Stata version 15. A parallel latent growth curve analysis was applied, followed by an Auto-regressive Latent Growth Curve Model with Structured Residuals (ALT-SR). The ALT-SR model enables the unambiguous disaggregation of between-person (person-specific) and within-person (time-varying) change in the key relationships of interest. It provides evidence of the strength of association between constructs in two ways: firstly, relative to what would be expected based on the average patterns of alcohol use and aggression among young people in the sample (taking into account individual covariates such as gender) i.e. *between-person* effects, and secondly, whether the strength of the association varies across different points in time i.e. *within-person* effects (Curran et al., 2014). This combined approach was applied to map individual trajectories of alcohol use and aggressive behaviour and determine whether alcohol use influences the development of

aggression over and beyond what would be expected, using all the available information, accounting for covariates of gender and socio-economic status (SES) and intervention type. Model parameters were estimated using Mplus version 8 (Muthén & Muthén, 2017).

### ***Part 1 – Parallel latent growth curve modelling of alcohol and aggression***

As a first step, aggression and alcohol use were modelled in separate growth models across five time points (age 13–16) with covariates of gender, SES and intervention type. Latent growth analysis models average patterns of change over time by estimating two latent growth parameters, the “intercept” which represents levels at a particular point of the growth curve, and the “slope” which represents the growth or rate of change over time. Once separate aggression and alcohol growth models were established, these were combined in a parallel process growth model to estimate the associations between the growth parameters of each variable. Previous research has found mixed evidence that trajectories of risk behaviours such as alcohol use during youth can be explained by both linear quadratic patterns of change over time (Brodbeck 2013). Therefore, models that included linear and quadratic (non-linear) growth terms were compared to identify the best fitting model according to goodness of fit indices (Hu & Bentler, 1999).

### ***Part 2 – Auto-regressive Latent Growth Curve Model with Structured Residuals (ALT-SR)***

Part two of the analysis plan applied the Auto-regressive Latent Growth Curve Model with Structured Residuals (ALT-SR) approach as parameterised by Curran and colleagues (2014). The model is flexible and works by regressing the observed repeated measure of a dependent variable (in this case, the residuals for aggression) on the time-varying residuals for repeated alcohol use across the five time points (ages 13, 13.5, 14, 15, and 16). The size of the residual at each measurement occasion represents a time-varying estimate of the deviation between the observed measure (i.e., scores on AUDIT-C aligned items) and the latent variable trend (underlying growth trajectory in alcohol use). The model accounts for individual

variability in alcohol use and aggression at each time point to determine whether high levels of alcohol use account for corresponding spikes in aggression, over and above what would be expected based on that person’s *predicted* trajectory of aggression (Curran et al., 2014; Hussong et al., 2004), taking into account factors affecting this trajectory such as gender, socio-economic status and whether they received a classroom intervention. Time-varying relations (within-person effects) are distinct from the between-person effects observed on the individual level. There was a six-month time interval between Time 2 and Time 3 (0.5 loading) whereas the time interval between Time 3, Time 4 and Time 5 was 12 months (1.0 loading). Growth curves were modelled using reverse time loadings so that the intercept (i.e., value of  $y$  where time = 0) represented the last time point, time 5 (age 16). Therefore, the time intervals were coded as follows:  $-3$  (Time 1, age 13);  $-2.5$  (Time 2, age 13.5);  $-2$  (Time 3, age 14);  $-1$  (Time 4, age 15);  $0$  (Time 5, age 16). This approach was taken to explore the key hypotheses about how growth parameters of each variable are associated with later aggression and hazardous alcohol use at the final time point at age 16.

### ***Clustering, missing data and model fit***

Clustering at the school level can affect standard error estimation, therefore to examine the extent of between-cluster variation for each dependent variable the intraclass correlation coefficient (ICC) was calculated using Stata version 15 (Crespi, 2016). The ICC included all 17 Independent schools. This indicated minimal clustering for the key model variables (ICCs  $< 1\%$  for alcohol,  $< 3\%$  aggression) (Lee, 2000).

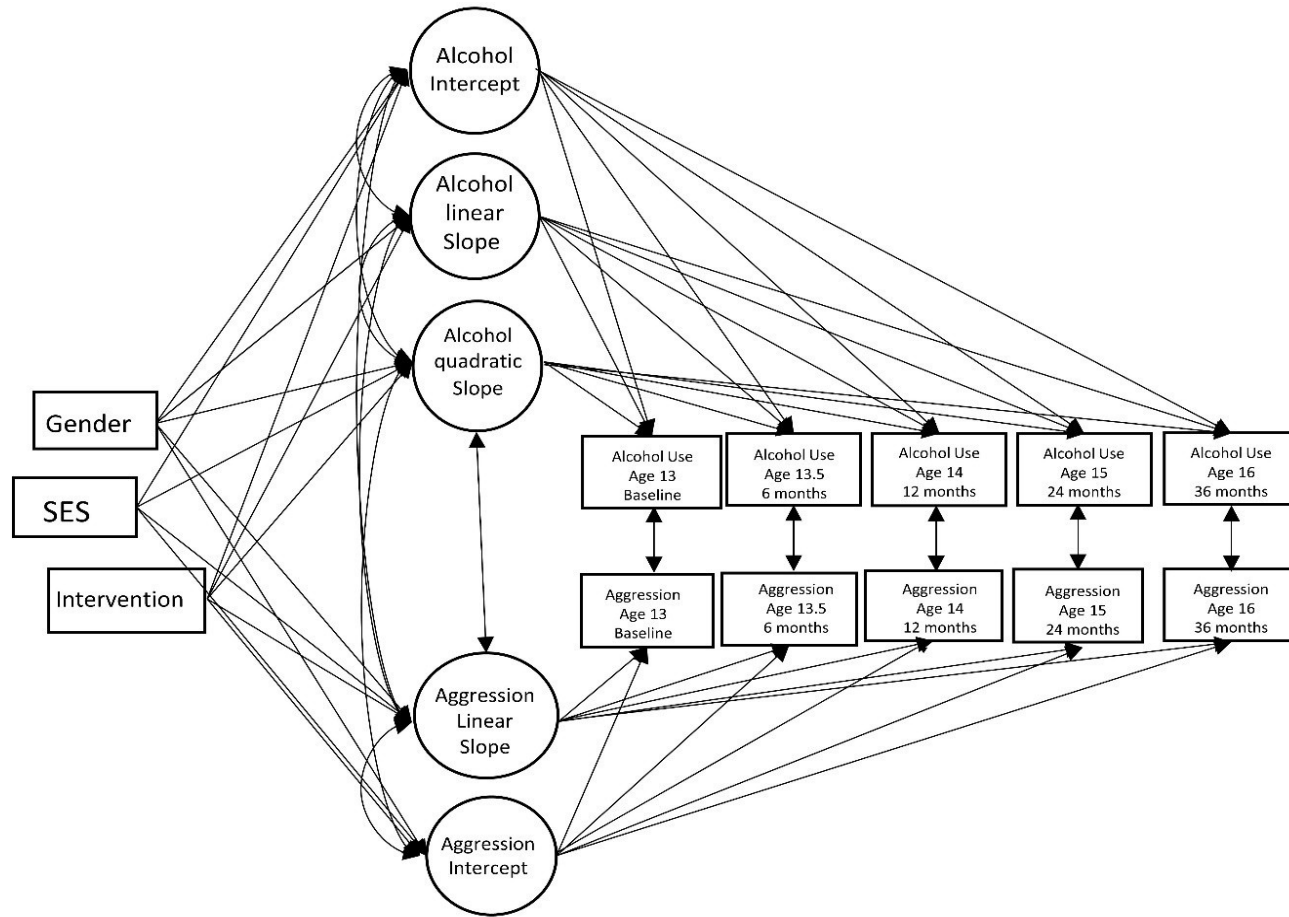
In the parallel growth model missing data were accommodated using full information maximum likelihood estimation (FIML) using maximum likelihood estimation with Robust standard errors (MLR) in Mplus under the assumption that missing values are Missing At Random (MAR) (Enders & Bandalos, 2001). Data for missing individuals were estimated based on the observed covariates and outcomes in the model and were assumed to be independent of other unobserved variables. The MAR assumption was considered plausible as

the analysis included multiple previous measurement occasions for key study variables and covariates predictive of incomplete variables and/or missingness. All individuals with data from at least one time point were included in the analysis ( $n = 1,560$ ) and participant retention was high throughout the follow-up period, averaging at 79% across the four time points.

Model fit was assessed using goodness of fit indices. A non-significant chi-square value ( $p > 0.05$ ) indicates good model fit; however, chi-square is sensitive to sample size and therefore it has been recommended to consider alternative model fit indices (Schumacker & Lomax, 2010). Due to this, various other model fit indices and cut-off values were considered to identify a good fitting model. These include a Root Mean Square Error of Approximation (RMSEA) of less than 0.06, Standardised Root Mean Square Residual (SRMR) of less than 0.08 and Tucker-Lewis index (TLI) and Comparative Fit Index (CFI) that are greater than 0.90 (Hair et al., 2010; Hu & Bentler, 1999). Unconditional and conditional models were compared with and without covariates included in the models and the model with the smaller Akaike and Bayesian Information Criterion (AIC/BIC) indicated the more parsimonious model (Browne & Cudeck, 1992).

**Figure 2.1**

*Parallel Latent Growth Curve Model of Hazardous Alcohol Use and Aggression*





## Results

### Sample characteristics

Just over half of the sample was male (59.84%) and the mean age of participants at the first measurement occasion (Time 1) was 12.94 years ( $SD$  0.45). Participants in the study came from above average socio-educational backgrounds according to the ICSEA scores ( $M = 5.80$ , range  $(-109 - 66, SD 53.21)$ ). A total of 1,636 (100%), 1,292 (79.0%), 1,352 (82.6%), 1,319 (80.6%) and 1,198 (73.2%) participants were retained from baseline to follow-up at six months, 1 year, 2 years and 3 years, respectively. Higher follow up rates were obtained at the one year follow up compared to the six-month follow up occasion. In the final analysis, 95% of participants ( $n = 1,560$ ) were included. Further details about the full CAP sample characteristics can be found elsewhere (Newton et al., 2012).

Attrition occurred when students were absent from school on the day of the survey or if they were unable to provide their account details. The vast majority of students (92.6%) completed surveys on more than one follow-up occasion. Attrition analyses were conducted to assess differences between students who had completed surveys on less than two follow-up occasions vs. those who had more complete data. On average, individuals with less complete data had higher scores on baseline alcohol use ( $t(210.6) -3.022, p = 0.003$ ) and aggression ( $t(180.4) -4.342, p = 0.000$ ), and were more likely to be male ( $t(250.3) 2.9, p = 0.004$ ), to not have received an intervention ( $t(277.4) -4.708, p = 0.000$ ) and to attend a school with a lower ISCEA (SES) ranking ( $t(198.3) 5.834, p = 0.000$ ).

### *Model fit*

In the first phase of the model building, linear and quadratic parallel process growth models were compared to identify the best fitting model for the data. The quadratic model provided the best fit for modelling alcohol use over time. Model fit was good for both the linear and quadratic models of aggression, however the linear model for aggression was selected for parsimony and given a non-significant quadratic slope for aggression (see

Supplementary Table [S1](#) for fit indices). In the second phase, the time-varying residuals of each of the observed repeated measures were included in the ALT-SR model which also demonstrated good fit to the data.

**Table 2.1***Mean Scores Alcohol Use and Aggression Over Time*

Variable	Age	Obs	Mean	<i>SD</i>	Min	Max	Male <i>M</i>	<i>SD</i>	Female <i>M</i>	<i>SD</i>
Hazardous alcohol use	13	1630	0.37	1.11	0	12	0.43	1.23	0.29	0.90
	13.5	1239	0.54	1.70	0	12	0.67	2.02	0.38	1.21
	14	1322	0.56	1.61	0	12	0.65	1.88	0.43	1.15
	15	1294	1.25	2.25	0	12	1.30	2.38	1.18	2.06
	16	1142	2.21	2.89	0	12	2.12	3.02	2.33	2.72
Aggression	13	1523	7.86	7.01	0	46	8.92	7.52	6.36	5.91
	13.5	1114	7.14	7.84	0	46	8.01	8.60	6.11	6.70
	14	1205	7.16	8.38	0	46	8.19	9.42	5.85	6.60
	15	1254	7.02	8.04	0	46	7.68	8.65	6.07	6.97
	16	1084	6.50	8.04	0	46	7.58	8.98	5.18	6.46

*Note.* Alcohol use items aligned with Audit-C scale including use, binge and harms.

## **Parallel growth in alcohol use and aggressive behaviour**

### ***Separate growth models for alcohol use and aggression***

This section outlines the relationships *within constructs* (e.g., how the rate of growth in alcohol use predicts alcohol use at age 16, how the rate of growth in aggression predicts aggression at age 16). Scores on alcohol and aggression had negatively skewed distributions, however MLR procedures were used which are robust to problems of non-normality. This approach was supported by sensitivity analyses exploring alternative model estimation (Poisson, zero-inflated and negative binomial models), which yielded results that were consistent with the findings of the MLR estimated continuous models (see Supplementary Table [S2](#)). Unconditional growth models of alcohol use and aggression across the five time points were run to examine univariate growth in each process separately. There was significant linear change over time in both alcohol use ( $r = 0.569$ ,  $SE\ 0.082$ ,  $p < .001$ ) and aggression ( $r = -0.217$ ,  $SE\ 0.077$ ,  $p < 0.01$ ). The quadratic term for alcohol use was significant and positive ( $r = 0.368$ ,  $SE\ 0.082$ ,  $p < 0.01$ ) indicating an accelerating increase in alcohol use over time. Linear growth in alcohol use from age 13–16 was positively related to alcohol use at age 16 ( $r = 0.757$ ,  $SE\ 0.051$ ,  $p < 0.001$ ) and linear growth in aggression from age 13 to 16 was positively related to aggressive behaviour at age 16 ( $r = 0.546$ ,  $SE\ 0.090$ ,  $p < 0.001$ ). There was significant variation in alcohol use ( $r = 0.857$ ,  $SE\ 0.047$ ,  $p < .001$ ) and aggression levels at age 16 ( $r = 1.104$ ,  $SE\ 0.060$ ,  $p < 0.001$ ).

### ***Parallel growth model***

This part of the analysis examined the relationships across constructs of alcohol and aggression, how alcohol predicts aggression and vice versa. Table [2.2](#) outlines how growth trajectories were affected by some covariates included in the model. Student’s SES significantly influenced change in alcohol use over time and severity of alcohol use and aggression at age 16. Gender and the intervention significantly influenced reported aggression at age 16.

Growth in aggression from age 13 to age 16 was positively related to alcohol use at age 16 ( $r = 0.551$ ,  $SE\ 0.124$ ,  $p < .001$ ). Linear growth in alcohol use from age 13 to 16 was positively related to aggressive behaviour at age 16 ( $r = 0.283$ ,  $SE\ 0.095$ ,  $p < .01$ ) indicating that the growth in alcohol use during adolescence predicted later aggression levels. There was a positive and significant relationship between alcohol use and aggression at age 16 ( $r = 0.590$ ,  $SE\ 0.057$ ,  $p < .001$ ). Growth in aggression was positively related to quadratic growth in alcohol use ( $r = 0.308$ ,  $SE\ 0.153$ ,  $p < 0.05$ ) such that increasing aggression over time is related to an acceleration of alcohol use at later time points. However, accelerated growth in alcohol use was not significantly related to increased aggression at age 16 ( $r = 0.065$ ,  $SE\ 0.105$ ,  $p > .05$ ). Results suggested that adolescent alcohol use and aggression develop in parallel: growth in alcohol use was positively related to growth of aggression during mid-adolescence ( $r = 0.525$ ,  $SE\ 0.139$ ,  $p < .001$ ).

**Table 2.2***Parameter Estimates of Covariates on Latent Growth Factors for Final Growth Models*

Covariates on latent growth factors	Intercept $\beta$ (SE)	Linear slope $\beta$ (SE)	Quadratic slope $\beta$ (SE)
Effects on alcohol use			
Gender	-0.064 (0.04)	0.008 (0.04)	0.034 (0.05)
SES (ICSEA)	0.140 (0.04)***	0.154 (0.06)**	0.136 (0.06)*
Intervention type	-0.061 (0.03)	-0.068 (0.04)	-0.049 (0.04)
Effects on aggression			
Gender	-0.117 (0.39)**	-0.011 (0.06)	-
SES (ICSEA)	-0.074 (0.05)	0.045 (0.07)	-
Intervention type	0.065 (0.06)*	-0.045 (0.06)	-

*Note.* Parameter estimates are standardised coefficients.

\*\*\*  $p < .001$ ; \*\*  $p < .01$ , \*  $p < .05$

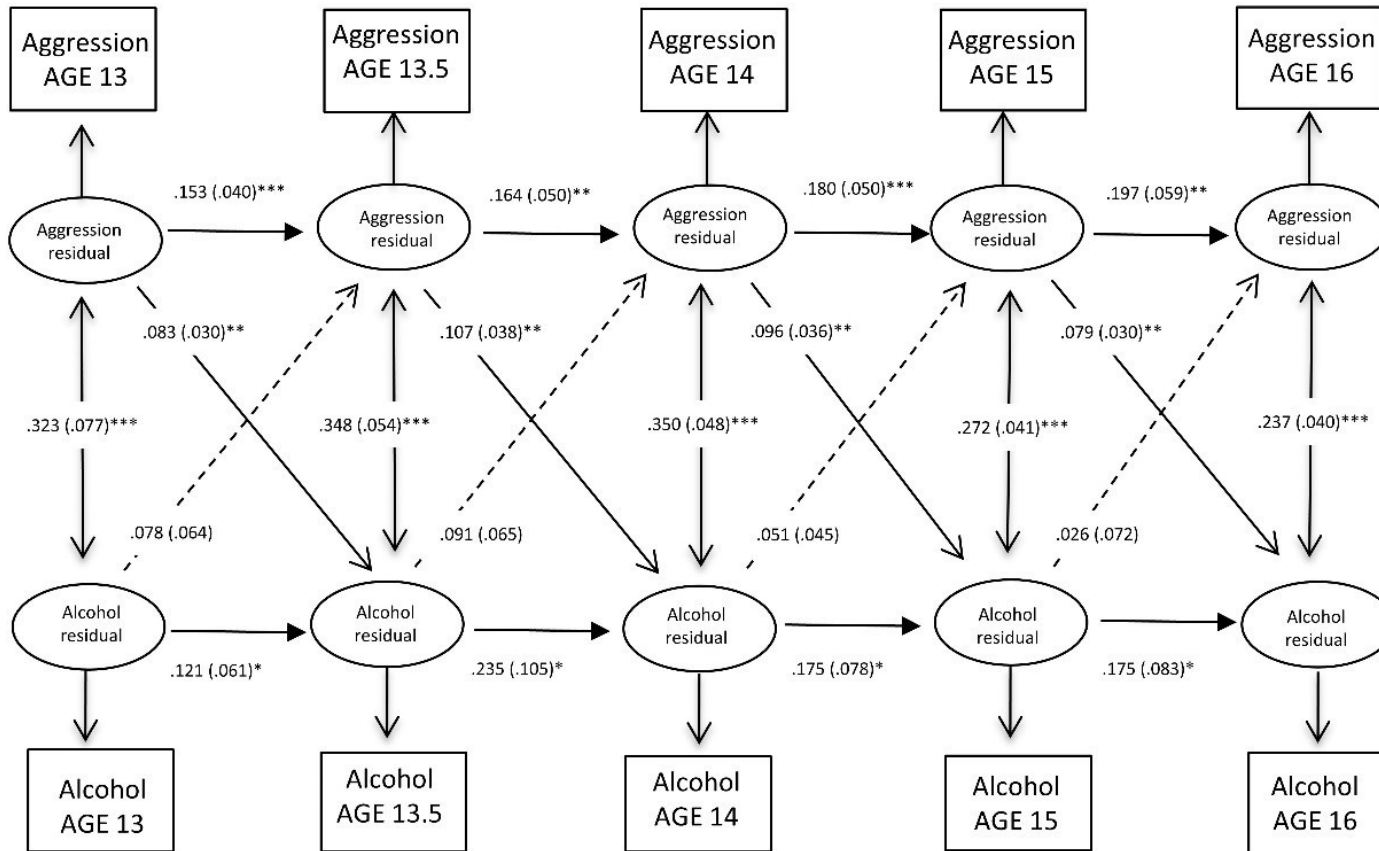
***Final auto-regressive latent growth curve model with structured residuals (ALT-SR) model***

This part of the analysis aimed to capture the relationship between alcohol use and aggression after accounting for the overall growth trajectories of each construct. The size of the residual at each measurement occasion represents deviations at each time point from the person-specific predicted growth trajectory in alcohol use/aggression from age 13 to 16. There were significant concurrent associations between deviations (structured residuals) for alcohol use across all five observation occasions. At each time point (age 13, 13.5, 14, 15 and 16) increases in alcohol use were associated with concurrent increases in aggression.

The strength of these associations varied significantly across measurement occasions (Wald test: 12.84 (4),  $p < .05$ ) where the strength of the association increased from age 13 to age 14 and then decreased again from age 15 to age 16. The strongest association was observed at the third measurement occasion (age 14) (see Figure [2.2](#)). There was also evidence of a unidirectional prospective effect, where spikes in aggressive behaviour at one time point predicted spikes in hazardous alcohol use at the subsequent time point, i.e., 6 months (age 13, 13.5 and 14) or 12 months (age 14, 15 and 16) later. However, there was no evidence of an association between spikes in alcohol use at any specific point in time with spikes in aggression levels at the following time point. This indicates that the time-varying effect of alcohol on aggression among young people is immediate rather than delayed and that the developmental relationship is one where heightened aggression predicts subsequent hazardous drinking but not the other way around.

**Figure 2.2**

*Auto-Regressive Latent Growth Curve Model with Structured Residuals (ALT-SR) Model*



\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$



## Sensitivity analyses

As the sample cohort included some students who received a drug prevention program, a sensitivity analysis was run in Mplus to repeat the primary analyses with only students in the control condition ( $n = 432$ ), who received standard school drug education and no intervention. Results were compared to the principal results with the entire sample ( $n = 1560$ ). The robustness of the findings was corroborated in growth models examining the control group only, as similar relationships were found in the main outcomes of interest although there was less power to detect effects leading to poorer model fit and convergence issues. In view of the negatively skewed alcohol data, further sensitivity analyses were run to confirm the robustness of the MLR continuous models to violations of non-normality (Muthén & Muthén, 2017). Poisson, Zero-Inflated Poisson (ZIP) and negative binomial models were applied to each unconditional parallel latent growth curve trajectory. The ZIP model for alcohol and the negative binomial model for aggression demonstrated good fit to the data (see Supplementary Table [S2](#)) and produced a pattern of results that aligned with those produced by the MLR estimated models. Given the consistency across estimation methods, continuous models estimated using MLR were retained given this method is most suited for modelling individual variability in the growth trajectories using the ALT-SR framework.

## Discussion

This study is the first to examine the person-specific and time-varying effects between hazardous alcohol use and aggression among Australian adolescents. The analysis strategy employed here and proposed by Curran and colleagues (2014) allowed for the *separation* of these effects which previous studies have not been able to fully capture. Examining the relationship between alcohol use and aggression during adolescence involves measuring typically opposing processes of change (declining aggression, increasing alcohol use) that interact in complex ways. These findings suggest a clear relationship between alcohol use and aggression during adolescence. These processes influence each other in the short-term, the

long-term and in both directions across this important developmental period. Spikes in aggression predicted subsequent spikes in hazardous alcohol use, growth in alcohol use led to heightened aggression at age 16 and there was a reciprocal concurrent relationship between alcohol and aggression at each time point. Consistent with representative Australian national survey data (Lam et al., 2017), young people in this study significantly increased their alcohol use over time. The analysis indicated a positive quadratic growth trend in hazardous alcohol use from age 13 to 16, suggesting an acceleration in the increase in the rate of use at the later measurement occasions (ages 15 and 16). Increases in alcohol use during adolescence are expected at the population level and the findings here support previous longitudinal research (Hemphill et al., 2014; Huang et al., 2001). A positive quadratic trend for alcohol use is also in line with evidence that alcohol use increases during adolescence and peaks in late adolescence/early adulthood when the purchase of alcohol becomes legal (age 18 in Australia) (Britton et al., 2015). A consistent declining trend in reported aggression is also supported by theory that aggressive behaviour accompanies hormonal changes peaking in late childhood and then declining throughout adolescence (Tremblay et al., 2004).

The findings here, that increases in alcohol use were related to concurrent spikes in aggression and growth in alcohol was related to aggressive behaviour at age 16, are consistent with the *snare hypothesis* (Moffitt et al., 2002) that heavy alcohol and other drug use can effectively ensnare young people into antisocial pathways by creating short-term increases in antisocial behaviour. This occurs during a time when most young people would show desistence in aggression and other antisocial behaviour (Hussong et al., 2004). Naturalistic and experimental research examining the acute effects of alcohol suggest that high doses of alcohol can precipitate heightened aggressive behaviour (Rothman et al., 2012) particularly among men and people who have a history of behavioural problems (Tomlinson et al., 2016). Laboratory studies involving alcohol administration demonstrate the probability of becoming aggressive increases by 6% for every .01% increase in blood alcohol content (Quinn et al.,

2013) and coronial data show how alcohol intoxication increases the risk of being both a victim and a perpetrator of violence (Pilgrim et al., 2014). Evidence for a dose-dependent relationship support psychopharmacological theories of alcohol and aggression, however a disinhibition model has been shown to be inadequate to explain the complexity of the effect that alcohol has on some individuals (Miczek et al., 1994). Furthermore, the concurrent relationship between alcohol and aggression identified here should be interpreted with caution. As hazardous alcohol use is indicated by retrospective reports within the previous six months, this study is not able to provide true representation of the immediate effect of alcohol on aggression or vice versa.

More sensitive measures of alcohol use and aggression such as ecological momentary assessment is required to examine the interaction of these processes in real time (Shiffman et al., 2008). While this bias is associated with most self-report studies of this nature, it is acknowledged that evidence of an immediate effect may instead be signaling a delayed effect.

In addition to revealing that growth in alcohol use predicted later aggression as well as reciprocal associations between alcohol and aggression, this study found that heightened aggression at age 13, 13.5, 14 and 15 predicted corresponding increases in hazardous alcohol use at the subsequent measurement occasion. While an overall positive association between alcohol and aggression levels is consistent with previous research (Tomlinson et al., 2016) few studies have demonstrated conclusive evidence for a prospective link (Huang et al., 2001). The finding that aggression predicted subsequent alcohol use supports previous work examining Australian young people (Scholes-Balog et al., 2013; Young et al., 2008). However, similar studies of American youths identified no prospective relationship between physical aggression and subsequent alcohol use (McNaughton Reyes et al., 2012; Swaim et al., 2004). It is possible these differences relate to how alcohol use and aggression are defined and measured. The prospective relationship may be more likely when alcohol use is hazardous or severe, and when broader conceptualisations of aggression are examined compared to contextual and specific definitions i.e., dating violence (McNaughton Reyes et al., 2012) or aggressive anger

expression (Swaim et al., 2004). It may be that a self-medication model is suitable to explain the direction and nature of this effect, where young people who experience negative emotional states may drink alcohol at increased levels in attempt to soothe aggressive tendencies or cope with feelings of distress (Khantzian, 1985; White, 2002). Past research has suggested that that young people may get negative reinforcement from alcohol use which then influences escalation in frequency and quantity of use (Colder et al., 2002). While there is evidence for the self-medication hypothesis among incarcerated adolescents (Esposito-Smythers et al., 2008) and young people with histories of trauma and antisocial behaviour generally (Garland et al., 2013), a review of the research examining drinking motives concluded that aggressive young people tend to drink for enhancement rather than coping motives (Kuntsche et al., 2005).

The analysis revealed that the strength of the concurrent association between alcohol and aggression was highest in early adolescence (age 13–14) and then decreased in mid-adolescence (see Figure [2.2](#)). This is despite a positive quadratic trend indicating accelerating hazardous alcohol use at ages 15–16. Shared risk factors and clustering of antisocial behaviours may explain why the relationship between alcohol and aggression is strongest in early adolescence. Previous research has found that the nature of peer relationships, specifically those characterised by rejection and delinquency, are important mediators influencing the relationship between early aggression and later substance use. This pathway is one where higher levels of aggression are associated with higher levels of peer rejection, and thereby predict subsequent peer delinquency and substance use (Fite et al., 2007). This mediational chain of events supports the theory that young people who are more aggressive may be pushed into associating with deviant peers and social networks where heavy drinking is normative and encouraged (White, 2002). Efforts to support aggressive young people who use alcohol should also focus on skill development in a range of areas including peer relationships, school performance and attachment, communication, problem-solving, emotional regulation and coping with difficult emotions (Botvin et al., 2006; Newton, Stapinski, Teesson, et al., 2020).

While our study found some evidence for a prospective effect of alcohol use on later aggression (increased growth in alcohol use during adolescence predicted heightened aggression at age 16), increasing alcohol use at one time point did not predict heightened aggression at the following time point. In line with these findings, Hammerton and colleagues (2017) too found that increases in alcohol use did not predict antisocial behaviour at adjacent time points during adolescence. However, they did find prospective effects for alcohol use on subsequent antisocial behaviour during young adulthood (ages 18–21). Further building on the work of Hammerton and colleagues (2017) it would be worthwhile extending on the current study to examine changes into early adulthood (i.e., age 18 to 25). Future study designs would also be strengthened by corroborative data such as accounts from teachers, parents or criminal records obtained through the criminal justice system. These recommendations notwithstanding, this study contributes to a broader literature investigating how early aggression and antisocial behaviour are predictive of later alcohol use and related problems.

### **Limitations and Directions for Future Research**

The study has some limitations that must be acknowledged. In the current sample almost three-quarters (73.6%) of participants received a classroom intervention aimed at preventing and reducing alcohol harms among young people. While it would have reduced complexity to use the control sample only it was not feasible due to the limited sample size. However, we are reassured by the low ICCs and sensitivity analyses within the control group only which show that the results are consistent across and representative of both groups. It is a limitation of the study that young people who were lost to follow up were more likely to be male, drink alcohol and score higher on aggression. This is a well-known challenge for drug prevention trials such as these (Vogl et al., 2009) and may be a source of bias in the follow up sample. However, FIML was employed in all models to estimate missing responses and this has been found to produce unbiased results under the assumption that data is missing at random. Further, the study could be improved by the inclusion of additional time-varying

covariates such as parenting and socialisation indicators (Kendler et al., 2018). Reliance on self-report data can be construed as a limitation despite being established as a reliable indicator for these constructs (Brenner et al., 2003). Finally, perhaps the most pressing challenge of longitudinal research is attrition. In the current context, this is the loss of individuals who on average scored higher on the constructs of interest, were more likely to be male, to have received no intervention and to have attended a school with a lower ISCEA (SES) ranking. To address the potential biases that can result from missing data, maximum likelihood estimation was employed for all analyses.

Despite these limitations, this study uniquely contributes to the literature by employing recent advances in statistical modelling to disaggregate the influence of alcohol use on aggression in a longitudinal study of Australian adolescents. The results demonstrated that change in hazardous alcohol use and aggression over time were interrelated, a finding carrying important implications for intervention. It is important to determine the feasibility of preventing or reducing alcohol harms and aggression through universal or targeted school-based programs. Programs that are effective in reducing the frequency and prevalence of binge drinking may have secondary effects in reducing aggressive behaviour among young people, and vice versa. Past research shows potential for targeting multiple risk factors including substance use, aggression and violence in the classroom (Botvin et al., 2006; Hahn et al., 2007), however this is yet to be demonstrated among Australian young people.

## **Conflict of Interest Statement**

Professor Teesson and Associate Professor Newton are co-directors and developers of Climate Schools Pty Ltd, an Australian company set up in 2015 to distribute the online Climate Schools programs. Ms Lawler, Dr Stapinski, Dr Barrett and Associate Professor Slade declare that they have no potential conflicts of interest.

## **Acknowledgments**

This research was funded by the National Health and Medical Research Council project grant (APP1004744). Ms Siobhan Lawler has received funding through the UNSW Scientia PhD Scholarship Scheme and the Matilda Centre PhD Scholarship.

## **Ethical Approval**

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee (UNSW HC11274) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

## **Clinical Trial Registration Information**

The CAP Study: Evaluating a Comprehensive Universal and Targeted Intervention Designed to Prevent Substance Use and Related Harms in Australian Adolescents;  
<http://www.anzctr.org.au/>; ACTRN12612000026820.

## **Informed Consent**

Informed consent was obtained from all individual participants included in the study. Associate Professor Tim Slade, Dr Matthew Sunderland and Dr Lexine Stapinski served as the statistical experts for this research.

**PAPER TWO: Unpacking Violent Behaviour in Young Adulthood:  
The Relative Importance of Hazardous Alcohol Use**

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Paper two was submitted for review in the Journal of Interpersonal Violence in  
December 2020.



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Siobhan Lawler

5 January 2021

## **Preamble**

The introduction and the first empirical study (paper 1) in this thesis have demonstrated that hazardous alcohol use has a significant influence on aggression and violence, developmentally and acutely. Hazardous alcohol use and aggression are behaviours that share numerous underlying risk factors, which naturally cluster and interact with each other. Few studies have examined the relative role of hazardous alcohol use on violence among young adults after accounting for other influences such as early adversity, personality risk factors and mental health symptoms. This lack of understanding negatively impacts the relevance and identification of interventions for this group, with limited effective options currently available. The following paper addresses this gap in the evidence by examining the relative influence of hazardous alcohol use on violent behaviour in young adulthood, after accounting for sociodemographic factors, adverse childhood experiences, impulsivity and psychological distress.

## **Abstract**

**Objective:** Young adulthood is an important developmental period for investigating the nature of violent behaviour. This study examines the unique contribution of alcohol use to violence perpetration among young adults in the Australian community.

**Method:** Cross-sectional, self-report data were collected from 507 young adults aged 18–20 years in the Australian general community via an online survey. Hierarchical logistic regressions examined the relative and independent contribution of adverse childhood experiences, impulsivity, psychological distress and hazardous alcohol use to past-year violent behaviour.

**Results:** One in eight young adults aged 18–20 (13%) reported at least one act of violent behaviour in the past year, primarily assault perpetrated against another person. Multivariate logistic regression identified that after controlling for other risk factors, the number of adverse childhood experiences reported and hazardous alcohol use were independently and positively associated with increased odds of reporting violent behaviour in young adulthood.

**Conclusions:** These findings demonstrate that adverse childhood experiences and hazardous alcohol use are important, independent correlates of violent behaviour in young adults. While preventing early adversity is key for reducing violence in the community, this evidence suggests that it is also important to target proximal causes such as hazardous alcohol use. Increasing early and widespread access to evidence-based, trauma-informed violence-prevention programs targeting risk factors across multiple settings is critical for reducing harm and supporting young people into healthy adulthood.

## **Introduction**

It is difficult to quantify the toll that violence takes on individuals, families, societies, and communities around the world, not just physically but psychologically, emotionally, relationally, intergenerationally and economically. The costs of violence are far higher than prevalence estimates would suggest. For example, a single homicide incident in Australia is estimated to cost \$2.7 million which is not accounting for the impact on the dependants, family members and friends of victims and offenders (Smith et al., 2014). Experiencing and surviving violence is also associated with an increased risk of adverse outcomes including depression, anxiety and post-traumatic stress disorder (Lagdon et al., 2014), violence perpetration and imprisonment (Barrett et al., 2011), suicide attempts, substance use problems, risky sexual behaviour, hospitalisations and future violent victimisation (Turanovic & Pratt, 2015).

Young adulthood is a distinct developmental period characterised by significant life changes, including increased independence, maturity, responsibility and autonomy (Bonnie et al., 2014). While for some it can be a time of desistance from antisocial behaviour (Stolzenberg & D'Alessio, 2008; Stouthamer-Loeber et al., 2004), for others it can be a stage of life where criminal trajectories are established, exacerbated and maintained (Basto-Pereira & Farrington, 2019). Adolescents and young adults are at high risk of experiencing and engaging in violent behaviour (Australian Institute of Health and Welfare, 2017; Farrington, 1986). Alongside illicit drug offences, acts intended to cause injury are the most common principal offence proceeded against by police in Australia (20%) with the largest proportion of offenders aged between 20 and 24 years (Australian Bureau of Statistics, 2020). Evidence suggests that one in seven (16%) 19- to 20-year-olds were in a physical fight in the past year, with higher rates among males compared to females (25% vs 9%, respectively) (Smart et al., 2003, pp. 46). Given the increased propensity for violence during this transitional life stage, it is critical to

understand the key risk factors that contribute to violence perpetration during young adulthood (Fougere et al., 2013; Smart et al., 2003).

Youth violence is predicted by individual (i.e., impulsivity), family (i.e., harsh parenting) and community (i.e., high crime neighbourhoods) risk factors (Grunseit et al., 2008). Current evidence on the nature of violent behaviour among young adults is lacking, as much of the existing literature has examined intimate partner violence (IPV) and dating violence specifically (Farrington et al., 2017). Studies examining intimate partner violence prevalence among young adults typically find high rates of bidirectional intimate partner violence (i.e., being both a perpetrator and victim of violence; 37–47%) and highlight the influence of childhood maltreatment (e.g., abuse and neglect) as a predictor of perpetrating and experiencing such violence (Renner & Whitney, 2012). Adverse childhood experiences are associated with negative health outcomes across physiological, cognitive and affective domains that in turn increase vulnerability to antisocial behaviour such as violence (Braga et al., 2017; Felitti et al., 1998; Hughes et al., 2017). These include reduced stress reactivity (cortisol, heart rate) and cognitive capacity, as well as difficulty with behavioural and emotional regulation, and impulsivity (Lovallo, 2013).

Alcohol is consistently and positively implicated in violent behaviour among young people and adults (Miller et al., 2015; Zhang et al., 1997), with between 30% and 70% of violent crime estimated to be alcohol-related (Briscoe & Donnelly, 2001b; Doherty & Roche, 2003; Poynton et al., 2005). Further, young people who binge drink are five times more likely to be violent compared to those who do not (Williams et al., 2009). This is concerning as young people aged 18–24 are most likely to exceed the risk guidelines for single occasion alcohol use (5 or more drinks, 41%) and one in seven (14.6%) report drinking more than 11 standard drinks on one occasion at least monthly (Australian Institute of Health and Welfare, 2019). Reviews of experimental studies confirm causal, dose-dependent associations between alcohol, aggression and violence but note the importance of individual and environmental

influences (Exum, 2006; Tomlinson et al., 2016). The relationship between mental health symptoms such as psychological distress and violent behaviour is less clear. Research suggests that rates of psychological distress (i.e., unpleasant feelings or emotions that interfere with day- to-day functioning) has been increasing in recent years, with young adults aged 18–24 most likely to report high or very high levels of psychological distress (Australian Bureau of Statistics, 2019). Some studies show people with depression have an increased risk of violent crime compared to the general population after controlling for previous offences and comorbid substance use (Fazel et al., 2015), whereas others find that severe mental illness (including depression) only predicts violence in the context of co-occurring substance use (Elbogen & Johnson, 2009).

Understanding the relative importance of alcohol use as a contributor to violent behaviour proves challenging as mental ill health and substance use frequently co-occur and risk factors tend to cluster and interact (Teesson et al., 2009). For example, risk markers for violent behaviour such as adverse childhood experiences and externalising and internalising symptoms also predict problematic alcohol use (Farrington et al., 2017; Felitti et al., 1998; Fox et al., 2015). It is necessary to examine these influences in combination in order to isolate the more important explanatory factors that can be targeted for optimal intervention. Building the evidence around the nature of these relationships during young adulthood is critical, not only because of the increased risk of related harm at this time but also because this is a group for which developmentally appropriate support interventions are lacking (Williams et al., 2009).

### **The current study**

Most of the research examining the nature of violent behaviour among young adults has examined specific types of violence (e.g., intimate partner violence) or has been conducted in the United States (Derzon, 2010; Farrington et al., 2017). Further work is needed to improve understanding of the relative importance of individual-level, theory-driven risk factors for violence among young adults in Australia. Specifically, investigation of the role of alcohol in violence during young adulthood after accounting for other individual-level risk factors is

required. Continuing to build the evidence base will improve the capacity of prevention and early intervention efforts to reduce violence and the associated systemic and economic burden on individuals and societies around the world. The current study will progress this aim by delineating the relative strength of the relationship between alcohol use to violent behaviour in young adulthood after accounting for the influence of demographic indicators, adverse childhood experiences, impulsivity and psychological distress.

## **Method**

The data for this study were collected as part of an international longitudinal study examining prosocial and antisocial behaviour in young adults, involving ten countries across five continents (Basto-Pereira et al., 2019). A total of 582 young adults from the Australian general community completed the baseline survey. The current study analysed data for participants who completed the violence questionnaire ( $n = 507$ ). Young adults aged 18–20 years were recruited between November 2018 and June 2019 through snowball sampling, advertisements on professional websites and on social media (e.g., Facebook, Twitter). A confidential online survey was administered to all participants, which took between 15 and 30 minutes to complete. The survey asked about sociodemographic characteristics, antisocial and prosocial behaviours, adverse childhood experiences, impulsivity, psychological distress and alcohol use. After completing the survey participants were entered into a draw to win a \$500 gift voucher. Ethics approval was obtained from the University of Sydney Human Research Ethics Committee (2018/876).

## **Measures**

### **Sample characteristics**

Demographic information was collected including gender, age, years of schooling, current occupation and socio-economic status. Gender was coded as male, female, and transgender and gender diverse people (TGD). Years of schooling was coded as a binary variable (did they complete year 12: yes/no). Occupation was a categorical variable

indicated as studying, employed, studying and working, or neither studying nor working. Participants’ socio-economic status (SES) was determined based on their occupation and education history if they were financially independent or their parent’s occupation and education history if they were not financially independent (Basto-Pereira et al., 2019; Pechorro et al., 2019).

### **Self-reported violence**

Self-reports of perpetration of violent behaviour committed during the past year were measured using a standardised interview tool developed for the National Youth Survey and National Institute of Justice multisite surveys and used in the Dunedin Multidisciplinary Health and Development Study (Arseneault et al., 2000; Elliott & Huizinga, 1989). The brief measure is comprised of seven items asking about common violent offences, including assault (e.g., hit someone you lived with or didn’t live with), serious assault (e.g., hit someone you lived with or didn’t live with a weapon or with the idea of seriously hurting them), robbery (e.g., used a weapon or force to rob a person, shop, bank or other business), gang fighting and sexual assault. The items were summed to create a composite score of total number of violent behaviours reported, however as the data were highly negatively skewed (skewness = 3.46 and kurtosis = 15.31), a binary indicator (yes/no) for any violent crime reported in the past year was used as the outcome variable in the analysis.

### **Adverse childhood experiences**

Early life adversity was measured using the Adverse Childhood Experiences (ACE) scale (Dube et al., 2003; Felitti et al., 1998) which outlines 10 categories of traumatic experiences that are strongly linked with long-term negative outcomes such as mental health disorders and chronic disease (Hughes et al., 2017). Categories relate to child abuse, neglect and household dysfunction including parent substance use problems, witnessing domestic violence, family member in jail, family member with mental illness and loss of a parent. The abuse and neglect categories are scored on a 5-point likert scale with responses ranging from



‘never’ to ‘very often’ which were then coded as a binary variable (‘yes’ or ‘no’). The household dysfunction category was coded as binary (‘yes’ or ‘no’). The total number of ACEs were calculated by summing the number of dichotomous responses resulting in a total continuous score (range 0-10). The ACE scale demonstrated acceptable internal consistency in this sample (Chronbach’s  $\alpha=0.67$ ). The use of the ACE scale is widespread and previous reviews support the validity of the ACE scale in research, with moderate agreement between retrospective and prospective measures of adversity (Hardt & Rutter, 2004; Reuben et al., 2016).

### **Impulsivity**

Impulsivity was measured using the behavioural subscale of the Youth Psychopathic Inventory – Short Version (YPI-S) (van Baardewijk et al., 2010) which is an 18-item shortened version of the original 50 item scale. Higher scores indicate higher levels of trait impulsivity, thrill-seeking and irresponsibility. (e.g., ‘It often happens that I do things without thinking ahead’). The subscale consists of six items that are scored across a four-point Likert scale (strongly agree – strongly disagree). The tool has been validated with Australian young people, and it correlates well with other measures of impulsivity such as the Child Behaviour Checklist (Dolan & Rennie, 2007; Shepherd & Strand, 2016). Exploratory factor analysis conducted in the current sample has replicated the YPI-S factorial structure for young adults and the internal consistency for each dimension is good ( $\alpha = >.70$ ).

### **Psychological distress**

Psychological distress was measured using the Depression, Anxiety and Stress Scale (DASS-21) (Lovibond & Lovibond, 1995). The DASS-21 is a 21-item self-report tool that examines three interrelated indicators of emotional distress including depression, anxiety and stress. Each scale contains seven items to which respondents use a four-point Likert scale to report how much they have experienced the symptom (0 = not at all, 4 = very much). In the current study respondents’ psychological distress scores were determined based on their

average score across the three DASS-21 subscales (stress, anxiety and depression). The DASS-21 was designed for application in research and clinical settings (Ng et al., 2007) and has been validated among young adults in Australia (Larcombe et al., 2016). Scores range from 0 to 42, with higher scores indicating greater psychological distress. The DASS total score provides a continuous measure which is suitable as an overall measure of distress and has good internal consistency, good construct validity and correlates highly with other measures of anxiety, depression and general distress in this sample (Cronbach’s  $\alpha=0.87$ ) and similar samples of young people (Henry & Crawford, 2005; Page et al., 2007).

### **Hazardous alcohol use**

Hazardous alcohol use was measured through the Alcohol Use Disorders Identification Test (AUDIT) (World Health Organization, 2001). The measure is a self-rating instrument with 10 multiple choice items scored on a five-point Likert scale that measures consumption (amount and frequency), problems related to use, and dependence. Scores range from 0 – 40, with scores between 8 and 15 indicating a medium level of alcohol problems, scores over 16 indicating a high level of problems and scores over 20 indicating probable dependence (World Health Organization, 2001). In this analysis, the total score was used as a continuous measure of hazardous alcohol use and problems. The AUDIT demonstrated good internal consistency in this sample (Cronbach’s  $\alpha=0.73$ ). The AUDIT has been well validated, with results showing the measure has good psychometric properties to detect alcohol use problems and disorders in Australian populations and young adults (García Carretero et al., 2016; Kokotailo et al., 2004).

### **Statistical analyses**

Descriptive analyses were run on each of the independent and dependent variables of interest. Sample characteristics were reported by gender and violence perpetration in the past year. Correlation analyses were initially run to examine bivariate associations between past year violence and predictor variables. Subsequently a hierarchical logistic regression was applied to examine the relative associations between past-year violent behaviour and adverse

childhood experiences, impulsivity, psychological distress and hazardous alcohol use. Model-building steps were determined a priori, with sociodemographic covariates (gender and SES) added first, then adverse childhood experiences, followed by internalising (psychological distress) and externalising (impulsivity) symptoms together, and then hazardous alcohol use was added separately in the final stage (Step 4). This analysis sequence allowed for determining the incremental variance accounted for at each step and examination of the unique contribution of alcohol use to the model above all other factors. All statistical analyses were run in IBM SPSS Statistics Version 25 (IBM, 2017).

## **Results**

Of the 582 participants who completed the baseline survey, 75 did not complete the questions about violent behaviour and thus were excluded from this analysis. There were no significant differences between participants who completed the violent behaviour self-report measure and those that did not on baseline covariates or for number of adverse childhood experiences, impulsivity, psychological distress or hazardous alcohol use ( $p$ 's > .05). All 507 participants included in the analysis had complete data on all other study measures.

Multicollinearity was not detected (VIF < 1.4 for all variables).

### **Sample characteristics**

Sample characteristics of participants are outlined in Table [3.1](#). The mean age of participants was 18.90 years ( $SD = .83$ ) and 70% were female followed by male (26%) and TGD (4%). Participants were mostly identified as high socio-economic background (SES) (49%), followed by medium (38%) then low (13%), and the majority had completed high school (94%). Close to half of the sample reported both working and studying (47%), followed by only studying (35%) or only working (14%) with a small number of people not working or studying at the time of the survey (4%).

**Table 3.1***Sample Characteristics for Those Who Reported Violence and Those Who Did Not Report Violence*

	Reported violence ( <i>n</i> = 65)	Did not report violence ( <i>n</i> = 442)	Total ( <i>N</i> = 507)
<i>Age (M, SD)</i>	18.83 (.82)	18.91 (.83)	18.90 (.83)
18	28/65 (43.1%)	174/442 (39.4%)	202/507 (39.8%)
19	20/65 (30.8%)	134/442 (30.3%)	154/507 (30.4%)
20	17/65 (26.2%)	134/442 (30.3%)	151/507 (29.8%)
<i>Gender</i>			
Female	52/65 (80.0%)	302/442 (68.3%)	354/507 (69.8%)
Male	12/65 (18.5%)	118/442 (26.7%)	130/507 (25.6%)
TGD*	1/65 (1.5%)	22/442 (5.0%)	23/507 (4.5%)
<i>Did not complete Year 12</i>	6/65 (9.2%)	26/442 (5.9%)	28/507 (5.8%)
<i>Socio-economic status</i>			
Low	11/65 (16.9%)	57/442 (12.9%)	68/507 (13.4)
Med	23/65 (35.4%)	168/442 (38%)	191/507 (37.7%)
High	31/65 (47.7%)	217/442 (49.1%)	248/507 (48.9%)
<i>Ethnic minority</i>	15/65 (23.1%)	103/442 (23.3%)	118/507 (23.3%)
<i>Occupation</i>			
Working	10/65 (15.4%)	59/442 (13.3%)	69/507 (13.6%)
Studying	18/65 (27.7%)	157/442 (35.5%)	175/507 (34.5%)
Working and studying	30/65 (46.2%)	210/442 (47.5%)	240/507 (47.3%)
Not working or studying	7/65 (10.8%)	16/442 (3.6%)	23/507 (4.5%)

	Reported violence ( <i>n</i> = 65)	Did not report violence ( <i>n</i> = 442)	Total ( <i>N</i> = 507)
<i>Independent variables</i>			
Early life adversity ( <i>M, SD</i> )	3.22 (2.81)	2.07 (1.84)	2.22 (1.94)
Impulsivity ( <i>M, SD</i> )	2.36 (0.58)	2.07 (0.60)	2.10 (0.60)
Psychological distress ( <i>M, SD</i> )	1.30 (0.61)	0.97 (0.67)	1.01 (0.67)
Hazardous alcohol use ( <i>M, SD</i> )	10.86 (7.54)	7.59 (6.42)	8.01 (6.66)

TGD = Transgender and gender diverse people.

**Table 3.2***Types of Violent Behaviour Reported in the Past Year for Male and Female Participants*

Violent behaviour	Male ( <i>N</i> = 130)	Female ( <i>N</i> = 354)	TGD ( <i>N</i> = 23)	Total ( <i>N</i> = 507)
	Yes (%)	Yes (%)	Yes (%)	Yes (%)
Hit someone you lived with	5/130 (3.8%)	33/354 (9.3%)	1/23 (4.3%)	39/507 (7.7%)
Hit someone you didn't live with, with the idea of hurting them	4/130 (3.1%)	21/354 (5.9%)	1/23 (4.3%)	26/507 (5.1%)
Attacked someone you lived with, with a weapon or with the idea of seriously hurting them	2/130 (1.5%)	6/354 (1.7%)	1/23 (4.3%)	9/507 (1.8%)
Attacked someone you didn't live with, with a weapon or with the idea of seriously hurting them or killing them	0/130 (0%)	2/354 (0.6%)	1/23 (4.3%)	3/507 (0.6%)
Used a weapon or force to rob a person, shop, bank, or other business	0/130 (0%)	0/354 (0%)	0/23 (0%)	0/507 (0%)
Been involved in a gang fight	2/130 (1.5%)	1/354 (0.3%)	0/23 (0%)	3/507 (0.6%)
Threatened or hurt someone to get them to have sex with you	0/130 (0%)	0/354 (0%)	0/23 (0%)	0/507 (0%)
Any violence in the past year	12/130 (9.2%)	52/354 (14.7%)	1/23 (4.3%)	65/507 (12.8%)

One in eight participants reported perpetrating at least one act of violence in the past year (Table 3.2). The most common violent behaviours reported by the sample were hitting someone they lived with or did not live with. Very few people reported they had used a weapon to attack someone they lived with or did not live with or been involved in a gang fight. Most participants reported more than one adverse childhood experience ( $M = 2.18$ ,  $SD = 1.91$ ) before the age of 18. Among people reporting any ACE, the most frequently reported ACEs related to household dysfunction, such as someone in the household having a mental illness (57%), divorce (34%) or substance abuse problems (28%). This was followed by physical abuse (21%) and emotional abuse (21%), emotional neglect (17%), sexual abuse (17%), physical neglect (14%), witnessing violence in the home (12%), and a family or household member having been incarcerated (3%).

The majority (65%) of young adults scored in the category of high risk for alcohol-related problems on the Alcohol Use Disorders Identification Test (AUDIT) (World Health Organization, 2001). Overall, participants in this study reported a mean total score of 8.01 ( $SD = 6.66$ ) indicating a medium level of alcohol problems. Over one in ten scored in the highest risk category stipulating that alcohol dependence is likely (13%). Almost one-third of participants were categorised as high risk of alcohol-related harms (30%) which indicates a harmful pattern of alcohol use that may require brief intervention, further monitoring and diagnostic evaluation (World Health Organization, 2001).

Bivariate correlations demonstrated past-year violence was significantly correlated with adverse childhood experiences ( $r = .20$ ,  $p < .001$ ), impulsivity ( $r = .17$ ,  $p < .001$ ), psychological distress ( $r = .16$ ,  $p < .001$ ) and hazardous alcohol use ( $r = .16$ ,  $p < .001$ ), but not gender ( $r = .03$ ,  $p = .478$ ) or SES ( $r = -.03$ ,  $p = .563$ ).

### **Hierarchical logistic regression**

Details about the hierarchical logistic regression findings are outlined in Table 3.3. In the baseline model, there was no evidence that gender or SES variables were associated with

increased odds of violence. In the next stage of model building, the number of reported ACEs was significantly associated with increased odds of reporting past-year violence. In the following stage, the number of ACEs and impulsivity, but not psychological distress, were significantly associated violence. The final model was significant ( $\chi^2 = 40.23$ ,  $df = 8$ ,  $p < .001$ ) with good fit to the data (Hosmer & Lemeshow:  $\chi^2 = 3.52$ ,  $df = 8$ ,  $p = .898$ ). This means that the model significantly explained 14% (Nagelkerke  $R^2$ ) of the variance in violence and correctly classified 87% cases. Female gender was significantly associated with increased odds of violent behaviour in the final model only, once accounting for other factors. Adverse childhood experiences and higher levels of alcohol use were significantly and independently associated with increased odds of violence among young adults. With every unit increase in AUDIT total score (range 0–29) the odds of reporting violence increased by five percent and with every additional ACE reported (range 0–10) the odds of reporting violent behaviour increased by 22%.



**Table 3.3***Results of the Hierarchical Logistic Regression Models Predicting Past Year Violent Behaviour*

		OR	95% CI	Cox & Snell R Square	Nagelkerke R Square	<i>p</i>
Step 1				.011	.020	.233
	Male *					
	Female	1.702	.876 – 3.304			.116
	TGD	.431	.053 – 3.494			.430
	Low SES *					
	Medium SES	.678	.309 – 1.485			.331
	High SES	.715	.337 – 1.516			.382
Step 2				.047	.088	.000
	Male*					
	Female	1.812	.919 – 3.571			.086
	TGD	.328	.039 – 2.732			.303
	Low SES *					
	Medium SES	.883	.390 – 1.998			.766
	High SES	1.110	.496 – 2.485			.799
	<b>Early life adversity</b>	1.321	1.167 – 1.496			.000
Step 3				.065	.121	.008
	Male*					
	Female	1.907	.952 – 3.820			.069
	TGD	.278	.033 – 2.361			.241
	Low SES *					
	Medium SES	1.030	.446 – 2.377			.945
	High SES	1.190	.525 – 2.697			.678
	Early life adversity	1.214	1.060 – 1.392			.005
	<b>Impulsivity</b>	1.762	1.090 – 2.848			.021
	<b>Psychological distress</b>	1.354	.872 – 2.101			.177
Step 4				.080	.150	.004
	Male*					
	Female	2.094	1.035 – 4.239			.040
	TGD	.303	.035 – 2.651			.281
	Low SES *					

Medium SES	.941	.403 – 2.563	.889
High SES	1.116	.486 – 2.563	.796
Early life adversity	1.220	1.061 – 1.403	.005
Impulsivity	1.475	.895 – 2.430	.128
Psychological distress	1.289	.824 – 2.017	.266
<b>Hazardous alcohol use</b>	1.054	1.011 – 1.098	.012

\*Indicates the reference group

## Discussion

This study examined the role of hazardous alcohol use in relation to past-year violent behaviour, after accounting for the impact of a number of known risk factors including ACEs, heightened impulsivity and psychological distress. The study found that hazardous alcohol use remains an important proximal predictor of violence perpetration even when accounting for other influences. This supports previous work showing that young adults who meet diagnostic criteria for alcohol use disorders account for a large proportion of violence in the community (Arseneault et al., 2000). Rates of violence among young adults in this Australian sample were relatively high with one in eight respondents (13%) reporting at least one act of violence in the past year, most commonly hitting someone with the intention of hurting them (i.e., assault). This is comparable to previous research showing one in six Australian young adults (aged 19–20; 16%) (Smart et al., 2003: p.44) and one in nine young adults in the United States report past-year violent behaviour (aged 18–19; 11%) (Loeber et al., 2017). Research from the Dunedin Multidisciplinary Health and Development Study found the prevalence of past-year violence (defined as two or more different violent behaviours and court-recorded violence) among young adults aged 21 was approximately one in ten (10%) (Arseneault et al., 2000). Taken together, the findings here align with evidence that self-reports of violent behaviour during young adulthood have remained relatively stable in recent decades across different studies conducted in Australia, New Zealand and the United States.

These results demonstrated that for every additional ACE experienced, the odds of perpetrating violence increased by 22%. While the prevention of adversity first and foremost is optimal, the complexity of this challenge means that it is also important to provide intervention and support for those young people who have been exposed to trauma (Barrett, Mills, & Teesson, 2013; Fox et al., 2015). The most frequently reported ACEs related to someone in the household having mental illness or substance use problems, and parental separation.

Experiences of living with someone who has been imprisoned was not frequently

reported (1 in 33) but experiences of emotional and physical abuse were relatively common in this group of young adults (1 in 5). A study of ACEs experienced by 22,575 justice-involved young people found that each additional ACE increased the odds of being a serious chronic violent offender by 35% (Fox et al., 2015). Histories of maltreatment are characteristic of young adults engaging in violent crime (Dean et al., 2015; Derzon, 2010; Lawler, Barrett, et al., 2020) however associations between early trauma and violence are not straightforward. The relationship is not direct, it is mediated by other factors such as how young people process and respond to their experiences of trauma (Faulkner et al., 2014). There is potentially an indirect association between ACEs and violence that is related to co-occurring alcohol use, as research suggests that people with post-traumatic-stress-disorder who use alcohol have more difficulties managing their anger (Barrett, Mills, & Teesson, 2013; Elbogen et al., 2010).

This study found there was a significant positive relationship between impulsivity, psychological distress and violence on the bivariate level, however, psychological distress was not significant in the regression accounting for early adversity. Reviews of personality risk factors for violence highlight both impulsivity and depressed mood as important predictors aggression and violence (Marcus, 2007b) however, research examining the link between internalising problems and violence remains mixed (Elbogen & Johnson, 2009; Fazel et al., 2015). The finding that there was not an independent link between psychological distress and violent behaviour in the current study is consistent with previous work examining young adults with alcohol dependence, where violent behaviour was best explained by alcohol use prior to the event rather than mental health problems or a history of conduct disorder (Arseneault et al., 2000). Similarly, our study found impulsivity was a robust predictor of violent behaviour after controlling for psychological distress which supports previous research (Zhou et al., 2014) however impulsivity did not predict violence after accounting for hazardous alcohol use. While the cross-sectional nature of this study means it is not possible to comment on the direction of the alcohol–violence relationship here (see Lawler et al., 2020), it does suggest that the proximal role of alcohol is more important risk factor for violence during young adulthood

than personality. As these results suggest, the role of impulsivity in violence may be better explained by hazardous alcohol use where impulsive personality increases the likelihood of hazardous alcohol use which in turn increases aggression. Moreover, it may be that a separate underlying mechanism common to hazardous alcohol use, heightened impulsivity and violence (such as problems with emotional regulation) drives all three behaviours (Garofalo & Wright, 2017).

The role of alcohol may also be more salient in predicting violent behaviour in young adulthood because of increased prevalence in heavy drinking during this time (alcohol use becomes legal at age 18 in Australia) (Australian Institute of Health and Welfare, 2017). This study demonstrated the odds of reporting violence increases by five percent with each unit increase in total AUDIT score. To add to interpretability, every one standard deviation increase in AUDIT scores is associated with a 42% increase in risk for reporting past-year violent behaviour. This study contributes to previous research demonstrating that hazardous alcohol use is associated with related spikes in self-reported antisocial behaviour and psychopathic features during young adulthood (Hammerton et al., 2017; Hawes et al., 2015). Drinking at hazardous levels may begin with enhancement motives but then the disinhibiting or direct (psychopharmacological) effects of the drug increase the risk of responding violently to a perceived threat (Barrett et al., 2011; Goldstein, 1985). An alternate motivation for hazardous alcohol use among young people who are aggressive is to self-medicate distress resulting from the consequences of their behaviour (e.g., rejection) (Fite et al., 2007; Kaplan et al., 2001).

While research shows young people who are aggressive tend to drink more for enhancement rather than coping motivations (Kuntsche et al., 2006) there is evidence that both motivations (enhancement and coping) are associated with increased risk of alcohol-related aggression in university samples (Mihic et al., 2009; Øverup et al., 2015). Specific motivational influences aside, it is clear the context of hazardous alcohol use is an important contributor to violent behaviour during young adulthood. Relevant prevention and treatment programs should be trauma-informed, address hazardous alcohol use and be implemented to

adolescents and young adults early and widely across multiple settings.

## **Limitations and Directions for Future Research**

There are limitations to be acknowledged for this study. Due to the cross-sectional design it is not possible to determine the direction of the effect, it may be that people who are violent are more likely to drink alcohol. A longitudinal design would facilitate inferences about causality (see Lawler et al., 2020). A further limitation was the convenience snowball sampling method, which resulted in oversampling of female participants from high socio-economic backgrounds. The findings relating to gender effects should be interpreted with caution given the majority female respondents, and we note the association between gender and violence only emerged in the final model with wide confidence intervals. Future studies should replicate this work in a larger and more representative community sample. These findings demonstrate high rates of violent behaviour among young adults in Australia and highlight the importance of developing and delivering targeted violence prevention and early intervention programs for this group.

Reviews of the literature confirm the potential for school-based prevention programs in reducing aggressive and impulsive behaviour such as bullying, substance use and other conduct problems during adolescence (Cox et al., 2016; Kelly et al., 2020; Newton, Stapinski, Teesson, et al., 2020). Research demonstrates the intergenerational continuity of alcoholism and aggression which both influence children’s aggression and risk for later alcohol use-disorders (Fuller et al., 2003). Further, there is evidence for potential generational benefits on the offspring of young people who receive effective prevention interventions (Hill et al., 2020). Drug prevention initiatives that target executive functioning and socialisation skills may be particularly beneficial (Giancola & Parker, 2001). Given relatively high rates of violent behaviour during young adulthood, it is critical to shift the focus from response-based efforts (i.e., rehabilitation, punishment) to investing in violence prevention through trauma-informed interventions that focus on alcohol (Neville et al., 2014). Prevention interventions have significant potential to equip young people with the coping resources they need before they

transition into young adulthood, a period of high-risk for hazardous alcohol use, violent behaviour and criminal justice engagement.

## **Conclusion**

This study has demonstrated the relative importance of hazardous alcohol in the perpetration of violent behaviour during young adulthood. Violence is a significant challenge for communities, families and individuals however it is possible to prevent violence with the provision of targeted support. Addressing structural determinants of violence such as exposure to early and cumulative adversity is key to reducing the burden of disease attributable to violence. In addition, individual-level factors such as hazardous alcohol consumption are relevant and important proximal influences on violent behaviour during young adulthood. Evidence-based interventions delivered during adolescence that prevent violence during young adulthood are critically needed to support people at risk of alcohol-related harm.

## **Conflict of Interest Statement**

Dr Basto-Pereira is the coordinator of the International Study of Pro/Antisocial Behaviour in Young Adults. Ms Lawler is the project coordinator and Dr Barrett is the project lead for the Australian research team. Dr Stapinski, Dr Newton and Dr Prior declare that they have no potential conflicts of interest.

## **Acknowledgments**

Ms Lawler has received funding through the UNSW Scientia PhD Scholarship Scheme and the Matilda Centre PhD Scholarship.

## **Ethical Approval**

Ethics approval was obtained from the University of Sydney Human Research Ethics Committee (2018/876).

## **Informed Consent**

Informed consent was obtained from all individual participants included in the study.



## **PAPER THREE: Themes in Sentencing Young Adults Charged With Serious Violent Crime Involving Alcohol and Other Drugs**

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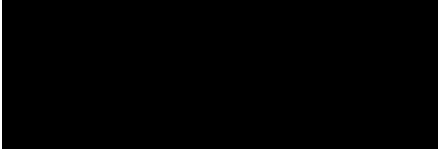
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Paper three has been published as: Lawler, S., Barrett, E., Stapinski, L., Bright, D. & Teesson, M. (2020). "Themes in sentencing young adults charged with serious violent crime involving alcohol and other drugs." *Australian and New Zealand Journal of Criminology* 53(3): 411–432.

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Siobhan Lawler

5 January 2021

## **Preamble**

In papers 1 and 2, novel evidence has been presented about the developmental relationship between alcohol, aggression and violence among young people in both student and community samples. Available research consistently shows that alcohol is a distinctive feature of violent crime committed by young people (and violent crime more generally) however there is a lack of research examining justice responses to young adults with substance use problems. It is important to build the evidence by examining how the courts interpret the relationship between alcohol, aggression and violence, and how judges apply this knowledge in their sentencing practice. Qualitative analyses of judicial responses to alcohol and drug related violence will determine whether the judicial aim of rehabilitation in sentencing aligns with current public health evidence. Such information is critical to guide evidence-based responses in criminal justice and health sectors. The following study therefore examined the role of alcohol in serious violent crime by young adults and explored how judges understand and deliberate the relationship between substance use and violent offending among youth.

## Abstract

**Objective:** The majority of young people in custody have alcohol and other drug problems, and more than 90% report past-year experiences of high-risk drinking and illicit drug use. Despite a strong link between drug use and violent offending, there is a dearth of information about how this relationship plays out in sentencing of young adult offenders (age 18–25). This study examines themes in the sentencing of drug-using young adults facing court for serious violent crime and describes how judges discuss rehabilitation as a consideration for this high-risk group.

**Methods:** This research contributes to the literature by bridging law and social science through a cross-sectional analysis of  $n = 507$  sentencing remarks from NSW higher courts.

**Results:** Substance use involvement was indicated in more than three-quarters (77%) of violent offence cases. Among young adults sentenced for violent crimes involving substance use ( $n = 51$ ) robbery and homicide were the most common offences, and alcohol and methamphetamine were the most frequently involved substances. Two themes emerged around judges’ reasons for sentencing, one emphasising offender agency and choice and another more compassionate position acknowledging the influence of drug dependence on offending behaviour.

**Conclusions:** Despite this divide, addressing substance use dependence was commonly seen as key for the successful rehabilitation of young people who commit violent crime involving alcohol and other drugs.

## Introduction

Young adult offenders (age 18–25) tend to have multiple and composite needs characterised by a number of static and dynamic risk factors that span environment, social, familial and individual antecedents (Fougere et al., 2013). This transitional period is a distinct developmental group from both adolescence and adulthood (Bonnie et al., 2014) however research indicates young adults aged 18–21 are more like teenagers than older adults in their tendency to engage in high-risk, impulsive behaviour (Cohen et al., 2016). The difference has been attributed in part to the development of the prefrontal cortex which is the brain region implicated in higher-order functions such as decision-making, foresight, emotion regulation and goal-directed action (Tanner & Arnett, 2011). Individuals who enter the justice system at a young age commonly present with significant histories of maltreatment, abuse and neglect, psychopathology and drug and alcohol misuse (Torok et al., 2015). Efforts to intervene early, divert, rehabilitate and reintegrate justice-involved young people are impeded by various challenges associated with a lack of coordination across siloed health, criminal justice and welfare services and systems (Dowse et al., 2014). Involvement in the criminal justice system can compound disadvantage related to housing, employment, and mental health issues.

Certain groups of young people are significantly over represented in custodial settings, including Aboriginal and Torres Strait Islander people (Australian Bureau of Australian Bureau of Statistics, 2018a), people with a cognitive disability (Haysom et al., 2014) and people with mental health and substance use disorders (Baldry et al., 2012). Despite the link between drug and alcohol use and antisocial behaviour, there has been little research examining how sentencers perceive and manage the multiplex needs of young adult offenders with drug and alcohol problems.

### **Judges’ aims in sentencing**

Sentencing is an inherently complex practice. Judges must undertake a careful exercise of *synthesis*, considerate of the evidence and the purpose of sentencing, guided by reason, experience and intuition (Potas, 1991). According to s. 3A of the *Crimes (Sentencing Procedure) Act 1999* (NSW) a sentence can be imposed for the purposes of retribution, deterrence, community protection, reparation and rehabilitation. While the youth of an offender is usually assessed in relation to their rehabilitation prospects, the purposes of sentencing adults and youth differ in several ways. While guidelines for sentencing children focus on protecting the rights and interests of the young person, aims in sentencing adults lean towards utilitarian priorities and deterrence. When sentencing children and adolescents, their developmental stage and maturity is always considered in legal proceedings. Whether, and to what extent, the philosophical aims in sentencing adults and children differ in practice is unclear. In the traditional court system, research has suggested that rehabilitation is given the least emphasis of all the sentencing objectives, where “treatment-based sanctions are perceived to be lenient and imposing them is a sign of weakness” (Edgely, 2009). Correctional rehabilitation tends to prioritise security, reductions in recidivism and risk management, in contrast to traditional mental health and drug rehabilitation service delivery where the focus is on recovery and support (Denton, 2014; Hall, 2017). Such tensions are likely to be present at the point of sentencing, with a number of competing considerations, including extant legislation, being balanced by the sentencing judge.

In most Australian states and territories, including NSW, offenders charged with serious violent crimes can be ineligible for court ordered diversionary treatment alternatives, despite evidence to suggest that violent offenders can benefit from such programs (Harkin et al., 2007). Within prison, access to alcohol and other drug use treatment is limited, and there is little evidence that prison-based treatments in Australia achieve lasting benefits (Doyle et al., 2019). In the local court, some programs such as Magistrates Early Referral into Treatment (MERIT) program include offenders provided they do not have histories of

*significant* violence. This demonstrates some effort toward balancing offender rehabilitation with competing goals of community protection, victim reparation and staff safety (Hughes & Ritter, 2008). However, further evidence on the needs of young adult offenders facing court for violent crimes is required if the goal is to prioritise a public health approach. The public health approach aims to prevent and reduce crime by improving health and wellbeing through evidence-based intervention in the community (Australian Institute of Criminology, 2003).

This requires recognition that drug use, crime and violence are symptoms of interrelated individual, historical, social and interpersonal factors that can be treated like illness or disease (Room et al., 2005). The public health approach contrasts to reactionary and punitive criminal justice responses such as mandatory minimum sentences that do not address underlying causes of criminal behaviour (Moore 1995; Mosher & Jernigan 2001) or reduce crime (Menendez & Weatherburn, 2016).

### **Intoxication and the law**

Young people who enter the justice system as juveniles tend to experience multiple forms of marginalisation (such as related to their race, gender, age, disability, class or sexual orientation) which can intersect and compound into entrenched webs of disadvantage. Intersectional analysis (Crenhaw 1995; Carbado et al., 2013) is a framework that facilitates inquiry into how these inequalities create unique (and poorly understood) structural challenges and barriers. Through an intersectional lens, we can more completely conceptualise how different dimensions of social disadvantage interrelate to increase risk for criminal justice involvement. In the Australian criminal justice context, identities related to gender, race and disability are particularly relevant and have implications for how we understand the relationship between disadvantage, violence and crime.

This intersectionality notwithstanding, a strong relationship between substance use, violence and crime is well established in the literature (Barrett et al., 2014; Boles & Miotto, 2003). Substance use disorders are a leading cause of preventable disease that affects about

one in 20 Australians (Australian Bureau of Statistics, 2007). Early initiation to drug and alcohol use is a risk factor for a range of poor psychosocial outcomes including drug and alcohol and mental health problems in adulthood, low educational attainment, abnormalities in brain development and involvement in the criminal justice system (Degenhardt et al., 2010; Macleod et al., 2004; Squeglia et al., 2009; Wells et al., 2004). While many people who use drugs (including alcohol) do so in moderation and without causing harm to themselves or others (Australian Institute of Health and Welfare, 2017), substance use problems are commonplace in offending populations and are factors consistently implicated in recidivism among young people and adults (Payne, 2007; Putniņš, 2003; Stoolmiller & Blechman, 2005). As a group, offenders who use alcohol and other drugs commit more crime, including violent crime, than those who do not. Moreover, alcohol and other drug use is more heavily implicated in juvenile offending compared to adult offending. Up to three-quarters of juveniles detained by police are intoxicated at the time of their offence and two-thirds report committing crime to obtain drugs or alcohol (Dean et al., 2015) compared to around half of adult detainees who attribute their offending to substance use (Payne & Gaffney, 2012).

According to the most recent Young People in Custody Health Survey, the majority of young people (aged 10 – 17) in custody in New South Wales (NSW) have self-reported drug and alcohol related problems (Dean et al., 2015). Half (52%) report problems caused by alcohol use and almost all (81%) report at least weekly illicit drug use in the year preceding custody with the most commonly used drugs including cannabis (76%), crystal methamphetamine (ice) (30%), ecstasy (10%) and cocaine (6%) (Dean et al., 2015).

Previous research details the complexity around the role of intoxication in criminal law and sentencing (Quilter & McNamara, 2018). This work highlights the multiple interpretations of the term intoxication in legal practice relating to the assessment, criterion or degree of impairment, and the absence of a shared definition across jurisdictions in Australia. Studies have found that judges can assess an offender’s alcohol and other drug use at the time



of the offence to be mitigating or aggravating, depending on the circumstances of the case. For example, drug use may be more likely to be mitigating in circumstances where the conduct was out of character or to support a lack of premeditation, or when associated with dependence or mental illness and general disadvantage. On the other hand, drug use can aggravate the offence when accompanied by random acts of violence and general recklessness, such as in the context of mandatory minimum sentences for one-punch attacks (Quilter et al., 2018). However, recent changes to sentencing legislation have curbed this opportunity for judicial discretion in considering the role of alcohol and other drug use in criminal acts. Under the *NSW Crimes (Sentencing Procedure) Act*, section 21A now states that self-induced intoxication is not to be taken into account as a mitigating or aggravating factor in sentencing.

### **Rehabilitation in sentencing**

There are a number of factors that judges consider in assessing an offender’s prospects of rehabilitation. These include evidence about an individual’s character, criminal record, behaviour since the offence occurred, age, whether they have engaged in treatment, education and their support network (National Judicial College of Australia, 2019). Where there is evidence to show an individual has promising potential to be rehabilitated (i.e., prior good character, limited criminal record, engaging in treatment), judges can make a ruling of ‘special circumstances’. Under s. 44 of the *Crimes (Sentencing Procedure) Act 1999* judges can elect to reduce the standard non-parole period (typically three-quarters of the head sentence and minimum time spent in prison) in exchange for increasing the time an offender will spend on parole and under supervision in the community. The concept of ‘special circumstances’ allows the court to take into account the interrelated and compounding factors that can contribute to offending behaviour. Past research has found that findings of ‘special circumstances’ occur for a range of purposes, including treatment for substance use and mental health problems, assistance with reintegration or to mitigate for an offender’s age, poor health, lack of criminal record, good prospects of rehabilitation and to reduce the risk of

institutionalisation (Poletti & Donnelly, 2013). In some cases, the prospect of early parole can serve as incentive for an offender to demonstrate good behaviour in prison and work towards their own rehabilitation.

The NSW Sentencing Council has conducted reviews into the sentencing of drug and alcohol fuelled violence in the NSW Local and District courts, in response to proposals that harsher penalties were required to increase deterrence (NSW Sentencing Council, 2009, 2015). On both occasions the Council ruled against these proposals, partly in recognition that the spontaneous nature of drug-related violence reduces the deterrent power of such laws. They recommended expanding education, treatment and diversion programs for offenders as well as specific policy and situational crime control measures. Their rehabilitation-focused recommendations highlight that the relationship between alcohol and other drug use and violence is as much a health issue as it is a criminal justice issue. It is important to expand our understanding of criminal justice responses to serious offenders with substance use problems through diverse processes and perspectives, including decisions made at sentencing.

Previous research has studied the behaviour of judges in sentencing widely and creatively across disciplines of law, psychology, criminology, drug policy and social network analysis (Bouhours, 2006; Bright et al., 2012; Deering & Mellor, 2009; Ducat, 2013; Hughes et al., 2016; McGorrery, 2016; Sullivan, 2017). Judges’ sentencing remarks provide significant insights, detailing the perspectives of legal experts in their decisions about how society should deal with individuals who break the law. Furthermore, analysis of judge’s remarks in the courtroom provides a unique opportunity to explore the real-world decisions of legal experts responding to violent crime and impart important insight into how young people are processed through the criminal justice system. Australian research has gained significant insight into judges’ behaviour in sentencing intimate partner homicide (Whittle & Hall 2018), sexual and violent offenders (Butrus 2018) and Aboriginal and Torres Strait

Islander people (Bartels et al., 2015; Jeffries & Bond, 2009). However, the content of these decisions has been largely underutilised as a resource for understanding how young adults are processed through the courts.

Through the application of quantitative and qualitative methods, we analysed themes in judges’ remarks when sentencing young adult offenders charged with serious violence involving drugs and alcohol. Judges remarks provide a rich opportunity to analyse how legal experts are describing and applying the principles of risk and rehabilitation in their practice. The findings have implications for the judiciary, how they communicate their own ideology around the role of drugs in crime, and the impact of this on the perceived potential for reparation, recovery and reintegration of young adult offenders.

## **Methodology**

This mixed-methods study employed both inductive and deductive analytic techniques (Thomas, 2006) to investigate the role of drugs in serious violence and rehabilitation in sentencing. This involved the first author (SL) reading and re-reading sentencing remarks to prepare and refine categories for data collection. The inductive approach involved the immersion into a subset of remarks to identify important terms and allow key themes (e.g., offence specific information, sentencing factors) to emerge from the data. Deductive content analysis was applied by reading the text and extracting themes that applied to the predefined categories of interest including offense, offender and sentencing characteristics. The combined approach informed the structure and content of the schedule, in that key terms and themes that commonly occurred were included and those that were not relevant to the content of the remarks were excluded from the final version. This framework allowed for more freedom extracting information than either approach on its own, leading to deeper insight and understanding of themes emerging from the data and relating to the research questions. Both methods and their combination are commonly employed in public health and social science research to systematically identify and condense qualitative data into summary format (Thomas, 2006). Descriptive and thematic analyses were conducted

using IBM SPSS Version 25.

## **Procedure**

Judges’ sentencing remarks in NSW higher courts from 2014–2017 were extracted from the Australian legal database AustLII, an online resource providing free access to judges’ sentencing remarks and other legal documentation. Judges’ sentencing remarks are a verbatim transcript that explains the judge’s reasons for a sentence, and usually include the following information:

- A summary of the offence based on accepted facts,
- Aggravating and mitigating circumstances,
- Relevant factors about the offender, their background and prospects for rehabilitation,
- Reference to the impact of the offence on any victim(s), and
- Reference to the purpose and aims of the sentence.

An online systematic key-word search was run in AustLII across judges’ sentencing remarks from NSW higher courts. Two searches identified reported remarks for relevant cases processed through the NSW District and Supreme Courts. The first search included terms for violent crime only (i.e., homicide or assault or abduction or robbery or burglary or break and enter or unlawful entry or sexual assault and violence or aggression) and the second search identified cases meeting criteria for violent crime involving alcohol or other drugs. The second search was applied using the same key words for violent crime as the first search as well as key words to capture drug and alcohol involvement (i.e., substance use/abuse, drug, alcohol). The number of cases in the second search with the key drug words provides an indication of the proportion of violent crimes sentenced within the time frame with substance use involvement.

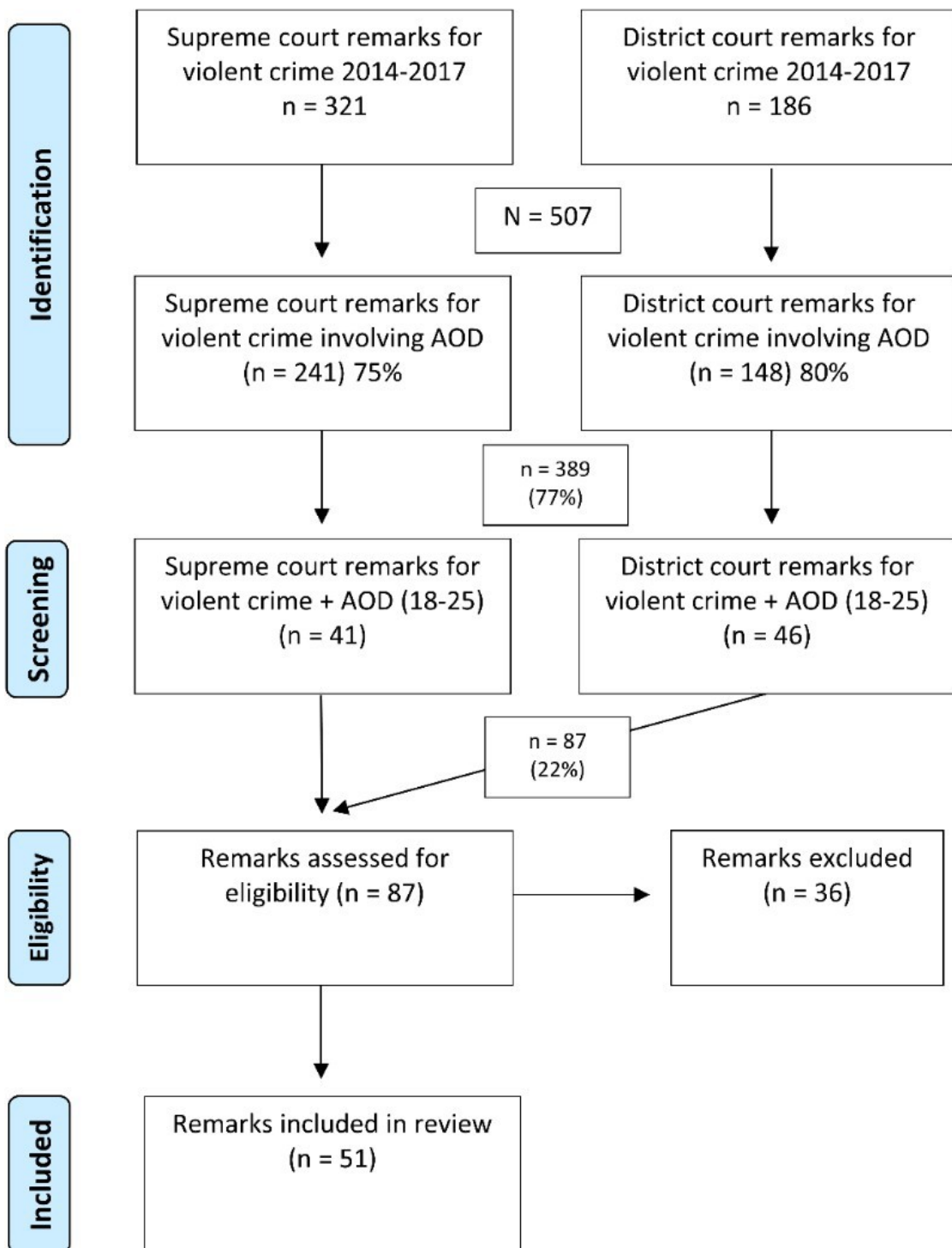
Remarks available in relation to offenders aged between 18 and 25 and violent offences involving alcohol or other drug use were exported for further review. This group will be henceforth referred to as either young adults or the more general terminology of young people/person, as defined by the National Strategy for Young Australians (Australian

Government Department of Health, 2010). Figure [4.1](#) outlines the data selection process. Cases were excluded if the offender was not under the influence of alcohol or other drugs around the time of the offence, the case was sentenced outside of the selected time frame (2014–2017), the offender was not aged between 18 and 25 at the time the offence, no sentence was handed down or the decision referred to a non-criminal or procedural matter.

Each transcript was read and re-read several times. Qualitative information in the form of judge’s verbatim quotes were assessed in relevance to the key research questions (role of drugs in violent crime, how judges discussed rehabilitation). Commentary that was representative of key themes was extracted, analysed and compared across cases, forming the basis of the conceptual framework for the study.

**Figure 4.1**

*Consort Diagram Outlining Data Selection Process*



## **Coding scheme**

A coding scheme was developed by the author (SL) (Appendix 4.1) and employed to guide the data extraction process. The scheme consisted of four levels, the primary category, its sub-categories, descriptive information and examples of how this would appear in the text. Each case ( $n = 51$ ) was coded for information falling into four key domains including offence characteristics, offender characteristics, victim characteristics and sentencing considerations and outcomes. Both manifest (explicit) and latent (implicit) content was coded for in recognition that context is important for understanding language and meaning (Neuman, 2006). This is especially so when interpreting judges’ decisions – characteristically rich with detail – yet the inherent assumptions are not always clearly articulated (Crowe, 2013). The scheme served to ensure consistency and guide decision-making for coders. To determine inter-rater reliability, a second coder extracted data from a subsample of remarks ( $n = 15$ ) to determine the level of consensus among raters (74% agreement). As a training exercise, a small proportion ( $n = 5$ ) of transcripts were coded by both the primary and secondary coder and any inconsistencies were discussed to increase agreeability between coders.

The coding scheme was developed through a process of refinement using the data and research as a guide. This section describes how specific coding categories were selected for inclusion. The violent offence codes were taken from the Australian and New Zealand Standard Offence Classification (ANZSOC) for serious violent crimes ( $n = 8$ ). Offender motive codes were adopted from Australian Institute of Criminology Drug Use Monitoring in Australia (DUMA) study and were based on established criteria used in past research (Makkai & Payne, 2003; Payne & Gaffney, 2012; Sutherland et al., 2015). There were four categories: financial; opportunistic; psychopharmacological and self-defence. Financial motivations included criteria such as needed money to buy drugs, to support oneself and to repay debts. Opportunistic motives were characterised by items such as enjoyed the rush, lost temper, urged by friends or acting on the spur of the moment.

Psychopharmacological motives were defined as under the influence or withdrawal. Self-defence motives were assigned when the offence occurred in response to a perceived threat on behalf of the offender. Mental health disorders included in the coding scheme framework were selected to align with common categories of psychological illness outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013). These included Substance Use Disorder, Depression, Generalised Anxiety Disorder, Social Anxiety Disorder, Post-Traumatic Stress Disorder, Obsessive-Compulsive Disorder, Bipolar Disorder, Schizophrenia, Eating Disorder, Autism Spectrum disorders, Antisocial Personality Disorder, Borderline Personality Disorder and Attention-Deficit/Hyperactive Disorder. Trauma items were adopted from the Life Events Checklist (LEC-5) (Weathers et al., 2013).

In relation to sentencing characteristics, codes for judges’ aims in sentencing were defined in line with NSW legislation. The *Crimes (Sentencing Procedure) Act 1999* (NSW) outlines seven purposes whereby judges can impose a sentence on an offender. These can be summarised as retribution, denunciation, deterrence, reparation, community protection and rehabilitation. Coding categories describing judges’ reasons for finding special circumstances were determined by past research and included rehabilitation, risk of institutionalisation, drug and alcohol addiction, first custodial sentence, ill health, disability or mental illness, accumulation of sentences, protective custody, age, hardship to family, self-punishment, parity and sentencing according to past principles (Poletti & Donnelly, 2013).

## **Results**

A total of  $n = 507$  remarks were identified as cases involving violence that were sentenced in the District ( $n = 186$ ) and Supreme ( $n = 321$ ) courts between 2014 and 2017. Of those cases, 77% ( $n = 389$ ) included mention of alcohol and other drug use and of these, 22% ( $n = 87$ ) involved young adult offenders aged 25 year or below. After the final assessment for



eligibility, a total of 51 transcripts met criteria for inclusion in the study as young adults, aged 18–25 charged with serious violent crime involving alcohol and other drugs.

### **Offender and offence characteristics**

Among the identified transcripts involving violent offenders aged 18 to 25, the overwhelming majority of offenders were male (90%) and one-third were identified as Aboriginal or Torres Strait Islander background (33%). Over half (60%) had appeared in the Children’s Court previously. Homicide and robbery were the most common offences (28% of cases), followed by break and enter (23%), assault (20%) and sexual assault (2%). Within the identified transcripts, none met criteria for the remaining serious violent crime codes of abduction, burglary and unlawful entry offences. Most of the offences occurred in rural areas (53%) followed by metro (35%) and remote (6%). The geographic location was not stated in 6% ( $n = 3$ ) of cases. The most common place for violent offences involving alcohol and other drugs were in residential locations (57%), followed by commercial locations (23%), cars (8%), licensed venues (6%), learning institutions (2%), hospitals (2%) and park/bushland (2%).

Alcohol was the most commonly involved psychoactive substance in the sample (37%) followed by methamphetamine (35%), cannabis (16%) and benzodiazepines (6%). Drugs (unspecified) was the primary drug involved in the offence in 16% of cases. Other drugs that were included in the coding schedule but not discussed in judges’ remarks as directly related to the offence include heroin, cocaine, methylenedioxy-methamphetamine (MDMA), inhalants, gamma hydroxybutyrate (GHB) and ketamine. Polysubstance use was a characteristic of 18% of cases. Judges stated an offender had a diagnosed substance use disorder (SUD) in over one-third (39%) of cases, and 45% were described as having at least one diagnosed mental health disorder other than a substance use disorder. Of the mental health disorders experienced by offenders, depression was the most common (25%) followed by anxiety (16%) and post-traumatic stress disorder (10%). Less common mental health

disorders included ADHD, conduct disorder, psychosis, antisocial or borderline personality disorders (6%) and schizophrenia and adjustment disorder were the least frequent diagnoses (4%). Among those cases where a SUD was identified, 41% were reported to be experiencing co-occurring mental health disorders. Treatment recommendations in the context of expert opinion and pre-sentence report directions were explicitly referred to by judges in 88% of cases.

### **Sentencing characteristics**

The sample included a total of  $n = 51$  transcripts detailing sentencing decisions by 21 individual judges, the majority of whom were male (86%). Most judges provided sentencing remarks for one case ( $M = 4.78$ ,  $SD = 3.20$ ). As described by judges, the most common motives for engaging in the offence were financial (39%), opportunistic (35%), psychopharmacological (6%) and self-defence (2%) (see Table 4.1).

**Table 4.1**

*Offender’s Motives for Engaging in Violent Crime as Described in Judges’ Remarks*

Motives	<i>N</i> cases	%
Financial	20	39
Opportunistic	18	35
Psychopharmacological	8	16
Self-defence	1	2

*Note.* The judge did not specify a motive in four cases (8%).

Judges in this sample were divided in their remarks on the role of alcohol and other drug use in offending and the importance of treatment for the rehabilitation of the offender. Around half of the judges ( $n = 28$ , 55%) took time to discuss the impact of alcohol and other drug dependence on offending, including the psychological, socio-economic and mental health influences that commonly co-occur with alcohol and other drug problems. In these cases, judges articulated a compassionate position on the relationship between drug use and offending. The quote below refers to a characteristic case and provides an example of how this was commonly described:

This offender has grown up with alcohol abuse being a normal part of his home life and also a devastating and entrenched problem in his peer group and his community. He committed these offences while affected by alcohol. The offender’s self-induced intoxication is not normally to be taken into account as a mitigating factor. However, the evidence before me demonstrates that he has experienced a deprived upbringing, including exposure to significant alcohol abuse and domestic violence resulting in a dysfunctional family environment and a significant degree of disadvantage. I am satisfied that his background of deprivation operates to reduce his moral culpability and thereby mitigate the sentence (*R v Sharpley*, (2014) at 52).

Judges often discussed the interrelated links between an individual’s drug dependence, mental health and violence, cautioning that intoxication is not a defence or excuse for such conduct, as shown in this example:

What I do accept from the evidence is that the prisoner’s mental state, disinhibited by alcohol and methylamphetamine, is a consequence in some respects, as one of the psychologists pointed out, to a background of anxiety, instability, trauma, which has led to the prisoner becoming dependent upon drugs and alcohol. In part to self-medicate symptoms that he has endured for a number of years. Thus, while his mental health does not directly contribute to the commission of the offence it indirectly does so, in the way it has contributed to his dependence upon alcohol and drugs. To that extent—to a limited extent, of course, his moral culpability is reduced. But, of course, the courts have said for time immemorial that drunken people cannot hide behind their drunkenness unless it gives rise to a defence to excuse themselves from serious conduct, particularly street violence. The community is sick and tired of reading and hearing about people being assaulted or attacked for no reason under no provocation in the street by people who are affected by drugs and alcohol (*R v Peters*, (2015) at 92–93).

In the remainder of cases ( $n = 23$ , 45%), judges emphasised the role of offender agency and choice. Agency and choice as described here relate to a person’s deliberate and intended behaviour, their capacity to make decisions and act in a particular situation or environment (Paternoster et al., 2015). In these cases, the judge would often remark that the decision by the offender to consume alcohol, knowing the effect it could have, was intentional and therefore served to increase their culpability for their crime:

Here the crime that was committed by the appellant was committed because she voluntarily took liquor which disinhibited her, allowed her to overcome the effects of medication and allowed her behaviour to be affected by her mental illness. When a person has a propensity to act violently if intoxicated then that person must abstain from intoxication... Here the appellant knew that she was prone to violence when un-medicated, was taking appropriate medication, but knew that if she took alcohol the medication would be overcome. She went ahead and did so (Sutherland v R, (2016) at 16).

In the next example, this judge provides similar insights, linking the consumption of the drug ‘ice’ directly to violent crime. Here there is a narrative of control over use, despite the assumption of psychological and physical dependence on that drug:

Virtually no-one in the community could be unaware of the link between methylamphetamine use and crime, particularly violent crime, so those who voluntarily take methylamphetamine can scarcely complain when they receive little or no reduction in sentence because their violent offences were committed under the influence of that drug... When he ran out of money and could not afford to buy the drug anymore he had a choice, he could have recognised the fact that he could not afford it and just not used it anymore... (R v Hobson, (2016) at 1, 4).

Despite differing perspectives expressed by judges about the role of alcohol and other drug use in these crimes, the majority ( $n = 38$ , 75%) of judges stated that addressing substance use and dependence was key for the successful rehabilitation of the offender. Even

in cases where judges expressed more conservative views, there was often discussion about the importance of rehabilitation for crime desistance. A number of judges referred to specific treatment programs and quoted expert recommendations in their remarks:

[the offender] will need intervention to settle back into the community. His rehabilitation will continue outside the gaol. He is also relatively young and the less exposure he has to other people in custody, the better. He will need rehabilitation to avoid relapse (R v Armstrong, (2015) at 29).

It is obvious, as the psychologist observes, that the drug problem is directly related to his crimes. She thought it was very important for him to participate in some form of assistance when he was released... She recommended some programmes in custody which might assist... (R v Towney, (2015) at 18).

In the example below, the judge balances the facts, presenting priorities of rehabilitation, risk and proportionality. Deliberations such as these were relatively common. It highlights not only the particular difficulty in sentencing these types of crimes but also the questionable capacity and appropriateness of the prison setting for delivering treatment to people with serious mental health problems:

...the offender’s mental condition mitigates his moral culpability for these crimes. However, until properly treated, the offender is a threat to the community (R v Weismantel (No 3), (2015) at 28).

We examined how judges discussed themes of agency and choice or dependence in relation to offence type and primary drug involved. This part of the analysis was data driven and guided by the general inductive approach where the text is read and re-read and themes are allowed to emerge from the data (Thomas, 2006). For the offence of homicide, judges emphasised offender agency and choice in most cases (64%) whereas for offences of robbery and break and enter, judges emphasised agency and choice in only 29% and 33% of cases, respectively. For offenders charged with assault offences as the primary offence, there was an

even split between themes of agency and choice vs. dependence (50%). Similar distinctions were observed between the primary drugs involved in an offence and how judges talked about choice and dependence. For offences involving methamphetamine ( $n = 18$ ), judges emphasised dependence in 67% cases and choice in 33% of these cases. In contrast, in cases where cannabis was a primary drug involved ( $n = 8$ ), judges emphasised choice in 75% of cases and dependence in only 25% of these cases. For offences involving alcohol ( $n = 19$ ), judges emphasised themes of dependence and choice more evenly across cases, 58% and 42% respectively.

### **Special circumstances**

If a judge decides to make a finding of special circumstances in their ruling, this has the effect of reducing the standard non-parole period so that an offender can spend a longer time under supervision on parole when they are released. This exercise in judicial discretion is for the purposes of assisting an individual to reintegrate into the community: it is not direction or diversion into a program but rather an opportunity for extended support. A finding of ‘special circumstances’ occurred in 59% of cases ( $n = 30$ ). In three cases the offender received a bond or order and in these cases a ruling of ‘special circumstances’ was not relevant as there was no period of imprisonment. The primary reasons for judges finding ‘special circumstances’ was for the purposes of rehabilitation generally (80%), to reduce the risk of institutionalisation (22%) and to get treatment for alcohol and other drug problems specifically (22%). Most judges provided more than one reason for the finding (63%). A detailed list of reasons stated by judges for a finding of special circumstances is outlined in Table [4.2](#).

**Table 4.2***Reasons for Ruling of ‘Special Circumstances’*

Reason	N cases	%
Rehabilitation	24	80
Risk of institutionalisation	11	22
Drug and alcohol addiction	11	22
Accumulation of individual sentences	6	12
Age of offender	4	8
First custodial sentence	3	6
Ill health, disability or mental illness	3	6
Parity	1	2

Based on a subset of  $n = 30$  cases that found ‘special circumstances’. Percentages do not total 100% because judges regularly gave multiple justifications for reducing the non-parole period. The mean number of reasons for the ruling provided by judges was 1.14 (range 4.00). Reasons not explicitly cited by judges include protective custody, hardship to family members and sentencing according to past practices.

**Discussion**

This is the first study to examine judicial responses to young adult offenders charged with serious violence involving drugs and alcohol. These findings have implications for understanding how higher courts process young adult offenders as well as for interdisciplinary researchers utilising data in sentencing remarks. The study applied a mixed-methods analysis and examined themes through a health perspective.

Homicide and robbery were the most common offences, reflecting the serious nature of crimes processed through the higher (District and Supreme) courts. The most common motives for offences were financial and opportunistic with psychopharmacological and self-defence being less common. This is perhaps counter intuitive, and in contrast to detainee’s own attributions where more often they attribute the direct effects of their drug use to their offending behaviour with much fewer reporting economic reasons (Payne & Gaffney, 2012). Alcohol and methamphetamine were the primary drugs involved in violent crimes analysed,

in line with well-documented links between alcohol in violence (see Tomlinson et al., 2016 for review) and recent increases in young adults seeking help for methamphetamine use in Australia (Degenhardt et al., 2017; McKetin et al., 2014).

### **Sentencing characteristics and themes**

In their role, judges aim to balance competing objectives of risk mitigation and rehabilitation. However, this is especially challenging when sentencing young offenders charged with serious violent crime where there is evidence of mental health problems and substance use dependence. These findings show that judges in this sample were divided in their opinions around the role of drug use in violent crimes committed by offenders. Just under half emphasised more conservative views with a focus on offender agency in their choice to engage in alcohol or other drug use associated with the offence. Human agency has roots in criminological theory through links to rational choice theory and has been applied predominantly as a way of understanding crime desistance (Paternoster 2017). Judges who expressed views in this vein described criminal behaviour as goal-directed, wilful, determined and well thought out, a decision made to embark on drug use (knowing it would make them violent) therefore a decision made to commit violent crime. Despite evidence that people who are substance dependent have limited capacity to control or cut down their use (American Psychiatric Association, 2013), some judges are expressing a different understanding of this condition. A philosophical discussion about mental health, free will and moral responsibility as it applies to the law in this context is beyond the scope of this paper (Meynen & Oei, 2010). However, our findings are relevant because they show how judges are applying these considerations in their sentencing practice. In a number of the remarks analysed here, we find there is an expectation of control over use, despite clear markers of substance use dependence. The difficulty with treating substance use disorders is well known, with relapse common and in many cases an expected part of the recovery process (Chassin, 2008). In fact, clinical diagnostic criteria for substance use disorders explicitly states how the inability to reduce or cease use (despite a desire to do so) is



characteristic of such dependence (American Psychiatric Association, 2013). This highlights a disconnect between some judges’ views on this and how, from a health perspective, we have come to understand these issues.

Rehabilitation as an aim in sentencing was further explored through whether or not judges made a finding of ‘special circumstances’. If certain criteria are demonstrated by an offender a judge can make a ruling of special circumstances where they adjust the normal statutory ratio to extend the parole period so the offender can have a longer period of supervision in the community when they are released. This period of supervision (parole) is usually for the purposes of assisting with reintegration and rehabilitation, among other reasons. In the current study, the ‘special circumstances’ option was used in the majority (59%) of cases but not the overwhelming majority. When a finding of special circumstances was made, it was most often for rehabilitative purposes (80%). Previous research also highlights that the various criteria relating to special circumstances (i.e., mental health and substance use problems, significant disadvantage, poor health and risk of institutionalisation) are commonplace among people coming into contact with the criminal justice system and hardly indicate an unusual case or experience (Poletti & Donnelly, 2013). This is consistent with the current sample where offenders overwhelmingly had significant histories of psychopathology, drug abuse and general disadvantage. The judges in this study commonly expressed compassionate views about how dependence on a drug (typically alcohol and/or, methamphetamine) can contribute to offending behaviour. However, even in the context of these concessions, the capacity of the courts to rationalise such serious conduct is of course limited. Despite recognising how the moral culpability of an offender is somewhat reduced by a background of deprivation, judges in the sample conceded that intoxication could not reasonably be conceptualised as excusing an offender’s violent acts. These findings contribute to this body of work dedicated to teasing apart this complexity around interpreting intoxication and how this is managed in legal practice and settings (McNamara et al., 2017).

It is accepted that diversion from the traditional court process is not always an option, and exclusion from diversionary treatment does not mean that a violent offender won’t receive treatment in custody. While judges can make recommendations for rehabilitation and treatment, these plans are ultimately decided on entry to prison and determined based on individual risk and need assessment tools (Hall, 2017; Sotiri, 2003). The separation of criminal justice processes makes it difficult to determine the extent to which sentencing recommendations are put into practice. In contrast to the Children’s Court (Richards et al., 2017) and drug courts where mandatory treatment and close judicial oversight is the nature of the sentence (Weatherburn, 2008), rehabilitative treatment is not at the forefront in traditional correctional processes. The purpose of the courts and judges’ objectives in sentencing differ from those of Corrections, which are more specific and targeted, “more about security and safety, tangible and measurable goals, and not so much about the philosophical aims of sentencing” (Hall, 2017, p. 19).

Despite their youth, few of the individuals in this study were first-time offenders and most had extensive criminal histories. Indeed, research shows that serious or prolific offenders are more likely to be young, male, and have a juvenile criminal history (Nelson, 2015). Conceptions of dangerousness, deterrence and seeing ‘justice to be done’ are weighed by judges based on the facts presented to the court and are considered alongside an offender’s prospects of rehabilitation. Within reason and practical limitation, the evidence analysed here suggests that judges in this sample are considerate of the principle proposed by King CJ, often quoted and paraphrased, that effective rehabilitation not only contributes directly to community protection but is critical for averting the establishment of antisocial trajectories, especially among young people who offend (*Yardley v Betts*, (1979) at 33).

Recognising the limitations of judicial power in ensuring their rehabilitation-focused sentencing recommendations are carried out in practice, it remains important that rehabilitation is a narrative in the sentencing process. It is notable that the majority of judges in this study (88%) referred to expert recommendations for treatment and pre-sentence

reports in their remarks. Many offenders in this sample presented with significant histories of trauma, some for whom an antisocial lifestyle was normalised, accepted and modelled from early childhood. Our analysis found that most judges assumed a compassionate position in sentencing, taking into account the impact of substance use dependence on individuals and their offending behaviour. A compassionate stance in sentencing is distinct from narratives of pity, it is not in any way ‘soft’ and it is not incompatible with aims of community safety. Hopkins and Bartels (2019) situate compassion as foundational to therapeutic jurisprudence, defining it as the practise of turning towards the suffering in ourselves and others, rather than simply facing or knowing it is there. In this context, a compassionate stance takes into account how multiple forms of marginalisation intersect and compound, forming barriers to desistance and recovery. A rehabilitative purpose in sentencing is an expression of commitment to equality with respect to difference across persons (Judicial college of Australia, Bronitt & McSherry 2017; Hopkins & Bartels 2019). It is encouraging that the majority of judges in this study are exercising compassion, within and despite the confines of a system traditionally geared towards punishment and efficiency. Our findings support those summarised by Anleu and Mack (2013) where 60% of judges and magistrates agree compassion is essential or very important in their practice.

Narratives of compassion and rehabilitation show recognition and hope that there is potential for reintegration into the broader community. This carries with it the caveat that offenders receive support to address factors that contribute to their offending behaviour, such as drug and alcohol dependence and mental health problems. The extent to which rehabilitation is an aim in sentencing repeat offenders reflects also on the wider community and its response to individuals who, overwhelmingly, have been significantly impacted by their own experiences of disability, neglect, abuse and maltreatment. Slowing the revolving prison door means turning towards those who are subject to punishment with an ‘open heart’ (Bartels & Hopkins, Forthcoming) and prioritising targeted rehabilitation and support for first-time, repeat and serious violent offenders at various points in their pathway (NSW

Sentencing Council, 2015). Further work is needed to identify ideal points and methods of intervention for greatest impact in reducing violent offending among young people with substance use problems (Baldry et al., 2012).

### **Limitations and Directions for Future Research**

The representativeness of the findings here are limited to the sample used. The data relate to some of the most serious and significant crimes sentenced between 2014 and 2017. The detailed rulings, with judges’ remarks, are published for the purposes of public interest, professional reference and to inform future precedent. The judgments analysed in the study are limited to reported judgments and are not a direct representation of the total number of judgments that are processed through the higher courts or crime rates in the Australian community. As the findings here pertain to serious crimes processed through the higher courts, future research could examine these themes within the lower courts, where 92.3% of defendants in NSW courts appear (Gotsis & Dobson 2018). The sentencing remarks analysed here are freely available through AustLII and are determined by how higher court judges decide to publish on NSW Caselaw. The majority of Supreme Court decisions are published on Caselaw as it is mandatory for judges in the Supreme Court to publish their decisions unless there is a good reason not to i.e., the information relates to an ongoing matter and publishing it will interfere with future court proceedings. Approximately 45% of District Court judges publish their judgments online, with some publishing most of their decisions and some publishing very few. There are individual differences between judges in terms of their reasons for sentencing and in terms of what information they consider relevant and important to include in their judgments. Ultimately, some level of consistency in structure is desirable. Most judges will include an overview of the facts, background to the offender and the offence, mitigating and/or aggravating factors and their (brief or detailed) reasons for sentencing. Such information is of interest in the current study.

This study could also be extended by examining the impact of judicial training in substance use, mental health and trauma. As there was a divide in views expressed by judges

in this study it would be worthwhile investigating whether enhanced understanding of the nature of mental disorders and substance dependence through training impacts on judges’ considerations in sentencing. Research shows that compassion training has great potential to reduce burnout, unconscious bias and vicarious trauma among judges (Hopkins & Bartels 2019). There is also potential for such training to facilitate expansion of the therapeutic justice approach that currently operates only within the confines of specialist courts such as drug courts, mental health courts, Koori courts and domestic violence courts (Freiberg, 2002). It is acknowledged that judicial opinions cannot reflect ‘truth’ or real-world facts and can be understood as each individual judge’s story justifying their decision through the provision of a selective and subjective subset of the facts (Hall & Wright, 2008). Despite this, it is important to study the behaviour of judges in reported judgments because these remarks are referred to in future cases and can influence rulings in future trials. The judgments themselves provide no insight into whether the judge’s objective of rehabilitation (i.e., an offender receiving treatment for alcohol or other drug use dependence) is actually addressed after their judgment is delivered. This is a separate piece of work.

## **Conclusion**

This study found that although judges may express conservative views around the relationship between drug use and violence, the majority prioritise rehabilitation as an aim in sentencing. It is encouraging that in just over half of the remarks analysed, judges expressed compassion towards offenders and acknowledged the impact of drug and alcohol dependence on offending and violent behaviour. Structural barriers to prioritising rehabilitation for violent offenders limit the potential of this important philosophical aim in sentencing. Increased transparency could be achieved through improved coordination between siloed services and systems and better sharing of information across relevant agencies from sentencing to corrections and beyond. Building the evidence base and increasing access to and implementation of effective treatment options for this group must be a priority if there is to be a public health approach moving forward. These findings reflect competing goals and

priorities among a subset of the judiciary in managing risk, and judges’ efforts to balance objectives of deterrence, punishment and rehabilitation in sentencing young violent offenders who use drugs.

## **Conflicts of Interest**

The authors declare they have no conflicts of interest in this study.

## **Acknowledgements**

The authors would like to thank and acknowledge the following people who provided guidance, expertise and support in the development of this manuscript: Dr Kari Lancaster (University of New South Wales); Associate Professor Philip Chung (AustLII); Dr Danielle Tyson (Deakin University) and Ms Leanne Piper (University of New South Wales).

This research was funded by the University of New South Wales Scientia PhD Scholarship and the Matilda Centre PhD Scholarship (SL).

## **Ethical Approval**

This research was approved by the University of New South Wales (HC180064) and the University of Sydney (2018/875) Human Research Ethics Committees.

**PAPER FOUR: The Long-Term Effectiveness of a Selective,  
Personality-Targeted Alcohol Use Prevention Program on  
Aggression and Violence During Adolescence and Young  
Adulthood**

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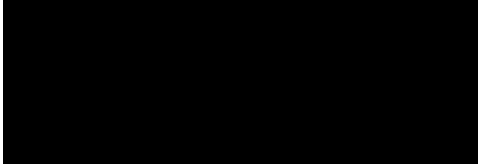
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5 January 2021

## Preamble

As demonstrated, hazardous alcohol use is important in the development of aggression in youth – but this is not the whole story. Paper 3 exposes the distinctive role of alcohol in serious violent crime yet indicates that current responses are limited by lack of understanding and poor integration between health and justice settings. Paper 2 demonstrated that early life experiences and personality factors such as impulsivity are related to violent crime in young adulthood but the proximal influence of alcohol plays an important role. Paper 1 shows the interconnection between trajectories of alcohol and aggression with evidence these reciprocal relationships are strongest in early adolescence. Together, this body of work points to the need to intervene ahead of time, before comorbid aggression and hazardous alcohol use is entrenched or culminates in severe manifestations by young adulthood, such as demonstrated in paper 3. Prevention initiatives that target shared underlying psychopathology common across alcohol use problems and aggression may be especially effective for reducing aggression among high-risk young people, however this has yet to be formally tested. Further, no studies to date have examined the long-term impact of a prevention program on aggression from adolescence into young adulthood. Therefore, the following and final study sought to address these gaps. Paper 4 examined the long-term effectiveness of the personality-targeted substance use prevention program *Preventure* on aggression.

## Abstract

**Background:** Aggression and violence among young people is of critical concern. This study examined the secondary effects of a personality-targeted alcohol use prevention intervention on aggression and violence in young people over a 7-year period (ages 13–20).

**Methods:** A cluster randomised controlled trial was conducted to compare the secondary effects of the selective *Preventure* program ( $n = 4$  schools) to an education as usual control ( $n = 5$  schools). Students who screened as high risk on four personality risk profiles for psychopathology and substance use (i.e., impulsivity, anxiety sensitivity, sensation seeking and negative thinking) were included in the analyses. Comprehensive self-report assessments were administered between 2012 and 2019 (baseline, 6 months, 1-, 2-, 3-, 5.5- and 7-years). Long-term outcomes of overall aggression and aggression subtypes (proactive, reactive) were examined using multilevel mixed effects analysis. Hierarchical logistic regression was applied to examine intervention effects on violence perpetration in young adulthood.

**Results:** A total of 339 students ( $M$  age = 13.02 years,  $SD = 0.42$ ,  $range = 12-15$ ) from 9 Australian schools were included in the analysis. Those who received the *Preventure* intervention demonstrated an increased rate of decline in total aggression ( $b = -.42$ ,  $p < .000$ ), reactive aggression, ( $b = -.22$ ,  $p = 0.000$ ) and proactive aggression ( $b = -.14$ ,  $p = 0.002$ ) compared to control, across the 7-year follow-up period. There were no significant differences between groups for violence perpetration in young adulthood.

**Conclusions:** Findings demonstrate the long-term benefits of a personality-targeted alcohol use prevention intervention in reducing aggressive behaviour from adolescence into young adulthood.

## Introduction

Aggressive and violent behaviour among young people is a serious societal challenge that has become an increasingly studied area in recent decades. Longitudinal research conducted internationally has indicated that between 17% and 28% of adolescents are involved in perpetrating aggressive acts (Henriksen et al 2020; Patalay & Gage, 2019). Most young people demonstrate declines in aggression throughout adolescence however some experience spikes in antisocial behaviour during this formative time that can have long-lasting impacts (Hussong et al., 2004; Moffitt et al., 2002; Tremblay, 2015; Tremblay et al., 2004). While normative aggression can have important evolutionary and adaptive purposes, maladaptive aggression has been associated with a range of negative outcomes for young people, including poor academic performance and social functioning, school dropout, alcohol and drug use, and incarceration (Bobadilla et al., 2012; Lawler, Stapinski, et al., 2020; Vitaro et al., 2006). Heightened aggression early in life is also strongly related to a range of harms in adulthood including violent behaviour, criminal justice involvement and mental health and substance use problems (Fite et al., 2010; Loeber & Hay, 1997; Marcus, 2007b; Odgers et al., 2008).

Aggression is not a unidimensional construct and previous research has emphasised the importance of differentiating between reactive and proactive functions of aggression, particularly in young people (Fite et al., 2007; Ostrov et al., 2013; Raine et al., 2006). Reactive aggression has been described as a ‘hot’ form of aggression which occurs as a defensive response to behaviour perceived as threatening or intentional (Bobadilla et al., 2012; Dodge, 1991). It is conceptualised as impulsive, retaliatory behaviour often characterised by elements of anger, negative emotionality and hostility (Card & Little, 2006; Fite, Colder, et al., 2008). Proactive aggression, on the other hand, has been described as a ‘cold’, calculated form of aggression which is often goal-oriented and occurs in the anticipation of self-serving outcomes (Bobadilla et al., 2012; Raine et al.,

2006). This distinction has been supported by studies using factor analyses that have delineated reactive and proactive functions of aggression in children and adolescents (Dodge & Coie, 1987; Poulin & Boivin, 2000; Raine et al., 2006).

Persistent aggressive behaviour during adolescence can indicate more serious psychopathology and accounts for a significant proportion of referrals for psychological services (Fite et al., 2010; Hubbard et al., 2010; Ostrov et al., 2013). Aggression commonly co-occurs with alcohol and other drug use during adolescence (Lawler, Stapinski, et al., 2020; Wells et al., 2007) and these behaviours can be expressions of the same externalising psychopathology. However, there is individual variation in how and why these relationships co-occur (Krueger et al., 2007). Research shows externalising traits such as impulsivity and sensation seeking can be motivators for aggressive behaviour, and reactive and proactive aggression in particular, during adolescence (Pérez Fuentes et al., 2016) whereas there is less support for the influence of internalising traits such as depressed mood (Marcus, 2007b). Nevertheless, aggression among young people remains a critical target for prevention efforts.

It is now widely acknowledged that substance use and mental health problems can share underlying psychopathology that increases risk for other problem behaviours such as aggression (Castellanos-Ryan & Conrod, 2011). Prevention initiatives aiming to reduce harm from these behaviours often target similar risk factors and successful interventions share common characteristics. Effective approaches tend to incorporate cognitive behavioural therapy (CBT), motivational interviewing (MI), targeting of known risk factors and the development of coping, social and problem-solving skills (Cox et al., 2016; Kovalenko et al., 2020; Teesson et al., 2012; Valente et al., 2020). Most violence-prevention interventions are delivered universally (Cox et al., 2016) whereas selective interventions differ by only targeting young people who are indicated as high risk for emotional and behavioural problems. The *Preventure* program is a personality-targeted substance use prevention program that is tailored specifically for at-risk young people. Young people are invited to participate in the *Preventure* intervention based on their scores on the Substance Use Risk

Profile Scale (SURPS) (Newton, Barrett, et al., 2016; Woicik et al., 2009). The SURPS is a personality questionnaire that measures four personality risk profiles associated with increased risk for mental health and substance use problems. These are impulsivity (i.e., acting on the spur of the moment, poor response inhibition), sensation seeking (i.e., elevated need for stimulation and inability to deal with boredom), hopelessness (i.e., depressed mood, worthlessness, negative beliefs about self and the world) and anxiety sensitivity (i.e., sensitivity to anxiety-related physical sensations) (Conrod et al., 2006; Newton, Barrett, et al., 2016). Young people who score one standard deviation over the school mean (approx. 45% of the population) on at least one of four personality risk profiles are invited to participate in the brief intervention. *Preventure* provides personality-specific support to these high-risk adolescents via a two-session brief intervention incorporating best practice principles (i.e., CBT, MI). Evaluations of the *Preventure* program have demonstrated its efficacy in reducing internalising symptomology and externalising problems among adolescent students, such as depression, alcohol-related harms, delinquency and truancy (Castellanos-Ryan & Conrod, 2006; Conrod et al., 2006). Previous research has also demonstrated the benefits of *Preventure* in reducing conduct problems and bullying in adolescents (Kelly et al., 2020; Newton, Stapinski, Teesson, et al., 2020; O’Leary-Barrett et al., 2013). However, the efficacy of *Preventure* to impact on aggression has not yet been established.

Finding novel approaches that effectively prevent aggression and violence is critical as few interventions with established effectiveness exist (Cox et al., 2016; Matjasko et al., 2012). Further, no studies to date have examined the long-term effectiveness of a school-based intervention on aggression across a seven-year period (Kovalenko et al., 2020). This study aims to evaluate the efficacy of the *Preventure* intervention on aggression from adolescence (age 13) into young adulthood (age 20). By targeting shared personality risk factors for aggression, substance use and mental health there is increased potential to impact across multiple problem behaviours that commonly co-occur and exacerbate each

other. Many young people with heightened aggression will not come to the attention of support services or receive targeted psychotherapy when they need it most. A preventive approach is required to avert transition to significant mental health or substance use problems and engagement with the criminal justice system. It is critical to determine whether a brief intervention delivered in early adolescence can have a lasting impact on aggression into young adulthood.

## **Methods**

### **Study design**

The current study examined data collected as part of a four-arm cluster randomised controlled trial (RCT) designed to investigate the relative effectiveness of universal, selective and combined (universal + selective) school-based interventions to prevent alcohol use (the Climate and Preventure [CAP] Study) (Newton et al., 2018; Newton et al., 2012). A total of 27 schools in New South Wales and Victoria participated in the CAP study, however only data from independent schools ( $n = 9$ ) that were randomised to *Preventure* ( $n = 4$  schools) or control ( $n = 5$  schools) were analysed for the current study. Only students from independent schools were included in the analysis because students from public schools did not complete the Reactive–Proactive Aggression Questionnaire due to ethics requirements.

Young people who provided informed consent and whose parents also provided passive consent were eligible to participate. A self-report questionnaire was administered across seven occasions from baseline to 6 months, 1-, 2-, 3-, 5.5- and 7-years. Student responses were linked over time using a unique identification code to ensure confidentiality. Detailed information about the study design, sample size calculations, recruitment, randomisation and consent procedures have been described previously (Newton et al., 2018; Newton et al., 2012). Ethical approval was granted by the University of New South Wales Human Research Ethics Committee (HREC 2018/845), the University of Sydney (2018/845), the Sydney Catholic Education Office (Ref: 772), and the New South Wales Department of Education and Training (SERAP 2011201). The trial is registered with the

Australian New Zealand Clinical Trials Registry (ACTRN12612000026820). The substance use outcomes of the CAP study, and primary alcohol use outcomes for Preventure, have been reported elsewhere (Conrod et al., 2013; Newton, Conrod, et al., 2016; Newton, Stapinski, Slade, et al., 2020; Teesson et al., 2017).

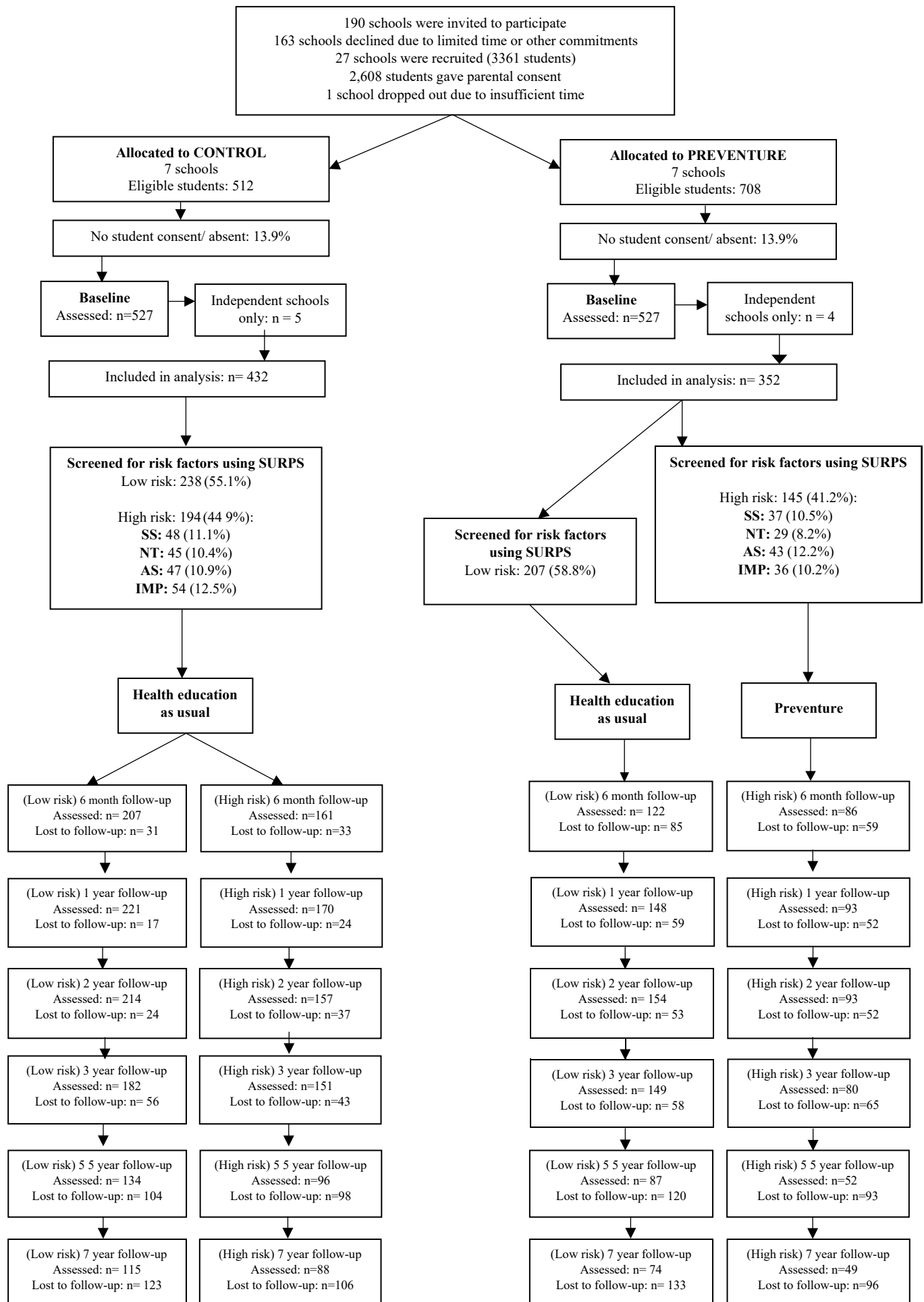
### **Participants**

The Consolidated Standards of Reporting Trials (CONSORT) diagram summarises participant flow and retention rates through the study for each condition (see Figure [5.1](#)). The current study examines data obtained from 339 year eight students who were attending school in 2012 and who were randomised to receive *Preventure* ( $n = 145$ ) or education as usual ( $n = 194$ ). Only high-risk students were included (identified by scores on the Substance Use Risk Profile (SURPS) as only high-risk young people were selected to receive the Preventure intervention.



**Figure 5.1**

Trial Profile—CONSORT Figure for Participant Flow in the Preventure and Control Groups Clustered Within Independent Schools Only, at Baseline, Immediate Post-Test, and 12-, 24-, 36-Month Follow-Up



## **Intervention**

*Preventure* is a personality-targeted brief prevention intervention that is delivered to young people who identify with personality profiles that are associated with higher risk for emotional and behavioural problems, including alcohol and other drug use (Woicik et al., 2009). These personality risk profiles include sensation seeking, impulsivity, hopelessness and anxiety sensitivity and are identified using the SURPS (Newton, Barrett, et al., 2016; Woicik et al., 2009). Students who scored at least one standard deviation above the school mean on the SURPS were allocated to one of the four personality risk profile groups. Young people who were classified as high on more than one risk profile were allocated to the group where they deviated most from the mean to receive the intervention most relevant to them. The *Preventure* intervention involved two 90-minute sessions delivered one week apart in school by trained facilitators (i.e., Clinical Psychologist and co-facilitator with a minimum training of Bachelor of Psychology with Honours). Core intervention components are CBT and motivational interviewing techniques to assist participants in understanding and modulating maladaptive thoughts, feelings and behavioural responses specific to their personality style, practice goal setting and discuss alternate coping strategies. Young people are provided with guidance in challenging personality-specific cognitive distortions (e.g., in the impulsivity group this includes over attribution of hostile intent) that lead to risky behaviours (e.g., aggression) and identifying trigger points (e.g., ‘hot thoughts’). Further information about the *Preventure* intervention is detailed elsewhere (Conrod et al., 2013; Newton et al., 2012).

## **Measures**

### ***Demographic information***

Participants were asked to report demographic information including age, gender, country of birth and socio-economic status. Socio-Economic Status (SES) was measured through the Index of Community Socio-Educational Advantage (ICSEA) which is a measure

of socio-economic advantage that has been calculated for most schools in Australia. ISCEA scores are mean centred so scores above zero indicate the student attends a school with an above average ISCEA score and scores below zero indicate the school has a below average ISCEA score.

### ***Personality***

The SURPS (Woicik et al., 2009) is a 23-item scale that examines personality-related risk factors for mental health and substance use problems. The tool measures four dimensions of personality: impulsivity (e.g., I often don’t think things through before I speak); sensation seeking (e.g., I enjoy new and exciting experiences even if they are unconventional); hopelessness (e.g., I feel that I am a failure) and anxiety sensitivity (e.g., I get scared when I experience unusual bodily sensations). The SURPS is scored on a four-point Likert scale (strongly agree – strongly disagree). Continuous measures of each personality risk profile were used in the initial ANOVA of baseline differences in aggression, with higher scores on each dimension indicating a higher extent of agreement with items measuring that construct. The relationship between the SURPS profiles and emotional and behavioural problems has also been validated among Australian adolescents (Newton, Barrett, et al., 2016).

### ***Aggression from adolescence to young adulthood***

Aggression was measured using the Reactive–Proactive Aggression Questionnaire (Raine et al., 2006). The scale has 23 items pertaining to aggression (11 reactive, 12 proactive) to which there are three possible responses (never, sometimes, often) with scores ranging from 0 to 46. The scale has good cross-cultural validity and reliability (Fung et al., 2009) with higher scores indicating higher levels of total, proactive and reactive aggression. Proactive items include ‘hurt others to win a game’ or ‘had fights to show who was on top’ whereas reactive items included ‘reacted angrily when provoked by others’ or ‘have gotten angry when frustrated’. Composite scores on total, proactive and reactive aggression were used to measure the outcomes of the intervention on aggression in this analysis. Internal

reliability for the total, reactive and proactive aggression scales at baseline was high (Cronbach’s alpha = .92; .89 and .87, respectively).

### ***Self-reported violence in young adulthood***

Violent behaviour in young adulthood was measured using a subset of questions from the standardised instrument developed for the National Youth Survey and National Institute of Justice multisite surveys (Elliott & Huizinga, 1989). The tool has been implemented widely and reliably in longitudinal research examining the development of violent and non-violent risk behaviours among young people around the world (Arseneault et al., 2000; Loeber et al., 2017; Najman et al., 2019; Pechorro et al., 2019). The brief measure is comprised of seven items that relate to common violent offences including simple and aggravated assault (hit someone, attacked someone with/without a weapon), robbery, gang fighting and sexual assault. Past-year violent behaviour was measured in the long-term follow-up only (5.5 and 7 years) (Newton et al., 2018). Items were summed to create a continuous measure (ranging from 0 to 7) however due to heavy skewness a binary outcome was created for each of the long-term follow-up occasions (any violence reported, yes/no). These were then combined to create a binary variable for any violence reported in young adulthood (age 18–20) to be used as the outcome for young adult violent behaviour in this analysis.

### **Statistical analyses**

Analyses were conducted in Stata IC 16 (StataCorp, 2019). Three stages of data analyses were applied. In the first stage, a one-way ANOVA was run to determine statistical differences between low-risk and high-risk young people on baseline aggression.

In the second stage, multilevel mixed effects analysis for repeated measures was estimated to examine the effects of *Preventure* on aggression. Mixed effects models are a rigorous approach to examining change over time across different treatment groups as well as assessment of individual-level change over time. This approach is appropriate for data that is hierarchical (i.e., where students sampled within classrooms/schools) such that the

specification of a random intercept allows variation at the individual level and specification of random effects at the school level account for differences across schools. As the data are clustered, multilevel mixed effects models were estimated across three levels with change over time nested within students and then with students clustered within schools. This approach uses baseline scores as the reference point and estimates are based on participant-specific starting points and change over time (Gueorguieva & Krystal, 2004). The most appropriate model (e.g., categorical, linear, quadratic) was determined using the likelihood ratio tests which were compared to the unconditional models. The covariance structure (e.g., auto-regressive) was selected using the fit statistics Akaike and Bayesian Information Criterion (AIC/BIC) with the lower estimate indicating the more parsimonious and suitable model (Singer & Willett, 2003). For all three models (reactive, proactive and total aggression) the linear model and the auto-regressive residual covariance structure were selected as the best fitting structures for the data. Intervention type was dummy coded (Control = 0; Preventure = 1). Time was coded as a discrete variable representing time periods of six months across the seven follow-up time points (0, 1, 2, 4, 6, 11, 14). A condition by time interaction was included (group  $\times$  time) to examine the difference between the two conditions in relation to changes in aggression over time. All models included a random intercept and gender as a covariate to control for baseline differences. Random slopes were added to see if this improved model fit. There was evidence to include a random slope in addition to the random intercept for the reactive and total aggression models but not the proactive aggression model. Models were based on the intention to treat principle, with all high-risk students allocated to the Preventure or Control group included in the analysis ( $N = 339$ ). Mixed models were estimated with the stata command *xtmixed*, marginal means were calculated with the *margins* command and graphs were created using the *marginsplot* command. Effect sizes for significant interaction effects were calculated using Cohens  $d$  (Feingold, 2013).

In the final stage, a mixed effects logistic regression was run to determine whether the odds of self-reporting violence in young adulthood (age 18–20) differed significantly depending on whether a young person received the intervention. Models were estimated across two levels (individuals within schools) and 15 integration points were used. All high-risk students who received *Preventure* or Control and who reported on the violence outcome in the long-term follow-up were included ( $N = 155$ ). The outcome measure was a binary indicator of violent behaviour reported at the 5.5- and 7-year follow ups (any violence = yes/no). Gender and baseline aggression scores were included as covariates. Baseline aggression was controlled for as a proxy for tendency towards violence because the violence outcome measure was only included in the long-term follow-up surveys (5.5- and 7-years post baseline). Mixed effects logit models were run using the stata command *xtmelogit*.

Power calculations based on the original trial (Newton et al., 2012) were powered to detect a small effect size of 0.3 assuming four time points. The power analysis for the current study were conducted post hoc. Based on the original sample size power calculations, this study (with seven time points) is powered to detect a small effect size (0.3). Further, a conservative estimate of 30% attrition across follow-up occasions results in a minimum of 260 students ( $n = 130$  per group) required to detect a moderate effect size which can be expected based on the existing international literature (Matjasko et al., 2012).

### **Missing data**

Missing data were handled through maximum likelihood estimation based on the baseline intention to treat principle which includes all young people in the study ( $n = 339$ ). Maximum likelihood estimation is widely accepted and commonly used approach to managing missing data in longitudinal analyses of health risk behaviour such as substance use problems among young people (Champion et al., 2018). The approach is advantageous as it utilises all available information about a person rather than omitting cases with less complete data. Maximum likelihood estimation assumes missing data are missing at random (MAR) meaning any correlates of missingness are captured by observed variables in the

model (such as covariates or assessment of outcomes at earlier time points) and are assumed to be independent of unobserved variables (Gueorguieva & Krystal, 2004). The MAR assumption is considered reasonable and safe in this circumstance as the analysis included several prior measurement occasions for key study variables and covariates (i.e. gender, baseline aggression) predictive of missingness.

## Results

### Sample characteristics

The mean age of participants ( $N = 339$ ) was 13.03 years ( $SD = 0.42$ , range 12-15) at baseline and 55.5% were male. Participants in the study came from above average socio-educational backgrounds according to the ICSEA scores ( $M = 7.26$ , range  $-85$  to  $50$ ,  $SD = 36.53$ ). Most young people in the sample were born in Australia (88.5%) with a small proportion of young people born in other English speaking (8.0%) and non-English speaking (3.6%) countries.

Young people were allocated to one of four personality risk profile groups based on their SURPS scores such as impulsivity (26.0%), sensation seeking (25.1%), hopelessness (21.8%) and anxiety sensitivity (26.6%). More male students were allocated to the *Preventure* condition (85.5%) compared to Control (33.0%).

### *Baseline personality profiles and association with aggression*

A one-way ANOVA was conducted to determine baseline differences on aggression between low-risk and high-risk young people. Young people in the control condition who scored as low risk on the SURPS ( $n = 445$ ) were compared to young people who screened high risk ( $n = 339$ ) for impulsivity ( $n = 90$ ), anxiety sensitivity ( $n = 90$ ), hopelessness ( $n = 74$ ) and sensation seeking ( $n = 85$ ). Dats is mean difference  $\pm$  standard error. The results from the ANOVA show there was a statistically significant difference between groups [ $F(4, 709) = 19.90$ ,  $p = 0.005$ ]. A Tukey post-hoc test revealed that young people who screened as high risk on impulsivity ( $6.07 \pm .82$ ,  $p = .000$ ) anxiety sensitivity ( $2.29 \pm .81$ ,  $p = .038$ ) and negative thinking ( $5.05 \pm .86$ ,  $p = .000$ ) risk profile groups reported significantly higher

levels of aggression at baseline compared to young people who screened as low risk.

However, there was no significant differences between low-risk young people and those who screened as high risk for sensation seeking on baseline aggression ( $2.13 \pm .81, p = .068$ ).

### ***Attrition analysis***

Most young people in this analysis (83.8%) completed surveys on two or more follow-up occasions. Attrition analyses were run to determine whether there were significant differences between young people with missing data for two or more follow-up occasions. Young people with partial data were more likely to attend a school with a lower ISCEA (SES) ranking ( $t(305) 2.134, p = 0.034$ ). There were no differences between individuals with less and more complete data on baseline aggression ( $t(46.29) -1.407, p = .166$ ), gender ( $t(337) 1.333, p = .183$ ), impulsivity ( $t(73.87) -1.983, p = .062$ ), hopelessness ( $t(78.53) -.529, p = .599$ ), anxiety sensitivity ( $t(70.96) -.140, p = .889$ ) or sensation seeking ( $t(77.61) .695, p = .489$ ).



**Table 5.1***Aggression and Violence Scores at Each Time Point*

Survey occasion	Time 1 Baseline	Time 2 6 months	Time 3 1 year	Time 4 2 years	Time 5 3 years	Time 6 5.5 years	Time 7 7 years	LT FU (T6&7)
N (% retained)	339 (100%)	247 (72.9%)	263 (77.6%)	250 (73.7%)	231 (68.1%)	191 (43.7%)	137 (40.4%)	
<i>Age (M, SD)</i>								
All	13.02 (0.42)	13.58 (0.51)	14.01 (0.42)	14.98 (0.38)	15.96 (0.37)	19.01 (0.43)	20.00 (0.50)	
<i>Total aggression (M, SD)</i>								
All	7.84 (6.94)	6.82 (7.40)	6.53 (7.36)	6.80 (7.67)	6.44 (8.06)	4.81 (4.71)	4.38 (5.03)	
Control	6.23 (5.27)	6.03 (6.42)	5.45 (5.96)	5.72 (6.25)	5.60 (7.36)	4.91 (4.98)	4.06 (4.28)	
Prevention	10.07 (8.25)	8.36 (8.82)	8.60 (9.16)	8.40 (9.17)	7.63 (8.85)	4.65 (4.23)	4.89 (6.03)	
<i>Reactive aggression (M, SD)</i>								
All	7.29 (4.71)	5.80 (4.68)	5.84 (5.11)	5.96 (5.06)	5.44 (5.10)	4.41 (3.60)	4.22 (3.41)	
Control	6.11 (3.99)	5.23 (4.05)	5.16 (4.44)	5.59 (4.68)	5.11 (4.79)	4.59 (3.64)	3.86 (3.02)	
Prevention	9.11 (5.15)	6.93 (5.59)	7.33 (6.12)	6.60 (5.63)	6.04 (5.62)	4.10 (3.52)	4.85 (3.96)	
<i>Proactive aggression (M, SD)</i>								
All	2.76 (4.02)	2.53 (4.17)	2.71 (4.57)	2.72 (4.47)	2.51 (4.92)	1.21 (2.11)	1.21 (3.04)	
Control	1.73 (2.73)	1.93 (3.20)	1.90 (3.23)	2.20 (3.71)	1.90 (4.19)	1.27 (2.38)	0.96 (2.10)	
Prevention	4.34 (5.06)	3.71 (5.44)	4.53 (6.33)	3.63 (5.45)	3.63 (5.90)	1.10 (1.50)	1.62 (4.19)	
<i>Past year violence (N, %)</i>								
All	-	-	-	-	-	16 (11%)	7 (5.4%)	22 (13.5%)
Control	-	-	-	-	-	10 (10.6%)	4 (4.9%)	14 (13.9%)
Prevention	-	-	-	-	-	6 (11.8%)	3 (6.3%)	8 (12.9%)

**Table 5.2**

*Prevention vs. Control Outcomes for Aggression: Coefficients, Effect Sizes and CIs from Multilevel Modelling Linear Change in Aggression from Baseline to 7-Year Follow-Up*

	<i>b</i>	95% CI		<i>p</i>	<i>Cohen's d</i>
		Low	High		
<i>Total aggression</i>					
Time effect (Control)	-0.18	-0.32	-0.05	0.009	-0.31
Time effect (Prevention)	-0.60	-0.77	-0.42	0.000	-1.05
Group × time interaction	-0.42	-0.64	-0.20	0.000	-0.73
<i>Reactive aggression</i>					
Time effect (Control)	-0.13	-0.21	-0.05	0.001	-0.39
Time effect (Prevention)	-0.35	-0.45	-0.26	0.000	-1.04
Group × time interaction	-0.22	-0.35	-0.10	0.000	-0.66
<i>Proactive aggression</i>					
Time effect (Control)	-0.06	-0.11	-0.00	0.041	-0.21
Time effect (Prevention)	-0.20	-0.27	-0.12	0.000	-0.70
Group × time interaction	-0.14	-0.23	-0.05	0.002	-0.49

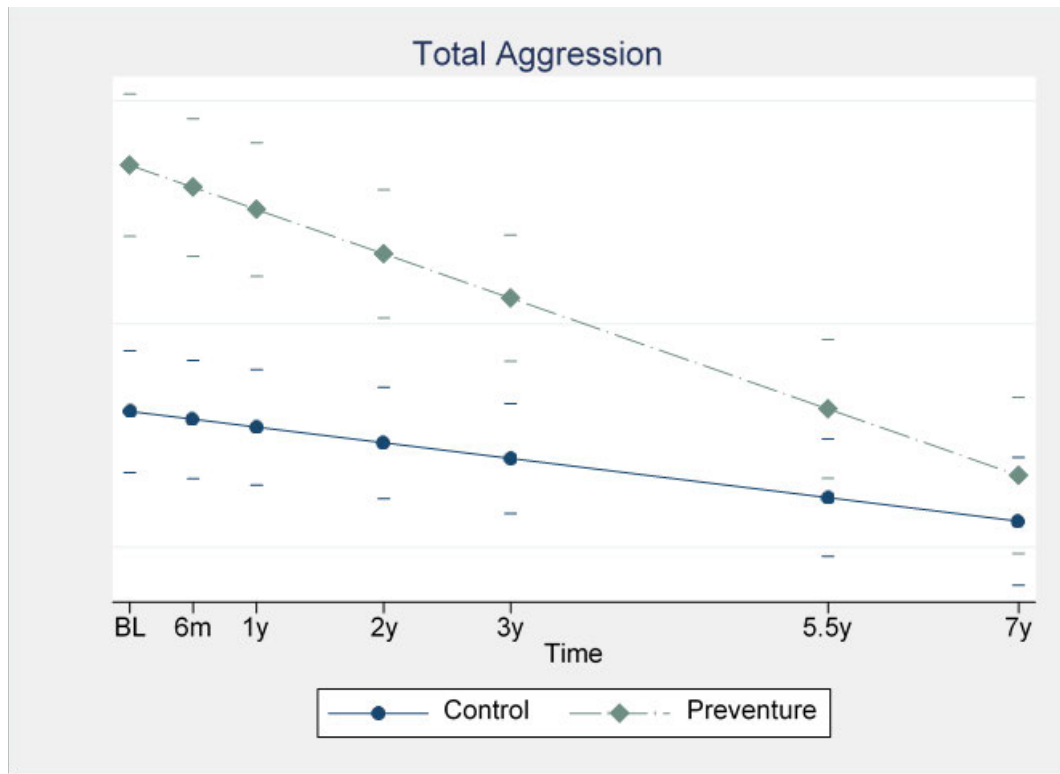
*Note.* Cohen’s *d* is the estimated effect size or standardised mean difference which was calculated based on the interaction between receiving Prevention vs. Control and time (Baseline – 7-years). Schools = 9, High-risk young people (*N* = 339).

### Multilevel modelling outcomes

The first step in model building involved estimating the function of change in aggression over time. Linear and quadratic models were compared, and the linear models provided the best fit for all three aggression trajectories (total, reactive and proactive aggression). Results from the multilevel modelling are reported in Table 5.2. Findings show that *Prevention* had a significant effect on aggression over the seven-year period. Young people who received *Prevention* demonstrated an increased rate of decline in total aggression compared the control condition (–.60 units every six months vs. –.18 units every six months, respectively) from baseline to 7 year follow-up ( $b = -.42$ ,  $CI = -.638$  to  $-.196$ ;  $p < .000$ ) (Figure 5.2). This is approaching a large effect size for the impact of the intervention across the seven-year period ( $d = -0.73$ ). Young people in the *Prevention* group also had an increased rate of decline in reactive aggression compared to the control condition (–.35 units vs –.13 units every six months, respectively) from baseline to 7 year follow-up ( $b = -.22$ ,  $CI = -.349$  to  $-.098$ ;  $p = 0.000$ ) (Figure 5.3). The size of the effect for receiving *Prevention* on reactive aggression was moderate ( $d = -0.49$ ). In addition, the rate of change in proactive aggression was also accelerated by receiving *Prevention* compared to control (–.06 units vs. –.20 units every six months, respectively) from baseline to 7 year follow-up ( $b = -.14$ ,  $CI = -.229$  to  $-.051$ ;  $p = 0.002$ ) (Figure 5.4). This equates to a moderate effect size for *Prevention* on proactive aggression ( $d = -0.66$ ). There was no significant effect of gender on changes in total, reactive or proactive aggression.

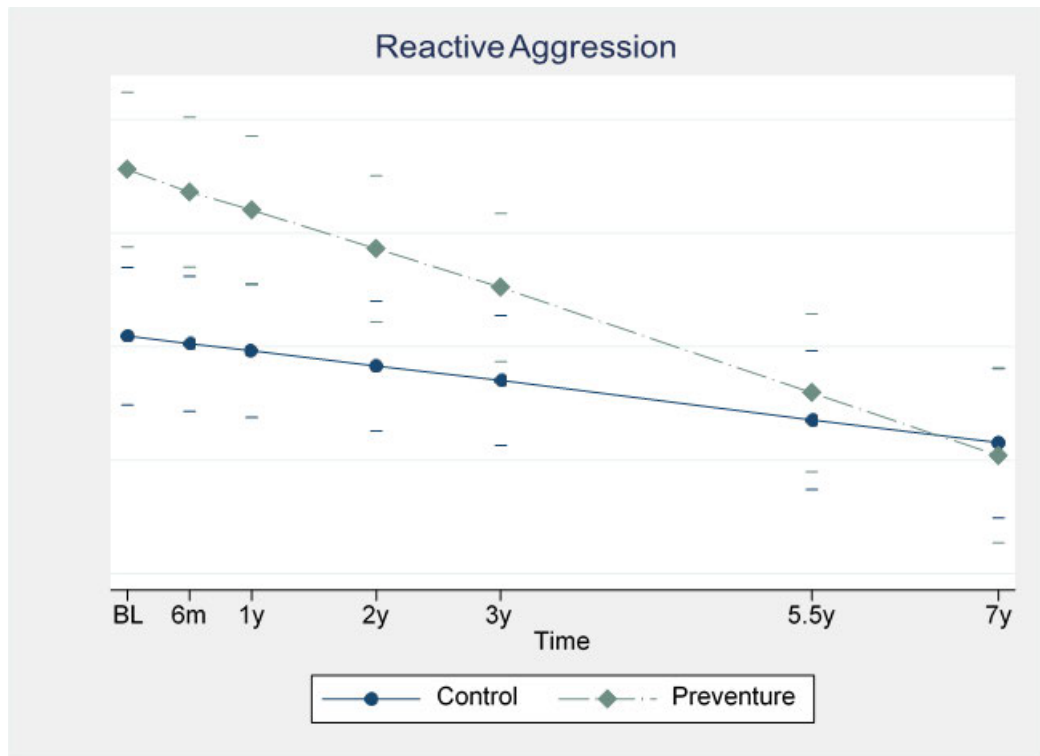
**Figure 5.2**

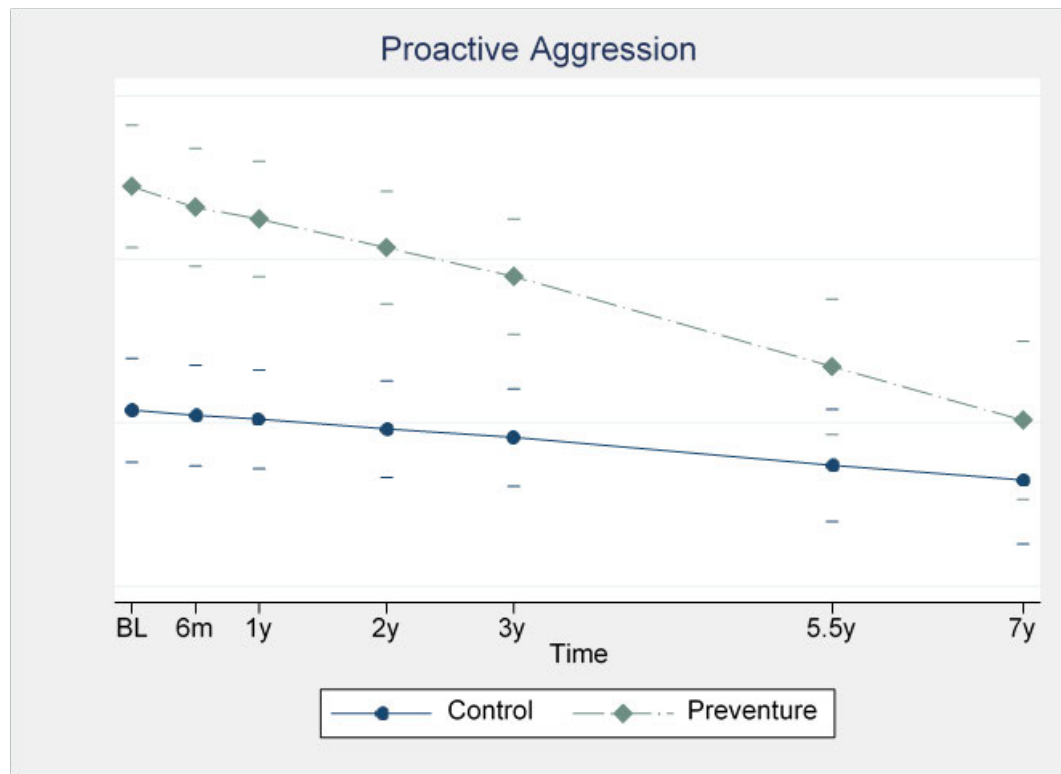
*Change in Total Aggression over Time by Condition*



**Figure 5.3**

*Change in Reactive Aggression over Time by Group*



**Figure 5.4***Change in Proactive Aggression over Time by Group***Mixed effects logistic regression**

Mean scores for past-year violence are reported in Table [5.1](#). As violent behaviour was measured in the long-term follow-up only (5.5- and 7-years post baseline) the mixed effects logistic regression model predicted any violence in young adulthood controlling for baseline aggression at age 13. The model was not significant ( $\chi^2 = 0.19, p = .907$ ) indicating no differences in self-reported violence in young adulthood (age 18–20) between young people who received *Preventure* and students in the control group.

**Discussion**

This study is the first to examine the effectiveness of a personality-targeted prevention program on aggression and violent behaviour. The study found that the *Preventure* program was effective in reducing aggression over the seven-year follow-up period. All young people in the study showed reductions in aggressive behaviours over time, however young people

who received the *Preventure* intervention demonstrated an increased rate of decline in aggression compared to those that did not receive the intervention. These results are consistent with previous research finding that *Preventure* is associated with decreases in conduct problems at three-year follow-up among Australian adolescents (Newton, Stapinski, Teesson, et al., 2020) and among high-risk bullies compared to control (Kelly et al., 2020). Intervention effects for *Preventure* in reducing conduct symptoms have also been found up to two years post baseline among young people in the United Kingdom (O’Leary-Barrett et al., 2013). To our knowledge, this is the first study to have demonstrated lasting effects of a school-based program on aggression from age 13 into young adulthood. This study contributes to the literature showing support for school-based programs in the prevention of aggression and violence carrying important implications for future interventions and research (Cox et al., 2016; Hahn et al., 2007; Kovalenko et al., 2020).

The significance of the adolescent years in the aetiology of future morbidity and wellbeing cannot be overstated. Reviews of the research tend to show small to moderate effects for school-based prevention of aggression and violent behaviour however long-term outcomes for programs are rarely assessed (Castillo-Eito et al., 2020; Kovalenko et al., 2020). These findings support past work showing that programs targeting high-risk young people and shared risk factors are effective in reducing aggression (Castillo-Eito et al., 2020). This may be related to the fact that targeted programs such as *Preventure* are commonly delivered by trained facilitators which is associated with increased effectiveness for school-based violence prevention (Castillo-Eito et al., 2020; Ttofi & Farrington, 2011).

The size of the effect of *Preventure* on overall aggression across the seven-year period was relatively large ( $d = -0.73$ ). This is significant, as existing evidence for selective violence-prevention interventions in Australia is weak and there is no evidence for school-based interventions in this space (Cox et al., 2016). Despite evidence for sustained effects of

*Preventure* on aggression over time, this study did not find any impact of the intervention on violence in the longer term, during young adulthood. This finding is similar to those reported in a nine year follow-up of young adults who participated in a community-based violence-prevention program, where long-term program impacts on violent behaviour were not detected (Oesterle et al., 2015). The low prevalence of violent behaviour in the sample and the impact of attrition at the long-term follow-up (59.6% at 7-years) cannot be ruled out as related. The null finding for violence may also indicate a qualitative distinction between aggression and violence that has important implications for the prevention of these behaviours. More intensive interventions may be required to impact on severe behaviours such as violence.

The results of this study provide support for both personality-targeted prevention and selective approaches that target common risk factors for shared psychopathology. This study highlights the potential to engage young people who may be demonstrating high levels of aggressive behaviours before they experience significant negative outcomes such as criminal justice engagement. While universal programs are (by definition) delivered to all young people regardless of risk, targeted prevention programs are delivered selectively, focusing on young people who are high risk for developing subsequent behavioural or emotional problems. Research shows that universal violence-prevention programs can have benefits but they tend to be more time and resource intensive (e.g., involving up to 15 sessions compared to two in *Preventure*) and long-term follow-up of school-based programs is lacking (Botvin et al., 2006). As a rule, universal prevention programs target known correlates of aggression such as cognitive factors (i.e., problem-solving, decision-making) and alcohol and other drug use (Cox et al., 2016). It makes sense that programs that are effective in targeting clustering risk factors (i.e., alcohol use, mental health) can have secondary effects on other behaviours (i.e., aggression) because of how closely related these behaviours tend to be. School-based approaches have appeal because you can provide developmentally appropriate skill



development and support to many young people who may have missed out otherwise. Rather than focusing on mental health or substance use in isolation, *Preventure* utilises principles from both CBT and MI to take a combined approach, targeting vulnerability profiles spanning across the externalising and internalising spectrums.

Compared to low-risk adolescents, young people who screened high risk for impulsivity, anxiety sensitivity and hopelessness (but not sensation seeking) reported significantly higher levels of aggression at baseline. This finding provides some insight into the potential mechanisms by which *Preventure* may be impacting on aggression outcomes. Previous research has shown that symptoms of anxiety and depression are associated with reactive aggression among young people (Fite et al., 2010). Further, previous work utilising the SURPS has demonstrated that impulsivity, but not sensation seeking, is associated with conduct disorder (e.g., rule breaking, fighting, bullying) in adolescence (Castellanos 2011 787) and that this relationship is partially mediated by poor response inhibition (Castellanos 2011 298). In *Preventure*, young people are guided through relevant personality-specific situations where they discuss and challenge cognitive and behavioural tendencies typical of their personality style (Conrod, 2016). Gaining better insight into their maladaptive coping strategies and learning how to consider alternate thoughts and behaviours may lead to a reduced likelihood of reacting aggressively. Further, young people high on impulsivity have poor response inhibition which can lead them into trouble (Castellanos-Ryan et al., 2011; Conrod, 2016). In *Preventure*, students safely explore personal situations where they acted impulsively and develop strategies for reducing anger and increasing their behavioural control, which could reduce their tendency for being aggressive (Conrod, 2016). While these findings provide some understanding of how *Preventure* may be effectively reducing aggression, further research using a larger sample could investigate aggression outcomes for each of the high-risk profiles.

While *Preventure* was effective in reducing reactive and proactive aggression over

time, the program appeared to have a stronger impact on proactive aggression compared to reactive aggression. There is overlap between reactive and proactive aggression subtypes, however research suggests they are quite different in how they are preceded, associated and driven (Hubbard et al., 2010). Young people high on reactive aggression behave aggressively in response to a perceived provocation or threat whereas proactive aggression is driven by a perception that aggressive behaviour will lead to positive outcomes. Programs that target the reward system may be more effective for these individuals because they respond less to costs and more to the benefits in perceived courses of action (Fite et al., 2014). Ultimately, the finding that *Preventure* had a moderate enduring impact on reactive and proactive aggression over the long term is important. Any intervention effects on proactive aggression are noteworthy given young people who score highly on this trait tend to be difficult to engage in treatment and there is a lack of evidence on what works with this population (Caldwell & Van Rybroek, 2013).

### **Limitations and Directions for Future Research**

This study has some limitations to acknowledge. The subsample analysed here was not powered to examine the effects of the intervention for each of the four high-risk personality profiles on aggression. It would be worthwhile exploring which personality profiles benefited most from *Preventure* in relation to aggression outcomes. There was a significantly higher proportion of male students in the *Preventure* intervention relative to control (86% vs 33%) which may explain higher average aggression scores at baseline for *Preventure* relative to control (10.07 vs. 6.23), as adolescent males tend to report higher rates of aggression compared to females (Smart et al., 2003). However, the analysis models take this into account by modelling change from participant-specific starting points and controlling for gender as a covariate. Future research should examine the mechanism through which *Preventure* is differentially effective for reactive and proactive aggression behavioural subtypes. Notwithstanding, this study provides a worthy contribution to the literature. The

inclusion of total aggression, subtypes of proactive and reactive aggression, and the violence outcome in young adulthood allows for a sensitive and developmentally appropriate exploration of the nature and severity of these risk behaviours in youth. The study is the first to assess the long-term impacts of a brief intervention on aggression into young adulthood and identify a prevention program that can effectively reduce aggression over a seven-year period.

## **Conclusion**

This study evaluated the long-term effectiveness of the *Preventure* program on aggression and violence among young people. Young people who received the intervention showed significantly greater reductions in total, reactive and proactive aggression from baseline to 7-year follow-up compared to control. These findings demonstrate the enduring impact of the personality-targeted intervention from early adolescence into young adulthood, providing strong support for the long-term effectiveness of school-based prevention on aggressive behaviour among high-risk young people.

## **Conflict of Interest Statement**

Professor Conrod is the developer of the *Preventure* program. Professor Teesson, Associate Professor Newton and Professor Conrod conceived of original Climate and *Preventure* study. Dr Stapinski and Professor Newton led the long-term follow-up. Ms Lawler, Dr Barrett, Dr Kelly, Dr Champion, Associate Professor Chapman and Associate Professor Slade declare that they have no potential conflicts of interest.

## **Acknowledgements**

The authors would like to acknowledge the contribution of Anna Smout, Jennifer Debenham, Marius Mather and Julia Boyle to this project and thank participants for their time. This study was funded by the National Health and Medical Research Council (NHMRC; APP1124958) and SL is supported by a Matilda Centre PhD Scholarship. EB is supported by the NSW Health Early-Mid Career Fellowships Scheme, funded by the NSW Ministry of Health. LS is supported by a NHMRC Translating Research into Practice Fellowship (GNT1132853). MT is supported by a NHMRC Principal Research Fellowship (GNT1041756; GNT1078407).

## **Clinical Trial Registration Information**

The CAP Study: Evaluating a Comprehensive Universal and Targeted Intervention Designed to Prevent Substance Use and Related Harms in Australian Adolescents; <http://www.anzctr.org.au/>; ACTRN12612000026820.

## General Discussion

Alcohol is commonly implicated in violent behaviour, but there is a lack of agreement on the developmental relationship between these behaviours during adolescence and young adulthood. This has limited the relevance and effectiveness of intervention efforts.

Adolescence and young adulthood are key periods of escalation in alcohol use and violent behaviour. Thus, a nuanced understanding is critical to inform effective health and justice responses to prevent the devastating impacts of aggression and violence around the world.

To provide much needed evidence for the relationship between, and prevention of, alcohol use, aggression and violence, this thesis examined the interconnection between these problems from developmental, justice and public health perspectives. Previous research was limited by a lack of prospective studies; limited evidence about the relative contribution of alcohol to violence in young adulthood; the few investigations into criminal justice responses to the alcohol–violence nexus in youth; and the sparsity of evidence supporting combined alcohol and aggression prevention for high-risk young people. This thesis addressed these gaps. A diverse range of quantitative statistical techniques and qualitative research methods were applied, resulting in a rich and comprehensive investigation into the topic. The research is truly interdisciplinary, bridging health and justice spheres to inform understanding and responses to this complex global public health challenge. The first empirical chapter (Paper 1) aimed to determine the precise developmental relationship between alcohol and aggression during adolescence, concluding that the relationship is strongest during early adolescence and is both reciprocal and directional. The second empirical chapter (Paper 2) isolated the role of alcohol in violence during young adulthood, confirming that hazardous alcohol use is independently associated with violence after controlling for early childhood adversity, impulsivity and psychological distress. The third empirical chapter (Paper 3) explored how the alcohol–violence intersection was considered in sentencing. It reported that while alcohol was prominent in the crimes analysed, judges expressed inconsistent views on the nature of

the relationship. Papers 1–3 provide new understanding about the development of aggression and violent behaviour in youth: calling attention to developmental windows of importance; situating hazardous alcohol use as the most significant proximal influence; exposing the limitations of current responses; and establishing a profound need for novel prevention initiatives targeting shared risk factors for aggression and substance use. The final empirical chapter (Paper 4) evaluated the long-term effectiveness of a personality-targeted substance use prevention program for high-risk young people. This study demonstrated that school-based prevention delivered in early adolescence can have a lasting impact on aggression into adulthood.

This final chapter will now discuss these findings in greater detail and situate this new knowledge in the context of the extant research. A discussion of the strengths, limitations, directions for future research and practical implications of the thesis will follow.

## **The Developmental Relationship Between Hazardous Alcohol Use and Aggressive Behaviour is Both Reciprocal and Directional**

Paper 1 examined the prospective relationship between hazardous alcohol use and aggression during adolescence, finding evidence for both reciprocal and directional relationships. On average, young people demonstrate declines in aggression over adolescence whereas rates of alcohol use tend to increase during this time. Despite these opposing normative trends, Paper 1 discovered that hazardous alcohol use and aggression develop in parallel. Findings within the broader literature also indicate that these behaviours are correlated and predict each other. However, Paper 1 has extended the evidence base by separating between- and within-person components of change to disentangle the developmental relationship between alcohol and aggression from ages 13–16. The application of novel and sophisticated statistical analysis allowed for disaggregation of the relative dynamics of change (at adjacent time points and over time) to identify ideal points of opportunity for intervention and prevention.

Paper 1 reported that changes in aggression and alcohol use during adolescence appear to prospectively affect each other, but in different ways. Heightened aggression predicted subsequent spikes in hazardous alcohol use (i.e., age 13 aggression levels predicted age 14 hazardous alcohol use) but hazardous alcohol use did not directly influence subsequent aggression at the following measurement occasion. This supports previous Australian research showing that heavy alcohol use predicted concurrent but not subsequent delinquent behaviour during adolescence (Miller et al., 2015). These findings align with experimental and laboratory research indicating that the dose-dependent effects of alcohol use on aggression are immediate rather than delayed (Exum, 2006). There is evidence for a delayed effect of alcohol on aggression during withdrawal. However, this is a short-term physiological reaction rather than a long-term developmental process of interaction and change (Boles & Miotto, 2003). Paper 1 also discovered that overall linear growth in alcohol

use between early and mid-adolescence (ages 13–16) is associated with heightened aggression levels at age 16. However, an increasing or accelerated rate of growth (i.e., a quadratic trend) in alcohol use over time is not. This suggests that the normative trajectory of alcohol use during adolescence (an accelerated rate of change at ages 15–16 indicated by the quadratic trend) is not associated with increased risk of aggressive behaviour.

As aggressive behaviour has commonly been measured through proxy terms of externalising or antisocial behaviour it is difficult to compare child, adolescent and adult literature that purports to examine aggression. Paper 1 has provided key evidence supporting theory that the normative development of aggression is that it declines during adolescence. Investigating the role of alcohol specifically, the findings show that heavy alcohol use impacts on this normative pattern of decline during this time through corresponding spikes in aggressive behaviour. At each measurement occasion between the ages of 13 and 16, young people who experienced elevations in aggression (considering their expected trajectory of aggression based on gender and sociodemographic predictors) also reported more hazardous drinking than usual. The snares hypothesis posits that certain experiences or behaviours influence persistence or desistence in antisocial behaviour (including aggression) during adolescence and young adulthood (Moffitt et al., 2002). The theory explains how hazardous alcohol use can cause short-term elevations in antisocial behaviour (Hussong et al., 2004), which reflects the pattern of these findings. However, caution is required when interpreting this relationship. It is not known whether alcohol intoxication itself caused the spikes in aggression or the spikes in aggression caused heavy drinking. Future studies should apply ecological momentary (i.e., real time) assessment (Shiffman et al., 2008) to better inform understanding of these reciprocal micro-level temporal associations between alcohol use and aggression. Moment-by-moment assessment is needed to clarify and unpack this relationship, but admittedly, this is challenging to capture in real-world naturalistic settings.

Previous research has employed the same (i.e., auto-regressive latent curve models)



or similar (i.e., cross-lagged path analysis) statistical approaches to examine the developmental relationship between alcohol and antisocial behaviour more broadly. This work has been limited by use of non-validated and simplistic measures of violence (Scholes-Balog et al., 2013), a specific or general behavioural focus (e.g., dating violence and antisocial behaviour) (Hammerton et al., 2017; McNaughton Reyes et al., 2012) and the exclusion of females (White et al., 2013). The findings from Paper 1 align with similar Australian and international cohort studies showing that early aggression predicts heavy alcohol use in young adulthood and vice versa (Najman et al., 2019; Scholes-Balog et al., 2013; Young et al., 2008).

However, this study extends previous research in important ways. First, most studies have assessed associations between behaviours by comparing young people with others in the sample rather than according to that individual's own expected trajectory. The sophisticated two-stage analysis applied in Paper 1 (i.e., parallel and auto-regressive latent growth curve modelling) allowed the *teasing apart* of relative influences of hazardous alcohol and aggression on one another, relative to each person's projected pathway. Second, previous research has tended to demonstrate overall associations between changes in constructs rather than examining time-specific associations that can provide insight into developmental windows of importance. Paper 1 demonstrated that the concurrent relationship between hazardous alcohol use and aggression is strongest at age 14 and decreases through mid- adolescence, indicating targeted prevention for both behaviours should be delivered prior to this time. Third, because most research has been conducted among young people internationally (US) and among students in the Australian state of Victoria (Edwards et al., 2013; Hemphill et al., 2007), this study contributes an analysis of young people in New South Wales (the most populous state in Australia), thereby building the evidence on young Australians. Last, most previous research has examined violence or antisocial behaviour more broadly (Hammerton et al., 2017). Thus, Paper 1 presents an in-

depth and developmentally appropriate analysis of aggression specifically. In sum, the findings indicate that while the time-varying effect of alcohol on aggression is proximal and not delayed, there is a prospective relationship in which heightened aggression predicts subsequent associated increases in alcohol use. Paper 1 provides key evidence that aggression and hazardous alcohol use affect each other through different developmental processes. However, they both remain important intervention targets because changes in one affect the other during this critical life stage.

## **Hazardous Alcohol Use Uniquely Contributes to Violence in Young**

### **Adulthood**

Paper 2 examined the relative influence of alcohol on self-reported violent behaviour among young adults in the Australian community. The study reported that ACEs and hazardous alcohol use remained important independent predictors of violent behaviour after accounting for other influences, such as internalising (psychological distress) and externalising (impulsivity) personality factors. On the bivariate level, hazardous alcohol use, ACEs, impulsivity and psychological distress all predicted violent behaviour. However, in the multivariate model only, ACEs and hazardous alcohol use were associated with an increased risk for violence. The relationship between psychological distress and violence was not significant after accounting for ACEs and impulsivity was no longer predictive of violence after accounting for alcohol use. This suggests the relative importance of ACEs and hazardous alcohol use, over psychological distress and impulsivity, in the risk of violence among young adults. This aligns with previous research on young adults (Björkenstam et al., 2017) and adolescents (Fox et al., 2015) showing the strong relationship between early adversity, particularly cumulative adversity, and later violent behaviour. Paper 2 also adds clarification to the mixed literature on the relationship between mental health problems, such as depression and anxiety, and violent behaviour. The findings indicate that during young adulthood, there is a relationship between internalising problems and violence. However, this

is better explained by a history of early adversity than it is by current mental health symptoms (psychological distress) alone. To self-medicate distress resulting from early experiences of trauma, young people are more likely to engage in substance use to cope (Garland et al., 2013), which can make them more likely to perpetrate violence. The relationship between trait aggression and problematic alcohol use is highest among young adults who have low distress tolerance (Ali et al., 2013). Thus, psychological distress may be a mediator in the relationship between adversity, alcohol and resulting violent behaviour. Future research should investigate these explanatory relationships further.

While there is a reasonably large body of literature examining the nature and prevalence of intimate partner violence or ‘dating violence’ in young adulthood, there is comparatively sparse evidence on self-reported rates of violence more generally. Paper 2 provides the first examination of violent behaviour among a community sample of young adults in Australia since 2000, demonstrating relatively high rates of violent behaviour among young adults aged 18–20 (12.8%). Interestingly, rates of reported violence among young adults in this community sample are similar to those reported by high-risk young adults in the Climate and Preventure study (CAP) cohort sample analysed in Paper 4 (11%). These findings are consistent with existing evidence on rates of violent behaviour among young adults in Australia (Smart et al., 2003), the US (Loeber et al., 2017) and New Zealand (Arseneault et al., 2000). While previous work has examined adults born ~1970–1980 (Arseneault et al., 2000; Loeber et al., 2017; Smart et al., 2003) Paper 2 contributes up-to-date evidence on trends in violent behaviour among young adults (born ~2000). This new evidence using similar measures indicates that rates of self-reported violent behaviour among young adults have remained relatively stable over time.

Recent Australian national data show that young people aged between 15 and 24 are most likely of all age groups to commit offences characterised by acts intended to cause injury (e.g., assault; Australian Bureau of Statistics, 2020). However, administrative data like

this are limited because they only provide part of the story. Self-reported data are important to complete this picture and illuminate the ‘dark figure of crime’—that is, crime that remains undetected, unreported and unrecorded (Hayes & Prenzler, 2014). The most common violent behaviours reported in this sample was hitting someone they lived with (7.7%) or did not live with (5.1%) and intending to hurt them. This may reflect that assault, and potentially assault against an intimate partner, friend or family member, is the most common type of violence perpetrated by this sample of young adults. Higher rates of violence were reported by women than by men and transgender and gender diverse participants in the sample. This finding is surprising and may relate to oversampling of females because it contrasts with the evidence base that shows that men perpetrate violence at a significantly higher rate in Australia and internationally (Australian Bureau of Statistics, 2020; Smart et al., 2003). On the bivariate level, female gender was not uniquely related to violence but the relationship between female gender and violence became significant after hazardous alcohol use was included in the model. In other words, when the relationship between alcohol and violence is accounted for, a significant relationship between female gender and violence emerged. In substance use treatment samples, in situations of provocation and in the context of interpersonal relationships, research indicates that the gender divide in self-reported violence is reduced (Bácskai et al., 2011; Denson, O’Dean, et al., 2018). While these findings should be interpreted with caution because of the large confidence intervals for gender, they may carry implications for preventing alcohol-related violence during young adulthood. While young men are typically the targets of efforts to reduce aggression and violence, it is essential that focused support is available for women experiencing alcohol-related problems during young adulthood and that aggression prevention initiatives include girls and boys.

Among young adults in this sample, each additional ACE reported increases the risk of reporting past-year violence by 23%, with most people in the sample reporting just over two ACEs before the age of 18. This new evidence presented in Paper 2 is important because

it contributes to a sparse literature on ACEs among young adults in the Australian context (Wickramasinghe et al., 2019). International research comparing ACEs and psychological distress among healthy adults in the US, Australia, England and the Netherlands reported reasonably high prevalence of ACEs with one-third of the sample reporting three or more ACEs (Cohen et al., 2006). In terms of common themes, the findings in Paper 2 broadly align with US data (Duke et al., 2018) and previous national Australian data on young adult women (born 1973–1978), in which psychological (emotional) abuse was the most common ACE reported, followed by household substance use and mental illness (~17%; Loxton et al., 2019). While reported rates of emotional abuse were comparable, rates of having someone in the household with a mental illness (1 in 2) or substance use problems (1 in 3) are notably higher in Paper 2 than in the international data (< 1 in 5; Loxton et al., 2019). This finding shows that half of young adults surveyed reported direct experiences of growing up in Australia in households managing significant mental health and substance use problems. The challenge to address this burden is real. The results from Paper 2 indicate that interventions to prevent and reduce violence among young people should recognise the interaction between common comorbidities, such as psychological distress, impulsivity and alcohol use. Programs that address shared psychopathology and account for both distal and proximal causes—most importantly, early adversity and heavy alcohol use—have the potential to be most effective.

### **Alcohol is Prominent in Violent Crime by Young Adults Facing Court**

Paper 3 examined the relationship between substance use and violence among young adults in the criminal justice context by analysing judges' opinions in sentences delivered for violent crime involving alcohol and other drugs. The study found that alcohol was commonly implicated in the violent crimes analysed and that judges expressed divided opinions on the role of substance use in violence. Some judges expressed more conservative views and others conveyed a more compassionate stance. Paper 3 is the first study to examine judicial

responses to young adult offenders charged with serious violence involving alcohol and other drugs. Alcohol was involved in over one-third (37%) of cases analysed and was the most frequent substance implicated in violent crime among young adults in the sample. This is consistent with evidence showing that alcohol is the drug most implicated in violent crime by young people (Lennings et al., 2003). Over one-third (39%) of young adults had a diagnosed substance use disorder, as indicated by judges' summaries of clinical evidence, and almost half (41%) had co-occurring mental health problems. This is congruous with research that reported that almost two-thirds of inmates reported drinking at hazardous levels prior to their time in custody, and nearly half (47%) have two or more co-occurring mental health conditions (Justice Health and Forensic Mental Health Network, 2017). Taken together, the findings in Paper 3 show just how relevant heavy alcohol use and mental health issues (and their comorbidity) are to the perpetration of violent crime among young people.

Extensive histories of maltreatment were characteristic among young people in this court sample, a finding that accords with evidence that over 90% of prisoners have experienced significant and multiple life-threatening traumatic events throughout their lives (Kilroy, 2000; Morrison et al., 2019; Stathopoulos & Quadara, 2014). National survey data show that Australians who have experienced childhood trauma are four times more likely to develop mental health and substance use disorders compared with people without these experiences (Barrett et al., 2015). The most common mental health disorders related to experiencing trauma are alcohol use disorder, depression and PTSD (Barrett et al., 2015). The findings from Paper 3 reflect past research that indicated that PTSD symptom severity (particularly hyperarousal) is associated with increased risk of violence perpetration among people with co-occurring PTSD and substance use dependence (Barrett et al., 2014). Hyperarousal (i.e., irritation, anger and hypervigilance) and heavy alcohol use share similar characteristics, including impaired cognitive processing, self-regulation and disinhibition (Taft et al., 2007). Future research should investigate the effectiveness of targeting co-

occurring heavy alcohol use and PTSD symptomology to reduce violent behaviour among young adults. Taken together, these results underscore the need for approaches that are trauma-informed and target the shared vulnerability across aggression, substance and mental health problems.

In Papers 2 (community sample) and 3 (court-facing sample), strong associations between early maltreatment, heavy alcohol use and violent behaviour were observed. While the prevention of early adversity is clearly critical for reducing harm from violence, proximal factors such as co-occurring substance use and mental health disorders remain highly relevant intervention targets. Indeed, most judges in the sample recognised the importance of addressing substance use problems for preventing future violent behaviour. Around half of judges took time to discuss the impact of mental health, substance use and trauma on offending and exercised compassion within the confines of the law by applying a ruling of ‘special circumstances’. The operationalisation of a ruling of special circumstances in Paper 3 is an innovative approach to ensure rehabilitative aims are conducted in practice when practical strategies for implementing rehabilitation-focused sentencing objectives are limited. This ruling reduced the standard non-parole period (time spent in prison) to increase the time a person spends under supervision in the community to focus on rehabilitation and reintegration.

Among other judges in the sample, themes emerged around choice, conservatism and responsabilisation. Responsibilisation is a concept adopted from economic liberalism that has been applied to punishment (Garland, 1981). It is the process through which people are assumed rational, deserving and morally responsible for themselves and presumed accountable for what would usually be the duty of another (e.g., the state) or not a responsibility at all (Garland, 1996; Wakefield & Fleming, 2009). Acknowledging the significant histories of disadvantage and abuse characteristic of people facing court for crimes of violence, it is argued that responsabilisation is advocating empowerment in an

environment of total constraint (Carlen & Worrall, 2004). Without stripping agents of the capacity to choose, acknowledging cases in which it is severely diminished is necessary for facilitating rehabilitation, desistance and individualised justice. Judges commonly communicated a normative expectation of top-down control over behaviour, despite evidence that people who are substance dependent have limited capacity for such agency, tantamount to other diagnosed mental health disorders (American Psychiatric Association, 2013).

The results from Paper 3 indicate that the relationship between alcohol use and violence is not well understood by a subset of legal experts who frequently engage with people presenting with these problems. The themes that emerged represent a divided subset of the judiciary but reflect on the wider system that treats an ill person's rehabilitation as their sole responsibility and accepts prison as the context in which such reform should occur (Bosworth, 2007). When faced with crimes of violence involving alcohol and other drugs, a system geared towards punishment and risk management is not well suited to address the substance dependence, trauma and other comorbidity commonly associated with such behaviour. Crimes of serious violence tend to evoke intense reactions in the average person, including disgust and anger (Casey et al., 2013). Implicit bias is pervasive in any field that requires professional judgement and involves discretion (e.g., policing, medical treatment and recruitment). However, for already stigmatised groups (such as people with mental health and substance use problems), this may contribute to increased engagement with the criminal justice system (Casey et al., 2013). In line with the findings in Paper 3, previous Australian research has highlighted the way that judges attempt to explain the role of intoxication in crime without providing clarity on how it is being judicially considered in sentencing (Whittle & Hall, 2018). The risk for bias may relate to the extent to which judges use their intuition over other resources at their disposal in cases such as these.

Importantly, Paper 3 bridges law and public health and highlights the interactions



between individual-level attributes, environmental factors and systemic processes that generate crime and criminality. This study also emphasises the importance of training for the judiciary around complex and highly emotive issues, such as comorbidity and violence, to address any potential implicit bias that may affect their practice. Such initiatives could focus on improving judges' understanding of the nature and impact of substance use dependence, including how it develops and manifests across people and the association between clinical dependence and impaired control. Of course, training to reduce bias at sentencing will be of little help if structures are not in place to support the delivery of appropriate rehabilitation-focused sentences. The separation between criminal justice processes (policing, courts and corrections) hinders the capacity for continuity between sentencing objectives (i.e., that the offender receives support to address substance use dependence) and the nature of the sentence served. Further, violent offenders tend to be excluded from diversionary treatment programs because of safety concerns, despite evidence that they can benefit by participating in these programs, including demonstrated reductions in recidivism (Weatherburn et al., 2020).

These sentencing transcripts illustrate the experiences of people who have faced significant challenges, who have been harmed and have harmed others. The stage of sentencing provides an opportunity for reflection but is clearly not the ideal time for intervention to reduce harm from violence. Paper 3 is the summons that further investment in prevention is critically needed. The kind of complex harm experienced and perpetrated by the people in this study requires the provision of targeted support early at multiple junctures in pathways through life.

## **Selective School-Based Substance Use Prevention can Reduce Aggression Over the Long Term**

In three different samples across three unique settings (school, community and criminal justice), this thesis has demonstrated significant continuity in the association between aggression, violence and hazardous alcohol use from adolescence into young adulthood. This body of work shows that harms from aggression and alcohol use develop in parallel and prevention interventions must be delivered early (see Paper 1). In young adulthood, alcohol is the most important proximal influence on violence (see Paper 2). However, there is a critical need for investment in prevention because the criminal justice system is not well suited to respond to these challenges (see Paper 3). Evidence supporting the effectiveness of programs for high-risk young people is lacking. To fill this gap, Paper 4 evaluated the long-term effectiveness of the personality-targeted prevention program *Preventure* on aggression from adolescence into young adulthood. In only two brief sessions, the school-based program effectively shifted trajectories of aggressive behaviour and reduced aggression with sustained benefits over seven years (ages 13–20). Young people who undertook *Preventure* had significantly reduced aggression into young adulthood, including reduced proactive and reactive aggression, compared with those in the control group.

The results of this study have far-reaching implications for policy and practice. This study provides world-first evidence that demonstrates that intervening in early adolescence and promoting personality-targeted coping skills can dramatically reduce subsequent aggression levels over a *seven-year period*. Between the ages of 13 and 20, young people who received *Preventure* decreased in their total aggression by an average of –8.4 units compared with only –2.5 units in the control condition. To date, this is the only study to demonstrate ongoing prevention benefits of a brief intervention delivered in early adolescence on aggression lasting into young adulthood. Few studies have examined the long-term impacts of programs and most evaluations show that the effects of interventions

decrease significantly at follow-up (Kovalenko et al., 2020). Thus far, research has provided limited evidence for selective interventions to reduce violent behaviour among high-risk young people in Australia (Cox et al., 2016). Paper 4 reports the first randomised controlled trial to show that targeted prevention delivered among high-risk young people can have lasting benefits on aggressive behaviour. Past research has highlighted the potential for aggression prevention programs targeting high-risk youth (Wilson et al., 2001). This study is the first to demonstrate that the benefits of selective prevention on aggression can endure for up to seven years. Paper 4 also showed the benefits associated with personality-targeted prevention for this group, a novel finding in the Australian and international literature. As demonstrated in this work, programs targeting shared psychopathology are effective in reducing aggression over the long term. They also constitute an efficient response to supporting a broad range of young people who will experience challenges relating to emotional and behavioural problems (Edalati & Conrod, 2019). Last, program effects were identified for both reactive and proactive aggression. This is significant because both distinct subtypes are associated with serious negative outcomes in adulthood including personality disorders, psychopathic traits and serious antisocial behaviour (Fite et al., 2010).

In line with Papers 2 and 3, findings from Paper 4 are consistent with theory on the interaction between individual and environmental factors that increase risk for violence (Averdijk et al., 2020; White et al., 2019). Young people bring individual traits into each situation they encounter and personality (e.g., impulsivity) can influence young people to behave aggressively or not (Marcus, 2007b). The *Preventure* program prepares young people for the environmental cues that will trigger them to act in problematic ways, an approach that has direct relevance for young people at high risk of aggression and alcohol-related harm. A primary aim of *Preventure* is to prevent harmful alcohol use by targeting personality profiles

associated with greater risk. The program does not explicitly focus on substance use but instead targets the underlying personality styles and related maladaptive strategies (such as aggression or substance use) employed to cope with everyday life (Edalati & Conrod, 2019). As demonstrated in Paper 2, alcohol is the most important proximal predictor of aggression. Therefore, it is possible that the effects of *Preventure* on aggression may be mediated (at least partially) by the effectiveness of *Preventure* in reducing harmful alcohol use (Newton, Conrod, et al., 2016). Future research should investigate this further. Importantly, the shared vulnerability model fundamental to *Preventure* addresses both alcohol use and other personality risk factors associated with aggressive behaviour (i.e., impulsivity and sensation seeking) to deliver a multipronged prevention approach. It is a significant contribution to the literature to demonstrate through a randomised controlled trial that personality-targeted prevention changes the development of aggression over the long term. This adds to a growing evidence base confirming the effectiveness of *Preventure* in reducing antisocial and delinquent behaviour among young people around the world, including theft, truancy and conduct disorder symptoms (Castellanos-Ryan & Conrod, 2006; O’Leary-Barrett et al., 2010).

While Paper 4 demonstrates the relevance of targeting personality to affect aggression, there was no influence of the intervention on violent behaviour in young adulthood. Given the strong associations between hazardous alcohol use and violence during young adulthood demonstrated in Paper 2, it is counterintuitive that an intervention designed to prevent harmful alcohol use and proven to be effective in preventing both alcohol use and aggression does not also affect violence. Two possible explanations for this were presented. The first requires revisitation of definitions of aggression and violence relayed in the introduction chapter of this thesis. Aggression is defined as a trait possessed, the threat of physical harm or actual harm, while violence is the exercise of force that results in injury or death. While *Preventure* had long-term effects on aggression into young adulthood, it may

be that the effects of *Preventure* on aggression do not translate onto more severe behaviour, such as acts of violence in the long-term. Second, the difference may relate to the distinct social context and challenges associated with violent behaviour in young adulthood, such as the purchase of alcohol becoming legal and increased time spent in the night-time economy. For example, research indicates that licensed premises are high-risk locations for alcohol-related violence (Hyder et al., 2018). For some young people who have had minimal exposure to alcohol until they reach the age of 18, the new freedom of emerging adulthood could make them more vulnerable to engaging in antisocial behaviour, such as violence, when they otherwise would not (Miller et al., 2015). Further, the peak onset of illicit drug use initiation occurs during young adulthood. Research suggests that people who consume a combination of alcohol and illicit drugs in night-time entertainment districts are more likely to be aggressive than those who consume alcohol only (Norman et al., 2019). Paper 4 highlighted that early adolescence (age 13) and late adolescence (ages 16–18) are important transitional periods in which to provide developmentally appropriate support for violence prevention. Booster sessions that incorporate a focus on acute influences on violence during young adulthood, such as navigating the night-time economy and polysubstance use, may be needed to support young people at risk of severe violent behaviour during young adulthood.

The transition into young adulthood signifies a key period of potential desistance from violence and criminal behaviour (Laub & Sampson, 1993). This is a time when young people assess whether their behaviour is consistent with how they view themselves and who they want to be (Corrales, 2012; Shapland & Bottoms, 2011). Therefore, it is important to ensure that targeted support is provided at various junctures in the pathways of young people and across contexts (i.e., school, health and justice) to prevent harms from aggression and violence.

## Limitations and Directions for Future Research

There are several limitations to acknowledge. However, these provide interesting directions for further building the evidence base in this critical research area. Papers 1 and 4 involve secondary data analysis of a randomised controlled trial (CAP) that was not designed with aggression as a primary outcome. Some environmental factors theorised to be related to the development of aggressive behaviour (i.e., association with antisocial peers) were not measured or analysed. The intervals between follow-up occasions for the CAP study (6 months–1 year apart) were not close enough to enable precise measurement of the momentary directional relationships between hazardous alcohol use and aggression. However, the statistical approach to assessing the reciprocal and prospective relationships indicated that the time-specific effect of alcohol use on aggression is not delayed, in line with previous work. Future research should involve ecological momentary assessment to measure relationships in real time (such as through daily diary entries or telephone reminders/updates) to overcome challenges like recall bias (Shiffman et al., 2008). Paper 1 could also be extended to examine the relationship between hazardous alcohol use and aggression extending into young adulthood.

Findings from Papers 2 and 3 demonstrated that violence-prevention interventions for young adults in the community and the criminal justice system should be trauma-informed and address alcohol use. It is vital to replicate the analysis in Paper 3 in other Australian jurisdictions because the results only relate to the NSW context. It would also be worthwhile to examine whether narratives in sentencing have any relation to sentence lengths imposed for similar crimes, holding things like criminal record and individual characteristics constant. In Paper 2, female gender was not significantly associated with violence on the bivariate level but became a significant predictor in the final multivariate model after including hazardous alcohol use. It is difficult to know whether this reflects a true relationship or if it is related to oversampling of females in this study. Future research should investigate this further using a

more representative sample. Underreporting is a potential source of bias in all self-report studies. However, self-report has been found to be a reliable and valid approach to measuring sensitive health and risk behaviours, including substance use and offending as long as respondents are assured of confidentiality (Piquero et al., 2014; Sutton et al., 2011).

*Prevention* may be differentially effective on aggression for young people with certain personality risk profiles. Previous research has reported that impulsivity is indirectly related to later onset (but more severe) substance use through conduct problems (Castellanos-Ryan & Conrod, 2011; Edalati & Conrod, 2019). This is an area in need of further investigation in the Australian context. Future research should also examine the mechanisms of program effectiveness on aggression, such as the impact of *Prevention* on alcohol use and drinking motives. As discussed previously, the effect of *Prevention* may be partially mediated by its impact on alcohol use; however, it was beyond the scope of this thesis to test this hypothesis. Research indicates that some young people with high levels of aggression drink alcohol to self-soothe or cope with distress related to their aggressive behaviour, but this can lead to significant related and compounding consequences (Øverup et al., 2015). Adapting the scenarios discussed in *Prevention* to align more strongly with aggression subtypes may result in stronger effects for participants high on aggression. Testing and identifying which mechanisms are most important in how young people respond to treatment will help refine and enhance the efficacy of future interventions.

Subtypes of proactive and reactive aggression were only examined in the final empirical chapter of the thesis because the complexity of the modelling procedures in Paper 1 would not allow such specificity. Subtypes of aggression were not measured in Papers 2 and 3; however, a range of violent crime subtypes was analysed, including assault, robbery and homicide. The nature of violent crimes examined in Paper 3 was more strongly aligned with reactive violence than with premeditated intentional actions because most occurred in the context of intoxication. In Paper 2, assaulting a person they lived with was the most common

violent behaviour reported by young adults in this study. This appears to capture rates of domestic assault, but it is not known if this violence is against a partner, family member, flatmate or friend, and whether it is retaliatory or not. One debate on the nature and prevalence of intimate partner violence is whether the violence is about male control and domination over women or whether it is a behaviour that is more equally demonstrated across gender (DeKeseredy & Schwartz, 2011; Walby & Towers, 2018). The findings from Paper 2 cannot shed light on this distinction, nor can they capture or be used to make inferences about the context in which the behaviour occurs or the motivations for this behaviour. Future research should explore this further to determine whether distinct approaches are required for the prevention of violence in the context of intimate relationships.

The application of developmentally appropriate measures of aggression (subtypes) during adolescence and violent behaviour during young adulthood were consistent across studies, allowing for comparison across chapters in this thesis and to the wider literature in Australia and internationally (Arseneault et al., 2000; Fite et al., 2007; Loeber et al., 2017; Smart et al., 2003). Further evidence on the correlates and prevalence of violent behaviour among young adults in Australia is needed because representative samples and up-to-date evidence are lacking. Information about the prevalence of violent behaviour among adolescents is more complete because school-based surveys provide relevant information. However, school leavers are more difficult to engage because they are less convenient to locate for participation in research. This is a notable gap given that harms from violence and alcohol use increase during young adulthood. Last, the generalisability of Paper 3 is limited, but because it is a qualitative study, the primary aim is not to capture a representative sample. However, the characteristics of the young adults facing court reflect those of justice-involved youth in terms of sociodemographic factors (gender and race), experiences of adversity and mental health and substance use problems.



## Implications for Policy and Practice

The findings from each of the four empirical chapters in this thesis are novel and carry significant implications for the prevention of aggression and hazardous alcohol use in youth. Papers 2 and 3 demonstrate the strong relationship between hazardous alcohol use and violence in young adulthood, making clear the need for prevention to be prioritised over criminal justice responses to these public health challenges. Paper 1 demonstrated the positive reciprocal relationship between hazardous alcohol use and aggression in adolescence, in which young people with higher trait aggression were at increased risk of hazardous drinking and related harms, and vice versa. This research indicates that the developmental relationship between hazardous alcohol use and aggression is strongest at age 14. It follows that prevention efforts need to be implemented prior to this, ideally at ages 12 or 13. Heightened aggression predicted subsequent increases in hazardous alcohol use, so providing evidence-based support to young people with high levels of aggression may also result in reduced hazardous alcohol use and related harms. Few violence-prevention initiatives have been scientifically evaluated (Averdijk et al., 2020). The findings from Papers 1 and 4 are particularly significant because they draw upon a large-scale randomised controlled trial and provide critical evidence about when and how programs should be delivered to prevent aggression in the school context. Randomised controlled trials of prevention interventions within the school environment are extremely difficult to conceptualise, integrate and implement. They require a high level of trust and cooperation between stakeholders, particularly the teachers, students and researchers involved. Considering this, Paper 4 provides acutely important evidence that must be acknowledged and translated into practice on a national level. Before this study was conducted, little was known about the long-term effects of school-based prevention interventions for aggression and violence (Averdijk et al., 2020). The sustained effectiveness of *Preventure* on aggression over a period of seven years proves that harms from aggression and alcohol use can be

prevented and that brief personality-targeted interventions delivered in school can have a long-term impact.

This thesis provides strong evidence to support wide implementation of approaches that target shared psychopathology. Personality-targeted prevention programs such as *Preventure* should be made available to all young people in schools across Australia and internationally to prevent harms from aggression and hazardous alcohol use. Current approaches tend to be intensive, taking weeks to years in duration and meta-analyses confirm that longer interventions are less effective for this group (Castillo-Eito et al., 2020; Cox et al., 2016). The *Preventure* program overcomes these challenges because the brief nature of the intervention (2 × 90-minute sessions) means it can feasibly be translated into different school contexts with little disruption to day-to-day activities. Young people who experience conduct programs, such as aggression and truancy, are more likely to be suspended and excluded from school (Kupersmidt & Coie, 1990). These young people are less likely to receive school-based interventions, are often missed in classroom surveys and ‘representative’ population surveys and are more likely to be lost to follow-up (Abram et al., 2015; Elkington et al., 2015). This group has the most critical mental health needs (as indicated in Paper 3) and it is critical that the *Preventure* intervention is accessible to young people who are disengaged from traditional schooling. Paper 4 focused on young people from independent schools only. Future research should evaluate the effectiveness of *Preventure* on aggression among young people in varying educational contexts, such as non-independent or public schools and schools for young people with special needs (Cox et al., 2016). It is important to ensure *Preventure* is available across both school and community settings because many interventions for reducing problem behaviours, such as aggression, are delivered outside the school environment. *Preventure* is effective when delivered by teachers, mentors, clinicians, counsellors and education specialists (Conrod et al., 2013) and is designed to be translated into a wide range of contexts in which young people present (Edalati & Conrod, 2019). All

professionals who work with young people in Australia, particularly school counsellors, child psychologists, youth workers and juvenile justice staff, should be trained in the delivery of *Preventure*.

## Conclusion

This body of work shows that aggression can be prevented and reduced over time through implementation of cost-effective brief intervention delivered in early adolescence. The harms that come with not intervening early, as demonstrated in the sentencing transcripts in Paper 3, can be reduced if real investment is made into evidence-based prevention. *Preventure* had a medium-to-large effect in preventing aggression from adolescence into young adulthood, which translated across a population level equates to considerable reductions in violent behaviour. The potential benefits of such a scheme, if rolled out widely and consistently across the country, would be enormous. For every year we delay the onset of drinking, we reduce the odds of alcohol-use disorder by 9% (Grant et al., 2001). One in three Australians report being affected by alcohol-related violence in some way each year (FARE, 2019) and between one-third to one-half of family violence incidents are alcohol related (Mayshak et al., 2020; Miller et al., 2016). Violence that involves alcohol is more severe, more likely to involve life-threatening injuries and more likely to re-occur (Mayshak et al., 2020). The effects of alcohol-related violence (e.g., ‘king hits’) are felt far beyond the consequences of loved one’s grief and populist policy, such as punitive mandatory minimum sentences that hold no preventative weight (Quilter, 2014). The findings presented in this thesis through these four novel empirical studies provide the evidence and guide. Herein is a significant opportunity to prevent alcohol-related violence in the community. Let us not waste it.

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**Supplementary Material**



**Table S1***Model Building and Selection Fit Statistics for Linear and Quadratic Models*

	<b>Model fit</b>							
	$\chi^2$	<i>df</i>	<i>p</i>	AIC	BIC	RMSEA	CFI	SRMR
<i>Unconditional model fit statistics</i>								
<i>Intercept only</i>								
Hazardous alcohol use	328.989	13	0.0000	26255.950	26293.750	0.122	0.000	0.228
Aggression	49.837	13	0.0000	41686.731	41724.450	0.042	0.913	0.066
<i>Linear growth only</i>								
Hazardous alcohol use	50.190	10	0.0000	25412.164	25466.164	0.050	0.829	0.073
Aggression	28.004	10	0.0018	41645.640	41699.523	0.033	0.957	0.051
<i>Linear and quadratic growth</i>								
Hazardous alcohol use	12.364	6	0.0543	25285.118	25360.718	0.025	0.973	0.032
Aggression	11.892	6	0.0644	41617.130	41692.566	0.025	0.986	0.032
<i>Final conditional model fit statistics</i>								
<i>Alcohol (quadratic) aggression (linear)</i>								
Parallel growth curve model	198.168	50	0.0000	63599.185	63840.045	0.044	0.901	0.045
ALT-SR model	80.476	52	0.0069	63379.501	63609.655	0.019	0.981	0.033

**Table S2***Summary Parameter Estimates for Sensitivity Analyses for Unconditional Models*

	Parameter estimates (SE) <sup>♦</sup>				
	Continuous	Dichotomous (Alcohol)	Poisson	Zero-inflated Poisson	Negative binomial
<i>Mean scores</i>					
Alcohol age 16	0.857 (0.47)***	-	0.310 (0.048)***	1.516 (0.175)***	0.160 (0.068)*
Change in alcohol use	0.569 (0.082)***	0.850 (0.366)*	1.620 (0.159)***	0.956 (0.215)***	1.890 (0.138)***
Aggression age 16	1.104 (0.060)***	1.031 (0.078)***	1.221 (0.058)***	1.449 (0.064)***	1.504 (0.085)***
Change in aggression	-0.217 (0.077)**	-0.245 (0.073)**	-0.160 (0.062)*	-0.312 (0.040)***	-0.482 (0.071)***
<i>Aggression age 16 with</i>					
Change in aggression	0.546 (0.090)***	0.544 (0.028)***	0.780 (0.025)***	0.726 (0.023)***	0.701 (0.043)***
Change in alcohol use	0.207 (0.087)*	0.363 (0.096)***	0.007 (0.092)	0.032 (0.080)	-0.148 (0.080)
Alcohol use age 16	0.532 (0.57)***	0.466 (0.047)***	0.587 (0.025)***	0.508 (0.036)***	0.506(0.045)***
<i>Alcohol use age 16 with</i>					
Change in alcohol	0.757 (0.51)***	0.801(0.092)***	0.374 (0.139)**	0.189 (0.120)	-0.218 (0.113)
Change in aggression	0.509 (0.118)***	0.252 (0.068)***	0.428 (0.055)***	0.271 (0.055)***	0.451(0.069)***
<i>Linear change in alcohol use with</i>					
Linear change in aggression	0.480 (0.131)***	0.536 (0.113)***	0.188 (0.068)**	0.088 (0.074)	0.565 (0.084)***

<sup>♦</sup>  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

**Table S3***Associations Between Baseline Covariates and Missing Data for Alcohol Use*

Baseline covariate	Follow ups completed		<i>t</i>	<i>df</i>	<i>P</i>
	Less than 2	$\geq 2$			
Alcohol use	188	1442	-3.022	210.626	0.003
Aggression	161	1362	-4.342	180.397	0.000
Sex: male	191	1445	2.920	250.326	0.004
Intervention type	191	1445	-4.708	277.387	0.000
ISCEA score	169	1391	5.834	198.310	0.000

**Table S4***Codebook for Sentencing Remarks*

Codebook				
Primary category	Sub-category	Description	Example	
Background	Case ID	Case citation	NSWDC_177_2016	
	Judge	Name of judge	Mahony SC	
		Before:		
	Judge gender	Gender of judge	M/F	
	Violent offence type		Violent offence being sentenced	Murder
				Assault
				Abduction
				Robbery
				Burglary
			See sentencing at end of transcript	Break and enter—includes aggravation Unlawful entry Sexual assault
Plea	Guilty/Not guilty (at time of sentence)	Guilty plea Not guilty plea		
Total convicted	Total offences convicted, found guilty	Add number (e.g., 2)		
		See end of transcript		

Codebook			
Primary category	Sub-category	Description	Example
		If good behaviour bond and no conviction, put 0	
	Comm exist order	Offence committed while on an existing order for a previous offence	Y/N
		Search terms include existing order, correction order, good behaviour, breach, bond, parole and supervision	
	Penalties total	Total sentence handed down by judge in months Includes time sentenced to good behaviour bond	Number of months (e.g., 30)
	Penalties non-parole	Total non-parole period handed down by judge in months	Number of months (e.g., 18)
		If good behaviour bond, put 0	
Description of facts	Fact summary	Brief outline of offence to differentiate from other similar offences	Armed robbery of a cinema in company, then armed robbery of a hotel
	Time	Time of day if mentioned	1:30 am, N/A
	Geo locat	Geographical area where offence occurred	Metro Rural/regional Remote
	Geo locat town	Specify town or city where offence occurred	Wagga Wagga, N/A
	Specific locat	Specific location where primary offence occurred	Residential Commercial School Public building Hospital/institution Car/vehicle

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Codebook			
Primary category	Sub-category	Description	Example
			Licensed venue Park/bushland Other
	Offend motive	What is the motive for the crime?  If there is more than one, choose the most likely/obvious option.  Financial (1–4) Opportunistic (5–11) Psychopharmacological (12–14) Self-defence (15)	Needed money to buy drugs Needed money to support myself Needed money to repay debts Other financial reasons Enjoyed the rush Lost temper Looking for revenge/payment Urged by friends Acting on the spur of the moment The opportunity arose Helping a friend out Under the influence of drugs Coming down/drug withdrawal Was hanging out Self-defence Other
	Planned	Was there evidence of planning/premeditation?	Y/N
	Weapon	Was a weapon used in the commission of the offence?	Y/N
	Weapon type		Firearm Knife Bar, bar or club

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Codebook			
Primary category	Sub-category	Description	Example
			Glass Syringe Other
Offender criminal history	Prev imp	Previous imprisonment? Search criminal history	Y/N
	Prev offend	Previous offending? Not necessary to have been arrested, imprisoned	Y/N
	Prev violent	Previous violent offending? Not necessary to have been arrested, imprisoned	Y/N
	Age first offence	Age at first offence?	Specify age (e.g., 14)
	Child court	Previously appeared in court as a juvenile?	Y/N
Offender mental health	Pre-sent report	Is a pre-sentence report referred to by the judge? For current offence or recent previous offence Search psych, corrections, officer	Y/N
	Diag current	Current diagnosis. Can select more than one  Only select options if judge or expert explicitly state (i.e., 'substance use disorder' etc.)  If 0, then N/A other specify and SUD specify	Substance use disorder Depression Anxiety Post-traumatic stress disorder Obsessive-compulsive disorder Bipolar disorder Schizophrenia Eating disorder Autism spectrum disorders

Codebook			
Primary category	Sub-category	Description	Example
			Antisocial personality disorder Borderline personality disorder ADHD None Other
	Risk reoffend	Is the offender considered a high risk of reoffending? May be in mitigating/aggravating factors Search reoffend, recidivism, risk	Y/N
Offender substance use	AOD at offence	Was the offender under the influence of alcohol or drugs at the time of the offence?	Alcohol Drugs Alcohol and drugs Withdrawal
	Primary drug offend	Primary drug related to offending  This could be the drug they were under the influence of at the time of the offence, or the drug they were trying to obtain money to buy. Can be more than one	Alcohol Cannabis Methamphetamine Heroin Ecstasy/MDMA Inhalants Prescription/benzodiazepines Cocaine Emerging drugs/NPS GHB Ketamine Drugs (general)



Codebook			
Primary category	Sub-category	Description	Example
			Other
	Current SU	What substances is the offender currently using (i.e., in prison or previous to arrest? Can be more than one)	See above
	Use pattern	Add any details about patterns of use, frequency of use, etc.	Heavy Regular Occasional
	SU history	Previous substance use, i.e., in childhood/adolescence	See 28 (Primary drug offend) for codes
		Select all that apply	
	Use pattern	Specify how much/often	See 30 (Use pattern) for codes
	SU tmt history	Have they received treatment for substance dependence?	Y/N
	Research question 1	Was drug and alcohol use perceived by the court to be within offenders' control?	Y (Drug use perceived to be a choice, within offenders' control) N (Drug dependence acknowledged, perceived as outside of control)
	Research question 2	How was violent behaviour perceived by the court?	Y (Violence was directly linked to substance use) N (Violence was linked to antisocial character/criminal disposition)
	Research question 3	Did the court recognise the importance of diverting the offender into drug and alcohol or mental health treatment?	Y (Treatment emphasised to be important in offender rehabilitation) N (Need for treatment not discussed)
Sentencing aims	Sentencing aims	What are the sentencing goals referred to by the judge?	Retribution ( <i>ensure offender is adequately punished</i> )

## Codebook

Primary category	Sub-category	Description	Example
		Will be explicitly stated, search each one.	Specific deterrence ( <i>detering offender and others from committing similar offences</i> )
		If judge refers only to 'deterrence' choose both 2 & 3.	General deterrence ( <i>to denounce the conduct of the offender</i> )
			Rehabilitation ( <i>promote rehab</i> )
			Protect public ( <i>protect community</i> )
			Protect victim ( <i>recognise harm done to victim and community</i> )
			Reparation ( <i>make the offender accountable</i> )
Special circumstances	Special circumstances	Did the judge find special circumstances were relevant?	Y/N
		Special circumstances mean that the judge can reduce the usual necessary non-parole period (> 75% of total sentence) to give the offender more time under supervision in the community (parole). This might be for reasons like rehabilitation, addressing drug dependence, family matters etc. (see list below)	
	Special circumstances details	If yes, which considerations were raised?	Rehabilitation
			Risk of institutionalisation
			Drug and alcohol addiction
			First custodial sentence
			Ill health, disability or mental illness
			Accumulation of individual sentences
			Protective custody
			Age
			Hardship to family members

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Codebook			
Primary category	Sub-category	Description	Example
			Self-punishment Parity Sentencing according to past practices
Additional comments	Add any relevant thoughts, comments or interesting quotes from the judge. This is opportunity to select a few excerpts from the text, a place for additional qualitative data. Include interesting reflections from the judge or defence, evidence supporting answers to research questions, particularly regarding drug use/violence relationship		

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