Oral Language Skills and Related Risk Factors for Antisocial Behaviour in Youth Offenders

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STATEMENT 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 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.

Stavroola Anderson

31/12/2019

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It seemed like a good idea at the time. However, unlike many of my other brilliant ideas, this one involved a lot of other people and, unforeseeably, required some of them to manoeuvre with me through a series of challenging life events.

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I designed procedures for this systematic review, conducted all database searches and study analyses and wrote the drafts of the manuscript.

Stavroola Anderson

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

David Hawes

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LIST OF ABBREVIATIONS

AS	Ambiguous Sentences
ASD	Autism Spectrum Disorder
CD	Conduct Disorder
CI	Conversational Inference
CU	Callous-unemotional
DBD	Disruptive Behaviour Disorder
DLD	Developmental Language Disorder
FASD	Foetal Alcohol Spectrum Disorder
FL	Figurative Language
HOL	Higher Order Language
MI	Making Inferences
NO	Non-Offender
NVA	Nonverbal Ability
OOHC	Outside of Home Care
OR	Odds Ratio
PT	Perspective Taking
RNR	Risk-Need-Responsivity
SAE	Standard Australian English
SES	Socio-Economic Status
SL	Structural Language
SLI	Specific Language Impairment
YO	Youth Offender

ABSTRACT

Background Poor verbal ability has been investigated extensively as a risk factor for antisocial behaviour. Yet much less is known about the specific oral language skills associated with antisocial behaviour, or how these skills may confer risk in conjunction with other risk factors.

Objectives The broad aim of the research reported in this thesis was to examine associations between oral language skills and related risk factors for antisocial behaviour in youth offenders. In order to inform an understanding of the complexity of associations between oral language skills, callous-unemotional (CU) traits, empathy and antisocial behaviour, these factors were investigated at a fine-grained level, and a dimensional approach was utilised predominantly. The current thesis consists of a systematic review and three empirical studies, each of which investigated associations between unique dimensions of oral language skills, CU traits, and/or empathy and antisocial behaviour.

Methods One hundred and thirty adolescent males (81 youth offenders; 49 non-offenders), recruited through youth justice centres and secondary public schools participated in the current research. Participants were between the ages of 13 and 20 years, of non-Indigenous (54%) and Indigenous (46%) Australian ethnicity and relatively low socio-economic status. Participants completed a semi-structured interview as well as a range of assessments and questionnaires during individual data collection sessions with the researcher. Measures assessed demographic variables, developmental experiences, nonverbal ability (NVA), oral language skills, perspective taking ability, CU traits and psychosocial functioning.

Results The systematic review revealed considerable evidence that youth offenders have relatively poor oral language skills. This review indicated, however, that ongoing research into the biopsychosocial factors that influence the association between oral language deficits

and youth offending is a high priority. The first empirical study found that weaker higher order language (HOL) skills were associated with a higher probability of being a youth offender, while stronger HOL skills were associated with a higher probability of being a non-offender. Stronger skills in some HOL skills were also demonstrated to be associated with a higher probability of being a non-offender in a group deemed at high-risk (due to poorer nonverbal ability). In the second empirical study status as a youth offender was associated with poorer structural, higher order and conversational inferential language skills. Primary variant CU traits (high CU traits, low anxiety) were associated with better conversational inference skills and, among youth offenders, interacted with better specific oral language skills to be associated with earlier age of first offence (conversational inference) and higher levels of violent offending (structural language). Secondary variant CU traits (high CU traits, high anxiety) were associated with poorer higher order, narrative and conversational inferential language skills. In empirical study three status as a youth offender was associated with poorer perspective taking (PT), both cognitive (first and second order) and affective, but only when structural language skill was not statistically controlled for. Individuals with primary variant CU traits demonstrated better skills in both cognitive (first and second order) and affective PT. Individuals with secondary variant CU traits demonstrated poorer second order cognitive PT.

Conclusions There is a continuing need for fine-grained investigation of interrelationships between individual risk factors for antisocial behaviour in children and adolescents. The current research findings revealed that discrete oral language skills were differentially associated with participation in and patterns of antisocial behaviour dependent on associations with other risk factors - nonverbal ability and variants of CU traits. Similarly, primary and secondary variants of CU traits were associated with different patterns of oral language and perspective taking skill which, in some cases, was further associated with different patterns of

antisocial behaviour. Current findings have the potential to inform theoretical models of antisocial behaviour. By extension, these findings could also inform intervention strategies directed towards antisocial children and adolescents, including clinical and functional assessment and more specific timing and targeting of remediation programs.

CHAPTER 1 - GENERAL INTRODUCTION

1.1 Antisocial Behaviour in Children and Adolescents

Antisocial behaviour encompasses a broad range of disruptive behaviours, from mild to severe, that violate social norms, the rights of others and/or the expectations of authority figures (Frick, 1998). While engagement in some form of antisocial behaviour is relatively common in youth, especially during adolescence (Najman et al., 2009), clinical levels of antisocial behaviour are less prevalent. The key clinical diagnoses that are associated with clinically-severe levels of antisocial behaviour are *Oppositional Defiant Disorder* and *Conduct Disorder*, (both categorised as *Disruptive Behaviour Disorders*), and *Antisocial Personality Disorder* (categorised as a personality disorder; American Psychiatric Association, 2013). Each of these diagnoses represents specific symptomology involving frequent and persistent problems in emotional and behavioural regulation (American Psychiatric Association, 2013). Specifically, oppositional defiant disorder involves a pattern of emotional symptoms (anger, irritability) and behavioural symptoms (argumentativeness, defiance, vindictiveness), conduct disorder is characterised by predominantly behavioural symptoms (aggressive, destructive, deceitful, serious rule-violating), and antisocial personality disorder is associated largely with behavioural symptoms (criminality, deceitfulness, impulsivity, reckless disregard, irresponsibility), as well as some emotional symptoms (irritability, lack of remorse; American Psychiatric Association, 2013). Epidemiologic investigations indicate approximate rates in Western societies of 3% for oppositional defiant disorder (Canino, Polanczyk, Bauermeister, Rohde, & Frick, 2010), 4% for conduct disorder (Costello, Egger, & Angold, 2005) and 3% for antisocial personality disorder (Volkert, Gablonski, & Rabung, 2018).

In addition to clinical classifications, antisocial behaviour can be classified in forensic terms. *Criminal behaviour*, defined in law, represents a type or level of antisocial behaviour that in most cultures society deems intolerable (Hollin, 2006). In relation to the individuals who engage in criminal behaviour, the term *offender* describes a person who has become involved with at least one element of the criminal justice system (e.g., the police, the courts, youth justice services) as a result of substantiated or suspected criminal behaviour (Australian Institute of Health and Welfare, 2019). In research, an individual may also be categorised as an offender based on self-reported criminal behaviour (Gomes, Maia, & Farrington, 2018).

At the extreme end of the antisocial spectrum, criminal behaviour manifests in a variety of forms. The *criminal career* paradigm (introduced by Blumstein, Cohen, Roth, & Visher, 1986) emphasises four key dimensions of offending as critical for understanding criminal behaviour. Of primary importance is the concept of *participation*, that is the distinction between those who offend and those who do not. The three other key dimensions - *frequency* (the number or rate of an individual's offences), *duration* (the period of time an individual is engaged in offending), and *seriousness* (the types of offences an individual engages in) are relevant only to those who offend and describe different aspects of a criminal career (Blumstein et al., 1986).

Another important distinction in forensic definitions of antisocial behaviour is that made between adult and youth offenders. A *youth offender* (juvenile offender; delinquent) is an individual, between the age of criminal responsibility (in Australia, 10 years) and the age of majority (in Australia, 18 years), who has engaged in criminal behaviour (Australian Institute of Health and Welfare, 2019). In accordance with international guidelines (United Nations, 1985, 1989), youth offenders in Australia, as in other Western societies, are catered for by a separate criminal justice system. This system is intended to be responsive to the levels of psychological, cognitive, emotional and social development associated with late

childhood and adolescence (Richards, 2011). Evidence suggests that fewer than 15% of youth (aged 10-17 years) in Australia come into official contact with the criminal justice system before they reach adulthood, and that only 5% of Australian 10 to 17 year-olds have more than one official youth justice contact before adulthood (Allard et al., 2010).

Despite their relatively small numbers, youth who engage in antisocial and criminal behaviour are associated with extensive costs to society, across a range of domains. In Australia, youth justice related processing costs alone are approximately A$640 million per year (Smith, Jorna, Sweeney, & Fuller, 2014). Youth who engage in antisocial and criminal behaviour also tend to become involved with multiple public services (Maschi, Hatcher, Schwalbe, & Rosato, 2008; R. White, 2003), resulting in the total public service expenditure for antisocial youth being approximately 10 times higher than that expended on youth with no problem behaviours (Scott, Knapp, Henderson, & Maughan, 2001). In addition to financial costs, individuals and organisations within society are impacted by the antisocial behaviour of children and adolescents in a variety of ways. These costs may include experience of physical or material loss, exposure to victimisation or trauma and imposition of increased social control or monitoring (Chalfin, 2015).

The most enduring costs associated with antisocial behaviour in children and adolescents are often borne by those engaged in the behaviour. In addition to the social exclusion commonly associated with detection of and/or intervention for antisocial behaviour (e.g., school exclusion, incarceration; Kupchik & Catlaw, 2014; Murray, Blokland, Farrington, & Theobald, 2017), youth who engage in higher levels of antisocial behaviour during childhood or adolescence have been shown to experience a range of negative long-term outcomes. These include persistent and pervasive social difficulties (e.g., Zoccolillo, Pickles, Quinton, & Rutter, 1992), under-attainment in education and employment (e.g., Fergusson & Horwood, 1998; Jung, 2015), lower levels of engagement in social systems (e.g.,

Kupchik & Catlaw, 2014), higher levels of engagement in adult criminal behaviour (e.g., Stevenson & Goodman, 2001) and poorer physical and mental health (e.g., Barnert et al., 2017; Hofstra, Van Der Ende, & Verhulst, 2002). These outcomes further reduce the likelihood of such individuals reaching their full psychological, social and economic potential. The impact of antisocial behaviour in children and adolescents on both social resources and individual potential highlight the importance of understanding the factors and processes that contribute to this behaviour.

1.2 The Risk Factor Paradigm and Antisocial Behaviour

Current models of antisocial behaviour emphasise a complex interplay between a variety of *risk factors* (i.e. variables that increase the likelihood of occurrence). The importance of the risk factor construct for improving understanding of antisocial and criminal behaviour in children and adolescents has been highlighted in a range of systematic reviews and meta-analyses (e.g., Assink et al., 2015; Fairchild, van Goozen, Calder, & Goodyer, 2013; Darrick Jolliffe, Farrington, Piquero, Loeber, & Hill, 2017; Murray & Farrington, 2010), as well as by the pre-eminence of the risk-need-responsivity model in youth justice practice (Bonta & Andrews, 2012). Extensive research focussing on this construct has revealed that a number of factors are consistently associated with antisocial behaviour in youth. These can be broadly grouped into environmental or contextual risk factors and individual or developmental risk factors.

Contextual risk factors demonstrated to be strongly associated with antisocial behaviour in children and adolescents relate to both family and community influences. Specifically, studies have revealed that poor parental supervision or monitoring (e.g., Bacchini, Concetta Miranda, & Affuso, 2010), harsh, erratic or authoritarian parental discipline (e.g., Haapasalo & Pokela, 1999), intra-family conflict and violence (e.g., Vu, Jouriles, McDonald, &

Rosenfield, 2016), separation from a parental figure (e.g., Stadelmann, Perren, Groeben, & Von Klitzing, 2010) and antisocial or criminal behaviour in parents (e.g., Farrington, Jolliffe, Loeber, Stouthamer-Loeber, & Kalb, 2001) are common antecedents of child and adolescent antisocial behaviour. Families rarely exist in isolation, however, and certain community influences have also been shown to be associated with increased risk for antisocial behaviour in children and adolescents. For example, economic disadvantage (Fergusson, Swain-Campbell, & Horwood, 2004), separation from family through formal outside of home care (e.g., Schofield, Biggart, Ward, & Larsson, 2015), high levels of community violence (e.g., Ingoldsby & Shaw, 2002), disorganised, inconsistent school environments (e.g., Herrenkohl, Hawkins, Chung, Hill, & Battin-Pearson, 2001) and association with antisocial or criminal peers (e.g., Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994) have all been linked with increased risk of engaging in antisocial behaviour during childhood and adolescence.

The contextual risk factors outlined above have been further demonstrated to interact with a range of *individual risk factors* during child and adolescent development to influence antisocial and criminal behaviour. Both research results (e.g., Bor, McGee, & Fagan, 2004) and official government reports (e.g., Australian Institute of Health and Welfare, 2017) consistently demonstrate that male gender is more strongly associated with antisocial behaviour than female gender. This association may be related to male vulnerability to other individual risk factors for antisocial behaviour (e.g., Eme, 2009), outlined below. Temperamental features in early life, such as poor self-regulation and control (e.g., Hyde, O'Callaghan, Bor, Williams, & Najman, 2012), negative emotional reactivity (e.g., Eisenberg et al., 1997) and poor adaptability (e.g., Thomas & Chess, 1984), have been linked to higher levels of antisocial behaviour later in childhood and adolescence. In addition, children and adolescents with higher levels of antisocial behaviour have been demonstrated to have poorer executive function than their typically developing peers in such domains as inhibitory control

(e.g., Brophy, Taylor, & Hughes, 2002), attentional focus (e.g., Van Nieuwenhuijzen et al., 2017) and mental flexibility (e.g., Seruca & Silva, 2015). There is also extensive evidence that lower levels of cognitive functioning in childhood increase the risk for later involvement in antisocial behaviour (e.g., Lynam, Moffitt, & Stouthamer-Loeber, 1993). Evidence suggests that these temperamental features and executive and cognitive function deficits contribute to difficulties in skills of social cognition, such as aspects of empathy, which have been demonstrated to be associated with antisocial behaviour (e.g., van Goozen, 2015).

While the risk factor paradigm continues to be important in research and practice relating to antisocial behaviour, more consideration is now also being given to factors which may reduce the risk of antisocial behaviour. These factors are widely referred to as *protective factors*, and are considered to entail individual strengths (Shepherd, Luebbers, & Ogloff, 2016). Noting that the term protective factor was applied inconsistently, Farrington, Loeber, Pardini and Joliffe (2008) introduced the term *promotive factor* to represent an influence that was associated with reduced risk of antisocial behaviour. They also elaborated on the term protective factor, differentiating an *interactive protective factor* (that interacted with a risk factor to suppress its effects) from a *risk-based protective factor* (that predicted a low probability of offending among a group at high risk based on a specific risk factor; Farrington, Ttofi, & Piquero, 2016). This conceptualisation of risk, promotive and protective factors forms the central methodology in Chapter 5 of the current thesis.

1.3 Developmental Theories of Antisocial Behaviour

As research into antisocial behaviour has progressed, many investigators have increasingly emphasised the importance of developmental perspectives. In a recent review of nine significant developmental theories of antisocial (specifically offending) behaviour, Farrington and Ttofi (2015) suggested that a *developmental perspective* involves investigating

antisocial behaviour in individuals in relation to early life precursors and risk processes, how these differ from typical developmental experiences, and how these relate to within-individual changes in antisocial behaviour over time. Forensically, developmental theories of antisocial behaviour could be considered an elaboration of the criminal career paradigm, integrating evidence relating to individual, family, social, contextual and situational experiences that impact an individual's pattern of antisocial and criminal behaviour (Farrington, 2005). Clinically, developmental theories of antisocial behaviour provide structure through which to understand the ways in which interactions between multiple influences may contribute to multiple pathways that result in a range of maladaptive outcomes, including antisocial and criminal behaviour (Calkins & Keane, 2009). A developmental perspective is particularly important for understanding the role of individual risk factors, such as oral language skill, as it provides a basis for characterising trajectories of antisocial behaviour that may differ in terms of the role that such risk factors play.

1.3.1 Pathways to Antisocial Behaviour

One of the most influential theories within this area of research is the *Developmental Taxonomy* proposed by Moffit (1993). This theory was based on an age-of-onset approach to understanding two robust empirical findings. First, antisocial and criminal behaviour is higher during adolescence than any other period of life (Farrington, 1986). Second, only a small proportion of individuals engage in persistent antisocial and criminal behaviour both prior to and beyond adolescence (Wolfgang, Figlio, & Sellin, 1972). Moffit proposed that two key trajectories, defined by distinct patterns and durations of antisocial behaviour, as well as distinct neurological and developmental factors, were associated with antisocial and criminal conduct in youth. A *life-course-persistent* path was considered to originate in early life, as a result of a child with high-risk inherited or neuropsychological features being exposed to a

high-risk family and social environment. It was proposed that interactions between individual and contextual factors throughout childhood and adolescence would contribute to poor social relationships, resulting in limited opportunity to learn prosocial skills and ultimately the development of maladaptive and restricted skills in social cognition and behaviour. Further, it was suggested that these maladaptive skills would be pervasive, consequently diminishing prospects for remediation (Moffitt, 1993).

In contrast, youth on an *adolescent-limited* path were theorised to have relatively typical developmental experiences and neurological functioning. Their engagement in antisocial behaviour was theorised to be in response to a maturity gap between biological capacity and psychological desire to engage in adult behaviours, as well as social restrictions surrounding such behaviours. It was proposed that this maturity gap contributed to social mimicry of antisocial peers. Moffit suggested that typical neuropsychological functioning and exposure to prosocial models during childhood would facilitate adaptive reintegration into conventional social systems as individuals matured into adulthood (Moffitt, 1993).

Since the introduction of the Developmental Taxonomy, a vast body of evidence from a number of longitudinal studies has demonstrated support for the main tenets of the theory (Darrick Jolliffe et al., 2017; Moffitt, 2006). A range of evidence has been found to support the notion that life-course-persistent offending is associated with a combination of individual and contextual risk factors present at the earliest stages of life. The life-course-persistent path has been shown to be linked to such individual childhood factors as under-controlled or difficult temperament (e.g., Moffitt, Caspi, Dickson, Silva, & Stanton, 1996), impulsiveness or hyperactivity (e.g., Jeglum-Bartusch, Lynam, Moffitt, & Silva, 1997), and neuropsychological deficits (e.g., Moffitt, Lynam, & Silva, 1994), including verbal deficits (e.g., Bellair, McNulty, & Piquero, 2016). In addition to these individual risk factors, youth on the life-course-persistent path have been demonstrated to have experienced greater

exposure to a range of contextual risk factors, such as inadequate parenting (e.g., Moffitt & Caspi, 2001), harsh and erratic parental discipline (e.g., Odgers et al., 2008), and separation from a parental figure (e.g., Bergman & Andershed, 2009). Furthermore, research has found that youth on a life-course-persistent path have poorer outcomes later in life, including a greater health burden (e.g., Odgers et al., 2007), occupational and financial difficulties (e.g., Moffitt, Caspi, Harrington, & Milne, 2002), higher rates of relationship difficulties (e.g., Woodward, Fergusson, & Horwood, 2002), and more frequent, enduring and serious criminal careers (e.g., DeLisi, 2001).

In contrast, evidence supports the conceptualisation of the adolescent-limited path being associated with the challenges of pubertal maturation, rather than developmental factors. For example, it has been found that youth on the adolescent-limited path tended to have more normative developmental experiences (Moffitt & Caspi, 2001). In addition, associations have been reported between a pubertal maturity gap and elevated rates of antisocial behaviour during adolescence (e.g., Dijkstra et al., 2015; Galambos, Barker, & Tilton-Weaver, 2003). The adolescent-limited path has also been demonstrated to be more strongly related to association with antisocial peers (e.g., Simons, Wu, Conger, & Lorenz, 1994). Furthermore, evidence indicates that an adolescent-limited trajectory is associated with lower levels of criminal behaviour in adulthood (e.g., Nagin, Farrington, & Moffitt, 1995).

Research has highlighted the potential value of revising some aspects of Moffit's theory, such as distinguishing low level chronic and adult onset antisocial groups (Moffitt, 2006). Nevertheless, the taxonomy distinguishing childhood-onset-persistent and adolescent-onset-limited antisocial behaviour has remained a key construct in research and clinical practice (as reviewed in Moffit, 2017). The importance of this distinction is highlighted by the continued investigation of these trajectories. More significantly, the addition of a specifier in the diagnosis of conduct disorder distinguishing childhood-onset from adolescent-onset, in the

fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994), emphasised age of onset as a central concept for understanding antisocial behaviour.

1.3.2 Callous-Unemotional Traits and Antisocial Behaviour

In the DSM-5 (American Psychiatric Association, 2013) an additional specifier was added to the diagnosis of conduct disorder. This specifier, 'with *limited prosocial emotions*', designates youth who, in addition to exhibiting serious antisocial behaviour, also demonstrate a pattern of interpersonal and emotional functioning characterised by (at least two of): a lack of remorse or guilt; callousness or a lack of empathy; a lack of concern about performance in important activities; and shallow or deficient affect. The inclusion of the limited prosocial emotions specifier in the DSM-5 diagnostic criteria for conduct disorder represented clinical application of extensive research evidence (Pechorro, Ray, Barroso, Maroco, & Gonçalves, 2016). The construct that has been the focus, and formed the basis of this research evidence is *callous-unemotional* (CU) *traits*.

The conceptualisation of CU traits, which correspond to the affective dimension of *psychopathy* (a disorder defined by a cluster of affective, interpersonal and antisocial characteristics; Hare, 1998), emerged through research aimed at refining how features associated with adult psychopathy might be expressed in children and adolescents (Frick, Ray, Thornton, & Kahn, 2014b). Its importance as an approach to subtyping trajectories of antisocial behaviour has been established through extensive research. Evidence from this research can be broadly summarised in terms of five key findings. First, a range of studies using different methodologies have indicated that genetic (e.g., Fontaine, Rijsdijk, McCrory, & Viding, 2010) and biological (e.g., Kimonis et al., 2008) markers distinguish individuals high in CU traits from those low in CU traits. Second, a growing body of evidence suggests

that high levels of CU traits are associated with distinct temperamental and personality characteristics, such as low levels of fear (e.g., Barker, Oliver, Viding, Salekin, & Maughan, 2011). Third, children and adolescents with high levels of CU traits have been demonstrated to present with distinct cognitive characteristics compared to those low in CU traits, including insensitivity to punishment cues and more deviant social values (e.g., Pardini, 2011). Fourth, elevated levels of CU traits have been found to be associated with reduced emotional responsiveness in terms of poor recognition of fearful facial expressions (e.g., Dadds, Perry, et al., 2006), reduced reactivity to negative emotional words (e.g., Loney, Frick, Clements, Ellis, & Kerlin, 2003) and weaker responses to distress cues (e.g., Kimonis, Frick, Munoz, & Aucoin, 2007). Fifth, high levels of CU traits have been shown to be associated with more severe, chronic and aggressive antisocial and criminal behaviour in children and adolescents (e.g., Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005).

The associations between CU traits and patterns of antisocial behaviour are of particular relevance to the current thesis. Evidence indicates that higher levels of CU traits are associated with a range of dimensions of antisocial behaviour. For example, CU traits have been shown to predict a greater likelihood of participation in antisocial (e.g., Viding, Jones, Paul, Moffitt, & Plomin, 2008) and criminal (e.g., Kahn, Byrd, & Pardini, 2013) behaviour. Individuals high on CU traits also tend to demonstrate a higher frequency (e.g., McMahon, Witkiewitz, & Kotler, 2010) and greater versatility (e.g., Declercq, Markey, Vandist, & Verhaeghe, 2009) of antisocial and/or criminal behaviour. In addition, research indicates that higher CU traits are associated with a longer duration of antisocial behaviour, including an earlier age of onset (e.g., Silverthorn, Frick, & Reynolds, 2001), involvement in persistent antisocial acts over extended periods (e.g., Pardini & Fite, 2010) and criminal recidivism (e.g., Boccaccini et al., 2007). Indices of seriousness of antisocial behaviour that have been demonstrated to be associated with higher CU traits include higher levels of reactive and

proactive aggression (e.g., Enebrink, Andershed, & Långström, 2005), higher levels of cruelty (e.g., Dadds, Whiting, & Hawes, 2006) and higher levels of violent offending (e.g., Kruh, Frick, & Clements, 2005). These associations between CU traits and patterns of antisocial behaviour have led researchers to suggest that those with high CU traits designate a unique group of antisocial youth (Frick, Ray, Thornton, & Kahn, 2014a).

As outlined in the diagnostic criteria for the limited prosocial emotions specifier for conduct disorder (American Psychiatric Association, 2013), one of the core deficits associated with CU traits and, by extension, this unique group of antisocial individuals, is a deficit in *empathy*. While empathy is an important element of social cognition, it is not a unitary construct. There is a range of views regarding precisely what constitutes empathy, however it is widely agreed that it consists of both *affective* (identifying with another's emotional state) and *cognitive* (understanding another's emotional state) components (R. Blair, 2005). Further, each of these components are represented by a range of constructs and skill sets. For example, in developing the Interpersonal Reactivity Index, Davis (1983) represented affective empathy through empathic concern and personal distress, and cognitive empathy through perspective taking and fantasy. *Perspective taking*, the capacity to recognise and understand the viewpoint of another through situational cues (Kurdek, 1978), is a specific focus in Chapter 7 of the current thesis.

Initially research appeared to indicate that individuals high in CU traits presented with deficits in affective empathy, but relatively intact cognitive empathy (R. Blair, 2005). More recently it has become apparent that the empathy deficits associated with higher CU traits are more complex than originally conceived, and may vary depending on age, gender and subtype of empathy. For example, Dadds et al. (2009) found that high levels of CU traits were associated with deficits in affective empathy throughout childhood (3 – 13 years) for males, and that both males and females had deficits in cognitive empathy in earlier childhood (up to

9 years). However, females with high CU traits did not demonstrate a relative deficit in affective empathy during childhood, and males with high CU traits demonstrated a relative improvement in cognitive empathy as they approached adolescence (9 – 12 years). In addition, researchers have found that examining different skill sets within components of empathy suggests that the empathy deficits associated with higher CU traits are more fine-grained than previously thought. For example, Anastassiou-Hadjicharalambos and Warden (2008) found that children with conduct disorder and high CU traits did not significantly differ on *cognitive perspective taking* (the ability to infer the thoughts of others), but demonstrated significantly poorer *affective perspective taking* (the ability to infer the feelings of others) compared to typically developing peers. Distinguishing individuals who engage in antisocial and criminal behaviour on the basis of high and low levels of CU traits is, therefore, important for understanding how their capacity to relate to others has previously and/or may continue to impact their behaviour.

This distinction between antisocial individuals high and low on CU traits aids in developing understanding of the roles that other potential risk factors for antisocial behaviour play in differing trajectories of antisocial and criminal conduct. There is a developing body of research demonstrating that CU traits are an important moderator of the relationship between risk factors for antisocial behaviour, such as oral language deficits, and patterns of antisocial behaviour, such as levels of aggression. For example, in a sample of adolescent male offenders, Munoz et al. (2008) found that individuals high on CU traits who also had higher verbal ability self-reported the highest levels of violent offending. Investigation of these forms of association is a key focus of Chapter 6 of the current thesis.

A further development in research relating to CU traits and antisocial behaviour has emerged through the subtyping of variants of CU traits based on concurrent level of anxiety and/or history of maltreatment. Recent research has established that individuals with *primary*

variant CU traits (i.e. high CU traits and low anxiety/negligible maltreatment history) demonstrate different characteristics to those with *secondary variant CU traits* (i.e. high CU traits and high anxiety/history of maltreatment). For example, in a sample of adolescent male offenders, Kahn, Frick, Golmaryami and Marsee (2017) found that individuals with primary variant CU traits demonstrated relatively better skills in cognitive perspective taking. This more concentrated investigation of relationships between various factors and antisocial behaviour in children and adolescents has the potential to considerably increase understanding of these individuals, and their antisocial conduct.

1.4 Oral Language Skills and Antisocial Behaviour

Verbal abilities have been among the most well researched individual cognitive risk factors for antisocial behaviour. Since Wechsler (1944) highlighted the discrepancy between Performance IQ and Verbal IQ scores often found in antisocial populations, research has supported a pattern of poorer scores on verbal compared to non-verbal components of intelligence tests as being characteristic of antisocial adolescents (Isen, 2010). Studies have consistently shown that children and adolescents engaged in antisocial or criminal behaviour produce significantly poorer scores on measures of *verbal ability* (cognitive function directly involving language skills) than their typically developing peers. Moreover, it has been demonstrated that these differences are independent of potentially confounding factors such as ethnicity (e.g., Cornell & Wilson, 1992) and socio-economic status (e.g., Yun & Lee, 2013). Furthermore, longitudinal studies have found that poorer verbal ability early in development predicts a range of later antisocial behaviour, including externalising behaviour problems (e.g., Petersen et al., 2013), parent-reported criminal behaviour (e.g., Bor et al., 2004), self-reported criminal behaviour (e.g., Beaver et al., 2013), and officially recorded criminal behaviour (e.g., Manninen et al., 2013). In addition, poorer verbal ability has been

shown to be associated with patterns of antisocial behaviour in children and adolescents, such as higher frequency of antisocial behaviour (e.g., Vermeiren, Schwab-Stone, Ruchkin, De Clippele, & Deboutte, 2002), longer duration of engagement in antisocial behaviour (e.g., Yew & O'Kearney, 2015) and more severe antisocial behaviour involving higher levels of aggression and violence (e.g., Barker et al., 2007).

Measures of verbal ability, however, only capture a limited representation of what is a complex construct. *Oral language* is a multidimensional system, governed by rules which establish the appropriate use and understanding of the *structural* skills of phonology (sound system meaning interactions), morphology (smallest units of meaning within words), syntax (structure of sentences), and semantics (provision of meaning; Paul & Norbury, 2012). Oral language also encompasses socially-sanctioned rules which establish the appropriate use of language in a range of social situations, known as *pragmatics* (Snow & Douglas, 2017). Due to the multidimensional nature of oral language, there is growing support for research involving more comprehensive assessments of oral language skills and investigation of specific oral language skills in relation to antisocial behaviour.

Before reviewing such research, it is important to acknowledge the variations in terminology applied to oral language deficits in academic and clinical literature. In the DSM-5 (American Psychiatric Association, 2013) four specific conditions (language disorder, social (pragmatic) communication disorder, speech sound disorder and childhood-onset fluency disorder (stuttering)) are described within the communication disorders section of the neurodevelopmental disorder categorisation. Notably *specific language impairment* (SLI) was not included as a specified condition. Although the term had been favoured by clinicians and researchers since the early 1980s to describe unexplained language deficits in youth, concerns had developed regarding the inconsistent application of diagnostic criteria and terminology and the reliance on exclusionary criteria (specifically, that the language deficit occurred in the

absence of other developmental deficits; Reilly et al., 2014). Since publication of the DSM-5 a multinational, multidisciplinary, two phase, two year project has been conducted to develop greater consensus regarding the diagnosis and terminology associated with oral language deficits with clinical impacts on functioning. This resulted in the term *language disorder* being recommended for general reference to oral language deficits associated with impaired functioning and a probable poor prognosis (Bishop, Snowling, Thompson, Greenhalgh, & Catalise-consortium, 2017). The term *developmental language disorder* (DLD) was recommended for reference to such deficits specifically when these were not associated with a known biomedical condition (Bishop et al., 2017). Although debate continues regarding the most appropriate assessment of these disorders, as with those listed in the DSM-5, diagnosis is based on the application of recognised criteria and clinical judgement (Bishop et al., 2017). Therefore, in the current thesis the more general term oral language deficit has been used to describe poor oral language skills, unless referring to a clinically determined condition.

The strength of the association between deficient oral language skills and antisocial behaviour has been examined in three recent meta-analyses. In an investigation of controlled prospective studies involving children with developmental language disorders, Yew and O'Kearney (2013) found that compared to children with typical language ability, children with developmental language disorder were more than twice as likely to meet criteria for an externalising disorder later in childhood or during adolescence, with relative risks for conduct disorder specifically ranging from 1.39 to 4.01. Focussing on unidentified oral language deficits among children officially categorised as having *emotional and behavioural disorders*, Hollo, Wehby and Olivier (2014) reported that on average, 47% of children with emotional and behavioural disorders demonstrated oral language skills equal to or less than two standard deviations below the mean for their age. In a more general examination of associations between oral language deficits and behaviour problems (both internalising and externalising)

in children and adolescents, Chow and Wehby (2017) calculated a significant mean effect size of -.17, indicating that poorer oral language skills were associated with higher levels of behaviour problems, both concurrently and predictively.

This association between oral language deficits and antisocial behaviour may be grounded in the role that oral language plays in the development of social cognition. *Social cognition* refers to the range of psychological processes that enable an individual to understand and effectively participate in the social world (Frith, 2008). Some researchers have demonstrated developmental linkages between oral language skill, social cognitive skill and social behavioural outcomes (Botting & Conti-Ramsden, 2008; Im-Bolter, Cohen, & Farnia, 2013). Indeed, one study provided evidence that oral language mediated the relationship between social cognition and externalising psychopathology (Yaghoub Zadeh, Im-Bolter, & Cohen, 2007). More particularly relevant to the current thesis, research has supported the role that different oral language skills play in the development of elements of empathy (e.g., Milligan, Astington, & Dack, 2007).

The association between different oral language skills and the development of empathy could be the key factor underlying relationships between oral language and CU traits. However, while the oral language skills of individuals high in psychopathic traits has received some research attention (de Almeida Brites, 2016), investigation of oral language skills specifically associated with CU traits has been less prominent. This is likely due to two key factors. First, the specific construct of CU traits (Frick & White, 2008), and the distinction between primary and secondary variants of CU traits based on associated level of anxiety/maltreatment specifically (e.g., Kahn, Frick, et al., 2013), are relatively recent developments in the understanding of antisocial behaviour in youth. As such, many areas of investigation into associations with other variables are in their infancy. Also, differences that are now becoming apparent between the skill profiles of primary and secondary variant CU

individuals may have been obscured in prior research which did not disaggregate analyses at this level (e.g., Kimonis, Frick, Cauffman, Goldweber, & Skeem, 2012). Second, potential oral language differences between individuals high in CU traits and those low in CU traits, as well as between individuals with primary variant CU traits and those with secondary variant CU traits may have been obscured by use of global measures of verbal ability to operationalise language. Such measures do not allow for separate analysis of different domains of language, which would be more likely to reveal subtle differences in language skills associated with high levels of CU traits (e.g., K. Blair et al., 2006).

A published systematic review specifically focussing on research investigating oral language deficits among youth offenders constitutes Chapter 2 of the current thesis. Since submission of this manuscript six additional studies, which would have met criteria for inclusion, have been identified (Bryan, Garvani, Gregory, & Kilner, 2015; Hopkins, Clegg, & Stackhouse, 2017; N. Hughes et al., 2017; Kippin et al., 2018; Lount, Purdy, & Hand, 2017; Winstanley, Webb, & Conti-Ramsden, 2019). Findings from these studies were consistent with evidence summarised in the systematic review. Some novel variables were investigated in these studies, such as use of languages and dialects other than English (Kippin et al., 2018), hearing and auditory processing deficits (Lount, Purdy, et al., 2017) and expository discourse (Hopkins et al., 2017). However, studies were generally methodologically similar to those included in the systematic review. An exception was the study of Hopkins, Clegg and Stackhouse (2017), in which logistic regression analyses were used to demonstrate that higher levels of oral language skill were associated with a higher likelihood of being a non-offender. A summary of key characteristics of these studies is located in Appendix A.

1.5 Overview of the Current Thesis

1.5.1 Rationale

As demonstrated, considerable research attention has been devoted to developing understanding of the characteristics and developmental experiences associated with antisocial and criminal behaviour in children and adolescents. This body of research shows that exposure to a range of contextual and individual risk factors during early developmental periods increases the likelihood of youth participating in antisocial behaviour. The role of the individual risk factor, oral language deficits, in the development and presentation of antisocial behaviour in youth has attracted particular attention. Research has further demonstrated that, depending on interactions between risk factors, antisocial behaviour may develop through different pathways towards different patterns of frequency, duration and severity.

As emphasised in research supporting the Developmental Taxonomy (Moffitt, 1993), early age of onset of antisocial behaviour has been linked to higher rates of persistent and aggressive conduct. Oral language deficits have been demonstrated to be associated with this trajectory (Bellair et al., 2016). There is now also a large body of research providing evidence that high levels of CU traits are associated with more frequent, chronic and violent antisocial behaviour (e.g., Frick et al., 2014a). In addition, research provides some indication that the association between oral language skill and antisocial behaviour may be moderated by levels of CU traits (Munoz et al., 2008). Through differentiating antisocial individuals on the basis of primary and secondary variants of CU traits, research is beginning to elaborate the different associations between antisocial behaviour, CU traits and different components of empathy.

There is a need for further research to address gaps in the current evidence base and increase understanding of the associations between oral language skills, CU traits, empathy and antisocial behaviour. Several studies have demonstrated that oral language deficits are associated with increased risk for antisocial behaviour. However, there has been relatively

little research focussing on the effect normative or superior oral language skills have in protecting against antisocial behaviour. Oral language skills and CU traits have been separately demonstrated to have strong associations with antisocial behaviour in children and adolescents. Yet, there has been comparatively little investigation of the ways in which these two factors interact in relation to patterns of antisocial behaviour. Considering the important links between oral language skills, CU traits, antisocial behaviour and empathy, surprisingly little research has been directed towards understanding how these factors may be interconnected. There is emerging evidence that investigating relationships between these factors using global measures may obscure the complexity of intricate associations and interactions that underlie the development of antisocial and criminal behaviour in children and adolescents.

As has been outlined, antisocial individuals generally and youth offenders specifically are a diverse and heterogenous group (Piquero & Weiss, 2011) and, for some engagement in antisocial and criminal acts has long term negative life outcomes (e.g., Barnert et al., 2017). It is therefore important that the interrelationships that exist between various risk factors for antisocial behaviour are understood at a more fine-grained level to increase the likelihood of more successful intervention. Conducting investigation using empirical techniques and analyses allows detailed statistical examination of interactive relationships between multiple variables, as well as statistical control of potentially confounding variables (Tabachnick & Fidell, 2014). Combined with the use of measures that have been standardised, and/or have proven reliability and validity within youth offender or similar populations, use of empirical techniques reduces bias and increases the generalisability of findings beyond the research sample (Mitchell & Jolley, 2004). As such, the current research will be well placed to inform theoretical understanding of antisocial behaviour in youth, as well as intervention directed towards reducing antisocial behaviour. Specifically, findings from the current research could

provide insights regarding assessment of skills and attributes of antisocial youth, coordination and timing of interventions to maximise positive influence on antisocial behaviour and targeting of interventions more specifically based on individual skills and attributes.

1.5.2 Overall Aim and Research Questions

The overall aim of the current thesis was to examine associations between oral language skills and related risk factors for antisocial behaviour, in youth offenders. In order to inform an understanding of the complexity of the associations between oral language skills, CU traits, empathy and antisocial behaviour, each empirical study in the current thesis examined elements of these factors at a fine-grained level, and a dimensional approach was utilised predominantly. The current thesis consists of a systematic review of the literature and three empirical studies, each of which investigated associations between unique dimensions of oral language skills, CU traits, and/or empathy and antisocial behaviour. The specific aims of the respective systematic review and empirical studies were as follows:

- Systematic Review: The major aim of this review was to identify, synthesise and evaluate current research evidence concerning associations between oral language deficits and youth offending.
- Study 1: The major aim of this study was to examine associations between distinct oral language skills and youth offending using the risk-promotive-protective paradigm.
- Study 2: The major aim of this study was to examine patterns of antisocial offending and specific oral language skills among adolescents with primary/secondary variants of CU traits.
- Study 3: The major aim of this study was to examine associations between cognitive and affective perspective taking, CU traits and youth offending.

CHAPTER 2 - SYSTEMATIC REVIEW[1]

2.1 Introduction

In most western societies youth offenders comprise a small proportion of the population who are associated with disproportionately high rates of social disadvantage (Australian Institute of Health and Welfare, 2014). Contact with the youth justice system exposes these youth to a range of experiences (police interviews, court proceedings, therapeutic intervention programs) that draw heavily on expressive and receptive language skills (LaVigne & Van Rybroek, 2011). However, there is growing evidence, particularly from Australia (e.g., Snow & Powell, 2011a), the United Kingdom (e.g., Bryan, Freer, & Furlong, 2007), and the United States (e.g., A. Davis, Sanger, & Morris-Friehe, 1991), that youth offenders are likely to lack the capability to effectively negotiate such high-stakes language rich situations. Language difficulties may therefore carry major consequences for these youth, by impacting their ability to accurately receive information conveyed to them (e.g., legal rights and responsibilities; Rost & McGregor, 2012), or affecting their ability to clearly express information to others (e.g., in consultation with legal representatives; LaVigne & Van Rybroek, 2014). Oral language skills are also fundamental to the transition to literacy in the early years of school, so deficits that are not addressed will manifest as academic difficulties during the school years (Snow & Powell, 2011b). Evidence of oral language deficits in youth offenders stands to inform the strategies by which youth justice and related agencies engage with this high-risk population, however such evidence has been slow to emerge. The major aim of this review

[1] For consistency throughout the current thesis manuscript, some terminology within this chapter has been altered from that used in the original publication: Anderson, S. A. S., Hawes, D. J., & Snow, P. C. (2016). Language impairments among youth offenders: A systematic review. *Children and Youth Services Review, 65*, 195-203. Specifically, the following substitutions have been made to reflect recommended changes in terminology developed since this article was published: youth justice for juvenile justice; oral language deficit for language impairment; developmental language disorder for (diagnosed) language impairments; language disorder for (criterion based) language impairment; oral language for language.

was to identify, synthesise, and evaluate, current research evidence concerning associations between oral language deficits and youth offending.

2.1.1 Definitions

Youth offenders (juvenile offenders; delinquents) are individuals who have committed criminal acts that have resulted in the imposition of community-based or custodial court orders. Most societies respond to the developmental immaturity of these youth through a youth justice system that caters to ages approximately 10 to 18 years (Bishop, 1997; Doolan, 1991; Minister of Justice and Attorney General, 2013; Richards, 2011). Statistics from Australia (Australian Institute of Health and Welfare, 2014), Canada (Munch, 2012), England and Wales (Youth Justice Board, 2014), New Zealand (Ministry of Justice, 2010), and the USA (Puzzanchera & Hockenberry, 2013) reveal that males constitute about three quarters of youth offender populations. In western societies Caucasian youth predominate in youth justice statistics. However, certain racial and ethnic groups are disproportionately represented. Notably Indigenous youth, in Australia (Australian Institute of Health and Welfare, 2014), Canada (Munch, 2012), New Zealand (Ministry of Justice, 2010), and the USA (Puzzanchera & Hockenberry, 2013), and black youth, in England and Wales (Youth Justice Board, 2014), and the USA (Puzzanchera & Hockenberry, 2013). Before coming into contact with the youth justice system, many youth offenders have grown up in circumstances of socio-economic deprivation, been placed in out-of-home (foster) care, and experienced academic disengagement and/or lack of success (Loeber & Farrington, 2000; Maschi et al., 2008). Research also reveals that executive function deficits (Beaver, DeLisi, Vaughn, & Wright, 2010), intellectual impairment (Haysom, Indig, Moore, & Gaskin, 2014), mental health problems (Anckarsäter et al., 2007), substance abuse (Lennings, Kenny, & Nelson, 2006), and traumatic brain injury (Moore, Indig, & Haysom, 2014), appear at higher rates in youth

offender samples than in the general population. When they come into contact with the youth justice system, youth offenders may be assessed and provided with services in accordance with the risk-need-responsivity (RNR) model (Bonta & Andrews, 2007). This model is based on the principle, and supported by evidence (Dowden & Andrews, 1999), that a reliable match between offender risk and service provision will maximise reductions in recidivism.

Despite the vulnerabilities highlighted in the previous paragraph, youth offenders are required to negotiate a justice system that is highly reliant on oral language skills. These skills are the auditory-verbal (listening and talking) competencies that individuals gradually acquire from infancy onwards. Oral language skills can be broadly divided into two categories. *Structural skills* are rules that relate various levels and combinations of sound to meaning, and include the form (phonology, morphology, syntax) and content (semantics) of language (Paul & Norbury, 2012). *Pragmatic skills* encompass appropriate use of language in social situations, such as rules of conversational interaction, cultural conventions of language use, and construction of logical narratives. (Bishop, 2000; de Villiers, 2004). When examining oral language, it is usual to distinguish *receptive* (comprehension) skills from *expressive* (speaking) skills, as these represent different modalities of language use (Larson & McKinley, 1995). While oral language skills usually develop in a steady trajectory, acquisition can be disrupted as a result of biological and/or environmental factors (Paul & Norbury, 2012; Tomblin, 1996). The language difficulties that may result from such disruption can impact one, or a combination of skill domains (Larson & McKinley, 1995), and are estimated to affect 5 to 10% of the general population (Tomblin, 1996). If detected during the developmental period, language difficulties attract a variety of labels, including, but not limited to, specific language impairment (SLI), developmental language disorder (DLD), and language learning impairment (Bishop, 2014).

2.1.2 Developmental Perspectives on Language and Offending

The acquisition of both oral language skills and social cognition are grounded within caregiver-child attachment during development, and influenced by socio-economic status (SES). Research indicates that children with secure attachment relationships have greater competency in oral language skills than those with insecure attachment (van IJzendoorn, Dijkstra, & Bus, 1995). Further, evidence suggests that the attachment – language relationship is mediated by interactive experiences. These are of particular relevance for individuals from low SES backgrounds whose caregivers may be less likely to communicate in ways that contribute to oral language development (Hoff, 2003). Similarly, studies emphasise the role that poor parental supervision and management techniques play in the development of antisocial behaviour in children (Sousa et al., 2011). Research suggests that low SES is associated with caregiver-child interaction patterns, such as inconsistent use of discipline and reduced use of effective monitoring, that are associated with delinquency (Sampson & Laub, 1994). Therefore, not only are low SES backgrounds over-represented in the developmental experiences of youth offenders (Maschi et al., 2008), these have also been linked to less enriched early language environments (Roy, Chiat, & Dodd, 2014).

The importance of developmental experiences is also reflected in theoretical explanations of an association between oral language deficits and antisocial behaviour. Redmond and Rice (1998) investigated two contrasting theoretical frameworks in their research involving analysis of parent and teacher ratings of the socio-emotional development of 17 children with specific language impairment (SLI) and 20 non-SLI age-matched peers (ages 6 and 7 years). Their findings, and evidence from other research involving children with SLI (for example, Fujiki, Brinton, & Todd, 1996), support the Social Adaptation Model (SAM). This model suggests that some youth with oral language deficits develop antisocial behaviour because their limited oral language skills create difficulties processing and

negotiating social interactions. However, these authors emphasise that their findings do not exclude an alternative framework for understanding language-behaviour associations - the Social Deviance Model (SDM). This model posits that innate psycho-emotional impairment influences the development of appropriate oral language skills, potentially due to a common underlying cognitive impairment. Evidence supporting the SDM can be found in research involving examination of oral language deficits in children with diagnosed socio-emotional disorders (e.g., Camarata, Hughes, & Ruhl, 1988), and research revealing that children with SLI produce similar scores on socio-behavioural measures to psychiatric populations (e.g., Baker & Cantwell, 1987). In addition to explanations similar to those investigated by Redmond and Rice, Bishop (1997) discussed a third potential theoretical framework for understanding oral language deficit-antisocial behaviour associations. The Limited Processing Model conceives of both language and social difficulties developing on the basis of more general cognitive constraints which impact the development of both skills. Bishop suggested that evidence to support this view can be found in research into the pragmatic language skills of young people with SLI (e.g., Bishop & Adams, 1991). While theoretical models provide a possible basis on which to interpret relationships between oral language and behaviour, evidence does not support a universal explanation for the association. The multifactorial and interconnected nature of linkages between communication and social competence (Brinton & Fujiki, 2005) mean that these three theorised pathways and possibly others play a role in explaining comorbidity between oral language and behaviour difficulties in some particularly at-risk individuals.

Evidence of the existence of a relationship between oral language deficits and antisocial and delinquent behaviour is, however, well established. Cross sectional studies reveal significant oral language deficits in youth excluded from school (Clegg, Stackhouse, Finch, Murphy, & Nicholls, 2009), youth with conduct disorder (Gilmour, Hill, Place, & Skuse,

2004), and institutionalised, antisocial youth (Warr-Leeper, Wright, & Mack, 1994). Similarly, longitudinal studies reveal an increase in antisocial problems with age among those with diagnosed developmental language disorders (Beitchman et al., 2001; Lindsay & Dockrell, 2012). Notably, one study revealed that language impairment at age 5 predicted self-reported adolescent delinquency (Brownlie et al., 2004). These findings are reinforced by research into *verbal ability* (an individual's ability to use language to analyse and solve problems) in youth offenders. Studies have shown that youth offenders display substantially poorer verbal intelligence quotient (VIQ) than performance intelligence quotient (PIQ) scores on Wechsler scales, indicating a specific deficit in cognitive skills related to language (Cornell & Wilson, 1992; Culberton, Feral, & Gabby, 1989; Romi & Marom, 2007).

2.1.3 Key Questions for the Current Review

The research outlined above demonstrates clear associations between oral language deficits and antisocial behaviours, as well as low verbal ability and youth offending. In order to more precisely characterise the relationship between discrete oral language skills and the extreme antisocial behaviour characterised by youth offending, this review will address three research questions. Firstly, how strong is the association between the presence of oral language deficits and youth offending? Secondly, is there evidence that some oral language skills or modalities are more impaired than others in youth offender populations? Thirdly, what biopsychosocial factors have been shown to influence the relationship between oral language deficits and youth offending? Detailed examination of research that addresses these questions will fulfil two major objectives. First, it is anticipated that critical analysis of the current evidence, and methodological strengths and limitations of the included studies will assist in directing and refining future research. Second, it is hoped that the review will endorse advocacy for early identification and specialised management of youth displaying

both oral language deficits and behaviour difficulties, who may be on a trajectory towards contact with the youth justice system.

2.2 Method

The review was based on a systematic search of six databases, Embase, ERIC, MEDLINE, PsycINFO, Scopus and Web of Science. The search strategy combined terms to identify studies investigating associations between oral language deficits and offending among youth. Search terms included variations of: (delinquent OR juvenile offender OR youth offender OR criminal behaviour OR incarceration OR recidivism OR juvenile justice OR forensic) AND (communication disorder OR language disorder OR language impairment OR communication skill OR language skill OR verbal ability OR language proficiency OR speech language pathology OR language therapy). Abstracts of identified peer-reviewed articles were screened for the following inclusion criteria: (a) publication in English; (b) presentation of cross sectional or longitudinal research data; (c) assessment of a youth sample with a mean age between 10 and 21 years; (d) assessment of youth offending through documented contact with the youth justice system; (e) assessment of more than one domain (structural, pragmatic, expressive or receptive) of oral language through a standardised measure, and/or comparison with a control group; (f) analysis of associations between oral language skills and youth offending.

The search identified 2567 records. After excluding duplicates, 2204 abstracts were screened, of which 86 were ultimately considered to meet inclusion criteria. The majority of papers were excluded at this point either because they did not constitute a research report or a youth sample was not assessed. Full text articles of the remaining abstracts were retrieved and reviewed, with 70 articles being excluded after further review. The key reason for exclusion at this stage was that assessment of oral language skills was limited to one domain of language

and therefore did not facilitate evaluation of evidence that some oral language skills or modalities are more impaired than others in youth offender populations. Hand searching of references of selected articles did not reveal any additional studies that met inclusion criteria. However, communication with key authors revealed one additional study. The final pool of 17 articles comprised studies of 16 different samples, and included research published between 1982 and 2016. A summary of study characteristics appears in Table 1. Of the 16 studies that met inclusion criteria, all reported findings from cross-sectional research and all were conducted in the USA, the UK, or Australia[2].

Studies addressed a variety of research questions, and employed a heterogeneous range of measurement approaches and analytic techniques. As a result, meta-analysis was not feasible. Studies were therefore reviewed in a narrative synthesis format guided by the research questions established for this review (based on Popay et al., 2006). For studies that included both a youth offender and a comparison sample, if not reported by the authors, effect sizes were calculated using the formulae described by Thalheimer and Cook (2002). Several studies examined more than one research question, and therefore appear in multiple sections of the review. Studies were systematically and critically appraised for methodological strengths and limitations according to sample characteristics and measurement of oral language, youth offender and biopsychosocial variables.

2.3 Results

2.3.1 Evidence of Associations Between Oral Language Deficits and Youth Offending

How strong is the association between the presence of language impairments and youth offending?

[2] For a summary of key characteristics of additional studies identified since the original systematic review was published, see Appendix A.

Evidence of oral language deficits in youth offenders is summarised in Table 1. In studies that compared group scores on language assessments, youth offender groups consistently obtained poorer scores than comparison groups. Blanton and Dagenais (2007) found that a group of incarcerated youth offenders (n = 32; 13-17 years; 56% female) produced significantly lower score on standardised language measures than a comparison group (n = 32) matched on age, sex, ethnicity and SES (with calculated effect sizes of d = .73 - .88 for males and d = .65 - .76 for females). These results reinforce evidence from four studies conducted by Snow and colleagues. Humber and Snow (2001), found that a community-based youth offender group (n = 15; 13-21 years; 100% male) had significantly lower scores on all language measures than a sex-matched group of non-offending peers (n = 15; 15-17 years), and reported large effect sizes (d = .96 -1.72). Similarly, Snow and Powell (2004, 2005), reported significantly poorer group scores for community-based, male youth offenders (n = 30; 13-19 years) than a group of age and sex-matched peers (n = 50) on all but one standardised language subtest, and overall narrative discourse score. Where significant differences were present, the authors reported moderate effect sizes (d = .50 - .71). These researchers (Snow & Powell, 2008) later reported significantly poorer group scores on all language measures for community-based, male offenders (n = 50; M age = 15.8) compared to sex, and SES-matched peers (n = 50; M age = 14.9). In this study significant differences were associated with moderate to large reported effect sizes (d = .64 - .95). These findings support those of Sanger and colleagues. In a sample of 24 incarcerated, male youth offenders (14-18 years) and 24 age, sex and IQ-matched peers, Davis, Sanger and Morris-Friehe (1991) found that the youth offender group obtained significantly lower scores on language measures than the comparison group (with calculated effect sizes of d = .79 - .97). In addition, Sanger, Hux and Belau (1997) reported group scores on language measures for 28 incarcerated, female

Table 1 *Characteristics of Included Studies and Evidence of Oral Language Deficits*

Study	Country (Ethnicity)	Sample Size & Type‡	Age range (years)	% female	Measure of Language	Measure of Youth Offending	Other Measures	Evidence of oral language deficits
Blanton & Dagenais (2007)	USA (Mixed, majority African American)	64 (YO-I, *n* = 25; YO-CB, *n* = 7; C, *n* = 32)	13-17	56	CELF-3	Adjudication	K-BIT	Scores language measures: YO sig. < C (*d* = .65 - .88) Presence language deficits: 25% of YO v. 3.1% of C
Bryan (2004)	UK	30 (YO-I)	18-21	0	BNT; FLTA; HSLRS; OCT	Conviction	PI	Presence language deficits: 23.3 – 73.3% of YO
Bryan et al. (2007)	UK (Mixed, majority Caucasian)	58 (YO-I)	15-18	0	BPVS-II; SA; TOAL-3; TROG-2	Conviction	BSA-IA	Presence language deficits: 52% of YO
Davis et al. (1991)	USA (100% Caucasian)	48 (YO-I, *n* = 24; C, *n* = 24)	14-18	0	DA; TOAL-2	Adjudication	AA	Scores language measures: YO sig. < C (*d* = .79 - .97) Presence language deficits: 38% of YO v. 4% of C
Games et al. (2012)	UK	11 (YO-CB)	11-17	8	CELF-4	YO Service Provision	School Type	Presence language deficits: 67 - 100% of YO
Gregory & Bryan (2011)	UK (Mixed, majority Caucasian)	72 (YO-CB)	11-18	16	SA; COS; CELF-4 (*n* = 58)	ISSP Sentence	School Type	Presence language deficits: 14 – 20.6% of YO
Humber & Snow (2001)	Aus	30 (YO-CB, *n* = 15; C, *n* = 15)	13-21	0	DA; SCOLP; TLC-E	JJU Attendance		Scores language measures: YO sig. < C (*d* = .96 – 1.72)
Karniski et al. (1982)	USA (100% Caucasian)	105 (YO-I, *n* = 54; C, *n* = 51)	12-17	0	BNT; SC; SR; TT; VO;	Commitment	NPA; SES	Presence language deficits: 9.6% of YO v. 2% of C
Myers & Mutch (1992)	USA	8 (YO-I, *n* = 6; YO-CB, *n* = 2)	7-18	0	CELF-R; TLC-E	Homicidal Behaviour	DICA-R	Presence language deficits: 87.5 – 100% of YO
Sanger et al. (1997)	USA (100% Caucasian)	56 (YO-I, *n* = 28; C, *n* = 28)	14-18	100	DA; TLC-E	Incarceration		Scores language measures: YO sig. < C (*d* = .43 -.63) Presence language deficits: 14.3% of YO v. 0% of C
Sanger et al. (2001)	USA (Mixed, majority Caucasian)	67 (YO-I)	13-18	100	CELF-3; WORD; PPVT-III (*n* = 10); CASL (*n* = 9)	Incarceration		Presence language deficits: 19.4% of YO
Snow & Powell (2004; 2005)	Aus	80 (YO-CB, *n* = 30; C, *n* = 50)	13-19	0	DA; SCOLP; TLC-E	JJO		Scores language measures: YO sig. < C (*d* = .50 –.71)
Snow & Powell (2008)	Aus	100 (YO-CB, *n* = 50; C, *n* = 50)	*M* = 15.8	0	CELF-4; DA; TLC-E	JJO; Offence Type	K-BIT; IAP-SF; DD	Scores language measures: YO sig. < C (*d* = .64 –.95) Presence language deficits: 52% of YO
Snow & Powell (2011)	Aus	100 (YO-I)	17-21	0	CELF-4; DA; TLC-E	Sentenced; CLCI	DASS; K-BIT	Presence language deficits: 46% of YO
Snow et al. (2016)	Aus (Mixed, 30% Indigenous)	100 (YO-I)	15-20	15	CELF-4; DA; TLC-E;	Incarcerated ANZSOC	DASS; K-BIT; TAS-20	Presence language deficits: 37% of YO
Wolff et al. (1982)	USA (100% Caucasian)	152 (YO-I, *n* = 56; C-low SES, *n* = 48; C-high SES, *n* = 48)	14-16	0	BNT; PIAT (RR); PPVT; SCWIT; TT	Detention	NPA	Scores language measures: YO sig. < C (*d* = .28 –.59)

‡ YO: Youth Offender; I: Incarcerated; CB: Community Based; C: Comparison. **Language Measures:** BNT: Boston Naming Task; BPVS-II: British Picture Vocabulary Scale; CASL: Comprehensive Assessment of Spoken Language; CELF-R/3/4: Clinical Evaluation of Language Fundamentals – Rev. ed./3rd ed./4th ed.; COS: Communication Observation Schedule of CELF-4 UK; DA: Discourse Analysis; FLTA: Fullerton Language Tests for Adolescents; HSLRS: Hospital Speech and Language Rating Scales; OCT: Oral Comprehension Test; PIAT (RR): Peabody Individual Achievement Test (Reading Recognition); PPVT-R/III: Peabody Picture Vocabulary Test – Rev. ed./3rd ed.; SA: Self-Assessment ; SC: Syntax Comprehension; SCOLP: Speed and Capacity of Language Processing Test; SCWIT: Stroop Colour Word Inference Test; SR: Sentence Repetition; TLC-E: Test of Language Comprehension – Exp. ed.; TOAL-2/3: Test of Adolescent Language – 2nd ed./3rd ed.; TROG-2: Test for Reception of Grammar – 2nd ed.; TT: Token Test; VO: Verbal Opposites; WORD: WORD Adolescent Test. **Youth Offending Measures:** ANZSOC: Australia and New Zealand Standard Offence Classification; CLCI: Cormier-Lang Crime Index; ISSP: Intensive Supervision Surveillance Program; JJO: Juvenile Justice Order; JJU: Juvenile Justice Unit. **Other Measures:** AA: Academic Achievement; BSA-IA: Basic Skills Agency – Initial Assessment; DASS: Depression, Anxiety and Stress Scale; DD: Demographic Data; DICA-R: Diagnostic Interview for Children and Adolescents- Revised; IAP-SF: Inventory of Adolescent Problems – Short Form; K-BIT: Kaufman Brief Intelligence Test; NPA: Neuro-Psychological Assessment; PI: Polmont Interview; SES: Socio-Economic Status; TAS-20: Toronto Alexithymia Scale.

youth offenders (14-18 years) that were significantly lower than the group score of 28 age and sex matched peers (with calculated effect sizes of d = .43 - .63). Such outcomes reflect evidence from an earlier study (Wolff, Waber, Bauermeister, Cohen, & Ferber, 1982), in which a group of 56 incarcerated, male youth offenders (14-16 years) produced lower scores on all language measures compared to two age and sex matched comparison groups (n = 48, respectively). Effect sizes were calculated to be small to moderate (d = .28 - .59).

Research involving comparison groups also indicated that higher proportions of youth offenders than matched peers had criterion based language disorders. Based on a criterion of low scores on a standardised language assessment, Blanton and Dagenais (2007), found that 25% of incarcerated youth offenders compared to 3.1% of the comparison group had language disorders. Similarly, Davis, Sanger and Morris-Friehe (1991), found that 38% of youth offenders, versus 4% of the comparison group, could be classified as having language disorders (as defined by a 1.5 standard deviation discrepancy between a composite language score and a general cognitive functioning score). Also, Sanger, Hux and Belau (1997) found a substantially higher rate of language disorder (based on performance at least 1.5 standard deviations below the mean on standardised language measures) among youth offenders (14.3%) versus the comparison group (0%). Using criteria of scores more than two standard deviations below the mean on auditory-language measures, Karniski and colleagues (Karniski, Levine, Clarke, Palfrey, & Meltzer, 1982), found that significantly more youth offenders (29.6%; n = 54; 12-17 years; 100% male) than age and sex-matched non-offenders (2%; n = 51) exhibited language disorders. These findings are reinforced by Snow and Powell's research (2008), in which 52% of youth offenders produced scores of one standard deviation or more below the comparison group's mean.

In studies not involving comparison groups, the key criterion for gauging rates of oral language deficits among youth offenders was deviation from standardised age equivalence

scores. In a sample of male youth offenders (*n* = 8; 7-18 years; 75% incarcerated), Myers and Mutch (1992) reported that 87.5 to 100% recorded age-equivalence scores three or more years below their chronological age on language measures. Similarly, Games, Curran and Porter (2012) found that 63.7% of community-based youth offenders (*n* = 8; 11-17 years; 8% female) scored equal to or greater than two standard deviations below the mean on at least one subtest of the language assessment. Further, Snow and Powell (2011a) found that 46% of incarcerated, male youth offenders (*n* = 100; 17-21 years) recorded a standard score greater than two standard deviations below the mean on more than one language measure. Using the same criterion, these researchers and their colleagues (Snow, Woodward, Mathis, & Powell, 2016) found that 37% of incarcerated youth offenders (*n* = 100; 15-20 years; 15% female) were classified as language disordered. In contrast, Sanger, Moore-Brown, Magnusen and Svoboda (2001) reported that only 19.4% of 67 incarcerated female youth offenders (13-19 years) performed 1.3 standard deviations below the mean on both of two key language measures. Variability in rates of identification of oral language deficits in youth offenders was reflected in three studies conducted by Bryan and colleagues. Of the 30 incarcerated, male participants (18-21 years) in one study (Bryan, 2004), 23.3 to 73.3% scored significantly below chronological age on at least one language measure, and 23.3% recorded significantly low scores on all language measures. Similarly, 46 to 67% of incarcerated, male youth offenders (*n* = 58, 15-18 years) recorded language subtest scores equivalent to approximately the bottom 9% of the overall population for this age group (approximately 1.25 standard deviations below the mean) on subtests of one language measure, and 100% failed to reach age equivalence on an alternative language measure (Bryan et al., 2007). In a community-based sample (*n* = 72; 11-18 years, 16% female), 14 to 20.6% of youth offenders received scores of two or more standard deviations below the mean on at least one language subtest (Gregory & Bryan, 2011).

Are some oral language skills or modalities more problematic for youth offenders?

All studies that assessed structural language skills indicated that these were problematic for youth offenders. Youth offenders produced significantly lower group scores on structural language measures than comparison groups in six studies (Blanton & Dagenais, 2007; A. Davis et al., 1991; Humber & Snow, 2001; Snow & Powell, 2004, 2008; Wolff et al., 1982), and higher proportions of youth offenders than matched peers performed poorly on structural language tasks in two studies (Karniski et al., 1982; Sanger et al., 1997). Humber and Snow (2001) found that youth offenders performed more poorly on receptive tasks, specifically those requiring speed and accuracy of comprehension. In addition, Blanton and Dagenais (2007) found that youth offenders had lower scores on receptive than expressive components of language assessments. Similarly, higher proportions of youth offenders experienced difficulties with receptive language assessments compared to expressive language assessments (Bryan, 2004; Bryan et al., 2007; Gregory & Bryan, 2011), and a receptive measure was the best predictor of the severity of antisocial behaviour among youth offenders (Wolff et al., 1982). However, one study found no significant difference between performance on receptive and expressive tasks for youth offenders with language impairments (Sanger et al., 2001), and another found that expressive and receptive language difficulties were apparent in equivalent proportions of youth offenders (Games et al., 2012). Further, poorer performance by youth offenders on expressive than receptive tasks was noted in one study (A. Davis et al., 1991), and an expressive task presented the greatest challenge for youth offenders in another (Myers & Mutch, 1992).

In relation to pragmatic language skills, Myers and Mutch (1992) found that all participants tested on a standardised pragmatic language measure produced scores at least five years below age equivalent scores. This was reinforced by studies that reported significantly lower mean scores for youth offenders than comparison groups across all subtests of

standardised pragmatic language measures (Humber & Snow, 2001; Sanger et al., 1997; Snow & Powell, 2008). In terms of deficits in specific pragmatic skills, studies reported that youth offenders had difficulty decoding abstract language (Humber & Snow, 2001; Sanger et al., 1997; Snow & Powell, 2004, 2008, 2011a), providing logical and sequential narratives (Humber & Snow, 2001; Snow & Powell, 2008), and producing narratives that consisted of adequate story grammar elements (Snow & Powell, 2005). However, Sanger and colleagues did not find a statistically significant difference between female youth offenders and a comparison group in pragmatic errors produced in a language sample (Sanger et al., 1997), and reported that a high proportion of language impaired female youth offenders (n = 9) performed within the normal range on a standardised pragmatic language measure (Sanger et al., 2001).

What biopsychosocial factors influence the association between oral language deficits and youth offending?

Three studies addressed the potential association between degree of oral language deficit and severity of youth offending. In a community-based sample, Snow and Powell (2008) found that when offending behaviour was divided into property or violence categories, significant associations with oral language deficits were not found. However, with an incarcerated sample, they reported differences between a group of participants classed as language disordered and a group classed as non-language disordered that approached significance for non-violent offences, but not violent offences (Snow & Powell, 2011a). These researchers also found that a group of youth classed as "high offending" scored more poorly than a group classed as "not high offending" on all language measures, and that 71% of those with extremely high offending scores (as measured by a published scale) had oral language disorders (Snow & Powell, 2011a). Such findings are consistent with evidence reported by Wolff and colleagues' (1982). In their research, regression analysis showed that

compared to measures of nonverbal intelligence, attention and spatial ability, language measures accounted for most variance in predicting the severity of offending.

Reviewed studies indicated that other factors also influence the association between oral language deficits and youth offending. Differences in educational experience were reported in three studies. These took the form of differences between youth offenders with oral language deficits and youth offenders with no oral language deficits in: years of school completed (Snow & Powell, 2011a); experience of early educational intervention of some kind (Snow & Powell, 2008, 2011a); or attendance at special education programs (Games et al., 2012). Two studies implicated gender as influencing the relationship between oral language skills and youth offending, with higher proportions of male than female youth offenders meeting criteria for language disorders (Blanton & Dagenais, 2007; Snow et al., 2016). One study indicated that ethnicity may have an impact on oral language functioning among youth offenders, with a lower proportion of Indigenous (16%) than non-Indigenous (30%) youth offenders having scores in the average range on the composite structural language score (Snow et al., 2016). A single study also highlighted early experience of maltreatment as a possible influence on the association, finding that 62% of youth offenders who reported experiencing out of home care placement, compared to 46% of the total youth offender group, met criteria for language disorders (Snow & Powell, 2011a). Finally, evidence that minor neurological signs (such as clumsiness, tremors and poor balance) predicted six of seven language measures among youth offenders (Wolff et al., 1982), alludes to a neurological influence in the relationship between oral language skills and youth offending.

In addition to revealing variables with a potential impact on the oral language - offending relationship, some research appears to discount other factors as contributing, at least in a straightforward manner, to the association. In two studies, nonverbal IQ did not explain the association between oral language deficits and youth offending (Snow & Powell,

2008, 2011a). Also, in one study no significant difference was found between the mental health of incarcerated youth offenders with oral language deficits and those with relatively typical language skills (Snow & Powell, 2011a). Similarly, in another study, no correlation was found between youth offender scores on a composite language measure and scores on either a measure of mental health, or a measure of alexithymia (Snow et al., 2016). In addition, one study revealed that skills in social interaction did not significantly correlate with oral language skills in youth offenders, but they did in non-offending, SES-matched controls (Snow & Powell, 2008). Further, one study reported that deficits in auditory-language function among a group of youth offenders, compared to a non-offending group, remained after controlling for SES (Karniski et al., 1982).

2.3.2 Evaluation of Oral Language Deficit – Youth Offender Research

Characteristics of samples

There was a large degree of variation in sample size and type among the studies included in this review (see Table 1). Small sample sizes, of 30 participants or fewer, were noted in four studies, while the five largest studies involved samples of 100 participants or more. The majority of studies (n = 7) employed samples of between 30 and 100 participants. In terms of sample type, five studies involved samples of community based youth offenders, two had a mixed sample of incarcerated and community based participants, and nine involved incarcerated youth. Comparison groups were incorporated in eight studies and, with two exceptions (Snow & Powell, 2004, 2005; Wolff et al., 1982), group sizes were exactly or closely equivalent to the corresponding youth offending group. Where comparison groups were included, attempts were made to match groups on age and sex in all cases, race in five studies (Blanton & Dagenais, 2007; A. Davis et al., 1991; Karniski et al., 1982; Sanger et al., 1997; Wolff et al., 1982), cognitive ability in two studies (A. Davis et al., 1991; Sanger et al.,

1997), and socio-economic status in three studies (Blanton & Dagenais, 2007; Sanger et al., 1997; Snow & Powell, 2008). The majority of studies (n = 10) utilised convenience samples selected from identified settings, often relying on setting staff to identify potential participants (based on inclusion criteria). Quasi-random sampling was employed in three studies (Bryan, 2004; Bryan et al., 2007; Karniski et al., 1982). In four studies (A. Davis et al., 1991; Games et al., 2012; Karniski et al., 1982; Wolff et al., 1982) poor participation of individuals who met inclusion criteria was reported. In addition, attrition of participants and/or failure to complete the full assessment regime impacted two studies (Bryan et al., 2007; Games et al., 2012).

Consistent with the epidemiology of youth offenders, adolescent, male and Caucasian participants were most commonly represented in the reviewed research (see Table 1). All studies included youth in the adolescent age range (12-18 years). One study (Myers & Mutch, 1992) involved participants who would be classed as children (younger than 12 years) and in five studies (Bryan, 2004; Humber & Snow, 2001; Snow & Powell, 2004, 2005, 2011a; Snow et al., 2016) the age range extended into what could be considered young adulthood (19-21 years; reflecting that in some jurisdictions individuals in this age-group can be dealt with under the youth justice system). The majority of studies (n = 10) included only male participants, while two studies (Sanger et al., 1997; Sanger et al., 2001) involved only female participants. Four studies had mixed gender composition (Blanton & Dagenais, 2007; Games et al., 2012; Gregory & Bryan, 2011; Snow et al., 2016), involving varying proportions of female participants (56%, 8%, 16%, and 15%, respectively). Ethnicity was not reported for all studies. However, where it was (n = 9), with the exception of two studies (Blanton & Dagenais, 2007; Snow et al., 2016), all or the majority of participants were Caucasian. In some cases these results may have been impacted by inclusion criteria relating to English language skill. Snow and colleagues (2016) highlight that, even where specific attempts were

made to recruit non-Caucasian participants, concerns regarding use of standard English were likely to have limited the representativeness of the sample.

Attempts to control for intervening variables were extensive throughout the included studies, but not universal. The most common variable established for inclusion criteria related to English language skills (n = 9), specifically that English was the participant's first language (Gregory & Bryan, 2011; Humber & Snow, 2001; Karniski et al., 1982; Sanger et al., 1997), the participant met English speaking criteria (Blanton & Dagenais, 2007), or the participant had completed the majority of their schooling in an English speaking country (Snow & Powell, 2004, 2005, 2008, 2011a; Snow et al., 2016). For Indigenous participants, Snow and colleagues (2016) also attempted to ensure that Standard Australian English was the participant's first dialect. Other common inclusion criteria were: absence of known impairment of intellectual functioning (Blanton & Dagenais, 2007; Humber & Snow, 2001; Snow & Powell, 2004, 2005; Snow et al., 2016), hearing within the normal range (generally self-reported) (Blanton & Dagenais, 2007; Humber & Snow, 2001; Sanger et al., 2001; Snow & Powell, 2004, 2005), absence of acute mental illness (Humber & Snow, 2001; Snow & Powell, 2004, 2005; Snow et al., 2016), and absence of neurological illness or insult (Humber & Snow, 2001; Snow & Powell, 2004, 2005). In one study youth with previously identified language or learning problems were excluded (Sanger et al., 1997).

Measurement techniques

Across the included studies, an array of different tools, totalling 23 separate instruments or techniques, was utilised in the measurement of oral language skills (see Table 1). The majority of these assessments were standardised clinical tools relying on specialist administration and/or scoring and interpretation. The most commonly used assessment instruments were relevant editions of the *Clinical Evaluation of Language Fundamentals* (CELF; Semel, Wiig, & Secord, 1987, 1995, 2003), used to assess structural language skills

in eight studies, and the *Test of Language Competence*, Expanded edition (TLC-E; W. Wiig & Secord, 1989), used to assess discourse-level and inferential language skills in seven studies. Various discourse assessment tools for analysis of pragmatic language skills were used in seven studies. Fourteen language measures were employed with only one study each. All but two studies utilised more than one assessment instrument to evaluate language skills. Eleven studies utilised measures that could assess both structural and pragmatic elements of language, and all studies assessed both receptive and expressive language domains, although not necessarily in equal proportion. Two studies (Blanton & Dagenais, 2007; Humber & Snow, 2001) reported randomization of presentation of language subtests and eight studies (Blanton & Dagenais, 2007; A. Davis et al., 1991; Humber & Snow, 2001; Sanger et al., 1997; Snow & Powell, 2004, 2008, 2011a; Snow et al., 2016) reported reliability checks being made for transcription and/or scoring of language measures, with inter-rater reliability ranging from 80.0 to 99.0%.

A more limited range of tools was used to evaluate other variables (see Table 1). Studies relied primarily upon jurisdictionally defined group membership to describe youth offender groups. Only four studies attempted to differentiate type or severity of youth offending behaviour, based on official records (Snow & Powell, 2008, 2011a; Snow et al., 2016; Wolff et al., 1982). A number of measures were used to assess other variables including demographic factors, academic skills, psychological problems, neurological deficits, and cognitive functioning. Only one of these measures, the *Kaufman Brief Intelligence Test* (K-BIT; Kaufman & Kaufman, 1990), was used in more than one study.

2.4 Discussion

2.4.1 Summary of Key Findings[3]

This systematic review investigated the relationship between oral language skills and youth offending in relation to three key questions. In relation to the first question, regarding the strength of the association between the presence of oral language deficits and youth offending, results indicated a relatively consistent, strong relationship. However, in relation to the second question, regarding whether some oral language skills or modalities were more impaired than others in youth offender populations, evidence was inconsistent and clear patterns did not emerge. In relation to the third question, regarding biopsychosocial factors shown to influence the relationship between oral language deficits and youth offending, it was difficult to reach firm conclusions due to the small number of studies that investigated each potential factor.

2.4.2 Implications of Key Findings

Without exception, evidence from this review indicates a strong association between youth offending and oral language deficits. Findings of significantly poorer scores on language measures for youth offender groups versus matched comparison groups (with effect sizes ranging from small to large, depending on the study and language measure) clearly signal the need for agencies involved in youth justice to build awareness and skills relating to this problem (for research evidence demonstrating the value of this, see Bryan & Gregory, 2013). In addition, with current research showing substantially higher rates of oral language deficits in youth offenders compared to their non-offending peers, higher priority should be given to the integration of focused language service provision, such as speech pathology and specialist education, into youth offender intervention. Further, on the basis of evidence that

[3] This section did not appear in the published version of this chapter.

substantial proportions of youth offenders achieve scores on language measures of greater than one standard deviation below standardised means, institution of universal language screening for youth who come into contact with the justice system would seem appropriate (Snow, Sanger, Caire, Eadie, & Dinslage, 2015).

It is clear that the provision of appropriate intervention for youths with oral language deficits needs to be embraced by agencies that deal with youth offenders. However, current evidence does not provide clarity as to the skills and modalities of oral language that are a priority for attention. Research indicating predominant deficits in receptive skills, which have the potential to impair youth offenders' accurate comprehension during verbal exchanges in a range of situations (including judicial proceedings and therapeutic interventions), emphasises the importance of intervention programs that address aspects of understanding. However, evidence of equivalent or greater deficits of expression, which may limit the ability of youth offenders to accurately convey important information (for example, during interviews), indicate that youth offenders require assistance in developing speaking skills. Alternatively, findings of deficits in pragmatic skills, which would impact youth offenders' capacity to engage appropriately with others across a range of social situations (for example, during restorative justice conferencing), highlight the need for programming to improve social communication. Such variety in findings accentuates the importance of specialist language assessment and programming to meet the specific language needs of youth offenders (such as demonstrated by Gregory & Bryan, 2011).

The diversity of language evidence revealed in this review contrasts starkly with more limited findings relating to biopsychosocial factors implicated in the relationship between oral language deficits and youth offending. There are some indications that severity and type of offending behaviour is associated with severity of oral language deficit, at least among incarcerated youth offenders (Snow & Powell, 2011a; Wolff et al., 1982). However, the

usefulness of these results for informing policy and programming is limited by variation in techniques used to define offending behaviour across studies, and the fact that evidence is confined to only two studies. Limited quantity of evidence also impacts the capacity of current research to clearly indicate what other factors influence associations between oral language deficits and youth offending. While the few studies to statistically analyse such relationships implicate education experiences (Games et al., 2012; Snow & Powell, 2008, 2011a), gender (Blanton & Dagenais, 2007), early maltreatment (Snow & Powell, 2011a), ethnicity (Snow et al., 2016), and neurological deficits (Wolff et al., 1982) as important variables, the direction and comparative strength of these relationships is unclear. Alternatively, the research appears to exclude factors such as general cognitive functioning (Snow & Powell, 2008, 2011a), emotional distress (Snow & Powell, 2011a), social skills (Snow & Powell, 2008), and SES (Karniski et al., 1982). However, evidence relating to each of these variables is almost exclusively based on a single study, and some studies relied on correlational and proportional analysis, rather than more sophisticated, statistical techniques (such as regression analysis).

All research that met inclusion criteria for this review was cross sectional. Combined with the data and analytical limitations discussed in the previous paragraph, this does not allow conclusions to be drawn as to whether the relationship between oral language deficits and offending behaviour is causal or correlational, direct or indirect. Similarly, based on the reviewed evidence, it is not possible to conclusively support one of the theoretical frameworks introduced in section 2.1.2 of this paper, nor to suggest an alternative model. Finally, while the available evidence alludes to linkages between oral language deficits and the major risk/need factors described in the Risk-Need-Responsivity (RNR) model, such as disrupted family/marital relationships and low academic attainment (Bonta & Andrews, 2007), there is not sufficient evidence to explain the nature of these relationships.

2.4.3 Directions for Future Research

Additional, detailed research, ideally involving longitudinal data collection, retrospective analysis of data from youth offender populations and/or the use of sophisticated statistical techniques, is required before definitive conclusions can be reached and clearer explanations can be proposed regarding the mechanisms that contribute to high rates of oral language deficits in youth offenders. *An important issue for consideration in future research is the application of more consistent standards in research design and statistical analyses. Group comparisons between youth offenders and non-offenders would be more meaningful if those groups were matched on key demographic factors known to be associated with both antisocial behaviour and oral language skill, such as age, gender, ethnicity, SES and education. However, in this type of research it is not possible to match groups on all potentially relevant variables (Mitchell & Jolley, 2004). For example, as Snow and Powell (2008) demonstrated, forming a comparison group matched to youth offenders on both age and education was impractical. Such difficulties highlight the importance of applying statistical control methods during analyses. The specific variables selected for control in each study would be dependent on a number of factors, such as conceptual relevance, reliability and validity of measurement and demonstrated statistical relationship with a variable of interest (Becker et al., 2016). However, statistically removing the influence of key demographic factors such as age, gender, ethnicity and SES would increase confidence in conclusions relating to the strength of association between oral language deficits and youth offending.*[4]

If agencies are to commit resources to implementation of strategies to address the oral language deficits of youth offenders, *research must extend beyond merely demonstrating that

[4] Text between asterisks did not appear in the published version of this chapter.

youth offenders tend to have compromised oral language skills.*[5] There is a need for more focused research into how and to what extent these deficits are interconnected with the major risk/need factors recognised as contributing to offending and predicting recidivism. It is therefore important that research include analyses of other biopsychosocial factors that are involved in the oral language-offending relationship. Indications that severity of oral language deficit is linked to severity and type of youth offending encourage more careful examination of this specific relationship and the implications this might have, particularly for youth offenders with severe oral language deficits. Scrutiny of the moderating role played by variables known to feature prominently in the lives of both those with compromised language skills and those who offend, for example low SES, disrupted caregiver attachment (family/marital relationships in the RNR model) and early educational disengagement and/or under-achievement (school/work in the RNR model), is also important. More detailed research analysis of such causal pathways will help to clarify what factors are important to target during early intervention for at-risk children and youth and during transition following contact with youth justice agencies.

Such research will also assist agencies to adhere to the responsivity principle of RNR, and appropriately and meaningfully modify justice-based training, programming, resources and interventions directed towards these youth (Gregory & Bryan, 2011; LaVigne & Van Rybroek, 2014; Snow & Sanger, 2011). In addition, broader awareness of the type and range of oral language deficits experienced by youth offenders could assist related agencies, including educators and specialists, in the development of targeted programs that address difficulties prevalent within the cohort. In turn, scientific examination of these programs could contribute to a body of intervention evidence upon which to base effective practice (a framework for which is discussed in Snow et al., 2015). Further, such research could inform

[5] Text between asterisks did not appear in the published version of this chapter.

the development of language screening tools that can be effectively and efficiently used within the constraints of youth justice settings (Snow et al., 2015).

As the RNR model emphasises, risk/need assessment, as well as effective interventions, consider personal strengths and socio-biological-personality factors (Bonta & Andrews, 2007). Meaningful change in policy and procedures relating to the importance of oral language deficits in youth offenders therefore needs to be based on evidence that includes data from representative samples. Considering the over-representation of Indigenous and ethnic minority youth in youth justice statistics, the need for more research focusing specifically on the oral language skills of these groups, as well as the development of measures with norms for these populations, is particularly important. *The predominance of Caucasian, English speaking participants in research to date is likely related to design considerations, such as the validity and reliability of language measures for diverse populations and generalisability of findings. However, as has been demonstrated in more recent research (e.g., Kippin et al., 2018; Snow et al., 2016), such strategies risk obscuring evidence of theoretical and practical importance for individuals of non-dominant ethnic and language backgrounds.*[6]

2.4.4 Conclusion

The evidence that is now available demonstrates that youth offenders have compromised oral language skills. However, for language to become prominent in policy and practice relating to this population, more focused and strategic investigation is required. Contact with the youth justice system involves vulnerable youth in interactions, interviews and interventions rich in oral language. Without more widespread and detailed understanding of the nature of factors contributing to oral language deficits in youth offenders, and the ways

[6] Text between asterisks did not appear in the published version of this chapter.

in which oral language deficits interact with other risk factors over-represented in this population, the capacity of agencies to engage appropriately and effectively with them will be severely constrained.

2.5 Making the Link[7]

The purpose of this systematic review was to more precisely characterise current knowledge regarding the association between oral language skills and youth offending. While evidence from reviewed research supported there being a strong association between oral language deficits and youth offending, evidence regarding whether discrete language skills or modalities were more impaired than others was inconsistent. To develop understanding of this, associations between discrete language skills and sub-skills and youth offending were investigated in both empirical study 1 (Chapter 5) and empirical study 2 (Chapter 6) of the current thesis. This systematic review further revealed limited research and evidence into the biopsychosocial factors that may have influenced associations between oral language skills and youth offending. In light of this, empirical study 2 (Chapter 6) and empirical study 3 (Chapter 7) of the current thesis involved detailed investigation of two factors strongly associated with oral language and/or antisocial behaviour, CU traits and empathy.

[7] This section did not appear in the published version of this chapter.

CHAPTER 3 - COMMON METHODS

For each of the three empirical studies in the current thesis specific details relating to participants, measures, procedures and data analytical plans appear in respective chapters. This chapter provides a detailed description of ethical considerations, participants, measures and procedures relating to the overall project. The design was cross-sectional, and a range of standardised and unstandardized measures were used.

3.1 Ethical Considerations

A major focus of the current research was investigating risk factors for antisocial behaviour in youth offenders and non-offenders within the adolescent age range, which could be considered a vulnerable population. Procedures and protocols for the current research were, therefore, developed with careful consideration for the rights and needs of participants. Initial contact with potential participants was made through youth justice staff (for youth offenders) and education staff (for non-offenders), who had limited or no prior contact with me and no personal involvement in the research. The recruitment stage consisted of a number of steps, during which potential participants had the opportunity to consult with youth justice and/or education staff, in addition to their parents (if they maintained a meaningful relationship with them). Reasonable attempts were made to use age-appropriate language in the Participant Information Statement and Consent Form. To maximise understanding, both documents were read to potential participants, checks for understanding were made and questions answered. It was emphasised to each potential participant, prior to requesting their consent to participate, that they could withdraw at any time and that non-participation or withdrawal would not impact their relationship with the staff and agencies they engaged with.

Data collection sessions were conducted in a space with which the participant was familiar and in which they were likely to feel safe. All participants were easily able to access a youth justice or education staff member during data collection sessions if they wished to. It was made clear to participants prior to commencement of data collection that I was obliged to inform youth justice or education staff if they disclosed any information to me that left me concerned for their health or safety. However, I assured participants that I would inform them first if I felt this was necessary. In recognition of the potential difficulties' participants may have had attending to tasks, data collection sessions were time limited and participants were given the option of conducting data collection over a greater number of shorter sessions. Also, if participants appeared too tired, distracted, or otherwise disaffected with the data collection process, I offered them the option of suspending assessment until a later date, or terminating it completely. All information and questions were read to participants and responses recorded by me. Measures were selected both for their psychometric rigour and for ease of use with high-risk individuals.

At the completion of data collection, participants were provided with general verbal feedback regarding their performance on nonverbal ability (NVA) tasks, oral language tasks and conversational inference/perspective taking tasks. I explained how skills in each of these areas could impact an individual's capacity to engage in education and/or youth justice programs. I enquired whether participants would like the information shared with education and/or youth justice staff (which all participants did). In addition to providing education and/or youth justice staff with general feedback, I also indicated if a participant's skills were substantially below what would be expected for someone of their age, and indicated that clinical investigation may be worthwhile. At the completion of data collection, participants were also provided with the opportunity to ask questions about the research and provide verbal feedback regarding their perception of the data collection process and the research.

3.2 Participants

The final sample included 130 young males between the ages of 13 and 20 years (M = 16.32, SD = 1.35). Most participants reported non-Indigenous Australian ethnicity (53.8%; majority Caucasian), while a substantial proportion reported Indigenous ethnicity (46.2%; majority Aboriginal). Socio-economic status (SES) was calculated based on assignment of an Index of Relative Socio-Economic Advantage/Disadvantage (IRSAD; from one (lowest) to nine (highest)) based on postcode of usual residence. Participants had a mean IRSAD of 3.26, indicating relatively greater disadvantage and lack of advantage in general. All participants were resident in New South Wales.

Eighty-one participants were youth offenders (Age M = *16.88*, SD = 1.28) of whom 47 were completing custodial orders (that is, they were detained within a secure youth justice centre) and 34 were completing community-based orders (that is, they were living in the community under the regular supervision of a youth justice case manager). In the youth offender group, similar proportions of participants reported being of non-Indigenous Australian ethnicity (50.6%; majority Caucasian) and Indigenous ethnicity (49.4%; majority Aboriginal). Youth offenders had a mean IRSAD of 3.54, indicating relatively greater disadvantage and lack of advantage in general. Forty-nine participants formed the non-offender group (Age M = *15.54*, SD = 1.05), the majority of whom reported being of non-Indigenous Australian ethnicity (59.2%; majority Caucasian), with a substantial proportion reporting Indigenous ethnicity (40.8%; all Aboriginal). Non-offenders had a mean IRSAD of 2.80, indicating relatively greater disadvantage and lack of advantage in general, and lower SES than the youth offender group.

Over a 20-month period in 2014-2016, I approached 149 young people and invited them to participate in the current research. The "approached" group included youth under the

supervision of youth justice services (n = 93; youth offenders), and youth attending public high schools (n = 56; non-offenders). Of these individuals, 94% (n = 88 youth offenders, n = 52 non-offenders) agreed to participate in the research. However, from this group, 5% (n = 5 youth offenders, n = 2 non-offenders) commenced, but did not wish to complete the full research protocol, either because they found it arduous or it interfered with preferred alternative activities. In addition, 2% (n = 2 youth offenders, n = 1 non-offenders) were unable to complete the full research protocol, due to priority given to justice or education requirements.

Five key inclusion criteria were established for participation in the current research. First, all participants were male. The study focused exclusively on males because there is evidence that both language skills and CU traits manifest differently in males and females (e.g., Blanton & Dagenais, 2007; Frick et al., 2014b). Second, the age range for participants was restricted to both youth who would come under the jurisdiction of a youth justice agency, and youth who would be able to independently assent to participation. Third, to specifically focus on oral language deficits, only young people with no known diagnosis of intellectual impairment or hearing impairment were included in the sample. Fourth, to rule out mental state alterations compromising a participant's capacity to engage in assessment, participants who were known to be experiencing an acute episode of mental illness were not included. Fifth, as the majority of measures were written in English and standardised for speakers of standard English, only participants who had undertaken the majority of their schooling in an English-speaking country were included in the research.

I conducted recruitment and data collection in all cases. Youth justice centres and community services in operation throughout NSW were approached to assist with recruitment of participants for the youth offender group. In total, six youth justice centres and 13 youth justice community services nominated young people who were willing to meet with me. To

recruit participants for the non-offender group I approached public secondary schools throughout NSW. Schools were selected to maximise potential for matching ethnicity and SES with the youth offender group (based on information provided by the Australian Bureau of Statistics and Department of Education, NSW). Non-offender group participants were recruited from five public secondary schools.

Inclusion criteria were provided to key staff within youth justice centres, youth justice community services and secondary schools. These staff approached eligible participants to determine interest and willingness to participate in the research. Staff in secondary schools were informed of the importance of recruiting a sample relatively well matched to the youth offender sample. Therefore, these staff were requested to approach students who had low SES backgrounds and, if possible, to recruit a sample including approximately 50% Indigenous students. These staff were also encouraged to recruit students across the range of academic and behavioural spectrums. Although selection bias may have impacted recruitment, my observations indicated that recruitment by youth justice and secondary school staff was relatively representative of specific settings.

Participants in the youth offender group who indicated an interest in participating in the research then met with me to discuss the proposed research and assessment procedures. Following this discussion, if the young person agreed to participate consent forms were completed. Consistent with procedures implemented by Snow et al. (Humber & Snow, 2001; Snow & Powell, 2004, 2005, 2008, 2011a; Snow et al., 2016), key youth justice staff acted as witnesses to the informed and willing nature of consent. Parent/guardian consent for participants in the youth offender group was not sought for three key reasons. First, some youth offenders in contact with the youth justice system are also provided with out of home care through the Department of Communities and Justice (formerly, the Department of Family and Community Services), and so do not have meaningful, trusting relationships with

their parents. Second, even when youth offenders maintain a relationship with their parents, detention in a secure youth justice centre significantly limits contact. Third, for youth offenders residing in secure youth justice centres, the NSW state government acts *in loci parentis.* For participants in the non-offender group, key school staff provided information to parents/guardians, who completed consent forms.

As outlined in section 3.1, careful consideration was given to the importance of respecting and maximising participants' autonomy at all stages of research. To avoid potential perception of coercion, initial contact was made through youth justice staff (for youth offenders) and education staff (for the comparison group), who were bound by NSW legislation and codes of conduct with regard their interactions with the young people in their care. In addition, I am a qualified teacher (registered in QLD and NSW), bound by codes of professional conduct that emphasise respect for persons and protection of children and young people, and have extensive experience working with vulnerable youth. I made it clear to each participant at the beginning of each assessment session that there would be no consequences for non-participation in research or withdrawal from research, and that non-participation or withdrawal would not negatively impact their relationships with the staff and agencies they engaged with. In interactions and discussions with participants I felt assured that none had felt coerced into participation. For example, many youth offender participants from custodial settings indicated that they had decided to participate because it was something different to do (compared to their usual custodial routine). Also, some youth offender participants from custodial settings requested (through youth justice staff) changes to planned assessment sessions so that they could participate in preferred activities.

3.3 Measures

3.3.1 Demographic Variables and Developmental Experiences

A semi-structured interview, based on a template developed by Snow and Powell (2011a) for research investigating oral language skills in youth offenders, was used to elicit self-report information relating to demographic variables and developmental experiences of participants. An example of the form used to record information from this interview is included in Appendix B.

Key demographic information requested from participants included age, socio-economic status (SES) and ethnicity. Participant age details were confirmed through official date of birth records held by the youth justice agency. SES was calculated based on assignment of an IRSAD code, linked to Socio-Economic Indexes for Areas (SEIFA), established by the Australian Bureau of Statistics (Adhikari, 2006). Ethnicity was based on self-report of ethnic/cultural identification. All participants identified as Australian, but with five separate ethnic/cultural backgrounds. Due to small numbers of participants identifying for three ethnic/cultural backgrounds, this variable was collapsed into two major categories for empirical studies - Indigenous Australian (including Aboriginal and Torres Strait Islander participants); non-Indigenous Australian (including Caucasian, Pacific Islander and other participants).

Additional data collected in relation to demographics included language background and use, and regional background. Language background was based on participant self-report of having grown up in an environment where a language and/or dialect other than Standard Australian English (SAE) was commonly spoken. Three separate language/dialect variations were identified – SAE, Aboriginal Englishes, other. Language use was based on participant self-report of the language and/or dialect that represented their primary language of communication.

Regional background was ascertained using the Australian Standard Geographical Classification (ASGC) system developed by the Australian Bureau of Statistics (Pink, 2011b). Participants were assigned a Remoteness Area (RA) based on postcode of usual residence. There are seven RA categories within the ASGC, five of which were relevant for the current sample - major cities (RA0), inner regional (RA1), outer regional (RA2), remote (RA3), and very remote (RA4). Due to only one participant being from a very remote background, remote and very remote categories were combined, with the result of regional background being coded as a four-level categorical variable in the current research.

Welfare and health experiences were ascertained through questions relating to outside of home care (OOHC), previous health problems and substance use. During the semi-structured interview, participants were able to provide details relating to these experiences. However, for the purposes of the current research, each of these variables were coded as two-level categorical variables (ever; never). In relation to OOHC, participants self-reported if they had ever officially been placed in a foster, kinship, residential unit or other OOHC placement. For previous health problems, participants self-reported if they had ever received a professional (health or educational) report (verbal or written) that indicated they had a hearing problem, foetal alcohol spectrum disorder (FASD), attention problems (including deficit/hyperactivity disorder, ADHD), autism spectrum disorder (ASD), speech, language or communication problems, cognitive problems (such as intellectual impairment) or mental illness (including depression, anxiety, psychosis). Participants also self-reported if they had ever received a knock to the head that rendered them unconscious. With regard to substance use, participants self-reported if they had ever consumed or used alcohol, tobacco or illicit drugs.

Educational and vocational experiences were investigated through questions relating to school attendance, school-based support, school disciplinary absences, alternative education

and participation in vocational training and employment. In Australia formal schooling extends over a period of 13 years, comprising seven years of primary schooling (kindergarten to year 6; approximate age range 6 to 12 years), and six years of secondary schooling (years 7 to 12; approximate age range 13 to 18 years). In New South Wales students are legally required to be enrolled in and attend school until the completion of Year 10 (usually age 16 years). In the current research years of schooling was calculated by adding one (to represent kindergarten) to the last full year of school completed (as self-reported by participants). Participants self-reported experience of school-based support to assist learning and attendance at a non-traditional educational setting which, for the purposes of the current research, were each coded as two-level categorical variables (ever; never). Participants self-reported experience of school suspension and exclusion, and estimated the number of times this had occurred. For school suspension, this was recoded into five categories – never, once, two to four times, five to nine times, ten or more times. For school exclusion, this was recoded into three categories – never, once, two to four times. In relation to vocational experiences participants self-reported if they had ever completed a competency in vocational training and ever completed work for which they had received payment. These were coded as two-level categorical variables (ever; never).

Self-report is used extensively to investigate a range of variables in research involving youth offenders. For example, in samples of youth offenders, self-report has been used to measure: experience of abuse (e.g., Silva, Graña, & González-Cieza, 2014); traumatic brain injury (e.g., Williams, Cordan, Mewse, Tonks, & Burgess, 2010); mental health (e.g., Chitsabesan et al., 2006); educational experience (e.g., Sander, Sharkey, Olivarri, Tanigawa, & Mauseth, 2010); and substance use (e.g., Eftekhari, Turner, & Larimer, 2004). Research has found moderate to high reliability of self-report of a range of health behaviours among youth offenders (Kenny & Grant, 2007).

3.3.2 Nonverbal Ability

The Matrices subtest of the *Kaufman Brief Intelligence Test*, 2nd edition (KBIT-2; Kaufman & Kaufman, 2004), was used to measure nonverbal ability (NVA). This tool was used both to screen for participants whose level of cognitive functioning could limit their capacity to complete the full research protocol, as well as to investigate variability in oral language skill as a function of NVA. The KBIT-2 is a widely used screening tool, with good reliability and validity, and standard scores (M = 100; SD = 15) for a wide age range. Higher scores represent better NVA, while lower scores represent poorer NVA. The Matrices subtest utilises pictures and abstract designs to assess an individual's ability to perceive relationships and complete visual analogies. Participants were required to select one of six illustrations that represented the best solution to a novel problem. Internal consistency values for the Matrices subtest range from .88 to.89, in the age range of participants in the current study (Kaufman & Kaufman, 1990).

The KBIT-2 has been used as a measure of cognitive functioning in a range of research involving adolescents. Participants in such research have included community samples (e.g., DeLisi et al., 2010), as well as youth with clinical symptomology (e.g., Laugeson, Frankel, Gantman, Dillon, & Mogil, 2012). A number of studies researching youth offenders have also utilised the KBIT-2 full protocol (e.g., Blanton & Dagenais, 2007), or Matrices subtest (e.g., Snow et al., 2016), as a measure of cognitive functioning.

3.3.3 Antisocial Behaviour

Antisocial behaviour was operationalised as a categorical variable (offender status) with two levels (youth offender; non-offender). In the current research, offender categorisation was based on official records provided by one element of the criminal justice system - Youth

Justice NSW (which did not include official records of the police or courts). Categorisation as a youth offender was based on officially documented contact with a youth justice agency at the time of participation in research, in the form of either supervision through a youth justice community service or detention (whether on the basis of a remand or control order) within a secure youth justice centre. Categorisation as a non-offender was based on self-report of no current or historical official contact specifically with a youth justice agency (that is, Youth Justice NSW or a related agency interstate). Consistent with the youth offender sub-sample, contact with the police or courts that did not result in official contact with a youth justice agency did not impact classification.

Officially recorded history of offending for participants in the youth offender group was provided by the youth justice agency and included date of first contact, periods of supervision, number of contacts and offence types to which contact related. Offences were classified based on Australian and New Zealand Standard Offence Classification codes (ANZSOC; Pink, 2011a). This system categorises offending into 16 divisions, ranging from the most serious, 01 Homicide and related offences, to the least serious, 16 Miscellaneous offences (such as regulatory offences). In addition, divisions can be grouped to distinguish violent (divisions 01 to 06) from non-violent (divisions 07 to 16) offences. ANZSOC has been designed to provide a standardised statistical framework for classifying and analysing criminal and justice statistics, and has been used in a range of published research relating to youth offenders (e.g., Allard et al., 2013; Moore et al., 2014; Snow et al., 2016).

In terms of frequency of offending, each separate offence contact within each ANZSOC category was summed to create a total number of offences for each offence category. For duration of offending, three variables were created. Age of onset was operationalised in terms of age of first contact (date of first contact minus date of birth) with the youth justice agency. Length of criminal career was operationalised as period of time (in days) between date of first

contact with the youth justice agency and date of assessment. Official supervision was operationalised as period of time (in days) between date of first contact with the youth justice agency and date of assessment, when the participant was officially under the supervision of the youth justice agency. Seriousness of offending was based on total number of offences across all ANZSOC categories, total number of offences across ANZSOC violent categories, and total number of offences across ANZSOC non-violent categories. In addition, proportion of offences violent was calculated based on the percentage of all offences that fell within the violent category. Detailed description of the codification of offence data supplied by the youth justice agency, as well as the categories of ANZSOC codes is located in Appendix C.

3.3.4 Oral Language

Structural language

The *Clinical Evaluation of Language Fundamentals*, Fourth Edition, Australian Standardisation (CELF4-A; Semel, Wiig, Secord, & Hannan, 2006), was used to assess aspects of structural language. The CELF4-A is a widely used, comprehensive test battery, normed on a representative Australian sample, and with standard scores for ages 5:0 to 21:11 years. Four subtests of the CELF were administered – Recalling Sentences, Formulated Sentences, Word Classes, and Word Definitions. Raw scores for each subtest were converted to standard scores (M = 10; SD = 3) using age-based tables. Subtest standard scores were summed to derive a Core Language Score (CLS; M = 100; SD = 15). Internal consistency (Cronbach's α) values for the Core Language Score and four subtests used in the current research ranged from .80 to .97, in the age range of participants in the current study (Semel et al., 2006).

In the Recalling Sentences subtest, participants repeated a sentence they had heard spoken by the test administrator. For example, "The sandcastle was built by the girls and

boys.”. Participants were awarded points (0 - 3) according to the accuracy of their repetition. The aim of the subtest was to evaluate participants’ ability to repeat spoken sentences of increasing length and complexity without altering meaning, morphology or syntax. Sentence repetition tasks are considered to tap into linguistic knowledge and phonological working memory.

In the Formulated Sentences subtest, participants were presented with a stimulus picture in conjunction with a target word. Participants were required to express a sentence that both included the target word and was related to the stimulus picture. For example, a picture of a female and male gardening, with a cat and dog in the background was presented in conjunction with the word “and”. Participants were awarded points (0 - 2) according to the grammatical and semantic accuracy of the sentence they produced. The aim of the subtest was to evaluate participants’ ability to formulate and express complete sentences within contextual constraints. Sentence formulation tasks reflect an individual’s capacity to integrate semantic, syntactic, and pragmatic rules while using working memory.

In the Word Classes subtest, participants were presented with a list of four words and required to: first, nominate which two of the four words were related in some way (receptive component); and second, provide an explanation as to the relationship between the two nominated words (expressive component). For example, a word list was: minute; decade; hour; winter. Participants were awarded points (0 - 1 for each component) for accuracy of word pairing and explanation of word-pair relationship. The aim of the subtest was to evaluate participants’ ability to understand and express semantic class relationships between words. Word relationship tasks reflect an individual’s capacity to perceive associations between words and identify dimensions of relationships between words.

In the Word Definitions subtest, participants were presented with a target word and heard it used contextually within a sentence. Participants were required to provide a definition

for the word consistent with the context. For example, "The word is echo, as in: Josh asked, "Is there an echo in here?". Participants were awarded points (0 - 2) according to the accuracy and detail of their definition. The aim of the subtest was to evaluate participants' ability to analyse and describe words according to their meaning in relation to a unique reference. Word definition tasks tap into an individual's semantic skills and their ability to use words as concepts.

Versions of the CELF are widely used internationally as diagnostic tools and for research purposes. The CELF-4 met nine of the 11 psychometric criteria used to evaluate language assessments in a recent review (Friberg, 2010). Versions of the CELF have been used in a range of research involving general and clinical samples of adolescents (e.g., Barth, Catts, & Anthony, 2009; Durkin & Conti-Ramsden, 2007; Rutherford et al., 2012). The fourth edition of the CELF, specifically, has been used with youth offender samples in at least five studies (Games et al., 2012; Gregory & Bryan, 2011; Snow & Powell, 2008, 2011a; Snow et al., 2016).

Higher order language

The Test of Language Competence – Expanded edition (TLC-E; Wiig & Secord, 1989) was used to assess higher order language. The TLC-E is a widely used test battery with two levels. Level 2 was used in the current research, as it has standard scores for ages 9:0 to 18:11 years. Three subtests of the TLC-E were administered - Ambiguous Sentences, Listening Comprehension: Making Inferences, and Figurative Language. One subtest (Oral Expression: Recreating Speech Acts) was not used, as the current research included a separate narrative language task. Raw scores for each of the subtests were converted to standard scores (M = 10; SD = 3) using age-based tables, and subtest standard scores were summed to produce a total higher order language score.

In the Ambiguous Sentences subtest participants were presented with a sentence and asked to provide two different interpretations of its meaning. For example, “I knew that glare really bothered Jane.”. Participants were awarded points for the provision of one (1 point) or two (3 points) accurate interpretations. The aim of the subtest was to evaluate understanding of multiple meanings of words and comprehension of complex syntactic structures. Tasks relating to ambiguity of language gauge an individual’s ability to use and understand communication that lacks lexical or structural clarity.

In the Listening Comprehension: Making Inferences subtest participants were presented with the beginning and ending of an event chain and asked to select two (of four provided) statements that best explained the ending of the event chain. For example, “Bob and Ray rode on a crowded bus to the shopping mall. They told the story of Bob’s bad luck to a policeman.”, accompanied by the possible explanations for talking to a policeman: “a. Bob didn’t have enough money for the movies.”; “b. They were unlucky to get on a crowded bus.”; “c. Bob’s wallet was stolen on the bus.”; or “d. Bob lost his money sometime before they got to the mall.”. Participants were awarded points for the provision of one (1 point) or two (3 points) accurate inferences. The aim of the subtest was to evaluate ability to select plausible inferences based on incomplete information. Inferential tasks measure an individual’s ability to understand and express alternative outcomes and infer cause and effect relationships where incomplete information is provided.

In the Figurative Language subtest participants were presented with a situation and associated idiomatic expression, and required to: first, explain the meaning of the expression as it related to the situation; and second, select one (of four provided) expression that had a meaning most similar to the original expression. For example, the situation; “Two students talking about a teacher” in conjunction with the expression: “It’s hard to zero in on his ideas.”, and the alternative expressions: “a. He is getting his ideas across.”; “b. it is difficult to

number his ideas."; "c. His ideas do not come through."; or "d. Some ideas are better than others.". Participants were awarded one point for provision of either an accurate meaning for the expression or the accurate selection of the corresponding expression, or three points for both. The aim of the subtest was to evaluate knowledge and understanding of widely used figurative language. Figurative language tasks measure an individual's ability to comprehend everyday metaphors, sayings, jokes, sarcasm and irony.

The TLC-E has been widely used internationally as a diagnostic tool and for research purposes, and met eight of the 11 psychometric criteria used to evaluate language assessments in a recent review (Friberg, 2010). This instrument has been used in research involving general and clinical samples of adolescents (e.g., N. Cohen, Farnia, & Im-Bolter, 2013; Moran & Gillon, 2004). Since the current research was conducted the TLC-E has been subsumed into the *Clinical Evaluation of Language Fundamentals*, Fifth Edition, Metalinguistics (CELF-5 Metalinguistics; E. H. Wiig & Secord, 2014).

Narrative language

A cartoon stimulus, "The Flowerpot Incident" (see Appendix D), was used to elicit a spoken narrative from participants. This six-frame, sequentially organised, black and white cartoon depicts an incident that follows a story grammar structure (Hedberg & Stoel-Gammon, 1986). The prototypical story grammar structure is considered to consist of seven key elements - the setting, an initiating event, an internal response, a plan, an attempt, direct consequences, and resolution (Stein & Glenn, 1975). Narrative samples were recorded and transcribed, and then analysed using protocols developed by Snow and Powell (2005).

This scoring system produced three dependent variables. First, the total number of syllables produced in the narrative was used as a measure of overall communication output. Second, the total number of story grammar elements (0 - 7) was used to measure the structural completeness of the narrative. Third, the summed scores for each of the story grammar

elements (0 - 14) was used to measure both structural completeness and qualitative adequacy of the narrative. Each story grammar element was, therefore, scored on a scale of zero to two (0 = element not present; 1 = structural evidence of element, but content deficits exist; 2 = element structurally evident and qualitatively complete). Consistent with previous research (Snow et al., 2016), inter-rater reliability checks were conducted on a random sample of 10% of narrative samples. Point-to-point agreement between raters on the number of syllables present in each narrative was 98.03%. Point-to-point agreement on the presence or absence of each story grammar element was 100%. Point-to-point agreement on adequacy of each story grammar element was 89.62%.

Narrative language tasks are recognised as important for the assessment of language skills, particularly during adolescence, because the ability to manage and produce longer units of discourse is central to success in academia and peer relationships (Paul, 2007). Narrative language tasks have featured in previous research investigating the language skills of youth offenders (A. Davis et al., 1991; Sanger et al., 1997). Narrative analysis based on "The Flowerpot Incident" stimulus, specifically, has featured in at least five studies involving youth offenders (Humber & Snow, 2001; Snow & Powell, 2005, 2008, 2011a; Snow et al., 2016). This stimulus has also been used to elicit narratives in research involving samples of typically developing and brain injured adolescents and young adults (e.g., Jorgensen & Togher, 2009).

3.3.5 Conversational Inference and Perspective Taking

The Awareness of Social Inference Test (TASIT; McDonald, Flanagan, & Rollins, 2011), uses video vignettes to examine understanding of emotional expressions and integration of contextual information in normal social encounters. The tool was developed to assess the capacity of individuals to meet a criterion of adequate social perception ability, defined as the level of social perception of normal individuals with average social skills.

TASIT has been designed for use with ages 13 - 60 years, and to differentiate between neurologically normal individuals and those with compromised skills. One subtest of TASIT, the Social Inference-Minimal Task (SI-M), was used in the current research.

In the Social Inference-Minimal Task participants viewed a series of 15 short videotaped vignettes of actors interacting in everyday conversational exchanges. Five of these scenes represented sincere exchanges in which text and content were consistent. Ten of the scenes represented sarcastic exchanges in which paralinguistic cues indicated that the speaker meant the opposite of what they were saying. Half of the sarcastic exchanges used simple sarcasm, where the accurate meaning was the opposite of what was said, while half used paradoxical sarcasm, where the dialogue did not make sense unless sarcasm was perceived. After watching each scene, participants were asked four questions regarding an actor's meaning, belief, intent and feeling in a scene. Participants could answer "yes", "no" or "don't know" for each question, and receive one point for an accurate response. Conversational inference skill was calculated by the addition of points for all accurate responses for a scene (up to 4 points), then summing the scene scores (up to 60 points). Perspective taking skill was calculated by summing correct responses for three question categories. Specifically, 'belief' questions were summed to produce a first order cognitive perspective taking score, 'intent' questions were summed to produce a second order cognitive perspective taking score, and 'feel' questions were summed to produce an affective perspective taking score. Each of these perspective taking scores could be up to 15 points.

The reliability and validity of TASIT has been demonstrated in research involving neurologically typical samples, as well as samples with clinical diagnoses (McDonald, 2012; McDonald et al., 2006; McDonald, Flanagan, Martin, & Saunders, 2004; McDonald et al., 2011; McDonald, Flanagan, Rollins, & Kinch, 2003). In addition, the psychometric properties and clinical usefulness of the assessment have been demonstrated in research specifically

focussing on adolescents (McDonald et al., 2003; Turkstra, Dixon, & Baker, 2004; Turkstra, McDonald, & DePompei, 2001). Normative data for adolescents (aged 13 - 15 years) is presented in the assessment manual (McDonald et al., 2011).

3.3.6 Callous-Unemotional Traits

The *Inventory of Callous-Unemotional Traits* (ICU; Frick, 2003) is a self-report scale designed to comprehensively assess the presence and magnitude of callous-unemotional traits in youth. The ICU was developed on the basis of statistical analysis and restructuring of the Callous-Unemotional subscale of the Antisocial Process Screening Device (APSD; Frick & Hare, 2001). The scale consists of 24 items that are each rated on a four-point scale (0 = 'not at all true', 1 = 'sometimes true', 2 = 'very true', and 3 = 'definitely true'). A total score was calculated by summing scores of 12 negatively worded items and reverse-scores of 12 positively worded items. A higher total score indicated an increased presence of callous-unemotional traits. Factor analysis supports a model in which all items load onto three factors – callousness, uncaring and unemotional, as well as a general higher-order factor (e.g., Essau, Sasagawa, & Frick, 2006; Kimonis et al., 2008; Pihet, Etter, Schmid, & Kimonis, 2015).

The validity of the ICU scale has been demonstrated in research involving community samples of adolescents (e.g., Essau et al., 2006; Fanti, Frick, & Georgiou, 2008; Roose, Bijttebier, Decoene, Claes, & Frick, 2010), as well as youth offenders (e.g., Feilhauer, Cima, & Arntz, 2012; Kahn, Byrd, et al., 2013; Kimonis et al., 2008; Pechorro et al., 2016; Pihet et al., 2015; Stickle, Kirkpatrick, & Brush, 2009). In these studies, internal consistency (Cronbach's α) for the total scale has ranged from .72 to .84. Comparable satisfactory internal consistency was found in the current research, with analysis revealing a Cronbach's α of .80 for the total scale.

3.3.7 Psychosocial Functioning

The Youth Self Report (YSR; Achenbach & Rescorla, 2001), is a questionnaire designed to assess adaptive and maladaptive functioning in adolescents. The YSR forms part of the Achenbach System of Empirically Based Assessment (ASEBA), and has been normed for ages 11 to 18 years. The YSR consists of 120 items that are scored on a 3-point scale (0 = 'not true', 1 = 'somewhat true', 2 = 'very or often true'). Items load onto eight clinical syndrome scales: Anxious-Depressed, Withdrawn-Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior. Two broad dimensional scales can also be calculated: Internalizing Problems (including Anxious-Depressed, Withdrawn-Depressed, and Somatic Complaints), and Externalizing Problems (including Rule-Breaking Behavior and Aggressive Behavior). Summing scores for the eight clinical syndrome scales and ten items classed as Other Problems produces a Total Problems Score.

The YSR has demonstrated reliability and validity (Achenbach & Rescorla, 2001), and has been used extensively in research investigating psychosocial functioning in adolescents. Cronbach's α reliabilities for the scale and subscales in community and clinical samples of adolescents have been demonstrated to be moderate to high (e.g., Newman, Lohman, & Newman, 2007; Van Meter et al., 2014), ranging from .66 to .92. In research involving youth offenders (e.g., Breuk, Clauser, Stams, Slot, & Doreleijers, 2007; Kimonis, Tatar, & Cauffman, 2012; Ruchkin, Schwab-Stone, Koposov, Vermeiren, & Steiner, 2002), similar reliability scores have been found (Cronbach's α = .53 to .93). In the current research analysis revealed the following internal consistencies (Cronbach's α): Total Problems - .95; Externalizing Problems - .91; Internalizing Problems - .88; Anxious Depressed - .81; Withdrawn Depressed - .74; Somatic Complaints - .76; Social Problems - .68; Thought Problems - .80; Attention Problems - .75; Rule Breaking - .87; Aggression - .85.

3.4 Procedure

The University of Sydney Human Research Ethics Committee approved this research. In addition, the Youth Justice Research and Evaluation Steering Committee (formerly Juvenile Justice, Department of Police and Justice, NSW; now Youth Justice, Department of Communities and Justice, NSW) approved: the recruitment and assessment of young people under the Department's supervision; data collection within facilities operated by the Department; and the provision of offence data for young people under the Department's supervision. Further, the Department of Education, NSW (formerly the Department of Education and Communities, NSW) approved recruitment and assessment of young people enrolled in public secondary schools, and approved data collection in secondary schools operated by the Department. Copies of notification of official approval to conduct research from each of these bodies are provided in Appendix E.

Participation in the full research protocol involved completion of a number of separate measures, over a period of 150 to 180 minutes. For logistical and clinical reasons, data collection was usually conducted over more than one session and rest breaks were provided as needed. With the exception of the semi-structured interview and KBIT-2 (which were used for the purposes of screening), measures were presented in a random order. Responses on language measures were audiotaped to assist with accuracy of later scoring and analysis. All items on the KBIT-2, CELF4-A, TLC-E and TASIT were read to participants, and demonstrations and practice opportunities for each subtest were provided. Participants were given the option of having items on the ICU and YSR read to them. Participants were also given the option of having their responses recorded for them.

In recognition of the time commitment involved in participation young people were offered a small payment on completion of data collection. For participants under the

supervision of youth justice community services and those attending school this was a $20 shopping voucher. For participants under the supervision of a secure youth justice centre this consisted of the provision of refreshments during data collection sessions (based on the operational guidelines of each centre). A shopping voucher was considered inappropriate for these participants, as detention in a secure setting limited their capacity to realise the value of a voucher.

CHAPTER 4 - GENERAL RESULTS: A DESCRIPTION OF THE SAMPLE

4.1 Introduction

For each of the three empirical studies in the current thesis relevant results appear in respective chapters. The purpose of this chapter is to provide a detailed description of the sample and report bivariate differences between key groups (youth offender; non-offender) on measures of demographics, developmental experiences and psychosocial functioning. In addition, descriptive statistics relating to key offence variables have been provided for the youth offender group. Data reported in this chapter was collected through the semi-structured interview, Youth Self Report (YSR; Achenbach & Rescorla, 2001), and officially recorded information supplied by the youth justice agency. These measures are described in detail in Chapter 3 and further information relating to the semi-structured interview and offence data can be found in the appendices.

While the aim of the current chapter was largely to provide insight into the current sample, certain patterns within the results were predicted. Based on efforts to match the youth offender and non-offender samples on key demographic variables, it was intended that the youth offender and non-offender sample would not show significant differences, especially with regards age, ethnicity and SES. Based on findings relating to youth offenders in Australia (e.g., Kinner et al., 2014; Perry & Newbigin, 2017), it was expected that youth offenders in the current sample would generally report poorer welfare and health experiences, report poorer educational and vocational experiences, and present with significantly higher scores on clinical syndrome scales of the YSR (indicating poorer psychosocial functioning). It was also considered likely that there would be a high degree of heterogeneity within the offence patterns of the youth offenders, consistent with previous findings reported for youth offenders in Australia and NSW (e.g., McGrath, 2015).

4.2 Results

4.2.1 Demographic

Descriptive statistics and group comparisons (alpha = .01 with Bonferroni correction) for demographic variables are presented in Table 2. Independent samples t-tests revealed a significant difference between youth offenders and non-offenders on age ($t(128) = 6.46$, $p < .001$) and a trend towards a significant difference on SES ($t(128) = 2.51$, $p = .013$). The

Table 2 *Descriptive Statistics and Group Differences for Demographic Variables*

T-test	Youth Offender (n = 81)		Non-Offender (n = 49)			95% Confidence Interval of Mean Difference		
	M	*SD*	*M*	*SD*	*t*	Lower	Upper	*d* #
Age	16.88	1.28	15.54	1.05	6.46***	.93	1.75	1.14
SES	3.54	2.12	2.80	1.27	2.51	.16	1.34	.42
Chi-square	Count	%	Count	%	χ^2			phi
Ethnicity					4.07			.18
Aboriginal	38	46.9	20	40.8				
Torres Strait Islander	2	2.5	0	0.0				
Caucasian Australian	40	49.4	28	57.1				
Pacific Is. Australian	1	1.2	0	0.0				
Other Australian	0	0.0	1	2.0				
Language Background					10.08**			.28
Standard Aus. English	60	74.1	47	95.9				
Aboriginal Englishes	14	17.3	1	2.0				
Other	7	8.6	1	2.0				
Primary Language								
Standard Aus. English	81	100.0	49	100.0				
Regional Background					46.15***			.60
Major cities	22	27.2	1	2.0				
Inner regional	39	48.1	11	22.4				
Outer regional	14	17.3	37	75.5				
Remote, very remote	6	7.4	0	0.0				

Notes: *** $p \leq .001$; ** $p \leq .01$. Bonferroni correction for multiple comparisons - alpha level = .01. # Cohen's *d* effect size.

Variables: Age (at time of assessment, based on official records for date of birth); SES (in terms of SEIFA categories, based on self-report of usual residence); Ethnicity (based on self-report of cultural identification); Language background (based on self-report of languages spoken in environment of upbringing); Primary language (based on self-report of overall primary language of communication); Regional background (in terms of ASGC, based on self-report of usual residence).

non-offender group had both a lower mean age (M = 15.54, SD = 1.05) and lower mean SES (M = 2.80, SD = 1.27) than the youth offender group (Age: M = 16.88, SD = 1.28; SES: M = 3.54, SD = 2.12). Chi-square tests for independence indicated no significant association between offender status and ethnicity, but a significant association between offender status and language background ($\chi^2 = 10.08$, $p = .006$). Higher proportions of youth offenders reported having grown up in an environment where a version of Aboriginal English (17.3%) or other (8.6%) languages were commonly spoken, compared to non-offenders (Aboriginal English = 2.0%; other = 2.0%). However, all participants in both groups reported that Standard Australian English (SAE) was their primary language of communication. A Chi-square test for independence indicated a significant association between offender status and regional background ($\chi^2 = 46.15$, $p < .001$). Higher proportions of youth offenders reported that their usual residence was in inner regional (48.1%) or major city (27.2%) areas than non-offenders (inner regional = 22.4%; major cities = 2.0%). The majority of non-offenders reported that their usual residence was in outer regional areas (75.5%).

4.2.2 Welfare and Health

Selected descriptive statistics and group comparisons (alpha = .005 with Bonferroni correction) for welfare and health experiences are presented in Table 3. A Chi-square test for independence (with Yates Continuity Correction) revealed a trend towards a significant association between offender status and outside of home care (OOHC; $\chi^2 = 6.42$, $p = .011$), with a higher proportion of youth offenders (28.4%) than non-offenders (8.2%) reporting having ever experienced OOHC. A further series of Chi-square tests for independence (with Yates Continuity Correction) indicated that there was no significant association between offender status and previous problems with FASD, hearing, speech-language, cognitive function, ASD or a knock to the head resulting in unconsciousness. However, significant

Table 3 *Descriptive Statistics and Group Differences for Welfare and Health Experiences*

Chi-square	Youth Offender (n = 81)		Non-Offender (n = 49)			
	Count	%	Count	%	χ^2	phi
Outside of Home Care	23	28.4	4	8.2	6.42	-2.42
Previous Health Problems						
Foetal Alcohol Spectrum	1	1.2	0	0.0	.00	-.07
Hearing	9	11.1	3	6.1	.41	-.08
Speech-language	9	11.1	5	10.2	.00	-.01
Cognitive	1	1.2	0	0.0	.00	-.07
Attention	39	48.1	1	2.0	28.34***	-.48
Autism Spectrum Disorder	2	2.5	0	0.0	.14	-.10
Unconsciousness	28	34.6	13	26.5	.58	-.08
Mental illness	38	46.9	1	2.0	27.18***	-.48
Previous Substance Use	79	97.5	12	24.5	74.12***	-.77

Notes: *** $p \leq .001$; ** $p \leq .005$. Bonferroni correction for multiple comparisons - alpha level = .005.
Variables: All self-report; count reported in table refers to experienced ever).

associations were found between offender status and previous problems with attention ($\chi^2 = 28.34$, $p < .001$) and mental illness ($\chi^2 = 27.18$, $p < .001$). In both cases a higher proportion of youth offenders reported having experienced a professional report to them that they had an attention problem (48.1%) or a mental illness (46.9%), compared to non-offenders (attention problems = 2.0%; mental illness = 2.0%). A Chi-square test for independence (with Yates Continuity Correction) also revealed that a higher proportion of youth offenders (97.5%) than non-offenders (24.5%) reported having ever consumed or used alcohol, tobacco or illicit drugs ($\chi^2 = 74.12$, $p < .001$).

4.2.3 Educational and Vocational

Descriptive statistics and group comparisons (alpha = .007 with Bonferroni correction) for educational and vocational experiences are presented in Table 4. An independent samples t-test revealed no significant differences between youth offenders and non-offenders on education. Chi-square tests for independence (with Yates Continuity Correction) showed

significant associations between offender status and both school-based support ($\chi^2 = 8.19$, $p = .002$) and non-traditional education ($\chi^2 = 23.89$, $p < .001$). A higher proportion of youth offenders (64.2%) than non-offenders (36.7%) reported that they had received some form of school-based support to assist learning. Also, a higher proportion of youth offenders (49.4%) than non-offenders (6.1%) reported that they had attended a non-traditional education setting at some time. Chi-square tests for independence indicated significant associations between

Table 4 *Descriptive Statistics and Group Differences for Educational and Vocational Experiences*

T-test	Youth Offender ($n = 81$)		Non-Offender ($n = 49$)			95% CI Mean Difference		
	M	*SD*	*M*	*SD*	*t*	Lower	Upper	$d^{\#}$
Years Schooling	9.48	1.74	9.69	1.10	-.85	-.71	.28	.14
Chi-square	Count	%	Count	%	χ^2			phi
School-Based Support					8.19**			.27
Ever	52	64.2	18	36.7				
Never	29	35.8	31	63.3				
Non-Traditional Education					23.89***			.45
Ever	40	49.4	3	6.1				
Never	41	50.6	46	93.9				
School Suspension					70.94***			.73
None	3	3.7	31	63.3				
One	2	2.5	6	12.2				
2-4	17	21.0	6	12.2				
5-9	39	48.1	6	12.2				
10+	20	24.7	0	0.0				
School Exclusion					20.62***			.40
None	54	66.7	49	100.0				
One	22	27.2	0	0.0				
2-4	5	6.2	0	0.0				
Vocational Training					16.93***			.38
Any	46	56.8	9	18.4				
None	35	43.2	40	81.6				
Employment					.95			.10
Any	48	59.3	34	69.4				
None	33	40.7	15	30.6				

Notes: *** $p \leq .001$; ** $p \leq .007$. Bonferroni correction for multiple comparisons - alpha level = .007. CI – confidence Interval. # Cohen's *d* effect size.

Variables: Years schooling (at time of assessment, self-report of total number of years of schooling completed); School suspension (at time of assessment, self-report of approximate number of suspensions from school); School exclusion (at time of assessment, self-report of approximate number of exclusions from school); Vocational training (at time of assessment, self-report of completion of vocational competency); Employment (at time of assessment, self-report of any experience of participation in paid work).

offender status and school suspension ($\chi^2 = 70.94$, $p < .001$) and school exclusion ($\chi^2 = 20.62$, $p < .001$). In both cases higher proportions of youth offenders reported more frequent school suspension (2-4 times = 21.0%; 5-9 times = 48.1%; 10+ times = 24.7%) and school expulsions (once = 27.2%; 2-4 times = 6.2%), compared to non-offenders (suspensions: 2-4 times = 12.2%; 5-9 times = 12.2%; expulsions: > none = 0.0%). Chi-square tests for independence (with Yates Continuity Correction) indicated that there was no significant association between offender status and employment, but a significant association between offender status and vocational training ($\chi^2 = 16.93$, $p < .001$). In the case of vocational training a higher proportion of youth offenders (56.2%) than non-offenders (18.4%), reported having completed a competency in vocational training.

4.2.4 Psychosocial Functioning

Descriptive statistics and group comparisons (alpha = .004 with Bonferroni correction) for psychosocial functioning, as measured through the YSR and based on a series of independent samples t-tests, are presented in Table 5. There were significant differences between youth offenders ($M = 16.70$, SD = 8.56) and non-offenders ($M = 11.55$, SD = 8.26) on the Internalizing Behaviors scale ($t(128) = 3.37$, $p = .001$), as well as the clinical Withdrawn-Depressed syndrome scale ($t(128) = 4.27$, $p < .001$; $M = 5.75$, SD = 2.86) within this category. Similarly, independent samples t-tests revealed significant differences between youth offenders ($M = 26.00$, SD = 9.32) and non-offenders ($M = 10.94$, SD = 6.80) on the Externalising Behaviours scale ($t(128) = 10.61$, $p < .001$), in addition to the two clinical syndrome scales within this category. In relation to this category, youth offenders demonstrated higher scores on Rule Breaking Behaviors ($t(128) = 12.27$, $p < .001$; $M = 13.65$, SD = 5.03) and Aggressive Behaviors ($t(128) = 6.92$, $p < .001$; $M = 12.35$, SD = 5.83) scales, compared to non-offenders (Rule Breaking Behaviors: $M = 4.47$,

Table 5 *Descriptive Statistics and Group Differences for Psychosocial Functioning*

T-test	Youth Offender (n = 81)		Non-Offender (n = 49)			95% CI Mean Difference		
	M	*SD*	*M*	*SD*	*t*	Lower	Upper	*d* [#]
Internalising Behaviors	16.70	8.56	11.55	8.26	3.37***	2.13	8.18	.61
Anxious-Depressed	6.23	4.18	4.67	4.11	2.08	.07	3.05	.38
Withdrawn-Depressed	5.75	2.86	3.55	2.84	4.27***	1.18	3.22	.77
Somatic Complaints	4.72	3.52	3.33	3.11	2.28	.18	2.60	.42
Externalising Behaviors	26.00	9.32	10.94	6.80	10.61***	12.25	17.87	1.85
Rule Breaking Behaviors	13.65	5.03	4.47	3.49	12.27***	7.70	10.67	2.12
Aggressive Behaviors	12.35	5.83	6.47	3.84	6.92***	4.20	7.56	1.19
Social Problems	4.94	3.23	3.45	2.52	2.93**	.48	2.50	.51
Thought Problems	7.58	4.66	4.96	3.71	3.54***	1.15	4.09	.62
Attention Problems	8.86	3.23	6.63	3.57	3.67***	1.03	3.44	.66
Other Problems	6.10	2.65	5.86	2.81	.49	-.73	1.21	.09
Total Problems Score	70.19	24.53	43.39	21.10	6.36***	18.45	35.14	1.17

Notes: *** $p \leq .001$; ** $p \leq .004$. Bonferroni correction for multiple comparisons - alpha level = .004. CI – confidence Interval.
[#] Cohen's *d* effect size.
Variables: Clinical syndrome scales, dimensional scales and total scale of Youth Self Report.

SD = 3.49; Aggressive Behaviors: M = 6.47, SD = 3.84). In terms of other clinical syndromes, youth offenders had significantly higher scores on Social Problems ($t(128) = 2.93$, $p = .004$; M = 4.94, SD = 3.23), Thought Problems ($t(128) = 3.54$, $p = .001$; M = 7.58, SD = 4.66) and Attention Problems ($t(128) = 3.67$, $p < .001$; M = 8.86, SD = 3.23), but not Other Problems. In comparison, non-offenders had lower scores on Social Problems (M = 3.45, SD = 2.52), Thought Problems (M = 4.96, SD = 3.71) and Attention Problems (M = 6.63, SD = 3.57). Overall, youth offenders demonstrated a significantly higher Total Problems Score ($t(128) = 6.36$, $p < .001$; M = 70.19, SD = 24.53) than non-offenders (M = 43.39, SD = 21.10).

4.2.5 Patterns of Offending

Descriptive statistics for patterns of offending for the youth offender group are presented in Table 6. In relation to frequency of offending, all categories of offending were

represented by at least one offence contact. Illicit drug offences demonstrated the lowest range of frequency (0 - 1), while theft and related offences exhibited the highest range of frequency (0 – 28). Five offence categories recorded a mean score of greater than one – theft and related offences (M = 3.14, SD = 5.15), unlawful entry with intent (break and enter; M = 2.40, SD = 3.77), acts intended to cause injury (M = 1.60, SD = 2.47), property damage (M = 1.20, SD = 1.81) and public order offences (M = 1.17, SD = 1.83). Fewer than 10% of youth offenders had contact with the youth justice agency in relation to four offence categories – miscellaneous offences (0.1%), homicide and related offences (2.5%), abduction, harassment and related offences (4.9%) and dangerous or negligent acts endangering other persons (6.2%). Greater than 50% of youth offenders had contact with the youth justice agency in relation to three offence categories – theft and related offences (60.5%), unlawful entry with intent (break and enter; 59.3%) and acts intended to cause injury (59.3%). Almost one quarter of youth offenders demonstrated the highest frequency of offending within each of three categories – acts intended to cause injury (24.7%), theft and related offences (23.5%) and unlawful entry with intent (break and enter; 21.0%). For over half of the youth offenders (58.0%), offences within the category acts intended to cause injury were their most serious offence. The next most serious offence categories were unlawful entry with intent (break and enter; 14.8%), sexual assault and related offences (8.6%) and robbery, extortion and related offences (7.4%).

In terms of duration of offending, the youngest age of onset was 11.12 years, while the oldest was 18.60 years (M = 14.83, SD = 1.66). Youth offenders demonstrated a large degree of variance in both length of criminal career (Range: 7 – 1988 days, M = 749.59, SD = 549.54) and period of official supervision (Range: 7 – 1715 days, M = 461.17, SD = 379.07). Seriousness of offending, as assessed through summed categorical offence scores, revealed that the highest total number of offences recorded for any one individual was

Table 6 *Descriptive Statistics for Patterns of Offending for Youth Offender Group*

Youth offenders (n = 81)	Range[a]		Central Tendency[b]		Prevalence[c] (% youth offenders)		
	Min	Max	*M*	*SD*	Ever	Most Often	Most Serious
Frequency (by ANZSOC category)							
1. Homicide & Related	0	2	.04	.25	2.5	1.2	2.5
2. Acts Intended to Injure	0	15	1.60	2.47	59.3	24.7	58.0
3. Sexual Assault & Related	0	10	.42	1.56	11.1	9.9	8.6
4. Dangerous/Negligent Endanger	0	5	.12	.62	6.2	0.0	1.2
5. Abduction, Harassment & Related	0	2	.07	.93	4.9	1.2	1.2
6. Robbery, Extortion & Related	0	11	.93	2.19	28.4	8.6	7.4
7. Break & Enter	0	19	2.40	3.77	59.3	21.0	14.8
8. Theft & Related	0	28	3.14	5.15	60.5	23.5	4.9
9. Fraud, Deception & Related	0	23	.64	3.32	8.6	1.2	0.0
10. Illicit Drugs	0	1	.16	.37	16.0	1.2	1.2
11. Prohibited/Regulated Weapons	0	11	.33	1.40	12.3	2.5	0.0
12. Property Damage	0	7	1.20	1.81	46.9	2.5	0.0
13. Public Order	0	10	1.17	1.83	48.1	1.2	0.0
14. Traffic & Vehicle Regulatory	0	7	.43	1.26	16.0	0.0	0.0
15. Offences Against Government	0	13	1.00	2.24	39.5	1.2	0.0
16. Miscellaneous	0	2	.09	.39	.1	0.0	0.0
Duration							
Age of Onset (years)	11.12	18.60	14.83	1.66			
Criminal Career (days)	7	1988	749.59	549.54			
Official Supervision (days)	7	1715	461.17	379.07			
Seriousness							
Frequency All Offences	1	75	13.74	15.81			
Frequency Violent Offences	0	16	3.10	3.66			
Frequency Non-Violent	0	61	10.64	14.21			
Proportion Offences Violent	0	100	35.07	33.64			

Notes: [a] minimum and maximum number recorded for any participant; [b] mean and standard deviation for youth offender group; [c] Ever: % youth offenders with offence contact for category; Most often: % youth offenders for whom highest number of offences were in category; Most serious: % youth offenders for whom most serious offence was in category.

Variables: Frequency (based on total sum of each offence contact within ANZSOC category); Duration: Age of onset (based on age of first contact with youth justice agency), criminal career (in days; based on period between first contact with justice agency and assessment date), official supervision (in days; based on days under official supervision of youth justice agency between first contact and assessment date); Seriousness: Frequency (based on total offences within relevant categories; All: 1 to 16; Violent: 1 to 6; Non-violent: 7 to 16), proportion offences violent (based on % of all offences within violent category).

75 (M = 13.74, SD = 15.81). Results also indicated that non-violent offending (Max.: 61, M = 10.64, SD = 14.21) was more prevalent than violent offending (Max.: 16, M = 3.10, SD = 3.66). Among youth offenders, the average proportion of total offences that fell within the violent category was 35%. However, this figure was associated with a high level of variance (SD = 33.64).

4.3 Summary and Comments

The purpose of this chapter was to provide a detailed description of the current sample and highlight differences between key groups. As expected, both the youth offender and non-offender groups were represented by relatively high proportions of Indigenous Australians, had relatively low SES and were largely within the adolescent age range. Due to the over-representation of Indigenous Australians in the youth justice system, efforts were made to recruit participants for the non-offender group from public secondary schools with a relatively high proportion of Indigenous Australian students. As a result, groups did not differ on the basis of ethnicity. While a higher proportion of youth offenders reported growing up in an environment where languages other than SAE were commonly spoken, all participants in both groups indicated that SAE was their primary language of communication. Efforts were also made to recruit participants for the non-offender group from schools likely to have a similarly low SES to that expected for the youth offender group. Interestingly, the non-offender group in the current sample actually had a lower average SES than the youth offender group. This was likely linked to the greater range of regional backgrounds represented in the youth offender sample compared to the non-offender sample. Youth offenders who were under the supervision of a secure youth justice centre at the time of assessment had a range of usual residences dispersed widely throughout NSW. Non-offender participants were all within the catchment areas of five schools.

Due to the different age cohorts under the jurisdiction of public secondary schools (13 – 18 years) and youth justice agencies (14 – 21 years) in NSW, there was a significant age difference between groups. However, while the non-offender group had a younger average age, there was no significant difference between the two groups in terms of total years of schooling. In attempting to match youth offender with non-offender samples across a number

of demographic variables, previous researchers have similarly involved non-offender groups of a younger age, but equivalent education to the youth offender group (e.g., Hopkins et al., 2017; Snow & Powell, 2004, 2008). In relation to other education variables, youth offenders demonstrated more experience of school-based discipline. This association has been demonstrated in international research (e.g., Mowen, Brent, & Boman, 2019). Interestingly, higher proportions of youth offenders reported experiences of school-based support, vocational education competencies and non-traditional education settings than non-offenders. This was potentially indicative of the challenges these youth faced in engaging with traditional school education (as reported by Office of the Advocate for Children and Young People, 2018).

As expected, and consistent with prior research, youth offenders generally reported more experience of official OOHC (e.g., McFarlane, 2017), as well as higher rates of attention problems (e.g., S. Young et al., 2010), mental illness (e.g., Rijo et al., 2016) and substance use (e.g., Kinner et al., 2014) compared to non-offenders. In addition, compared to the non-offender group, the youth offender group demonstrated poorer psychosocial functioning across many clinical syndrome scales on the YSR, reflective of the higher rates of psychopathology demonstrated in previous research (e.g., Margari et al., 2015).

The lack of significant differences in reporting of hearing and cognitive problems between the youth offender and non-offender groups was likely due to criteria for the current research specifically excluding participants with known diagnoses of hearing impairment or intellectual impairment. The lack of significant differences between the youth offender and non-offender groups on FASD, speech-language problems and ASD may have been related to limited prior awareness or diagnosis. Previous research has demonstrated high rates of previously undiagnosed FASD (e.g., Bower et al., 2018), language deficits (e.g., Snow et al., 2016) and ASD (e.g., Sutton et al., 2012) in youth offender samples. With regard to

experience of a knock to the head resulting in unconsciousness, the rates reported by youth offenders were consistent with prior research evidence (e.g., Williams et al., 2010). That a similar proportion of non-offenders reported experience of a knock to the head resulting in unconsciousness was unexpected, and unusual (e.g., Bruns Jr & Hauser, 2003).

Within the youth offender group heterogeneity of offending patterns was found. All ANZSOC (Pink, 2011a) offence categories were represented at least once, and substantial proportions of youth offenders committed offences within a variety of categories. Three categories of offending did, however, appear consistently across a number of measures. Theft and related offences, unlawful entry with intent (break and enter), and acts intended to cause injury were each associated with at least three measures indicating high frequency of occurrence. There was a high degree of variance found in relation to duration (criminal career span, periods under official supervision) and seriousness (all offences, violent offences, non-violent offences, proportion of offences violent) of offending patterns. The patterns of offending reported in the current study are consistent with figures reported elsewhere (e.g., Kenny & Lennings, 2007; Perry & Newbigin, 2017). However, it should be noted that, as data in the current study was cross-sectional, these figures represent a snapshot of offending behaviour.

4.4 Making the Link

The purpose of this chapter was to provide a description of the sample, as well as bivariate differences between youth offender and non-offender sub-samples. Consistent with expectations, the youth offender sub-sample and non-offender sub-sample demonstrated statistically significant differences on some key variables. Each of these variables could have, therefore, been considered potential confounds in statistical analyses for empirical studies. In developing analytical plans for empirical studies, careful consideration was given to which of

these variables should be statistically controlled for (based on recommendations outlined by, Becker et al., 2016). As many of the variables detailed in this chapter were measured through self-report requiring historical recall potentially influenced by subjective socio-cultural interpretation (e.g., language background, mental illness, school-based support), it was considered that these did not have adequate reliability and validity to be included as control variables. In addition, as a number of variables reported in this chapter represented alternative measurements of antisocial behaviour (e.g., school suspension, previous substance use, YSR Externalising Behavior subscales), statistical control would have undermined conceptually meaningful analyses. Further, as some variables outlined in this chapter represented proxies for and/or were highly correlated with other, more reliably measured variables (e.g., regional background for SES; language background for ethnicity), these were not considered for statistical control.

Three key variables (age, SES and ethnicity) were selected for statistical control in all empirical studies, based on greater reliability of measurement, as well as theoretical meaningfulness in relation to research questions and compatibility with statistical techniques. A fourth variable (education) was also statistically controlled for in most analyses of empirical study 1 (Chapter 5), as the analysis of both language skills and non-verbal intelligence implicated this variable as a potential confound. This addition was considered acceptable because accuracy of participant self-report was, in most cases, supported by demonstrated concurrent or recent engagement in school education.

CHAPTER 5 - HIGHER ORDER LANGUAGE: RISK, PROMOTIVE, PROTECTIVE ASSOCIATIONS WITH ANTISOCIAL BEHAVIOUR

5.1 Introduction

Over the past three decades researchers, notably in the field of criminology, have been using the risk factor prevention paradigm to increase understanding of variables associated with offending. Farrington et al. (e.g., 2008; 2011; 2016), especially, have worked towards refining definitions and analytical techniques in order to examine a range of variables in terms of their association not only with high rates of offending, but also with low rates of offending or mitigation of other risks. In criminological terms it has been widely accepted that, a *risk factor* is a variable that predicts a high probability of offending (Farrington et al., 2016). However, the term *protective factor* had been inconsistently applied within the literature. This led Farrington, Loeber, Pardini and Joliffe (2008) to introduce the concept of *promotive factor* to represent a low probability of offending. Further, they endorsed a two-dimensional conceptualisation of protective factor, differentiating an *interactive protective factor* from a *risk-based protective factor*. In this conceptualization, a risk-based protective factor represented a variable that predicted a low probability of offending among a group at high risk based on a specific risk factor. In contrast an interactive protective factor represented a variable that interacted with a risk factor to suppress its effects. That is, in the presence of a specific risk factor, the probability of offending decreased when the protective factor was also present, but the protective factor alone (without the specific risk factor present) did not decrease the probability of offending (Farrington et al., 2016).

In detailed analysis of data from the Pittsburgh Youth Study (Farrington et al., 2008), and Cambridge Study in Delinquent Development (Farrington & Ttofi, 2011; Farrington et al., 2016), these researchers utilised a technique of trichotomization of variables into the

"worst" quarter (i.e. the 25% of participants with the lowest scores), "middle" half (i.e. the 50% of participants with scores in the middle of the distribution), and the "best" quarter (i.e. the 25% of participants with the highest scores). This allowed them to investigate risk factors by comparing the probability of offending in the worst group with the combined middle and best group, and promotive factors by comparing the probability of offending in the best group with the combined middle and worst group. Through such analyses these researchers were able to demonstrate that while some variables had a purely risk association with offending, others had both a risk and promotive association (termed a *mixed factor*), and some actually had a purely promotive association. Any variable that had a promotive or mixed association with offending could then be investigated in terms of interactive or risk-based protective elements in relation to any variable that had a risk or mixed association with offending.

5.1.1 Oral Language Skills and Antisocial Behaviour

There is evidence from a wide range of research implicating poor oral language skill as a risk factor (a variable that predicts a high probability) for antisocial behaviour, including offending behaviour. In longitudinal research, it has been demonstrated that oral language deficits in childhood are associated with behaviour problems in adolescence, even after controlling for childhood behaviour (Beitchman et al., 1996; Beitchman et al., 2001; Bor et al., 2004; Conti-Ramsden, Mok, Pickles, & Durkin, 2013; Petersen et al., 2013). In one study, age 5 language disorder was found to directly predict age 19 parent-rated delinquency, a relationship that could not be accounted for by age five demographic or family variables (Brownlie et al., 2004). Significant correlations have also been found between infant language development and preschool age language maturity and officially registered criminality up to age 30 (Stattin & Klackenberg-Larsson, 1993). *Verbal ability* (cognitive function directly involving language skills) during adolescence has been demonstrated to have significant

negative associations with later officially recorded contacts with justice agencies, as well as self-reported delinquency (Beaver et al., 2013; Darrick Jolliffe et al., 2017; Manninen et al., 2013; Moffitt et al., 1994; Murray & Farrington, 2010). Yew and O'Kearney (2015) provided evidence that preschool age oral language deficits had a moderating influence on aspects of antisocial behaviour throughout childhood. Specifically, early oral language deficits were associated with higher levels of antisocial behaviour later in childhood in boys who also experienced harsh parenting and low socio-economic status (SES). Demonstrating the complexity of associations between oral language skills and antisocial behaviour, these researchers also found that early oral language deficits were associated with lower levels of antisocial behaviour in boys who were exposed to maternal distress and exhibited higher levels of sociability.

That oral language deficits generally confer greater risk for antisocial behaviour has been further demonstrated in the high rates of oral language deficits found in clinically defined antisocial children and adolescents (N. Cohen et al., 2013; Gilmour et al., 2004; Nelson, Benner, & Cheney, 2005). Studies have consistently found that youth offender groups present with significantly poorer mean scores on overall oral language skills than comparison groups (Blanton & Dagenais, 2007; A. Davis et al., 1991; Humber & Snow, 2001; Karniski et al., 1982; Sanger et al., 1997; Snow & Powell, 2004, 2005, 2008; Wolff et al., 1982). Even when applying stringent criteria (a performance of 1.5 standard deviations or more below the mean on a comprehensive standardised language measure), between 14 and 46% of youth offenders have been deemed to meet criteria for oral language disorder (Games et al., 2012; N. Hughes et al., 2017; Sanger et al., 1997; Snow & Powell, 2011a; Snow et al., 2016). Moreover, performance on oral language assessments have been demonstrated to account for 45% of variance in severity of youth offending (Wolff et al., 1982), as well as produce 64 to 81% correct classification rates for offender status (youth offender, non-offender; Hopkins et

al., 2017).

Although extensive research has focused on oral language deficits as risk factors for antisocial behaviour and offending, comparatively little research has investigated whether superior oral language skills can be conceptualised as promotive factors (variables that predict a low probability) and/or risk-based protective factors (predicting a low probability within a risk group). Lahey et al., (2002) examined adolescent antisocial outcomes among boys diagnosed with conduct disorder (CD). They found that those who had higher verbal ability at initial assessment (specifically greater than one standard deviation above the mean) demonstrated a greater decrease in CD symptoms over time than those with lower verbal ability. Loeber et al. (2007) found that high verbal ability was one of a number of promotive factors that predicted a lower probability of self-reported offending for adolescent males. White, Moffit and Silva (1989) reported that higher verbal ability acted as a risk-based protective factor for those deemed at high risk of offending, based on high levels of antisocial behaviour at age 5. Farrington et al. (2016), however, have produced one of the only studies to analyse a language variable specifically from the risk-promotive-protective perspective. They demonstrated that verbal ability had both risk and promotive associations with offending. In addition, they found that high verbal ability acted as a risk-based protective factor for those deemed at high-risk of offending, based on high hyperactivity, high nervousness of mother, poor child-rearing or separated parents.

5.1.2 The Current Study

The major aim of the current study was to examine associations between distinct oral language skills and youth offending using the risk-promotive-protective paradigm. *Higher order language* (HOL) skills involve understanding non-literal aspects of language (e.g., ambiguity, inference and figurative devices; N. Cohen et al., 2013). I am aware of no previous

studies that have explicitly tested HOL using this paradigm, despite various reasons to suggest that it can be seen as a key priority for such research. For example, the use and understanding of these more complex, abstract language forms must increase markedly in late childhood and during adolescence, when these higher order mechanisms become integral to a range of socio-emotional functions (Nippold, 2016). This developmental period also represents the life-stage when young people engaged in antisocial behaviour are at risk of formal contact with the justice system (Australian Institute of Health and Welfare, 2019). However, evidence demonstrates that youth offenders present with significantly compromised HOL skills, compared to non-offending peers (Humber & Snow, 2001; Sanger et al., 1997; Snow & Powell, 2004, 2008, 2011a) or expected norms (Myers & Mutch, 1992; Snow et al., 2016). This suggests that antisocial youth find themselves at a linguistic disadvantage precisely at the time they must rely on such skills to effectively navigate the complex and often nuanced language associated with justice and related agencies (Wszalek, 2017).

It is proposed in this study that applying the unique conceptual and methodological approaches of the risk-promotive-protective paradigm stands to significantly inform models regarding the linguistic mechanisms that may underlie associations between general verbal ability and the development of antisocial behaviour. Evidence concerning the importance of oral language skills from this perspective may also inform youth justice policy and highlight priorities for early intervention. The first specific aim of the current study was to examine the risk and promotive associations between three HOL skills and youth offending. The specific HOL skills investigated were understanding *ambiguity* (language that expresses multidimensional meaning, e.g., words with multiple meanings, paradoxes), *making inferences* (making conclusions through integration of evidence and reasoning) and understanding *figurative language* (non-literal aspects of spoken language, e.g., idioms, metaphors, hyperbole). It was hypothesised that each of these skills would meet criteria for

both risk and promotive associations with youth offending. Specifically, it was predicted that, compared to those with moderate and strong HOL skills, those with weak skills would have a higher probability of being a youth offender. It was further predicted that, compared to youth with moderate and weak HOL skills, those with strong skills would have a higher probability of being a non-offender. The second specific aim was to test HOL skills as risk-based protective factors for the well-established risk association between low nonverbal ability (NVA) and youth offending (e.g., J. Craig, Piquero, Farrington, & Ttofi, 2017; Raine, Yaralian, Reynolds, Venables, & Mednick, 2002; Schwartz et al., 2015). It was hypothesised that superior skills in each of the HOL variables would predict a low probability of offending among those at risk of offending due to poor NVA.

5.2 Methods

5.2.1 Participants

Participants in the current study were 130 male adolescents. All participants had undertaken the majority of their schooling in an English-speaking country. None of the participants had a known diagnosis of intellectual impairment or hearing impairment, or were known to be experiencing an acute episode of mental illness. Participants were aged between 13 and 20 years (M = 16.32, SD = 1.35). The youth offender group included 81 participants (Age M = 16.88, SD = 1.28), who were recruited through 19 youth justice centres (detention = 6; community service = 13). The non-offender group included 49 participants (Age M = *15.54*, SD = 1.05), recruited through five public secondary schools. All participants were resident in New South Wales, the most populous state in Australia. Slightly over half of all participants reported being of non-Indigenous Australian ethnicity (53.8%; majority Caucasian), while slightly under half reporting being of Indigenous ethnicity (46.2%; majority Aboriginal). Overall, participants were of relatively lower socio-economic status. SES was

based on Socio-Economic Indexes for Areas (Adhikari, 2006) using assignment of an Index of Relative Socio-Economic Advantage/Disadvantage (IRSAD; from one (lowest) to nine (highest)) based on postcode of usual residence. Participants had a mean IRSAD of 3.26, indicating relatively greater disadvantage than advantage.

5.2.2 Measures

Offender status

Offender status was operationalised as a categorical variable with two levels (youth offender; non-offender). A youth offender was an individual with officially documented contact with a youth justice supervision agency, in the form of supervision through a youth justice community service or secure youth justice centre, at the time of participation in research. A non-offender was an individual who self-reported lack of current or historical official contact with a youth justice supervision agency.

Higher Order Language

The *Test of Language Competence* – Expanded edition (TLC-E; Wiig & Secord, 1989) was used to assess aspects of HOL. Level 2 of the TLC-E was used in the current study, as it has standard scores for ages 9:0 to 18:11 years. Three subtests of the TLC-E were administered. In the Ambiguous Sentences subtest participants were presented with a sentence and asked to provide two different interpretations of its meaning. For example, "I knew that glare really bothered Jane.". Participants were awarded points for the provision of one (1 point) or two (3 points) accurate interpretations. Tasks relating to ambiguity of language reflect an individual's ability to use and understand multiple meanings of words and complex syntactic structures.

In the Listening Comprehension: Making Inferences subtest participants were presented with the beginning and ending of an event chain and asked to select two (of four provided)

statements that best explained the ending of the event chain. For example, “Bob and Ray rode on a crowded bus to the shopping mall. They told the story of Bob’s bad luck to a policeman.”, accompanied by the possible explanations for talking to a policeman: “a. Bob didn’t have enough money for the movies.”; “b. They were unlucky to get on a crowded bus.”; “c. Bob’s wallet was stolen on the bus.”; or “d. Bob lost his money sometime before they got to the mall.”. Participants were awarded points for the provision of one (1 point) or two (3 points) accurate inferences. Inferential tasks reflect an individual’s ability to understand and express alternative outcomes, cause and effect relationships and multiple event chains.

In the Figurative Language subtest participants were presented with a situation and associated expression, and required to: firstly, explain the meaning of the expression as it relates to the situation; and secondly, select one (of four provided) expressions that had a meaning most similar to the original expression. For example, the situation; “Two students talking about a teacher” in conjunction with the expression: “It’s hard to zero in on his ideas.”, and the alternative expressions: “a. He is getting his ideas across.”; “b. It is difficult to number his ideas.”; “c. His ideas do not come through.”; or “d. Some ideas are better than others.”. Participants were awarded one point for provision of either an accurate meaning for the expression or the accurate selection of the corresponding expression, or three points for both. The aim of the subtest was to evaluate knowledge and understanding of widely used figurative language. Figurative language tasks reflect an individual’s ability to comprehend metaphors, sayings, jokes, sarcasm and irony. Raw scores for each of the subtests were converted to standard scores (M = 10; SD = 3) using age-based tables.

Nonverbal ability

The Matrices subtest of the *Kaufman Brief Intelligence Test*, 2nd edition (KBIT-2; Kaufman & Kaufman, 2004), was used to measure NVA. The KBIT-2 is a widely used

screening tool, with good reliability and validity, and standard scores (M = 100; SD = 15) for a wide age range. Higher scores represent better intellectual functioning, while lower scores represent poorer intellectual functioning. The Matrices subtest utilises pictures and abstract designs to assess an individual's ability to perceive relationships and complete visual analogies. The participant was required to select one of six illustrations that represented the best solution to a novel problem. Internal consistency values for the Matrices subtest range from .88 to .89, in the age range of participants in the current study (Kaufman & Kaufman, 1990).

5.2.3 Procedure

Following approval by the University of Sydney Human Research Ethics Committee, the Department of Communities and Justice, NSW and the Department of Education, NSW, inclusion criteria, participant information and consent forms were distributed to participating youth justice centres and schools. All participating youth justice centres and schools were visited by the researcher to administer assessments and questionnaires on site. The full study protocol involved conducting a semi-structured interview, followed by the KBIT-2, to ensure participants met inclusion criteria, then presentation in random order of all other questionnaires and assessments. All items on the TLC-E and KBIT-2 were read to participants, to ensure reading difficulties did not prevent them from accessing the content. Demonstrations and practice opportunities for each subtest were provided, in accordance with provisions in the test manuals.

5.2.4 Data Analytic Plan

Analyses of variables as risk, promotive, and risk-based protective factors were based on those used by Farrington et al. in the Pittsburg Youth Study (2008), and Cambridge Study

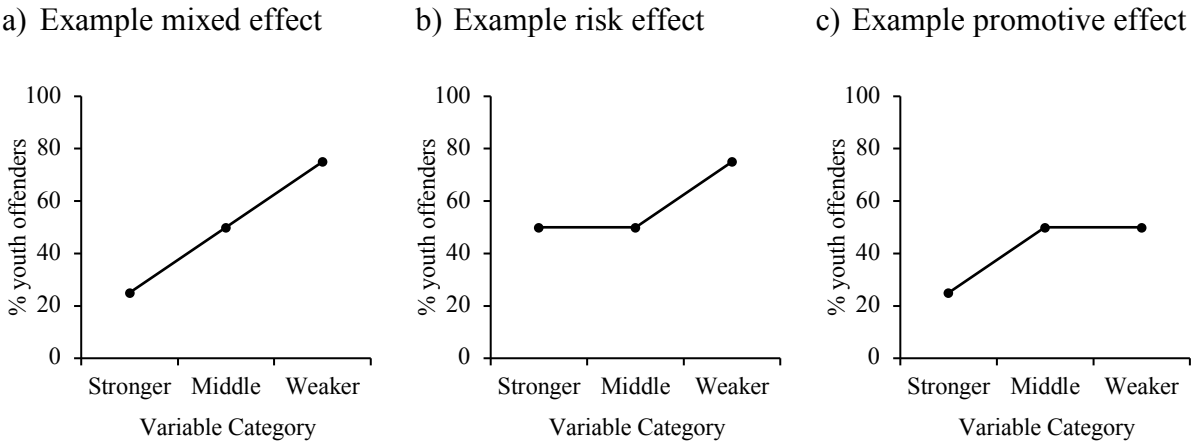
in Delinquent Development (2011; 2016). The first step in the process involved trichotomization of variables of interest to create groups that as closely as possible represented the lowest 25% of scores (*weakest*), middle 50% of scores, and highest 25% of scores (*strongest*). For each of the HOL variables the weakest 25% of scores related to standard scores from 0 to 3, the middle 50% of scores related to standard scores from 4 to 7, and the strongest 25% of scores related to standard scores from 8 to 14. For Ambiguous Sentences group sizes were 37 for weakest, 58 for middle, and 35 for strongest. For Making Inferences group sizes were 29 for weakest, 67 for middle, and 34 for strongest. For Figurative Language group sizes were 46 for weakest, 52 for middle, and 32 for strongest. For NVA the weakest 25% of scores related to standard scores from 60 to 83 (n = 34), the middle 50% of scores related to standard scores from 84 to 130 (n = 63), and the strongest 25% of scores related to standard scores from 101 to 160 (n = 33).

In line with Farrington et al. (2016), risk-based analyses in the current study compared the probability of offending in the weakest category (lowest 25% of scores) of each variable with the remainder of the group (other 75% of scores), while promotive analyses compared the probability of offending in the strongest category (highest 25% of scores) of each variable with the remainder (other 75% of scores). This approach capitalised on the full cohort in each analysis. Binary logistic regression was used to allow for statistical control of potentially confounding influences of age, SES, ethnicity and education. For this purpose, each trichotomized HOL variable and NVA was reconfigured as two separate, two-level categorical variables. For risk analyses the *risk categorisation* of the variable, consisting of two levels - weakest and middle-strongest, was utilised. For promotive analyses the *promotive categorisation* of the variable, consisting of two levels – middle-weakest and strongest, was utilised. The dependent variable in each analysis was offender status – youth offender (YO) or non-offender (NO). The key statistic of interest resulting from these analyses was the odds

ratio (OR), which Farrington et al. (2008; 2011; 2016) used as the main measure of the strength of the effect. In the risk analyses OR indicated the magnitude of the association between weakest HOL and NVA skills and categorisation as a youth offender compared to that of middle-strongest skills and categorisation as a youth offender. In the promotive analyses, OR indicated the magnitude of the association between strongest HOL and NVA skills and categorisation as a non-offender compared to that of middle-weakest skills and categorisation as a non-offender.

In order to identify if a variable could be considered a risk, promotive or mixed (both risk and promotive) variable in relation to offending, three analytic methods were used (Farrington et al., 2008). First, size and statistical significance of the OR (as obtained through the logistic regression analyses described above) was considered. Farrington et al. (2008; 2011; 2016) used the criterion of an OR that was 2.0 or larger, or significant at the $p < .05$ level. A risk factor was indicated if only the risk OR was significant or 2.0 or larger, a promotive factor was indicated if only the promotive OR was significant or 2.0 or larger, and a mixed factor was indicated if both the risk and promotive ORs were significant or 2.0 or larger. Second, relative sizes of risk and promotive ORs for each variable were calculated using a *z* test. A risk OR that was significantly higher than the associated promotive OR was indicative of a risk factor, a promotive OR that was significantly higher than the associated risk OR was indicative of a promotive factor, while a finding of no significant difference between the risk and promotive ORs was indicative of a mixed factor. Third, testing of linear effects was conducted using Mantel-Haenszel linear-by-linear chi-squared. Like the Cochran-Armitage linear trend test used by Farrington et al. (2008), the Mantel-Haenszel test indicated if the proportion of youth offenders in a HOL or NVA category tended to rise as the HOL or NVA skill level decreased. A significant result was indicative of a mixed factor because percent of youth offenders increased from strongest to middle, and from middle to weakest

Figure 1 *Example Visual Representation of Mantel-Haenszel Test Linear and Nonlinear Associations*



categories (see Figure 1, a). A non-significant result was indicative of either a risk factor (percent youth offenders increased only from middle to weakest categories; Figure 1, b) or a promotive factor (percent youth offenders increased only from strongest to middle categories; Figure 1, c). Factor classification was based on agreement of results from at least two of the three criteria. The key classifications of interest for HOL variables were promotive or mixed factor, as this allowed the variable to be investigated as a potential risk-based protective factor in the next stage of analyses. The key classifications of interest for NVA were risk or mixed factor, as this allowed the variable to be utilised as a risk-factor for the examination of the potential protective effects of HOL variables.

In order to investigate if any HOL variable that demonstrated promotive effects (that is, designated as a promotive or mixed factor) also operated as a risk-based protective factor, it was necessary to identify a reasonably large risk group. In a scenario that resembled those described in previous research of this kind (e.g., Farrington et al., 2016), few participants in the lowest quarter of NVA possessed potential protective factors within the highest quarter for HOL variables. In line with Farrington et al. (2016), I dichotomized all variables of interest based on median splits. Any HOL

variable designated as a promotive or mixed factor was dichotomized into *protective* (highest 50% of scores) and *non-protective* (lowest 50% of scores) categories. Group sizes for protective categories were 67 for Ambiguous Sentences (standard scores from 0 to 5), 61 for Making Inferences (standard scores from 0 to 6), and 70 for Figurative Language (standard scores from 0 to 5). For non-protective categories, group sizes were 63 for Ambiguous sentences (standard scores from 6 to 14), 69 for Making Inferences (standard scores from 7 to 14), and 60 for Figurative Language (standard scores from 6 to 14). Ensuing analyses aimed to identify HOL protective factors that predicted a low probability of offending amongst the NVA *risk* category (lower 50% of scores; standard scores from 60 to 93, $n = 67$) compared to the *not-risk* category (higher 50% of scores; standard scores from 94 to 130, $n = 63$). The key question was whether either protective factor would reduce the percentage of youth offenders among the risk category of NVA to somewhere near the rate among the not-risk category of NVA. As per previous research (Farrington et al., 2016), variables were deemed to be risk-based protective factors if there was a difference of 10% or greater between the proportion of youth offenders in the NVA risk group as a whole and the proportion of youth offenders in the HOL protective category of the NVA risk group. ORs were calculated for each comparison to assess the magnitude of influence of HOL scores in protective and non-protective categories, in both the NVA risk and not-risk groups, on the likelihood that a participant was a youth offender. In order to control for the effects of age, SES, ethnicity and education a series of binary logistic regression analyses was again performed.

5.3 Results

5.3.1 Preliminary Analyses

Descriptive statistics, group comparisons and bivariate correlations between key study variables are presented in Table 7. There were significant differences between youth offenders and non-offenders on all HOL variables – Ambiguous Sentences (AS; $t(128) = -5.17$, $p < .001$), Making Inferences (MI; $t(128) = -4.71$, $p < .001$), and Figurative Language (FL; $t(128) = -5.28$, $p < .001$), as well as NVA ($t(128) = -5.33$, $p < .001$). In all cases, the youth offender group (AS: $M = 5.09$, SD = 2.36; MI: $M = 5.38$, SD = 2.49; FL: $M = 4.88$, SD = 2.41; NVA: $M = 87.89$, SD = 11.41) produced lower scores than the non-offender group (AS: $M = 7.45$, SD = 2.78; MI: $M = 7.53$, SD = 2.56; FL: $M = 7.24$, SD = 2.59; NVA: $M = 99.86$, SD = 13.93). There were significant medium correlations between the three HOL variables (AS-MI: $r = .56$, $p < .001$; AS-FL: $r = .78$, $p < .001$; MI-FL: $r = .54$, $p < .001$), as well as between NVA and each HOL variable (AS: $r = .59$, $p < .001$; MI: $r = .50$, $p < .001$; FL: $r = .57$, $p < .001$). In terms of variables of potential relevance to covariate analyses, there were significant differences between youth offenders and non-offenders on age ($t(128) = 6.46$, $p < .001$) and SES ($t(128) = 2.51$, $p = .013$). The non-offender group had both a lower mean age ($M = 15.54$, SD = 1.05) and lower mean SES ($M = 2.80$, SD = 1.27) than the youth offender group (Age: $M = 16.88$, $SD = 1.28$; SES: $M = 3.54$, $SD = 2.12$). There were no significant differences between youth offenders and non-offenders on education. There was no significant association between ethnicity and offending status. There were significant small correlations between age and two HOL variables (AS: $r = -.28$, $p = .001$; FL: $r = -.19$, $p = .028$), as well as SES and one HOL variable (AS: $r = .19$, $p = .031$). There were no significant correlations between age or SES and Making Inferences or NVA or between education and any of the HOL variables or NVA.

Table 7 *Descriptive Statistics, Group Differences and Zero Order Correlations*

T-test	Youth Offender (n = 81)		Non-Offender (n = 49)			95% Confidence Interval of Mean Difference		
	M	*SD*	*M*	*SD*	*t*	Lower	Upper	$d^{\#}$
Higher Order Language								
Ambiguous Sentences	5.09	2.36	7.45	2.78	-5.17***	-3.27	-1.46	.91
Making Inferences	5.38	2.49	7.53	2.56	-4.71***	-3.05	-1.25	.85
Figurative Language	4.88	2.41	7.24	2.59	-5.28***	-3.26	-1.48	.43
Nonverbal Ability	87.89	11.41	99.86	13.93	-5.33***	-16.42	-7.52	.94
Demographic								
Age	16.88	1.28	15.54	1.05	6.46***	.93	1.75	1.14
SES	3.54	2.12	2.80	1.27	2.51*	.16	1.34	.42
Education	9.48	1.74	9.69	1.10	-.85	-.71	.28	.14

Chi-square	Indigenous (n = 60)		Non-Indigenous (n = 70)			
Ethnicity	Count	%	Count	%	χ^2	phi
Youth Offender	40	49	41	51	.59	.08
Non-offender	20	41	29	59		

Correlation	HOL			NVA	Demographics			
	AS	MI	FL		Age	Eth.	SES	Edu.
Higher Order Language (HOL)								
Ambiguous Sentences (AS)								
Making Inferences (MI)	.56***							
Figurative Language (FL)	.78***	.54***						
Nonverbal Ability	.59***	.50***	.57***					
Demographic								
Age	-.28**	-.15	-.19*	-.12				
Ethnicity	.16	.16	.17	.09	.32			
SES	.19*	.13	.14	.10	.06	.03		
Education	.03	.05	.05	.12	.47***	.03	-.08	

Notes: *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$. # Cohen's *d* effect size.

Variables: Higher Order Language (HOL; TLC-E - AS: Ambiguous Sentences subtest standard score; MI: Making Inferences subtest standard score; FL: Figurative Language subtest standard score); Nonverbal Ability (NVA; K-BIT2 Matrices subtest standard score); Demographic: Age (at time of assessment, based on official records for date of birth); Ethnicity (based on self-report of cultural identification; for correlation: Indigenous = 1, Non-Indigenous = 2); SES (in terms of SEIFA categories, based on self-report of most recent address); Education (at time of assessment, based on self-report of total years schooling completed).

5.3.2 Risk and Promotive Analyses

A series of eight binary logistic regression analyses were performed – a risk and promotive analysis for each of the three HOL variables, and a risk and promotive analysis for NVA. As outlined previously, each risk analysis compared the probability of offending in the weakest category (lowest 25% of scores) of the variable with the remainder of the group (other 75% of scores), while each promotive analysis compared the probability of offending in the strongest category (highest 25% of scores) of the variable with the remainder (other 75% of scores). These models were designed to test for the association between HOL scores in the strongest and weakest ranges and the likelihood that a participant was a youth offender, while controlling for age, SES, ethnicity and education. Each model contained five independent variables (age, SES, ethnicity, education, and the relevant HOL or NVA categorical variable). As can be seen in Table 8, the full model containing all predictors was statistically significant in all eight analyses (AS-risk: $\chi^2 = 79.87$, $p < .001$; AS-promotive: $\chi^2 = 78.74$, $p < .001$; MI-risk: $\chi^2 = 84.12$, $p < .001$; MI-promotive: $\chi^2 = 83.72$, $p < .001$; FL-risk: $\chi^2 = 89.15$, $p < .001$; FL-promotive: $\chi^2 = 79.15$, $p < .001$). The models explained between approximately 47% (45.4 - 49.6%; Cox and Snell R square) and approximately 64% (61.9 – 67.6%; Nagelkerke R squared) of the variance in offending, and correctly classified approximately 84% (83.1 – 87.7%) of cases. In all analyses age (OR of 14.5 – 16.3, $p < 001$) and education (OR of .14 – .16, $p < .001$) made significant contributions to the model. SES and ethnicity did not make statistically significant contributions to the model in any analyses. The respective HOL variables each made a unique, statistically significant contribution to the model in all but one analysis. For Ambiguous Sentences the risk OR was 4.5 ($p = .031$), while the promotive OR was 3.2 ($p = .052$). Making Inferences had a risk OR of 12.6 ($p = .008$), and a promotive OR of 5.9 ($p = .005$). Figurative Language had a risk OR of 11.5 ($p = .001$) and a promotive OR of 3.4 ($p = .044$). Risk ORs indicated that youth with HOL scores in the

weakest category were more likely to be a youth offender than youth with HOL scores in the remainder of the distribution by: 4.5 times for Ambiguous Sentences; 12.6 times for Making Inferences; and 11.5 times for Figurative Language. Promotive ORs indicated that youth with HOL scores in the strongest category were more likely than youth with HOL scores in the remainder of the distribution to be a non-offender by: 3.2 times for Ambiguous Sentences; 5.9 times for Making Inferences; and 3.4 times for Figurative Language.

These models were also used to test for the association between NVA scores and the likelihood a participant was a youth offender, in preparation for later examination of risk-based protective factors. For NVA the full model containing all predictors was statistically significant in both the risk ($\chi^2 = 84.89$, $p < .001$) and promotive ($\chi^2 = 80.76$, $p < .001$) analyses (see Table 8). The models explained between approximately 47% (46.3 - 47.9%; Cox and Snell R square) and approximately 64% (63 - 65.3%; Nagelkerke R squared) of the variance in offending, and correctly classified approximately 84% (83.1 – 86.2%) of cases. In both analyses age (OR of 14.30 - 19.23, $p < .001$) and education (OR of .14 – .17, $p < .001$) made significant contributions to the model. SES and ethnicity did not make statistically significant contributions to the model in either analysis. NVA made a unique, statistically significant contribution to the model in both the risk (OR = 9.2, $p = .004$), and promotive (OR = 4.4, $p = .018$) analyses. Therefore, youth with NVA scores in the weakest category were 9.1 times more likely to be a youth offender than youth with NVA scores in the remainder of the distribution. Youth with NVA scores in the strongest category were 4.4 times more likely than youth with NVA scores in the remainder of the distribution to be a non-offender.

Table 8 *Logistic Regression Analyses: Variables Predicting Offender Status*

	Model predicting offender status[#]						Unique contribution of variable to prediction						
				% correct classification								95% Confidence Interval	
	χ^2	Cox & Snell R square	Nagelkerke R squared	NO	YO	Over all	*B*	*SE*	Wald	*df*	Odds Ratio	Lower	Upper
Higher Order Language													
Ambiguous Sentences													
risk analysis	79.87***	.459	.625	79.6	85.2	83.1	1.51	.70	4.64	1	4.53*	1.15	17.90
promotive analysis	78.74***	.454	.619	83.7	82.7	83.1	1.17	.60	3.79	1	3.21	.99	10.41
Making Inferences													
risk analysis	84.12***	.476	.649	81.6	85.2	83.8	2.53	.95	7.04	1	12.56**	1.94	81.48
promotive analysis	83.72***	.475	.647	83.7	86.4	85.4	1.78	.63	7.90	1	5.91**	1.71	20.38
Figurative Language													
risk analysis	89.15***	.496	.676	85.7	88.9	87.7	2.44	.73	11.34	1	11.49***	2.77	47.60
promotive analysis	79.05***	.456	.621	83.7	84.0	83.8	1.23	.61	4.05	1	3.40*	1.03	11.21
Nonverbal Ability													
risk analysis	84.89***	.479	.653	77.6	86.4	83.1	2.21	.77	8.34	1	9.15**	2.04	41.09
promotive analysis	80.76***	.463	.630	87.8	85.2	86.2	1.47	.63	5.56	1	4.36*	1.28	14.85

Notes: [#] with age, SES, ethnicity and education entered as predictors for statistical control; NO: non-offender, YO: youth offender; *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$; † $p \leq .075$.

Variables: Higher Order Language (HOL; TLC-E - AS: Ambiguous Sentences subtest standard score; MI: Making Inferences subtest standard score; FL: Figurative Language subtest standard score); Nonverbal Ability (NVA; K-BIT2 Matrices subtest standard score).

5.3.3 Classification of Primary Influence: Risk, Promotive or Mixed

Having calculated risk and promotive OR for each of the HOL variables, and NVA, each variable was then classified as a risk factor (one with only risk associations with youth offending), a promotive factor (one with only promotive influences against youth offending) or a mixed factor (one with both risk and promotive effects). As outlined previously this classification was based on at least two of the following three criteria meeting a classification. First, were the respective ORs for the variable 2.0 or larger, or significant at the $p < .05$ level? This resulted in a risk classification if only the risk OR was significant or 2.0 or larger factor, a promotive classification if only the promotive OR was significant or 2.0 or larger and a mixed classification if both the risk and promotive ORs were significant or 2.0 or larger. Second, was there a significant difference between the size of the risk and promotive ORs of the variable? This resulted in a risk classification if the risk OR was significantly higher than the associated promotive OR, a promotive classification if the promotive OR was significantly higher than the associated risk OR and a mixed classification if there was no significant difference between the risk and promotive ORs. Third, was there a significant linear trend in the proportion of youth offenders in the strongest, middle and weakest categories of the variable? This was indicative of a mixed factor, in which the proportion of youth offenders tended to rise from weak to middle, and middle to strong HOL or NVA categories.

Table 9 shows the ORs for risk and promotive associations for each HOL variable and NVA, *z* scores for comparison of sizes of these ORs, and Mantel-Haenszel linear-by-linear chi-squared trend for percent of youth offenders in each category of HOL and NVA. Figure 2 provides a further visual representation of Mantel-Haenszel linear-by-linear chi-squared trends. As can be seen, all three HOL variables were classified as mixed factors, demonstrating both risk and promotive effects. Ambiguous Sentences was classified as a

Table 9 *Risk and Promotive Factors for Youth Offending*

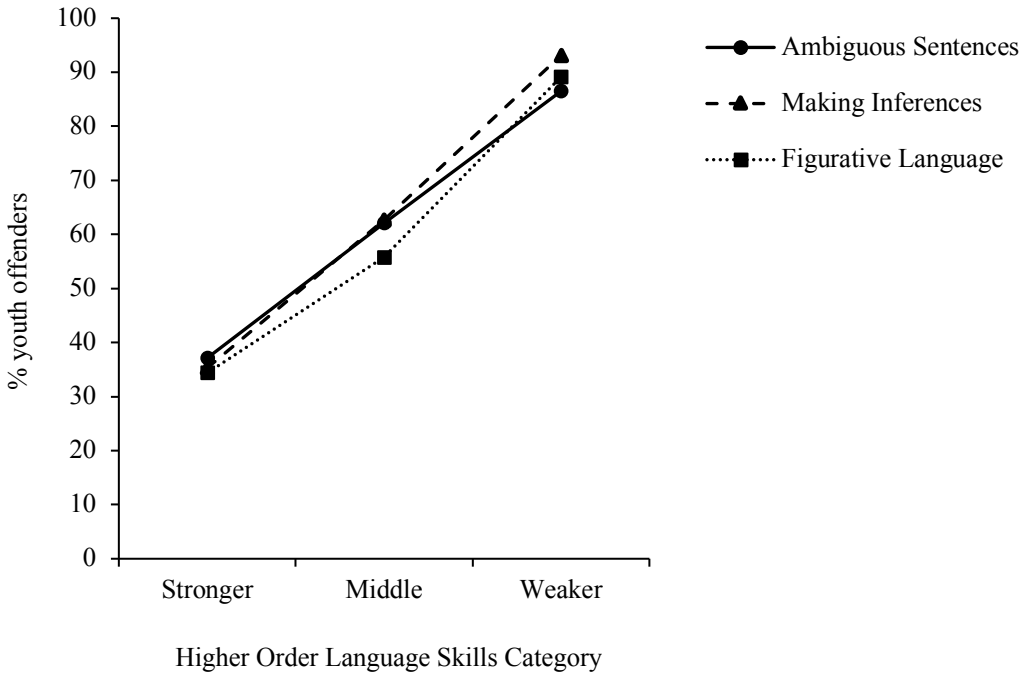
Variable	% youth offenders				Odds ratio			Type
	Strong	Mid	Weak	$\chi^{2\#}$	Prom.	Risk	z	
Higher Order Language								
Ambiguous Sentences	37	62	91	18.51^{***}	3.2	4.5^{*}	1.12^{*}	Mixed
Making Inferences	35	63	93	22.08^{***}	5.9^{**}	12.6^{**}	1.84	Mixed
Figurative Language	34	56	89	25.06^{***}	3.4^{*}	11.5^{***}	3.29^{**}	Mixed
Nonverbal Ability	33	65	85	19.05^{**}	4.4^{*}	9.1^{**}	1.99^{*}	Mixed

Notes: $^{\#}$ Mantel-Haenszel linear-by-linear chi-squared; $^{***}p \leq .001$; $^{**}p \leq .01$; $^{*}p \leq .05$.

Variables: Higher Order Language (HOL; TLC-E - AS: Ambiguous Sentences subtest standard score; MI: Making Inferences subtest standard score; FL: Figurative Language subtest standard score); Nonverbal Ability (NVA; K-BIT2 Matrices subtest standard score).

mixed factor based on two criteria indicating a mixed classification. Although the risk OR was significantly higher than the promotive OR ($z = 1.12$, $p < .05$), both risk and promotive ORs were greater than 2.0, and there was a significant linear association between proportion of youth offenders and HOL category (Mantel-Haenszel linear-by-linear chi-squared = 18.51, $p < .001$). Making Inferences was classified as a mixed factor based on three criteria indicating a mixed effect. Both promotive and risk ORs were greater than 2.0 and there was a significant linear association between proportion of youth offenders and HOL category (Mantel-Haenszel linear-by-linear chi-squared = 22.08, $p < .001$). Figurative Language was also classified as a mixed factor based on two criteria indicating a mixed effect. While, the risk OR was significantly higher than the promotive OR ($z = 3.29$, $p < .05$), both promotive and risk ORs were greater than 2.0, and there was a significant linear association between proportion of youth offenders and HOL category (Mantel-Haenszel linear-by-linear chi-squared = 25.06, $p < .001$). In summary, each of the three HOL variables demonstrated risk effects, exemplified by those with weak skills having a higher probability of being a youth offender compared with those with moderate or strong skills. Also, each of the three HOL variables demonstrated promotive effects, exemplified by those with strong skills having a higher probability of being a non-offender compared to those with moderate or weak skills.

Figure 2 *Prediction of Youth Offending from Higher Order Language Variables*



As each of the HOL variables demonstrated promotive effects, all three could be investigated as potential risk-based protective factors. It was therefore necessary to ensure that NVA demonstrated the risk effects necessary for these analyses. Based on two criteria indicating both risk and promotive effects, and one criterion indicating a risk effect only, NVA was designated as a mixed factor. Both promotive and risk ORs were greater than 2.0 and there was a significant linear association between proportion of youth offenders and NVA category (Mantel-Haenszel linear-by-linear chi-squared = 19.05, $p < .01$). However, the risk OR was significantly higher than the promotive OR ($z = 1.99$, $p < .05$). In summary, like the HOL variables, NVA demonstrated risk effects, exemplified by those with weak skills having a higher probability of being a youth offender compared with those with moderate or strong skills. Also, NVA demonstrated promotive effects, exemplified by those with strong skills having a higher probability of being a non-offender compared to those with moderate or weak skills. Importantly, as a variable that demonstrated risk effects, NVA could be used as the risk factor in investigations of the potential risk-based protective effects of HOL variables.

5.3.4 Risk-based Protective Factors for Nonverbal Ability

With each of the three HOL variables designated as mixed factors (and therefore demonstrating promotive effects), and NVA designated as a mixed factor (and therefore demonstrating risk effects), it was possible to investigate all HOL variables as potential risk-based protective factors in the association between NVA and youth offending. As outlined previously (and demonstrated by Farrington et al., 2016), these analyses were based on dichotomized HOL variables, with categories protective (highest 50% of scores) and non-protective (lowest 50% of scores). The aim of the analyses was to identify HOL protective factors that predicted a low probability of offending amongst the NVA risk group (lower 50% of scores; 78% youth offenders) compared to the NVA not-risk group (higher 50% of scores; 46% youth offenders). The proportion of youth offenders of the risk and not-risk groups of NVA in the protective and non-protective categories of each HOL variable, are shown in Table 10. In all cases the proportion of youth offenders in the HOL protective category was lower than the proportion in the non-protective category. For participants with low NVA (risk group), 58% of those with higher scores (protective category; $n = 19$) on Ambiguous Sentences were youth offenders compared to 85% of those with lower scores (non-protective category;

Table 10 *Protective Factors for Lower Nonverbal Ability*

Nonverbal ability	Risk (78% YO)			Not Risk (46% YO)		
	% YO			% YO		
	P	NP	OR	P	NP	OR
Ambiguous Sentences	58	85	3.8	40	67	2.1
Making Inferences	70	81	1.1	39	59	2.9
Figurative Language	55	87	5.6*	40	69	2.2

Notes: Risk (lower NVA), Not Risk (higher NVA); P = protective category (higher HOL), NP = nonprotective category (lower HOL).
Variables: Higher Order Language (HOL; TLC-E Ambiguous Sentences subtest standard score; Making Inferences subtest standard score; Figurative Language subtest standard score); Nonverbal ability (NVA; KBIT-2 Matrices subtest standard score).

n = 48), 70% of those with higher scores (*n* = 20) on Making Inferences were youth offenders compared to 81% of those with lower scores (*n* = 47), and 55% with higher scores (*n* = 20) on Figurative Language were youth offenders compared to 87% of those with lower scores (*n* = 47). This pattern was also present for participants with higher NVA (not-risk group), with 40% of those with higher scores (*n* = 48) on Ambiguous Sentences being youth offenders compared to 67% of those with lower scores (*n* = 15), 39% of those with higher scores (*n* = 41) on Making Inferences being youth offenders compared to 59% of those with lower scores (*n* = 22), and 40% (*n* = 50) with higher scores on Figurative Language being youth offenders compared to 69% of those with lower scores (*n* = 13). The key question, however, was whether potential HOL protective factors could meet one of two criteria. First, was the percent youth offenders in the HOL protective category of the NVA risk group somewhere near the rate among the NVA not-risk group as a whole (i.e. 46%)? Second, was there a 10% or greater difference between the percent youth offenders in the NVA risk group as a whole and the percent youth offenders in the HOL protective category of the NVA risk group? None of the HOL variables demonstrated a percent of youth offenders in the HOL protective category of the NVA risk group near 46%. However, in their respective protective categories of the NVA risk group, both Ambiguous Sentences and Figurative Language demonstrated a 20% or greater difference between proportion of youth offenders in the protective category (58% and 55% respectively), and the proportion of youth offenders in the NVA risk group as a whole (78%). As a result, these were the only variables deemed to be risk-based protective factors. That is, Ambiguous Sentences and Figurative Language, but not Making Inferences, were deemed to represent variables that predicted an acceptably low probability of offending among a group at high risk for offending, based on having low NVA.

To assess the impact of HOL scores in the protective and non-protective category on the likelihood that a participant was a youth offender, ORs were calculated for each comparison. Due to small sizes in some groups, however, logistic regression with five independent variables (age, SES, ethnicity, education, relevant HOL variable) resulted in low precision for some analyses. As a result, logistic regression analyses were repeated with only age and the relevant HOL variable entered as independent variables. Of the two variables designated as risk-based protective factors, only Figurative Language was represented by a statistically significant OR. This indicated that among youth in the NVA risk (i.e. lower skills) group those with lower Figurative Language skills were 5.6 times more likely to be a youth offender than those with higher Figurative Language skills. Although the result for Ambiguous Sentences was not statistically significant, the OR indicated that in the NVA risk group those with lower Ambiguous Sentences skills were 3.8 times more likely to be a youth offender than those with higher Ambiguous Sentence skills. This contrasts with results for Making Inferences in which the OR indicated that in the NVA risk group those with lower Making Inferences skills were only 1.1 times more likely to be a youth offender than those with higher Making Inferences skills. In the NVA not-risk group (i.e. higher skills), youth with lower HOL skills were 2.1 (Ambiguous Sentences), 2.2 (Figurative Language), and 2.9 (Making Inferences) times more likely to be a youth offender than youth higher HOL skills. As such, lower HOL skills were consistently associated with a higher probability of being a youth offender, than higher HOL skills. This pattern was true for not only those at high risk of offending, based on lower NVA, but also those considered not at risk for offending, based on higher NVA. Only higher Figurative Language, however, demonstrated a statistically significant lower probability of being associated with offending than that demonstrated by lower Figurative Language, and

this significant result was only present among youth at high risk for offending (i.e., youth with low NVA).

5.4 Discussion

The current study systematically examined discrete HOL skills as risk, promotive and risk-based protective factors for youth offending. Findings supported the hypothesis that each of the HOL skills examined would meet criteria for risk associations with youth offending. Specifically, it was demonstrated that those with weaker skills in understanding ambiguity, making inferences and understanding figurative language had a higher probability of being a youth offender than those with moderate and stronger skills. These findings are consistent with long established evidence that verbal ability constitutes a risk factor for antisocial and criminal behaviour in youth (e.g., Beaver et al., 2013). Findings are also consistent with evidence linking childhood deficits in oral language skills with later antisocial (e.g., Petersen et al., 2013), and offending (e.g., Stattin & Klackenberg-Larsson, 1993) outcomes.

Findings from the current study also extend upon those from research which has previously demonstrated that youth offenders have comparatively poorer HOL skills (Humber & Snow, 2001; Myers & Mutch, 1992; Sanger et al., 1997; Snow & Powell, 2004, 2008, 2011a). Specifically, current findings provide evidence that having weaker HOL skills increases the risk of being a youth offender at least fourfold, independent of age, ethnicity, SES and level of education. Further, these findings provide evidence to inform models relating to associations between language and antisocial behaviour. It has been theorised that language deficits may confer risk for antisocial behaviour through impacts on executive functions (e.g., attention, inhibition, flexibility, regulation), which influence problem solving ability and adaptability (Eme, 2009; Nigg & Huang-Pollock, 2003). Our findings indicate that some of the language deficits that contribute to these impacts may be those involved in higher

level verbal reasoning (such as making inferences) and manipulation of abstract concepts (such as, accurately interpreting ambiguous and figurative language).

In addition to demonstrating risk effects, findings from the current study provide the first evidence (to my knowledge) that specific HOL skills constitute a promotive factor for non-offending. As predicted, those with stronger skills in understanding ambiguity, making inferences and understanding figurative language had a higher probability of being a non-offender than those with moderate and weaker skills. These findings are consistent with previous research (Farrington et al., 2016; Loeber et al., 2007), which indicated that verbal ability had promotive associations with non-offending. Current findings relating to promotive effects also provide further insight into the mechanisms underlying associations between neuropsychological deficits and antisocial behaviour. It has been suggested that a combination of neuropsychological deficits (specifically, low verbal ability and compromised executive function) may exert influence on antisocial behaviour indirectly through the disruption of socialisation (Lynam & Henry, 2000; Moffitt, 1993). Current findings support this notion. That stronger skills in understanding of ambiguous and figurative language, as well as the capacity to make accurate inferences are more associated with non-offending than offending, suggests that these specific skills are important for prosocial behaviour and interactions.

Building upon findings relating to promotive effects, this study provides novel evidence that at least some HOL skills act as risk-based protective factors among those at risk for antisocial behaviour due to another factor. Based on the well-established risk association between low NVA and antisocial behaviour (e.g., J. Craig et al., 2017), a group of participants were classified as high risk based on low NVA scores. In this group, the proportion of youth offenders with higher figurative and ambiguous language skills was substantially lower (more than 20%) than the proportion in the low NVA group as a whole. In addition, in the high risk (low NVA) group, those with higher figurative language skills had a significantly lower

probability of being a youth offender than those with lower figurative language skills, and those with higher ambiguous language skills demonstrated a trend toward a significantly lower probability of being a youth offender than those with lower ambiguous language skills. These findings are consistent with previous research that found that high verbal ability constituted a risk-based protective factor for those at high risk of antisocial behaviour, based on other individual and/or contextual risk factors (Farrington et al., 2016; J. L. White et al., 1989). Current findings are also consistent with theoretical models in which more severe antisocial behaviour results from a complex interplay between risk factors (Moffitt, 1993). Evidence from the current study suggests that understanding ambiguous and figurative language could have a greater impact on reducing the risk effects for antisocial behaviour conferred by NVA, compared to the capacity to make accurate inferences.

As well as informing theoretical models, the findings of the current study have important implications in terms of service provision for youth at risk of or already engaged in antisocial behaviour. Primarily, findings of risk, promotive and risk-based protective associations between HOL skills and youth offending highlight the importance of early focus on improving language development for reducing risk for later antisocial outcomes. Enhancing oral language development in early life also has the potential to influence other risk factors for antisocial behaviour, such as literacy skills (e.g., Nation & Snowling, 2004), educational attainment (e.g., Conti-Ramsden, Durkin, Simkin, & Knox, 2009), and social functioning (e.g., Clegg, Hollis, Mawhood, & Rutter, 2005). More specifically, current findings have significant implications for youth at risk of engagement with the justice system. Legal language (Wszalek, 2017) and processes (e.g., restorative justice conferencing; Snow & Sanger, 2011) often require the capacity to make accurate inferences, and involve subtleties such as ambiguous and figurative language. Unless justice and related agents are informed otherwise, the difficulties these youth have with HOL may contribute to potentially

inappropriate utterances and behaviours being misattributed to non-compliance, lack of engagement or lack of empathy (e.g., Hopkins, Clegg, & Stackhouse, 2016; LaVigne & Van Rybroek, 2014; Lount, Hand, Purdy, & France, 2017). Also, if HOL deficits are not appropriately remediated during justice-related interventions, ongoing impacts may limit a youth offender's capacity to become a functional and productive participant in society (e.g., Conti-Ramsden & Durkin, 2008).

Despite these important implications, the current findings should be interpreted in view of some limitations. First, current findings are specific to males, and may not be applicable to females. Evidence demonstrates that young females and young males have different rates of engagement with the criminal justice system (Moffitt, Caspi, Rutter, & Silva, 2001). In addition, some studies have provided evidence that female youth offenders present with different profiles of oral language skills to male youth offenders (e.g., Sanger et al., 2001). Second, the current sample included only youth within the adolescent age range. Although use and understanding of HOL typically increases during adolescence, these skills are present during childhood (Nippold, 2016). It would be beneficial for future research to investigate if the same patterns of risk, promotive and risk-based protective effects found in the current study can be replicated in earlier developmental periods. A third limitation concerns the three particular HOL skills indexed in the study. The finding that one of these skills (making inferences) did not meet criteria to be classified as a risk-based protective factor in relation to NVA, raises the possibility that HOL skills not examined in this study may have different risk, promotive and risk-based protective relationships with antisocial behaviour. In future research, assessment of a wider range of discrete HOL skills could provide more detailed evidence regarding the patterns of these associations. In addition, it should be noted that since this research was conducted the TLC-E has been subsumed into the *Clinical Evaluation of Language Fundamentals*, Fifth Edition, Metalinguistics (CELF-5 Metalinguistics; E. H. Wiig

& Secord, 2014). Finally, as this was a cross-sectional study, it is essential that results relating to risk, promotive and risk-based protective effects are not interpreted in terms of causal mechanisms. Ideally findings from the current study and the work of Farrington et al. (2008; 2011; 2016) will encourage future longitudinal investigations of the risk, promotive and protective effects of oral language skills in relation to antisocial behaviour.

5.4.1 Conclusions

The current study provides the first evidence of the utility of conducting investigations into the multi-faceted relationship between oral language skills and antisocial behaviour through the risk-promotive-protective paradigm. Providing evidence that discrete HOL skills have risk, as well as promotive and risk-based protective effects in relation to youth offending promotes an expanded view. A view not only focused on the negative implications of language deficit, but also inclusive of the positive implications of superior language skill (Farrington et al., 2016).

Highlighting the risk effects of HOL deficits in relation to youth offending, our findings emphasise the importance of careful modification of justice-related training and intervention, in order to provide more appropriate services to youth engaged with the system. Further, by demonstrating the novel promotive effects of superior HOL skills in relation to non-offending, this research supports the implementation of oral language development interventions for a wide range of antisocial youth, not just those with clinically defined deficits. More importantly, as the first known study to find that some HOL skills had protective effects for youth at risk of antisocial behaviour by virtue of their poor nonverbal skills, the current research makes a valuable contribution to understanding the complex associations between language variables and antisocial behaviour. Specifically, current findings suggest that specific oral language skills may have different associations with

antisocial behaviour, particularly in the presence of other variables. Ultimately, the three-dimensional conceptualisation of the language skill-antisocial behaviour association, achieved through the risk-promotive-protective paradigm, can be seen as particularly informative with regard to developmental models of antisocial behaviour, and prevention and intervention efforts based on the translation of these models.

5.5 Making the Link

The purpose of the current study was to examine the risk, promotive and risk-based protective effects of distinct oral language skills in relation to youth offending. Findings supported an association between poorer oral language skills and youth offending, and between better oral language skills and non-offending, even in the presence of another known risk factor. Having demonstrated the multi-dimensional association between oral language skills and youth offending, it was important to extend investigation to include other biopsychosocial factors that may influence the oral language – youth offending association. In empirical study 2 (Chapter 6) the association between four discrete oral language skills and youth offending was investigated in relation to a key biopsychosocial factor considered to demarcate unique groups of antisocial youth – callous unemotional traits.

CHAPTER 6 - ORAL LANGUAGE SKILLS, VARIANTS OF CU TRAITS AND ANTISOCIAL BEHAVIOUR

6.1 Introduction

Risk factors for antisocial behaviour related to *verbal ability* (cognitive function directly involving language skills) have been researched extensively. Evidence from such research has revealed that low verbal ability is not only associated with a greater risk for offending (Schwartz et al., 2015; Yun & Lee, 2013), but also a greater risk for specific patterns of offending, including earlier onset (Moffitt et al., 1994), and violent offending (Manninen et al., 2013). Conversely, high verbal ability has been shown to be associated with lower rates of self-reported criminal activity, as well as lower rates of self-reported official detection of criminal activity (Boccio, Beaver, & Schwartz, 2018). Recent advances in this research have come from examining the moderators of this association, a key example of which is *callous-unemotional (CU) traits* (e.g., lack of guilt and/or empathy, shallow affect and callousness towards others; Frick et al., 2014b).

Considerable research has demonstrated that high CU traits are associated with earlier (Ray, Pechorro, & Gonçalves, 2016), and more aggressive, antisocial behaviour (Kimonis et al., 2014). Further, as outlined in the following sections, evidence suggests that verbal ability may be differentially associated with antisocial behaviour in individuals with high versus low levels of CU traits. The role of CU traits in moderating associations between verbal ability and child antisocial behaviour was initially investigated by Loney et al. (1998). These researchers found that children with antisocial behaviour and low CU traits demonstrated a deficit in verbal ability compared to a comparison group, while children with antisocial behaviour and high CU traits did not show a deficit. Johansson and Kerr (2005) extended these findings to adult populations. Their research demonstrated that, in a sample of men

convicted for violent crimes, low psychopathic traits (which include CU traits; Hare, 1998) and higher verbal ability were associated with a later age of first offence, while high psychopathic traits and higher verbal ability were associated with an earlier age of first offence.

Munoz et al. (2008) then tested if CU traits similarly moderated associations between higher verbal ability and high risk patterns of offending (i.e., self-reported violent and non-violent offending, and officially recorded age of first offence) in adolescent offenders. An effect was seen for violent offending, such that relatively higher verbal ability was associated with lower levels of violent offending for youth low in CU traits, but with higher levels of violent offending for youth high in CU traits. This evidence suggests that differences in level of verbal ability between high CU and low CU antisocial individuals is of greatest importance when considered in relation to particular patterns of antisocial behaviour (Johansson & Kerr, 2005). Findings have also, however, been mixed, with other research producing contrary results. For example, in a sample of adolescent offenders and non-offenders, Allen et al. (2013) found no evidence to suggest that CU traits moderated the relationship between verbal IQ and antisocial behaviour, after controlling for variables with known associations with verbal ability.

An emerging body of research may provide some explanation for these mixed findings. This research concerns the distinction between variants of CU traits based on associated levels of anxiety (i.e., low anxiety primary variant, and high anxiety secondary variant; Kimonis, Frick, et al., 2012). This distinction is considered important for understanding developmental trajectories of antisocial behaviour, because the two variants have been shown to present with different risk histories, neurocognitive deficits and behavioural outcomes. Individuals with primary variant CU traits tend to be relatively free from childhood maltreatment (Dadds, Kimonis, Schollar-Root, Moul, & Hawes, 2018), score low on

measures of psychological distress (Cecil, McCrory, Barker, Guiney, & Viding, 2018), and demonstrate less engagement with distressing emotional stimuli (Kimonis, Frick, et al., 2012). In contrast, secondary variant CU traits are associated with more severe childhood maltreatment (Cecil et al., 2018; Kahn, Frick, et al., 2013; Kimonis, Frick, et al., 2012), greater emotional and attentional problems (Kahn, Frick, et al., 2013; Kimonis, Frick, et al., 2012; Roşan, Frick, Gottlieb, & Faşicaru, 2015), and more severe externalising behaviour (Kahn, Frick, et al., 2013; Roşan et al., 2015). Together, these findings support theoretical models in which the antisocial outcomes of secondary variant CU trait individuals are assumed to be accounted for largely by adverse environmental influences, while those of primary variant CU trait individuals are explained more by neurodevelopmental underpinnings (Kahn et al., 2017; Kimonis, Frick, et al., 2012). However, to date there has been limited investigation of interrelationships between variants of CU traits, antisocial behaviour and verbal ability.

In the same way that global measures of CU traits may mask important individual differences in the underpinnings of these traits, it is also apparent that global measures of verbal ability mask potentially important individual differences in oral language skills. Oral language is understood to consist of five key domains (Honig, 2007). Four of these domains - phonology, morphology, syntax (all representing aspects of language form), and semantics (relating to language content), involve rules that relate sound combinations to meaning, and are together generally categorised as *structural language* (Paul & Norbury, 2012). While structural language is perpetually evolving throughout development, key elements are typically established during early childhood (Honig, 2007).

The fifth domain of oral language, *pragmatics*, encompasses the subtleties of appropriate use of language in social situations, is interconnected with the development of a range of other socio-cognitive skills, and is continually developed and refined throughout the

lifespan (Snow & Douglas, 2017). Importantly, as expectations and skills relating to social cognition increase during adolescence, there is typically a marked increase in the complexity of pragmatic language skills associated with this developmental period (N. Cohen et al., 2013; Nippold, 2016). Pragmatic skills are diverse, but are often categorised and assessed in terms of: higher order skills (such as, understanding ambiguity, making inferences, and understanding figurative language); extended expression (such as, construction of logical narratives); and (appropriate interaction in, or evaluation of) conversational inference (Bishop, 2000; de Villiers, 2004; Honig, 2007).

The enmeshed nature of oral language and social development throughout childhood and adolescence provides some explanation for the comorbidity of oral language deficits and antisocial behaviour (Brinton & Fujiki, 2005). Indeed, extensive research has demonstrated that antisocial behaviour, including offending behaviour, is associated with deficits in structural (e.g., Hopkins et al., 2017), higher order (e.g., Snow et al., 2016), narrative (e.g., Snow & Powell, 2005) and conversational inferential (e.g., Nilsen & Bacso, 2017) language skills in adolescents. However, less research has been dedicated to understanding relationships between these specific oral language skills and subtypes of antisocial behaviour, defined by level of CU traits.

Although limited evidence is available regarding associations between oral language skills and CU traits specifically, a number of studies have examined oral language skills among individuals with *psychopathy* (a disorder defined by a cluster of affective, interpersonal and antisocial characteristics; Hare, 1998). This research suggests that individuals high on psychopathic traits may possess skills on structural language tasks, such as phonological processing, text decoding, and semantics that are comparable (K. Blair et al., 2006; de Almeida Brites, Ladera, Perea, & García, 2014; Hare & Jutai, 1988), or potentially superior (Selenius & Strand, 2015), to those with low psychopathic traits. However, findings

indicate that these individuals may have deficits in the subtler skills associated with pragmatic language. There is evidence, from samples of adolescent offenders (Raine, O'Brien, Smiley, Scerbo, & Chan, 1990), and adult offenders (Hare & McPherson, 1984; Hiatt, Lorenz, & Newman, 2002), that high psychopathic traits are associated with weaker or inefficient patterns of language lateralisation. This implies that individuals with psychopathic traits may have different cognitive resources available during language rich tasks. In one study this association was demonstrated in relation to language with emotional content among adult offenders with high psychopathic traits and low anxiety (i.e. consistent with primary variant CU traits; Lorenz & Newman, 2002).

Evidence suggests that individuals high on psychopathic traits have deficits in specific pragmatic language skills, compared to individuals low on psychopathic traits. In adult offenders, high psychopathy has been associated with difficulties in skills associated with higher order language, specifically, accurately interpreting metaphors with emotional content (Hervé, Justus Hayes, & Hare, 2003), and categorising words in abstract tasks (Hare & Jutai, 1988; Kiehl, Hare, McDonald, & Brink, 1999). There is also evidence that psychopathic adult offenders demonstrate atypical linguistic techniques (e.g., egocentrism, power orientation; Endres, 2004) in sentence completion, language expression (e.g., more disfluencies, less person/social references, less emotional expression; Hancock, Woodworth, & Porter, 2013; Le, Woodworth, Gillman, Hutton, & Hare, 2016), and use of language conventions in narratives (e.g., fewer plot units, fewer cohesive ties; Brinkley, Bernstein, & Newman, 1999; Brinkley, Newman, Harpur, & Johnson, 1999). This suggests that individuals high on psychopathy may be more likely to produce narratives that do not fully comply with listener needs and expectations. Further, adolescent offenders high on psychopathy have been found to demonstrate poorer performance on the comprehension subtest of a general intelligence measure (Hecht & Jurkovic, 1978). An inverse relationship has also been found between

affective psychopathic traits and performance on reading comprehension in a sample of non-offending adolescents (Vaughn et al., 2011). These findings suggest that higher psychopathic traits are associated with difficulties accurately making inferences from language-based information sources.

In summary, antisocial youth without CU traits exhibit poor oral language skills compared to high CU or typically developing peers (e.g., Loney et al., 1998). However, emerging evidence suggests that among high CU youth, individuals with primary versus secondary variants of CU traits may follow risk pathways that implicate distinct oral language skills. Specifically, adult offenders high in psychopathy appear to have intact structural language, but impaired pragmatic language (K. Blair et al., 2006; Hare & Jutai, 1988), and primary variant CU traits have been associated with reduced engagement with emotional stimuli (Kimonis, Frick, et al., 2012), that is often a critical component of pragmatic language. It is therefore possible that individuals with primary variant CU traits carry deficits specifically in skills associated with pragmatic language. In contrast, secondary variant CU traits are associated with higher levels of childhood maltreatment, emotional and attentional problems (Kimonis, Frick, et al., 2012); features that have also been consistently related to both structural and pragmatic language deficits (e.g., Korrel, Mueller, Silk, Anderson, & Sciberras, 2017; St Clair, Pickles, Durkin, & Conti-Ramsden, 2011; Sylvestre, Bussières, & Bouchard, 2015). This would appear to suggest possible language deficits across a range of specific skills, both structural and pragmatic, in such individuals.

In terms of evidence that variants of CU traits may interact with language skills to shape patterns of antisocial offending, high verbal ability has been associated with earlier age of first offence among psychopathic adults (Johansson & Kerr, 2005) and more violent offending among youth with high CU traits (Munoz et al., 2008). Research has yet to examine whether associations between superior oral language skills and earlier onset, more violent

offending are particularly characteristic of individuals with primary variant CU traits. This would appear to be likely given the neurodevelopmental underpinnings of primary variant CU traits.

The aim of the current study was to examine patterns of antisocial offending and specific oral language skills among adolescents with primary/secondary variants of CU traits. The first specific aim was to examine the oral language skills (one structural and three pragmatic) that characterise adolescent offenders and non-offenders with primary/secondary variants of CU traits. It was hypothesised, first, that poorer oral language skills, both structural and pragmatic, would be most strongly associated with offender status among youth low in CU traits. It was hypothesised, second, that associations between CU traits and specific language skills would vary based on variant of CU traits. Specifically, it was predicted that higher CU traits would be associated exclusively with poorer pragmatic language skills, but only among youth with primary variant CU traits (i.e. high CU traits, low anxiety), while higher CU traits would be associated with both poorer structural and pragmatic language skills among youth with secondary variant CU traits (i.e. high CU traits, high anxiety). The second specific aim was to examine the interaction between variants of CU traits (primary, secondary and low), and language skill (high or low), in relation to patterns of offending among youth offenders. Hypothesis three was that offenders with primary variant CU traits and better language skills would exhibit earlier onset of offending and more violent offending than those with secondary variant or low CU traits, across all language skills.

6.2 Method

6.2.1 Participants

The sample consisted of 130 male adolescents between the ages of 13 and 20 years (M = 16.32, SD = 1.35). Only participants who had undertaken the majority of their schooling

in an English-speaking country were included, while young people with a known diagnosis of intellectual impairment or hearing impairment, or who were known to be experiencing an acute episode of mental illness were not included. Eighty-one participants were youth offenders (Age *M = 16.88*, *SD* = 1.28), recruited through 19 youth justice centres (detention = 6; community service = 13). Forty-nine participants were non-offenders (Age *M = 15.54*, *SD* = 1.05), recruited through five public secondary schools. All participants were resident in New South Wales, the most populous state in Australia. Most participants reported being of non-Indigenous Australian ethnicity (53.8%; majority Caucasian), while a substantial proportion reporting being of Indigenous ethnicity (46,2%; majority Aboriginal). Socio-economic status (SES) was calculated based on Socio-Economic Indexes for Areas (SEIFA), established by the Australian Bureau of Statistics (Adhikari, 2006). Participants were assigned an Index of Relative Socio-Economic Advantage/Disadvantage (IRSAD; from one (lowest) to nine (highest)) based on postcode of usual residence. Participants had a mean IRSAD of 3.26, indicating relatively greater disadvantage and lack of advantage in general.

6.2.2 Measures

Offending

Offending was operationalised as a categorical variable with two levels (youth offender; non-offender). Categorisation as a youth offender was based on officially documented contact with a youth justice agency at the time of participation in research, in the form of either supervision through a youth justice community service or detention in a secure youth justice centre. Categorisation as a non-offender was based on self-reported lack of current or historical official contact with a youth justice supervision agency.

Officially recorded history of offending for participants in the youth offender group was provided by the youth justice agency. Information relating to participants' first contact with

youth justice was used to measure age of first offence. Information relating to number and type of offences was used to measure violent offending. Specifically, offences were classified based on Australian and New Zealand Standard Offence Classification codes (ANZSOC; Pink, 2011a). This system categorises offending into 16 divisions, ranging from the most serious (01 Homicide and related offences), to the least serious (16 Miscellaneous offences, such as regulatory offences). In addition, divisions can be grouped to distinguish violent (divisions 01 to 06) from non-violent (divisions 07 to 16) offences. ANZSOC was designed to provide a standardised statistical framework for classifying and analysing criminal and justice statistics, and has been used in a range of published research relating to youth offenders (e.g., Allard et al., 2013; Moore et al., 2014; Snow et al., 2016).

Callous-unemotional traits

The *Inventory of Callous-Unemotional Traits* (ICU; Frick, 2003) is a self-report scale designed to comprehensively assess the presence and magnitude of callous-unemotional traits in youth. The ICU was developed on the basis of restructuring the Callous-Unemotional subscale of the Antisocial Process Screening Device (APSD; Frick & Hare, 2001). The scale consists of 24 items that are each rated on a four-point scale (0 = 'not at all true', 1 = 'sometimes true', 2 = 'very true', and 3 = 'definitely true'). A total score is calculated by summing scores of 12 negatively worded items and reverse-scores of 12 positively worded items. A higher total score indicates an increased presence of callous-unemotional traits. The validity of the scale has been demonstrated in research involving community and clinical samples of adolescents (Essau et al., 2006; Fanti et al., 2008; Roose et al., 2010), as well as youth offenders (Feilhauer et al., 2012; Kahn, Byrd, et al., 2013; Kimonis et al., 2008; Pechorro et al., 2016; Pihet et al., 2015; Stickle et al., 2009). In these studies internal consistency (Cronbach's α) for the total scale ranged from .72 to .84. Comparable satisfactory

internal consistency was found in the current study, with analysis revealing a Cronbach's α score of .80 for the total scale.

Anxiety

The Anxious-Depressed subscale of the *Youth Self Report* (YSR; Achenbach & Rescorla, 2001) was used to measure anxiety. The YSR has been normed for ages 11 to 18 years and has demonstrated reliability and validity (Achenbach & Rescorla, 2001). It is a questionnaire designed to assess psychosocial functioning in adolescents and forms part of the Achenbach System of Empirically Based Assessment (ASEBA). The Anxious-Depressed subscale consists of 16 items that are scored on a 3-point scale (0 = 'not true', 1 = 'somewhat true', 2 = 'very or often true'). High Cronbach's α reliabilities (ranging from .80 to .86) have been demonstrated for the Anxious-Depressed subscale of the YSR in samples of adolescents, including samples of youth offenders (Breuk et al., 2007; Kimonis, Tatar, et al., 2012; Van Meter et al., 2014). The Cronbach's α of .81 for the Anxious-Depressed subscale found in the current study also demonstrated high reliability.

Language

Structural language was assessed with the *Clinical Evaluation of Language Fundamentals*, Fourth Edition, Australian Standardisation (CELF4-A; Semel et al., 2006). Versions of the CELF have been widely used internationally for research investigating the oral language skills of youth offenders (e.g., Hopkins et al., 2017; Kippin et al., 2018; Lount, Purdy, et al., 2017; Sanger et al., 2001). The CELF4-A was normed on a representative Australian sample, and has standard scores for ages 5:0 to 21:11 years. Four subtests of the CELF4-A were administered – Recalling Sentences (RS), Formulated Sentences (FS), Word Classes (WC), and Word Definitions (WD). Raw scores for each subtest were converted to standard scores (M = 10; SD = 3) using age-based tables, and subtest standard scores were summed to derive a Core Language Score (CLS; M = 100; SD = 15).

Higher order language was assessed with Level 2 (standard scores for ages 9:0 to 18:11 years) of the *Test of Language Competence* – Expanded edition (TLC-E; Wiig & Secord, 1989). The TLC-E has been used internationally for research investigating the higher order language skills of clinical (e.g., N. Cohen et al., 2013) and antisocial (e.g., Snow et al., 2016) samples of adolescents . Three subtests of the TLC-E were administered - Ambiguous Sentences (AS), Listening Comprehension: Making Inferences (MI), and Figurative Language (FL). Raw scores for each of the subtests were converted to standard scores (M = 10; SD = 3) using age-based tables, and subtest standard scores were summed to produce a total higher order language score.

A six-frame, sequentially organised, black and white cartoon stimulus, "The Flowerpot Incident", was used to elicit a spoken narrative from participants. This cartoon depicts an incident that follows a story grammar structure (Hedberg & Stoel-Gammon, 1986), which is considered to consist of seven key elements (setting, initiating event, internal response, plan, attempt, direct consequences, resolution; Stein & Glenn, 1975). Narrative samples were recorded and transcribed, then analysed using a protocol developed by Snow and Powell (2005). Each story grammar element was scored on a scale of zero to two (0 = element not present; 1 = structural evidence of element, but content deficits exist; 2 = element structurally evident and qualitatively complete). Scores were then summed to produce a narrative discourse score used to measure both structural completeness and qualitative adequacy of the narrative. In line with previous research (Snow et al., 2016), inter-rater reliability checks were conducted on a random sample of 10% of narrative samples. Point-to-point agreement on the adequacy of each story grammar element was 89.62%.

Conversational inference was measured using the Social Inference-Minimal Task (SI-M) of *The Awareness of Social Inference Test* (TASIT; McDonald et al., 2011). TASIT uses video vignettes to examine understanding and integration of contextual information in normal

social encounters. TASIT has been designed for use with ages 13 to 60 years, and to differentiate between neurologically typical individuals and those with compromised skills. In the Social Inference-Minimal Task participants viewed a series of 15 short videotaped vignettes of actors interacting in everyday conversational exchanges. Five of these scenes represented sincere exchanges, where words and meaning were consistent, and 10 represented sarcastic exchanges, in which paralinguistic cues (e.g., tone of voice) indicated inconsistency between words and meaning. After watching each scene, participants were asked four questions and were allocated a total of up to four points for each scene (one point for each correct response). Scene scores were then summed to produce a total conversational inference score.

6.2.3 Procedure

This research was approved by the University of Sydney Human Research Ethics Committee, as well as the Department of Communities and Justice, NSW and the Department of Education, NSW. The researcher distributed inclusion criteria, participant information and consent forms to participating youth justice centres and schools, then visited each youth justice centre and school for the purpose of onsite data collection. To ensure participants met inclusion criteria the full study protocol involved conducting a semi-structured interview, followed by assessment of non-verbal ability. After this the CELF4-A, TLC-E, TASIT-SI-M, ICU and YSR were presented to participants in random order. To minimise potential difficulties associated with low literacy levels, all items on the CELF4-A, TLC-E and TASIT-SI-M were read to participants. Consistent with published test manuals, demonstrations and practice opportunities for each subtest were provided. Visual and verbal instructions were provided for the narrative task. The researcher gave participants the option of having items on the ICU and YSR read to them and their responses recorded for them.

6.2.4 Data Analytic Plan

All analyses were conducted using SPSS, Version 24 (IBM Corp., 2016). Hypotheses one and two were tested using four hierarchical regression models - a separate model for each of the structural and pragmatic (higher order, narrative, conversational inferential) language outcome variables. Two continuous predictor variables (CU traits, anxiety) were centred by subtracting the sample mean from each ICU Total Score (to form CU traits) and each YSR Anxious/Depressed subscale score (to form anxiety), and one categorical variable (offender status: youth offender; non-offender) was recoded based on weighted effect coding. In order to examine how associations between offender status and language differed according to levels of CU traits (hypothesis one) a two-way interaction term was created between centred CU traits and weighted, recoded offender status terms. A two-way interaction term was also created (between centred versions of CU traits and anxiety) to examine how associations between CU traits and language differed according to distinct variants of CU traits (primary low anxiety, secondary high anxiety; hypothesis two). To identify whether associations with language skills were independent of demographic factors, two centred continuous variables (age, SES), and one recoded weighted categorical variable (ethnicity) were included in each model. In each model, demographic variables (age, SES, ethnicity), as well as CU traits, anxiety, and offender status were entered at step one, and interaction terms (CU x anxiety; CU x offender status), were entered at step two. To test if associations between CU trait variants and language skills varied based on offender status, all analyses were repeated with an additional three-way interaction term (CU x anxiety x offender status), entered at step three. Preliminary analyses revealed no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity.

Hypothesis three was tested in the youth offender subsample (n = 81), as it related specifically to patterns of offending. This involved a separate multiple analysis of covariance (MANCOVA) for each of the four language variables. As theoretical models suggest that individuals with CU traits represent unique variants based on whether they also exhibit high or low anxiety, three CU groups were created. Following the method used by Munoz et al. (2008), a median split on the youth offender group ICU Total Score was used to form low CU (analysis group one; n = 37) and high CU groups. A median split on the high CU group's YSR Anxious-Depressed subscale score was likewise used to form secondary variant CU trait (high CU traits, high anxiety; analysis group two; n = 23) and primary variant CU trait (high CU, low anxiety; analysis group three; n = 21) groups. To test the moderating role of CU variant in the link between language skills and aspects of antisocial behaviour, high and low groups were formed for each language variable by performing median splits on the youth offender group scores for structural (high: n = 41; low: n = 40), higher order (high: n = 39; low: n = 41), narrative (high: n = 37; low: n = 48), and conversational inferential (high: n = 37; low: n = 44) language. To ensure that associations with patterns of offending were independent of demographic factors, age, SES, and ethnicity were added as covariates in each analysis. The two dependent variables, pertaining to high risk patterns of offending, were age of first offence and violent offending (total number of violent offences). Preliminary testing revealed that violent offending scores were positively skewed and contained a number of outliers and zero values. Therefore, all MANCOVA were repeated with this variable replaced by an alternative based on log-transformed scores which corrected any violations of statistical assumptions. However, as the pattern of results and significance of interactions did not differ between the two sets of analyses, results from MANCOVA using non-transformed data are reported here. Checks revealed no further serious violations of the assumptions of normality,

linearity, homogeneity of variances, and homogeneity of regression slopes, that could impact results.

6.3 Results

6.3.1 Preliminary analyses

Descriptive statistics, mean differences and zero order correlations for relevant study variables in relation to the overall sample are provided in Table 11. A Chi-square test for independence (with Yates Continuity Correction) indicated no significant association between offender status and ethnicity, yet the offender group differed in age (M = 16.88, SD = 1.28; $t(128) = 6.46$, $p < .001$) and SES (M = 3.54, SD = 2.12; $t(128) = 2.51$, $p = .013$) compared to the non-offender group (Age: M = 15.54, SD = 1.05; SES: M = 2.80, SD = 1.27). Independent samples t-tests revealed that the youth offender group had significantly higher scores for anxiety (M = 6.23, SD = 4.18; $t(128) = 2.08$, $p = .040$) and CU traits (M = 27.74, SD = 8.62; $t(128) = 3.05$, $p = .003$) than the non-offender group (Anxiety: M = 4.67, SD = 4.11; CU traits: M = 23.35, SD = 6.69). The youth offender group had significantly lower scores for structural (SL; M = 70.00, SD = 17.17; $t(128) = -8.30$, $p < .001$), higher order (HOL; M = 15.35, SD = 6.11; $t(128) = -6.03$, $p < .001$), and conversational inferential (CI; M = 46.68, SD = 7.30; $t(128) = -4.20$, $p < .001$) language than the non-offender group (SL: M = 95.35, SD = 16.35; HOL: M = 22.22, SD = 6.63; CI: M = 51.27, SD = 5.11). There was no significant difference between the groups on narrative language (NL).

Significant negative correlations were seen between CU traits and structural (r = -.18, $p = .047$) and higher order (r = -.20, $p = .022$) language, with higher levels of CU traits associated with poorer language in both cases. In addition, there was a significant positive correlation between anxiety and narrative language (r = .21, $p = .016$), with higher anxiety associated with better language. Furthermore, significant negative correlations were seen

Table 11 *Descriptive Statistics, Group Differences and Zero Order Correlations for Whole Sample.*

T-test	Youth Offender (n = 81)		Non-Offender (n = 49)			95% Confidence Interval of Mean Difference		
	M	*SD*	*M*	*SD*	*t*	Lower	Upper	Effect Size
CU Traits	27.74	8.62	23.35	6.69	3.05**	1.55	7.24	.57
Anxiety	6.23	4.18	4.67	4.11	2.08*	.07	3.05	.38
Language Skills								
Structural	70.00	17.17	95.35	16.35	-8.30***	-31.39	-19.31	1.51
Higher Order	15.35	6.11	22.22	6.63	-6.03***	-9.14	-4.62	1.08
Narrative	6.91	2.04	7.18	2.18	-.71	-1.02	.48	.13
Convers. Inference	46.68	7.30	51.27	5.11	-4.20***	-6.75	-2.43	.73
Demographic								
Age	16.88	1.28	15.54	1.05	6.46***	.93	1.75	1.14
SES	3.54	2.12	2.80	1.27	2.51*	.16	1.34	.42

Chi-square	Indigenous (n = 60)		Non-Indigenous (n = 70)			
Ethnicity	Count	%	Count	%	χ^2	phi
Youth Offender	40	49	41	51	.59	.08
Non-offender	20	41	29	59		

Correlation	CUT	Anx	Language				Demographic	
			SL	HOL	NL	CI	Age	Eth
CU Traits								
Anxiety	-.09							
Language								
Structural	-.18*	.01						
Higher Order	-.20*	.07	.85***					
Narrative	-.11	.21*	.41***	.42***				
Convers. Inference	-.01	.02	.57***	.58***	.34***			
Demographic								
Age	.13	.18*	-.36***	-.24***	.01	.05		
Ethnicity	-.11	.03	.30***	.19*	.01	.22*	-.09	
SES	.08	.02	.08	.18*	.22*	.20*	.06	.03

Notes: *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

Variables: CU Traits (ICU total scale score); Anxiety (YSR anxious-depressed subscale score); Language: Structural (CELF-4, Core Language Score); Higher Order (TLC-E, combined score of 3 subtests); Narrative (Narrative Discourse Score); Conversational Inference (TASIT, Social Inference Minimal, sum of scores); Demographic: Age (at time of assessment, based on official records for date of birth); Ethnicity (based on self-report of cultural identification; for correlation: Indigenous = 1, Non-Indigenous = 2); SES (in terms of SEIFA categories, based on self-report of most recent address).

between age and structural (r = -.36, p < .001) and higher order language (r = -.24, p = .006), with an older age associated with poorer structural and higher order language. Ethnicity was also correlated with both structural (r = .30, p = .001) and higher order (r = .19, p = .032), as well as conversational inferential (r = .22, p = .012) language, such that identification as non-Indigenous was associated with better language skills. SES was correlated with higher order (r = .18, p = .042), narrative (r = .22, p = .012) and conversational inferential (r = .20, p = .025) language, with higher SES associated with better language skills.

Zero order correlations for key study variables and offence variables computed within the youth offender group are provided in Table 12. A significant negative correlation was seen between CU traits and age of first offence (r = -.25, p = .027), with higher levels of CU traits associated with younger age of first offence. In contrast, there was a significant positive

Table 12 *Zero Order Correlations for the Youth Offender Group*

Correlation	CUT	Anx	Language				Offending		Demographic	
			SL	HOL	NL	CI	Age	VO	Age	Eth
CU Traits										
Anxiety	-.20									
Language										
Structural	.02	.10								
Higher Order	-.00	.13	.77***							
Narrative	-.05	.17	.44***	.44***						
Conv. Inf.	.14	.11	.56***	.54***	.47***					
Offending										
Age of first offence	-.25*	.29**	.00	.07	.11	.23*				
Violent	.12	.07	.07	.15	.16	.05	-.17			
Demographic										
Age	.01	.13	-.15	-.03	.08	.19	.51***	.21		
Ethnicity	-.10	-.01	.25*	.06	-.16	.16	.14	-.13	-.03	
SES	.14	-.08	.20	.26*	.15	.30**	.04	.18	-.04	-.04

Notes: *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

Variables: CU Traits (CUT; ICU total scale score); Anxiety (Anx; YSR anxious-depressed subscale score); Language: Structural (SL; CELF-4, Core Language Score); Higher Order (HOL; TLC-E, combined score of 3 subtests); Narrative (NL; Narrative Discourse Score); Conversational Inference (CI; TASIT, Social Inference Minimal, sum of scores); Offending: Age of first offence (age of first official contact youth justice services); Violent (VO; total number violent offences recorded to date of assessment; Demographic: Age (at time of assessment, based on official records for date of birth); Ethnicity (based on self-report of cultural identification; Indigenous = 1, Non-Indigenous = 2); SES (in terms of SEIFA categories, based on self-report of most recent address).

correlation between anxiety (r = .29, p = .008) and age of first offence, with higher levels of anxiety associated with older age of first offence. There were no significant correlations between structural, higher order or narrative language and age of first offence, nor between CU traits, anxiety, or any of the language variables and violent offending. However, there was a significant positive correlation between conversational inference and age of first offence (r = .23, p = .037), with superior skills on this language measure associated with older age of first offence. Age was significantly correlated with age of first offence (r = .51, p < .001), with older age associated with later age of first offence.

6.3.2 Tests of Main Study Hypotheses

Coefficients for the four hierarchical regression models testing predictors of structural, higher order, narrative, and conversational inferential language, are provided in Table 13. These models entailed analyses relevant to two key questions.

Do CU traits interact with offender status in relation to specific oral language skills?

In the model testing predictors of structural language there was a significant main effect for offender status (ß = -.59, p < .001), in which non-offender status was associated with better structural language skills. The interaction term for CU traits x offender status was non-significant. In the model testing predictors of higher order language there was a significant main effect for offender status (ß = -.52, p < .001), in which non-offender status was associated with better higher order language skills. The interaction term for CU traits x offender status was non-significant. In the model testing predictors of narrative language there was no significant main effect for offender status and the interaction term for CU traits x offender status was non-significant. In the model testing predictors of conversational inference there was a main effect for offender status (ß = -.53, p < .001), in which non-offender status was associated with better conversational inference skills. The

Table 13 *Hierarchical Regression Analyses for Specific Oral Language Skills with predictors CU Traits, Anxiety and Offender Status*

	Structural Language			Higher Order Language			Narrative Language			Conversational Inference		
	β	*b* [95% CI]	R^2	β	*b* [95% CI]	R^2	β	*b* [95% CI]	R^2	β	b [95% CI]	R^2
Age	-.09	-1.43 [-3.72, .86]		-.02	-.09 [-.96, .78]		.03	.05 [-.24, .35]		.28**	1.42 [.54, 2.30]	
Ethnicity	.23***	9.72 [4.23, 15.22]		.12	1.75 [-.33, 3.84]		-.02	-.08 [-.79, .63]		.20**	2.80 [.69, 4.91]	
SES	.19**	2.06 [.57, 3.54]		.28***	1.06 [.49, 1.62]		.25**	.28 [.09, .48]		.27***	.99 [.42, 1.56]	
Offender Status	-.59***	-25.25 [-31.97, -18.53]		-.52***	-7.59 [-10.14, -5.05]		-.15	-.64 [-1.51, .23]		-.53***	-7.52 [-10.10, -4.94]	
ICU	.01	.04 [-.31, .38]		-.06	-.05 [-.18, .08]		-.08	-.02 [-.06, .03]		.10	.08 [-.05, .22]	
Anxiety	.12	.61 [-.05, 1.28]		.15*	.26 [.01, .52]		.22*	.11 [.02, .20]		.06	.10 [-.16, .36]	
			.47***			.34***			.12*			.28***
ICU x Anxiety	-.13	-.08 [-.16, .01]		-.18*	-.04 [-.07, -.01]		-.26**	-.02 [-.03, -.01]		-.35***	-.07 [-.10, -.04]	
ICU x Off. Status	.06	.36 [-.44, 1.16]		.12	.24 [-.06, .54]		.09	.05 [-.05, .15]		.11	.22 [-.07, .50]	
			.48			.38*			.18*			.39***

Notes: *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$. β = standardized beta, *b* = unstandardized beta, CI = confidence interval.

Variables: Age (centred); Ethnicity (dichotomised with weighted effect size: Indigenous Australian = -.54; non-Indigenous Australian = .46); SES (centred); Offender Status (dichotomised with weighted effect coding: Youth offender = .38; Non-offender = -.62); CU Traits (ICU total scale score; centred); Anxiety (YSR anxious-depressed sub-scale score; centred); Language: Structural (CELF-4, Core Language Score; centred); Higher Order (TLC-E, combined score of 3 sub-tests; centred); Narrative (Narrative Discourse Score; centred); Conversational Inference (TASIT, Social Inference Minimal, sum of scores; centred).

interaction term for CU traits x offender status was non-significant.

No three-way interactions for CU traits x anxiety x offender status were significant in any of these models. Therefore, only coefficients for blocks 1 and 2 of these models are reported in Table 13.

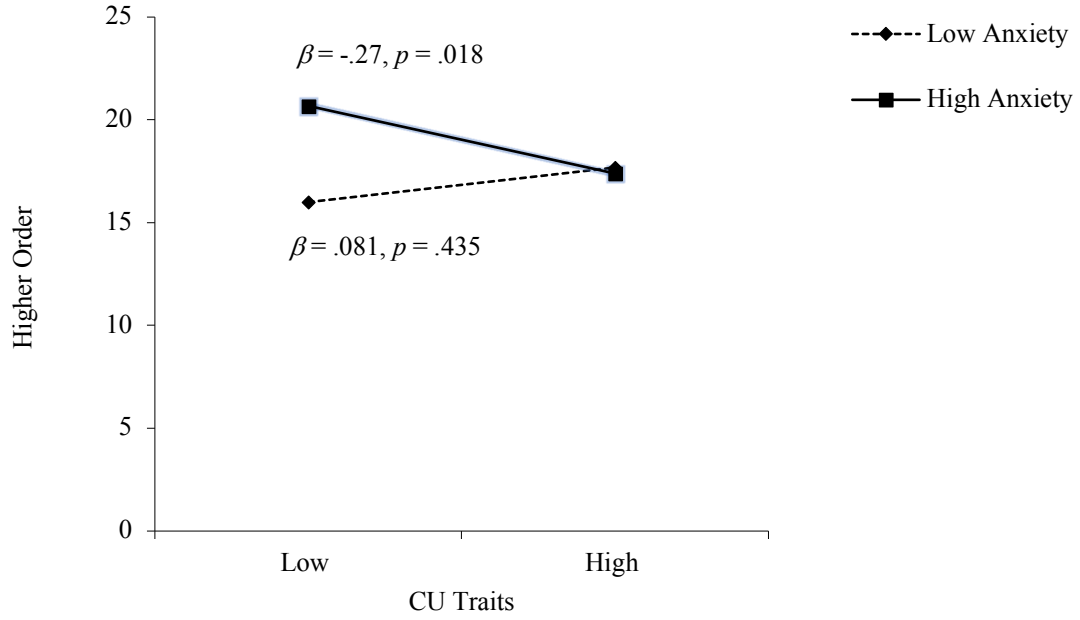
Do primary and secondary variant CU traits demonstrate different associations with specific oral language skills?

In the regression model testing predictors of structural language there were no significant main effects for CU traits or anxiety, and no significant interaction between CU traits and anxiety.

In the model testing predictors of higher order language there was a significant main effect for anxiety (ß = .15, p = .043), in which higher anxiety was associated with better higher order language skills. There was no significant main effect for CU traits, however, the interaction between CU traits and anxiety was significant (ß = -.18, p = .021). The significant interaction was probed by testing the conditional effects of CU traits on higher order language at high and low anxiety. As illustrated in Figure 3, CU traits were significantly related to higher order (ß = -.27, p = .018) language when anxiety was high, but not when anxiety was low. That is, higher scores on CU traits were associated with poorer higher order language, but only for youth high in anxiety (i.e. secondary variant CU traits). For youth low in anxiety (i.e. primary variant CU traits), there were no significant associations between CU traits and higher order language.

In the model testing predictors of narrative language there was no significant main effect for CU traits, yet there was a significant main effect for anxiety (ß = .22, p = .013), which was positively associated with better narrative language skills. There was also a significant interaction between CU traits and anxiety (ß = -.26, p = .004). The significant interaction was probed by testing the conditional effects of CU traits on narrative language at

Figure 3 *Interaction Between Higher Order Language Skill and CU Traits at High and Low Levels of Anxiety*



high and low anxiety. As illustrated in Figure 4, CU traits were significantly related to narrative (ß = -.37, p = .006) language when anxiety was high, but not when anxiety was low. That is, higher scores on CU traits were associated with poorer narrative language, but only for youth high in anxiety (i.e. secondary variant CU traits). For youth low in anxiety (i.e. primary variant CU traits), there were no significant associations between CU traits and narrative language.

In the model testing predictors of conversational inference there were no significant main effects for CU traits or anxiety. There was, however, a significant interaction between CU traits and anxiety (ß = -.35, p < .001). The significant interaction was probed by testing the conditional effects of CU traits on conversational inference at high and low anxiety. As illustrated in Figure 5, CU traits were significantly related to conversational inference when anxiety was high (ß = -.29, p = .010), as well as when anxiety was low (ß = .40, p < .001). In this case, higher scores on CU traits were associated with poorer conversational inference for

youth high in anxiety (i.e. secondary variant CU traits), but with better conversational inferential language for youth low in anxiety (i.e. primary variant CU traits).

Figure 4 *Interaction Between Narrative Language Skill and CU Traits at High and Low Levels of Anxiety*

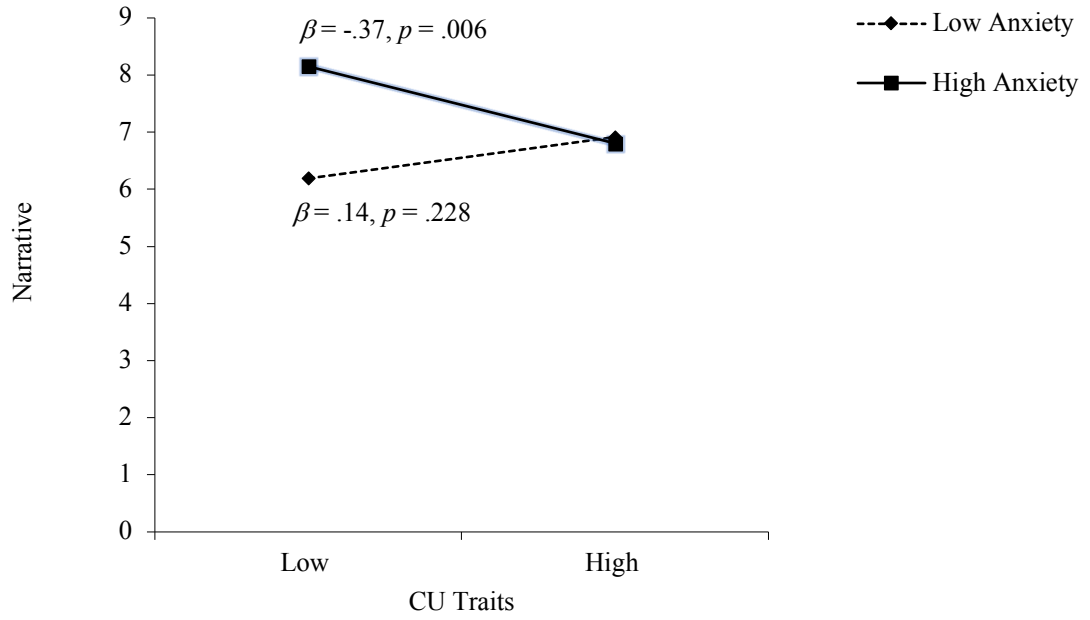
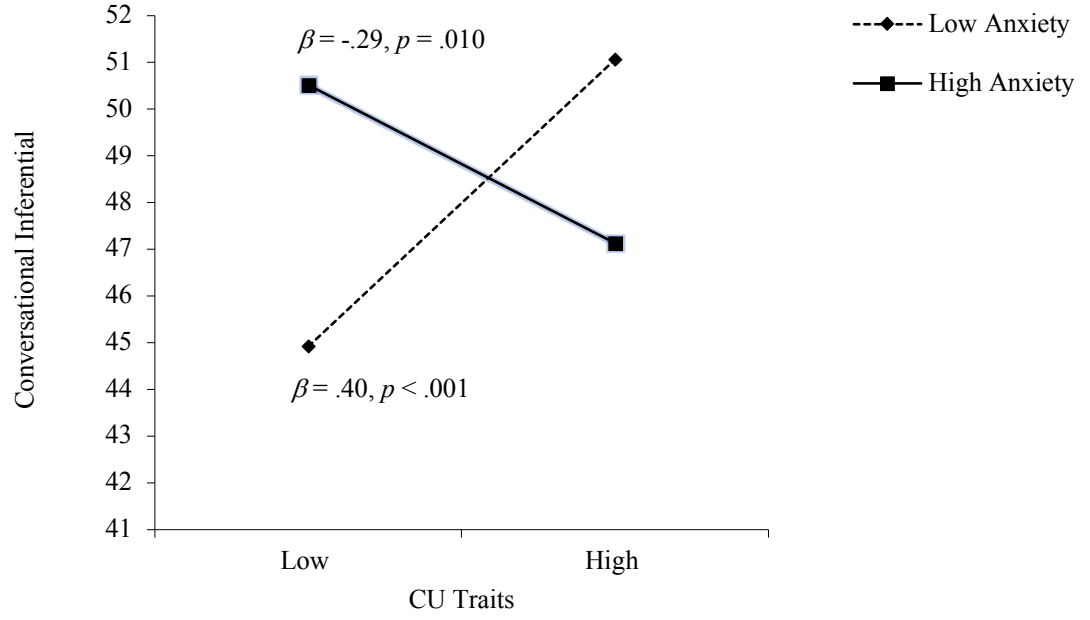


Figure 5 *Interaction Between Conversational Inference Skill and CU Traits at High and Low Levels of Anxiety*



Do variants of CU traits interact with language skills in associations with high risk patterns of offending?

Statistics for the four MANCOVA conducted for each of the respective language skills (structural, higher order, narrative, conversational inferential) can be seen in Table 14. In each of these analyses, associations were examined between independent variables comprising the respective language skill (high/low), CU traits variant (primary/secondary), and the dependent variables of age of first offence and violent offending.

In the analyses examining structural language, no main effects were found. A significant interaction was, however, found between CU variant and structural language ($V^{(s)}$ = .13, $F(4, 144) = 2.56$, p = .041, partial η^2 = .07). In univariate analysis, with a Bonferroni adjusted alpha level of .025, this interaction was only significant for violent offending ($F(2, 72) = 4.33$, p = .017, partial η^2 = .11). Pairwise comparisons with Bonferroni adjustments revealed a significant difference in violent offending for primary variant CU youth (M_{DIFF} = -4.72, SE = 1.56, p = .003), with significantly more violent offending demonstrated by those with higher language skills (EMM = 5.19, SE = 1.04) compared with those with lower language skills (EMM = .47, SE = 1.14). This significant difference is illustrated in Figure 6.

In analyses examining higher order and narrative language there were no significant main effects for CU variant, or significant interactions between CU variant and language skill. In the higher order language analysis, however, there was a significant main effect for this language skill ($V^{(s)}$ = .10, $F(2, 71) = 4.08$, p = .021, partial η^2 = .10). While follow-up analyses revealed that this association was specific to violent offending, it was not significant at the Bonferroni adjusted alpha level of .025.

In the analyses examining conversational inference, no significant main effects for CU variant or language skill were found. However, a significant interaction was found between

Table 14 *Interactive Effects of Variant of Callous-Unemotional Traits and Oral Language Skill on Age of First Offence and Violent Offending*

	Callous-Unemotional Variant								
	Low Language Skill			High Language Skill			$V^{(s)}$	F	Part. η^2
Structural	Primary CU (n = 9)	Secondary CU (n = 10)	Low CU (n = 21)	Primary CU (n = 12)	Secondary CU (n = 13)	Low CU (n = 16)			
Offending							.13	2.56*	.07
Age of 1st Offence	14.85 (.48) [13.90, 15.80]	14.25 (.45) [13.53, 15.32]	14.87 (.33) [14.22, 15.51]	14.33 (.44) [13.46, 15.19]	14.58 (.40) [13.79, 15.37]	15.60 (.36) [14.88, 16.31]		1.23	.03
Violent	.47 (1.14) [-1.81, 2.75]	4.61 (1.08) [2.46, 6.77]	2.17 (.78) [.62, 3.72]	5.19 (1.04) [3.12, 7.27]	3.16 (.95) [1.27, 5.05]	3.23 (.86) [1.52, 4.94]		4.33*	.11
Higher order	Primary CU (n = 10)	Secondary CU (n = 14)	Low CU (n = 18)	Primary CU (n = 11)	Secondary CU (n = 9)	Low CU (n = 19)			
Offending							.08	1.52	.04
Age of 1st Offence	14.84 (.44) [13.96, 15.72]	14.32 (.37) [13.57, 15.06]	14.61 (.35) [13.91, 15.31]	14.30 (.44) [13.43, 15.19]	14.82 (.46) [13.90, 15.75]	15.71 (.33) [15.06, 16.36]		2.13	.06
Violent	1.06 (1.11) [-1.15, 3.27]	3.70 (.94) [1.83, 5.57]	2.07 (.88) [.31, 3.83]	5.04 (1.11) [2.83, 7.26]	3.96 (1.17) [1.64, 6.30]	3.17 (.82) [1.53, 4.81]		1.68	.05
Narrative	Primary CU (n = 12)	Secondary CU (n = 18)	Low CU (n = 18)	Primary CU (n = 9)	Secondary CU (n = 5)	Low CU (n = 19)			
Offending							.05	.95	.03
Age of 1st Offence	14.81 (.41) [13.90, 15.63]	14.38 (.34) [13.70, 15.05]	14.82 (.35) [14.15, 15.53]	14.22 (.49) [13.25, 15.19]	14.98 (.65) [13.68, 16.27]	15.50 (.33) [14.85, 16.15]		1.40	.04
Violent	2.36 (1.05) [.27, 4.46]	4.18 (.86) [2.47, 5.89]	2.68 (.89) [.92, 4.45]	3.85 (1.24) [1.38, 6.33]	2.51 (1.66) [-.79, 5.81]	2.73 (.84) [1.07, 4.40]		.84	.02
Convers. Infer.	Primary CU (n = 6)	Secondary CU (n = 13)	Low CU (n = 25)	Primary CU (n = 15)	Secondary CU (n = 10)	Low CU (n = 12)			
Offending							.15	2.94*	.08
Age of 1st Offence	15.56 (.55) [14.46, 16.66]	14.77 (.38) [14.02, 15.52]	14.81 (.28) [14.26, 15.37]	14.12 (.36) [13.41, 14.84]	14.19 (.43) [13.33, 15.05]	15.97 (.41) [15.16, 16.78]		5.58**	.13
Violent	.84 (1.46) [-2.08, 3.76]	3.82 (.99) [1.84, 5.80]	2.95 (.74) [1.47, 4.42]	3.91 (.95) [2.02, 5.80]	3.80 (1.14) [1.53, 6.07]	2.17 (1.07) [.03, 4.31]		1.62	.04

Notes: Reported results are estimated marginal means, standard errors (in parentheses) and 95% confidence intervals [in square brackets]; Multivariate tests: $V^{(s)}$ = Pillai's trace; df = 4, 144; $^{***}p \leq .001$; $^{**}p \leq .01$; $^{*}p \leq .05$. Univariate tests: df = 2, 72; $^{***}p \leq .001$; $^{**}p \leq .01$; $^{*}p \leq .025$ (Bonferroni adjustment). Co-variates were evaluated at: Age = 16.88; Ethnicity = 1.51; SES = 3.54.

Variables: CU Variant - Primary: high CU traits, low anxiety; Secondary: high CU traits, high anxiety; Low: low CU traits (based on ICU total score, YSR anxious-depressed sub-scale score); Language: Structural (CELF-4, Core Language Score); Higher Order (TLC-E, combined score of 3 sub-tests); Narrative (Narrative Discourse Score); Conversational Inference (TASIT, Social Inference Minimal, sum of scores).

CU variant and conversational inference ($V^{(s)}$ = .15, F(4, 144) = 2.94, p = .022, partial η^2 = .08). In univariate analyses, with a Bonferroni adjusted alpha level of .025, this interaction was significant only for age of first offence (F(2, 72) = 5.58, p = .006, partial η^2 = .13). Pairwise comparisons with Bonferroni adjustments revealed a significant difference in age of first offence, dependent on language skill for primary variant CU youth (M_{DIFF} = 1.44, SE = .66, p = .032), and low CU youth (M_{DIFF} = -1.15, SE = .51, p = .025). For youth with primary variant CU traits, a significantly earlier age of first offence was demonstrated by those with higher language skills (EMM = 14.12, SE = .34), compared to those with lower language skills (EMM = 15.56, SE = .55). In contrast, for youth with low CU traits, a significantly earlier age of first offence was demonstrated by those with lower language skills (EMM = 14.81, SE = .28), compared to those with higher language skills (EMM = 15.97, SE = .41). These significant differences are illustrated in Figure 7.

Figure 6 *Interaction Between Variants of CU Traits and Structural Language Skill in Relation to Violent Offending*

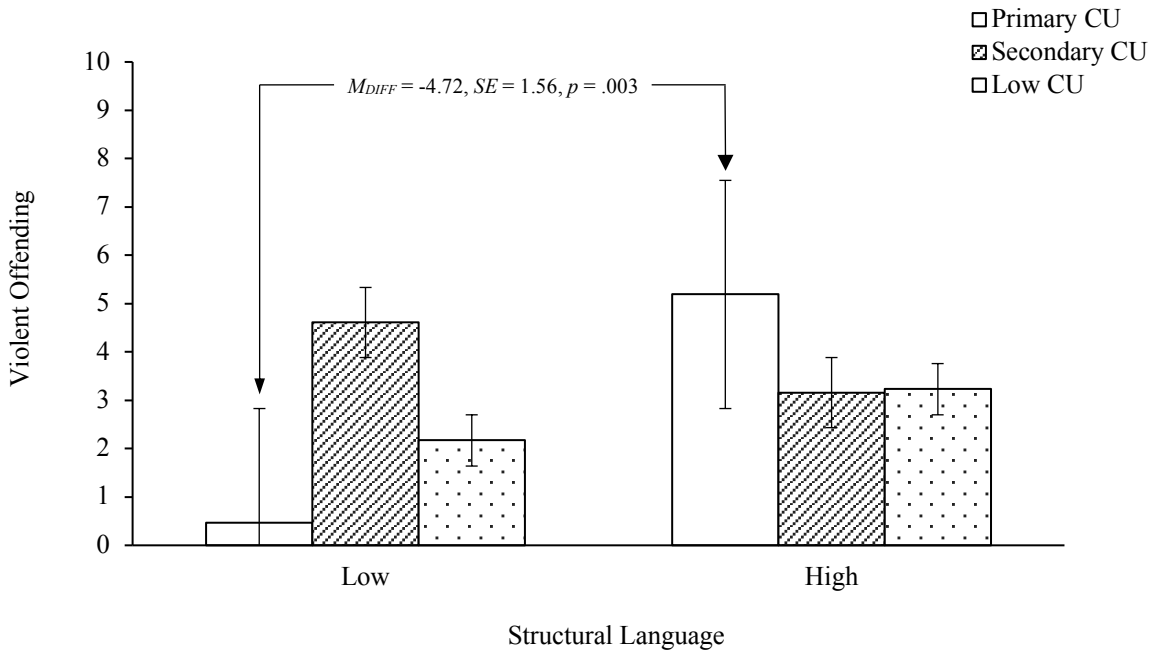
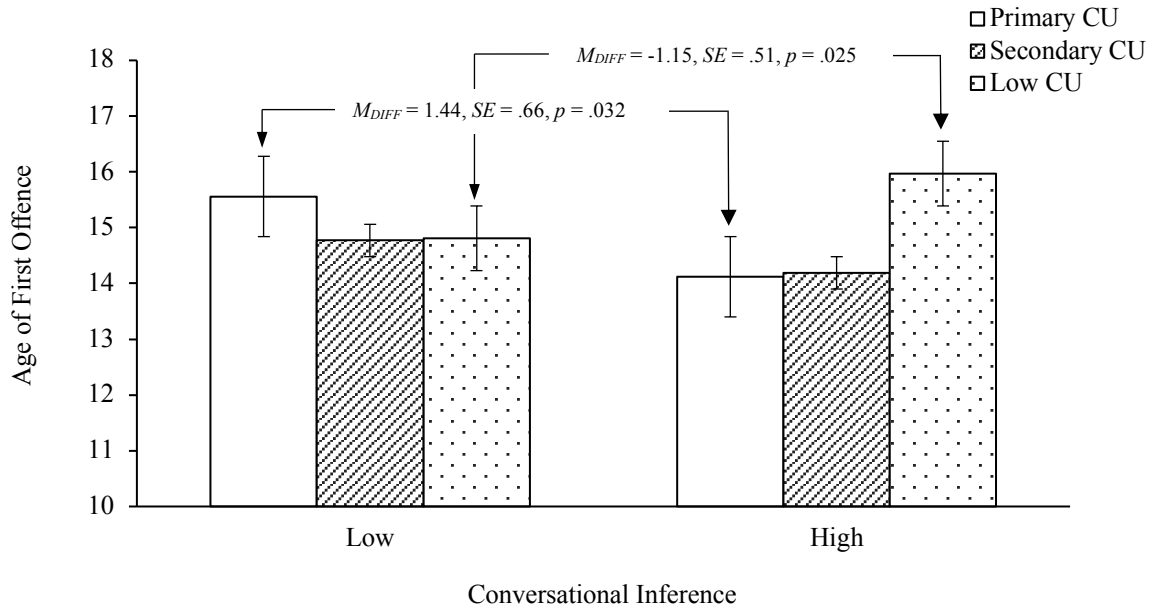


Figure 7 *Interaction Between Variants of CU Traits and Conversational Inference Skills in Relation to Age of First Offence*



6.4 Discussion

The current study examined associations between patterns of adolescent antisocial offending, specific oral language skills, and primary/secondary variants of CU traits. Findings supported the notion that associations between CU traits and oral language skills vary as a function of variants of CU traits. That is, this association was moderated by anxiety. As predicted, this interaction between CU traits and anxiety was not uniform across language skills, but varied depending on language skill domain. Among the pragmatic language skills examined, this interaction was seen for higher order, narrative, and conversational inference skills. Specifically, higher CU traits were associated with poorer higher order, narrative and conversational inferential language skills for those with secondary variant CU traits (i.e. high CU traits, high anxiety). This can be seen as consistent with research conducted largely with adult offenders, which has found that those high on psychopathy have difficulty in language tasks involving higher order (Hare & Jutai, 1988; Hervé et al., 2003; Kiehl et al., 1999),

extended expression (Brinkley, Bernstein, et al., 1999; Brinkley, Newman, et al., 1999; Hancock et al., 2013), and inferential skills (Vaughn et al., 2011). These findings represent the first evidence, to my knowledge, that language-related correlates of CU traits among youth offenders differ according to variant of CU traits.

Interestingly, and contrary to predictions, there were no significant associations between CU traits and higher order and narrative language skills for those with primary variant CU traits (i.e. high CU traits, low anxiety). Further, higher CU traits were actually associated with superior skills in conversational inference for those with primary variant CU traits. This intriguing finding, that primary variant CU traits have an association with superior language skill in at least one area, even when demographic and antisocial factors are taken into account, suggests that the atypical language processing noted in previous research with adolescent and adult offenders high on psychopathy (Hare & McPherson, 1984; Hiatt et al., 2002; Lorenz & Newman, 2002; Raine et al., 1990), may not be universally detrimental.

Youth with high versus low levels of CU traits were found to be comparable in terms of structural language skills, consistent with findings from research with adult offenders (K. Blair et al., 2006; de Almeida Brites et al., 2014; Hare & Jutai, 1988). Although we had predicted that secondary variant CU traits would be associated with poorer structural language skills, given that youth with secondary variant CU traits are characterised by a number of risk factors (e.g., childhood maltreatment, attentional problems, internalising problems) that are also associated with such language deficits, this was not seen in our data. It should be noted, however, that this association was nonetheless approaching significance, and therefore warrants further investigation before firm conclusions can be drawn about this point.

Noteworthy findings were seen regarding specific patterns of offending associated with variants of CU traits and specific oral language skills. It was hypothesised that offenders with primary variant CU traits and better oral language skills would exhibit earlier age of first

offence and more violent offending, while for those with secondary variant or low CU traits earlier age of first offence and more violent offending would be associated with poorer oral language skill. As predicted, offenders in our sample with primary variant CU traits who also had higher structural language skills demonstrated significantly higher levels of violent offending than those who had lower structural language skills. Additionally, and consistent with predictions, youth with primary variant CU traits and higher conversational inference skills demonstrated a significantly earlier age of first offence than those with lower conversational inference skills. For youth with low CU traits, those with lower conversational inference skills demonstrated a significantly earlier age of first offence than those with higher conversational inference skills. On the whole, these findings can be seen to reflect previous evidence regarding global forms of verbal ability and global CU traits, in adult offenders (e.g., Johansson & Kerr, 2005) as well as youth offenders (e.g., Munoz et al., 2008). At the same time, these findings suggest that language-related risk mechanisms for antisocial behaviour may play out among distinct subgroups of young offenders in ways that are more complex than previously thought.

Offender status among youth in the current sample was strongly associated with poorer structural, higher order, and conversational inferential language skills. This is consistent with previous research (e.g., Hopkins et al., 2017; Nilsen & Bacso, 2017; Snow et al., 2016). With regard to CU traits, there were no significant interactions to suggest that CU traits moderated the association between any language skill and offender status. This was counter to our hypothesis, based on previous research on global verbal ability, which has found the relationship between verbal ability and antisocial behaviour among antisocial children, adolescents and adults to differ based on global CU traits (Johansson & Kerr, 2005; Loney et al., 1998; Munoz et al., 2008). Interestingly, at least one previous study has likewise failed to support a role for CU traits in moderating associations between verbal ability and antisocial

behaviour in youth (Allen et al., 2013). It is unclear whether methodological factors shared by that previous study and the current research (e.g., similar sampling of both offending and non-offending adolescents) might account for these comparable findings.

The current findings should be interpreted in light of some limitations. First, this research relates specifically to adolescent males, and results should not be generalised to adolescent females. Research suggests that females demonstrate different patterns of relationships between antisocial behaviour and CU traits to males (Hicks, Vaidyanathan, & Patrick, 2010; Pechorro et al., 2013). Second, CU traits were measured using youth-self report only. While a range of factors impact access to reliable others with whom youth offenders have maintained a stable relationship (Keijsers, Loeber, Branje, & Meeus, 2012; Vaughn, Pettus-Davis, & Shook, 2012; Wolbransky, Goldstein, Giallella, & Heilbrun, 2013), research does suggest that multi-informant measurement of CU traits provides more comprehensive data (e.g., Docherty, Boxer, Huesmann, O'Brien, & Bushman, 2016; Lin, Kerig, & Adkins, 2019). Third, primary and secondary variants of CU traits were operationalised based on concurrent level of anxiety. While various other studies have also used this technique (e.g., Cecil et al., 2018; Kahn et al., 2017; Sharf, Kimonis, & Howard, 2014), emerging evidence suggests that the use of data on both anxiety and maltreatment may be a stronger basis for this grouping (S. Craig & Moretti, 2019; Dadds et al., 2018; Kahn, Frick, et al., 2013). Fourth, the language measures used in this research employed different modalities of assessment and techniques of standardisation. While the measures were selected to represent a diverse range of specific oral language skills, there is ongoing debate regarding the relative merits of different forms of oral language assessment (Bishop, 2017).

6.4.1 Conclusions

Although the findings from the current study did not correspond with all facets of the three hypotheses proposed, the results do have important theoretical and practical implications. In demonstrating that CU traits moderate associations between anxiety and different specific language skills, and that associations between variants of CU traits and specific patterns of offending vary depending on level of certain specific language skills, evidence from this research supports disaggregated conceptualisations of CU traits and psychopathy distinguished by level of anxiety (Kimonis, Frick, et al., 2012). Further, the diversity in risk for more severe patterns of offending, represented by different language skill – variant of CU traits interactions, supports models in which different causal mechanisms lead to different patterns of antisocial behaviour (Munoz et al., 2008).

As previously demonstrated in relation to verbal ability (Johansson & Kerr, 2005; Munoz et al., 2008), evidence from this research reveals that, for some individuals, it is higher not lower skills in specific areas of oral language that present a greater risk for more severe antisocial behaviour. In practical terms, the differences revealed between primary and secondary variant CU traits groups on language, as well as in association with language on patterns of offending, emphasise the importance of conducting comprehensive multidimensional assessments in order to appropriately filter antisocial youth into intervention programs (Kimonis, Kennealy, & Goulter, 2016). This individualised approach is more reflective of research suggesting that youth with CU traits are more likely to benefit from intensive, specialised interventions (Caldwell, Skeem, Salekin, & Van Rybroek, 2006; Frick et al., 2014b; Haas et al., 2011; Hawes & Dadds, 2005). It is also more consistent with the risk-needs-responsivity principles that are central to youth justice interventions (Bonta & Andrews, 2012).

6.5 Making the Link

The current study had two key aims. The first aim was to examine associations between a range of specific oral language skills, youth offending and variants of CU traits. The second aim was to investigate the interaction between variants of CU traits and specific oral language skills in relation to specific patterns of offending. Findings supported an association between secondary variant CU traits and poorer pragmatic language skills (across three specific skills), as well as between primary variant CU traits and better conversational inference skills. Further, findings revealed that youth offenders with primary variant CU traits demonstrated higher levels of violent offending in the presence of better structural language skills, and an earlier age of first offence in the presence of better conversational inference skills. Conversational inference skills (measured in the current study through TASIT SI-M total score) represent more complex language skills involving comprehension and integration of a range of information. Considering the different associations between these skills and primary and secondary variants of CU traits, and the association between such skills and aspects of empathy, further investigation was warranted. In empirical study 3 (Chapter 7) skills in three specific aspects of cognitive empathy (measured through specific sub-scores of TASIT SI-M) were examined in relation to offending and variants of CU traits. As structural language skills were found to be relatively comparable between youth high and low in CU traits in the current study, structural language was selected in post hoc analyses in Chapter 7 to investigate the potential impact of language skill on associations between aspects cognitive empathy and variants of CU traits.

CHAPTER 7 - VARIANTS OF CU TRAITS, PERSPECTIVE TAKING AND ANTISOCIAL BEHAVIOUR

7.1 Introduction

The notion that antisocial individuals lack *empathy*, that is, being cognisant of and identifying with the thoughts and feelings of others (D. Cohen & Strayer, 1996), has a long history in the literature. In an early review, Miller and Eisenberg (1988) found that empathy was negatively associated with antisocial, aggressive and externalising behaviours across the lifespan. Since then numerous studies have found that community (e.g., K. L. Thompson & Gullone, 2008), clinical (e.g., Dolan & Fullam, 2004), and forensic (e.g., Spenser, Betts, & Das Gupta, 2015), samples of antisocial children (e.g., C. Hughes, White, Sharpen, & Dunn, 2000), adolescents (e.g., D. Jolliffe & Farrington, 2007), and adults (e.g., Domes, Hollerbach, Vohs, Mokros, & Habermeyer, 2013), tend to demonstrate lower empathy than appropriately social peers.

Also, from a theoretical perspective, low empathy appears to be intrinsic to antisocial behaviour. Individuals with typically developing empathy are understood to be able to moderate their behaviour in order to maximise positive and minimise negative thoughts and feelings for others (Moul, Hawes, & Dadds, 2018). In contrast, the behaviour of individuals with low empathy is not likely to be modified by comprehension of its impact on the thoughts and feelings of others (Feshbach, 1975). Further, having failed to comprehend negative consequences of their behaviour on others, those with low empathy are likely to repeat antisocial behaviours (D. Jolliffe & Farrington, 2007). However, Miller and Eisenberg (1988), as well as more recent systematic and meta-analytical reviews, have revealed inconsistency in evidence regarding the association between antisocial behaviour and empathy. Analyses from these studies suggested that the antisocial behaviour-empathy association varied depending on

the measure of empathy used, the subtype of empathy and/or antisocial behaviour assessed, and the age group of participants (D. Jolliffe & Farrington, 2004; Lovett & Sheffield, 2007; Miller & Eisenberg, 1988; Vachon, Lynam, & Johnson, 2014).

Key advances in understanding these discrepancies in empathy-related deficits among antisocial groups, have come from differentiating subgroups of antisocial individuals based on *callous-unemotional (CU) traits*. CU traits refer to a cluster of symptoms, such as lack of remorse or guilt, deficient affect, and lack of caring towards others, that reflect the affective component of psychopathy (Moul et al., 2018). One of the most established theoretical positions regarding associations between empathy and CU traits has been that high levels of CU traits are associated with a core deficit in *affective empathy* (the capacity to share another's emotional state), rather than *cognitive empathy* (the capacity to understand another's emotional state).

In a seminal review, Robert Blair (2005) outlined an array of research evidence supporting an association between impaired affective empathy (specifically recognition of fearful facial expressions) and elevated levels of psychopathic traits. Further, he highlighted the lack of an association between cognitive empathy (specifically *theory of mind*; ToM) and psychopathic traits evidenced by a range of research (R. Blair, 2005). However, while more recent investigations support a deficit in affective empathy in individuals with psychopathic or CU traits, findings also suggest that deficits in cognitive empathy among these individuals are greater and more complex than previously thought. For example, in a large longitudinal study, Dadds et al. (2009) demonstrated that, for males, high levels of CU traits were associated with lower levels of affective empathy across all age ranges, from 3 to 13 years. Surprisingly, high levels of CU traits were also found to be associated with lower levels of cognitive empathy in childhood, with cognitive empathy only reaching comparatively normal levels by adolescence (Dadds et al., 2009).

The complex associations between antisocial behaviour, CU traits and cognitive empathy, has been further demonstrated by research examining the specific abilities that contribute to cognitive empathy (e.g., awareness, perception, recognition, imagination, comprehension, interpretation, expression; for a summary see Proctor & Beail, 2007). One construct that has been the focus of investigation is *perspective taking* (PT). PT is a common component of models of empathy, and is considered to be a similar, but more precise, construct than ToM (Proctor & Beail, 2007). Specifically, whereas ToM refers to the capacity to conceive of and understand others' mental states (Baron-Cohen, Leslie, & Frith, 1985), PT refers to the recognition and understanding of another's viewpoint based on perception of situational cues (Kurdek, 1978). Evidence suggests that there is a negative association between antisocial behaviour and PT skill. In youth offenders, PT has been demonstrated to be significantly deficient, compared to non-offenders (Chandler, 1973; Morosan et al., 2017), as well as being predictive of recidivism (Bock & Hosser, 2014). This reflects findings from research involving adults, in which offenders made more errors on PT tasks than a comparison group (Newbury-Helps, Feigenbaum, & Fonagy, 2017). Decreased accuracy in PT among adult offenders has also been demonstrated to be associated with a higher number of violent assaults (Seidel et al., 2013). Further, poorer PT has been shown to contribute to the prediction of future violent offending in adults (Lauterbach & Hosser, 2007). In relation to CU traits, findings are less clear. While Diaz-Galvan et al. (2015) demonstrated a negative association between level of psychopathic traits and PT ability among adult offenders, Moroson et al. (2017) found no association between the callous-unemotional dimension of psychopathy and overall PT ability.

Evidence that CU traits are associated with at least some aspects of PT ability is found in research that has independently examined two distinct types of PT (Healey & Grossman, 2018; Oswald, 1996). *Cognitive PT* refers to the ability to infer the thoughts of others, and can

be further categorised as *first order*, relating to another's knowledge or belief, and *second order*, relating to what another intended a listener to believe (McDonald et al., 2003). *Affective PT* refers to the ability to infer the emotional state (or feelings) of others (Lui, Barry, & Sacco, 2016). In a pivotal study, Anastassiou-Hadjicharalambos and Warden (2008) found different associations for cognitive and affective PT in children. In relation to cognitive PT, youth with conduct disorder (CD) and low CU traits demonstrated significantly poorer scores than both those with CD and high CU traits and those without CD, who did not produce significantly different scores. However, while youth with CD and low CU traits demonstrated significantly poorer performance on affective PT than both those with CD and high CU traits and those without CD, youth with CD and high CU traits also demonstrated significantly poorer performance than their peers without CD. Such results suggest that antisocial youth with low CU traits are likely to have deficits in both cognitive and affective PT, while those with high CU traits are likely to have selective deficits in affective PT. These findings are supported by evidence that conduct disordered children with high CU traits presented with deficits in affective PT (O'Kearney, Salmon, Liwag, Fortune, & Dawel, 2017) and that among adolescents disengaged from school, CU traits were associated with a relative deficit in affective PT (Lui et al., 2016). Conversely, among healthy adults, cognitive PT was not found to be associated with psychopathic traits (Lockwood, Bird, Bridge, & Viding, 2013).

Emerging evidence suggests that, for some individuals, CU traits could be associated with enhanced skills in cognitive PT. This evidence is based on the subtyping of primary and secondary variants of CU traits in terms of concurrent level of anxiety (primary variant, low anxiety; secondary variant high anxiety). In novel research involving incarcerated youth offenders, Kahn et al. (2017) investigated the moderating role of anxiety in associations between CU traits and empathy. Their results revealed no significant interactions between CU traits and anxiety in relation to either self-report or laboratory measures of affective empathy.

However, findings demonstrated that CU traits and self-reported cognitive empathy were negatively correlated in individuals with high anxiety (i.e. secondary variant CU traits), but uncorrelated in individuals with low anxiety (i.e. primary variant CU traits). Further, these authors were able to assess different elements of cognitive empathy through a PT task (introduced by Hynes, Baird, & Grafton, 2006), in which participants were required to interpret a character's thought (cognitive PT) or feeling (affective PT). CU traits and cognitive PT were found to be non-significantly negatively correlated in individuals with high anxiety (secondary variant CU traits), but positively correlated in individuals with low anxiety (primary variant CU traits). In contrast, there were no significant interactions between CU traits and anxiety in relation to affective PT (Kahn et al., 2017). This is a potentially important finding that Kahn et al. (2017) highlight as worthy of further investigation.

The major aim of the current study was to examine associations between PT, CU traits, and youth offending. Moreover, attention was given to both cognitive and affective forms of PT, and to primary (high CU traits, low anxiety) and secondary (high CU traits, high anxiety) variants of CU traits. While emerging evidence has been reported to suggest that youth with distinct variants of CU traits exhibit somewhat distinct deficits in cognitive PT (e.g., Kahn et al., 2017), current conceptualisations of cognitive PT emphasise distinctions that have not been incorporated into such research to date. As such, the current study was designed to provide novel tests of these associations based on a more fine-grained examination of PT addressing both first and second order cognitive PT, as well as affective PT. In addition, there is a need for such research to index PT using ecologically-valid measures that reflect real-world skills, given the reliance on text, verbal and picture-based stimuli to date (e.g., Anastassiou-Hadjicharalambous & Warden, 2008; Kahn et al., 2017). For this reason, in the current study forms of PT were indexed using a video-based method involving conversational exchange in real-world social settings. Finally, based on evidence that social cognition

deficits may increase risk for antisocial behaviour via language-related mechanisms (e.g., Yaghoub Zadeh et al., 2007), I tested whether associations between CU traits, anxiety and PT were independent of language skills.

In the current study three key hypotheses were examined. It was predicted, first, that antisocial behaviour would be associated with deficits in both cognitive and affective PT, such that youth offenders would have significantly poorer PT skills than non-offenders. The remaining hypotheses addressed associations between CU traits and PT based on CU variant and form of PT. Second, it was hypothesised that both primary and secondary variants of CU traits would be associated with poorer affective PT. Third, it was hypothesised that higher CU traits would be associated with better cognitive PT skills, but only among youth with primary variant CU traits. No such association was expected for youth with secondary variant CU traits or low CU traits.

7.2 Method

7.2.1 Participants

Participants were 130 male adolescents between the ages of 13 and 20 years (M = 16.32, SD = 1.35). Participants were included in the current research if they had undertaken the majority of their schooling in an English-speaking country, did not have a known diagnosis of intellectual impairment or hearing impairment, and were not known to be experiencing an acute episode of mental illness. Youth offenders (n = 81; Age M = *16.88*, SD = 1.28) were recruited through 19 youth justice centres (detention = 6; community service = 13). Non-offenders (n = 49; Age M = *15.54*, SD = 1.05) were recruited through five public secondary schools. All participants were resident in New South Wales, the most populous state in Australia. Most participants reported non-Indigenous Australian ethnicity (53.8%; majority Caucasian), but a substantial proportion reported Indigenous ethnicity

(46.2%; majority Aboriginal). Using Socio-Economic Indexes for Areas (Adhikari, 2006), participants were assigned an Index of Relative Socio-Economic Advantage/Disadvantage (IRSAD; from one (lowest) to nine (highest)) based on postcode of usual residence. Participants had a mean IRSAD of 3.26, indicating relatively greater disadvantage and lack of advantage in general consistent with lower socio-economic status (SES).

7.2.2 Measures

Offender status

Offender status was operationalised as a two-level categorical variable, (youth offender; non-offender). A youth offender was categorised as such based on officially documented contact with a youth justice agency at the time of participation in research. This official contact could be in the form of either supervision through a youth justice community service or detention in a secure youth justice centre. Non-offender categorisation was based on self-report of no current or historical official contact with a youth justice supervision agency.

Callous-unemotional traits

CU traits were measured using the *Inventory of Callous-Unemotional Traits* (ICU; Frick, 2003). This self-report scale, based on restructuring of the Callous-Unemotional subscale of the Antisocial Process Screening Device (APSD; Frick & Hare, 2001), was designed to comprehensively assess the presence and magnitude of CU traits in youth. Participants were asked to respond to 24 items that were each rated on a four-point scale (0 = 'not at all true', 1 = 'sometimes true', 2 = 'very true', and 3 = definitely true'). A total score was calculated by summing scores of 12 negatively worded items and reverse-scores of 12 positively worded items. Increased presence of CU traits was indicated by a higher total score. The validity of the ICU has been demonstrated in a range of research involving community, clinical and forensic samples of adolescents (Essau et al., 2006; Fanti et al., 2008;

Feilhauer et al., 2012; Kahn, Byrd, et al., 2013; Kimonis et al., 2008; Pechorro et al., 2016; Pihet et al., 2015; Roose et al., 2010; Stickle et al., 2009). In the current study analysis revealed a Cronbach's α score of .80 for the total scale, which was comparable to findings from previous research (a range of .72 to .84 for the total scale in previously referenced research).

Anxiety

Anxiety was measured using the Anxious-Depressed subscale of the *Youth Self Report* (YSR; Achenbach & Rescorla, 2001). The YSR is a questionnaire designed to assess adaptive and maladaptive functioning in adolescents, forms part of the Achenbach System of Empirically Based Assessment (ASEBA), and has been normed for ages 11 to 18 years. The Anxious-Depressed subscale consists of 16 items that are scored on a 3-point scale (0 = 'not true', 1 = 'somewhat true', 2 = 'very or often true'). The YSR has demonstrated reliability and validity (Achenbach & Rescorla, 2001), and has been used extensively in research investigating psychosocial functioning in adolescents. Cronbach's α reliabilities for the Anxious-Depressed subscale of the YSR in samples of adolescents, including samples of youth offenders, have been demonstrated to be high, ranging from .80 to .86 (Breuk et al., 2007; Kimonis, Tatar, et al., 2012; Van Meter et al., 2014). In the current study analysis revealed a Cronbach's α .81 for the Anxious-Depressed subscale.

Perspective taking

The Awareness of Social Inference Test (TASIT; McDonald et al., 2011), was developed as an ecologically valid means to systematically assess different facets of social perception. TASIT has been designed for use with ages 13 to 60 years, and to differentiate between neurologically typical individuals and those with compromised skills. Participants were assessed using the Social Inference-Minimal Task (SI-M), which involved viewing a series of 15 short videotaped vignettes of actors interacting in everyday conversational

exchanges. Five of these scenes represented sincere exchanges, where words and meaning were consistent, and ten represented sarcastic exchanges, in which paralinguistic cues indicate inconsistency between words and meaning. After watching each scene, participants were asked four questions, each capturing a distinct facet of the inferential process (McDonald et al., 2003). Two questions were representative of cognitive PT. 'Belief' questions examined the participants capacity to accurately construe what the speaker knew or believed, and represented first order cognitive PT. 'Intent' questions examined the participants capacity to accurately construe what the speaker intended (including what they intended the listener to believe) and represented second order cognitive PT. 'Feel' questions, representative of affective PT, examined the participants capacity to accurately construe what the speaker was feeling. 'Say' questions examined the participants capacity to accurately construe meaning from the conversational exchange, but were not the focus of analysis in the current study. Participants were allocated one point for each correct response. Question category scores were then summed to produce total belief (first order cognitive PT), intent (second order cognitive PT), and feel (affective PT) scores.

Language

Language was assessed with the *Clinical Evaluation of Language Fundamentals*, Fourth Edition, Australian Standardisation (CELF4-A; Semel et al., 2006). The CELF4-A, an assessment of structural language skills (phonology, morphology, syntax, semantics), was selected because syntactic skills have been shown to be related to aspects of social cognitive development (Astington & Jenkins, 1999). The CELF4-A was normed on a representative Australian sample, and has standard scores for ages 5:0 to 21:11 years. Four subtests of the CELF4-A were administered – Recalling Sentences (RS), Formulated Sentences (FS), Word Classes (WC), and Word Definitions (WD). Raw scores for each subtest were converted to

standard scores (M = 10; SD = 3) using age-based tables, and subtest standard scores were summed to derive a Core Language Score (CLS; M = 100; SD = 15).

7.2.3 Procedure

The University of Sydney Human Research Ethics Committee, the Department of Communities and Justice, NSW and the Department of Education, NSW, approved this research. Having received these approvals, inclusion criteria, participant information and consent forms were distributed to participating youth justice centres and schools. The researcher visited all participating youth justice centres and schools to administer assessments and questionnaires on site. Measures were presented in a random order. All items on the TASIT and CELF4-A were read to participants, and demonstrations and practice opportunities were provided. Participants could choose to have items on the ICU and YSR read to them and have their responses recorded for them by the researcher.

7.2.4 Data Analytic Plan

All analyses were conducted using SPSS, Version 24 (IBM Corp., 2016). Preliminary analyses revealed no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. Hypotheses were tested using a set of three hierarchical regression analyses consisting of a separate model for each of the dependent variables of cognitive (first order; second order) and affective PT. All models included the same independent variables, which were entered in two blocks. Block one consisted of demographic variables comprising the continuous variables of age and SES, and the recoded weighted categorical variable of ethnicity. Also entered in this block were the mean centred variables of CU traits and anxiety and the categorical variable of offender status (youth offender; non-offender). In order to test for associations with variants of CU traits based on high or low anxiety, the two-way

interaction term for CU x anxiety was entered in a second block. Significant interactions were probed using simple slope analyses involving tests of conditional effects of CU traits on each PT variable at high and low levels of anxiety. Post hoc analyses were conducted to test whether any significant effects were independent of structural language skill. The three hierarchical regression analyses performed previously were repeated with the addition of one continuous predictor variable (structural language) at step one. This centred variable was formed by subtracting the sample mean from each CELF4-A CLS.

7.3 Results

7.3.1 Preliminary analyses

Descriptive statistics, mean differences and zero order correlations for key study variables are provided in Table 15. Independent samples t-tests indicated significant differences between youth offenders and non-offenders on age ($t(128) = 6.46$, $p < .001$) and SES ($t(128) = 2.51$, $p = .013$). The non-offender group had both a lower mean age ($M = 15.54$, SD = 1.05) and lower mean SES ($M = 2.80$, SD = 1.27) than the youth offender group (Age: $M = 16.88$, $SD = 1.28$; SES: $M = 3.54$, $SD = 2.12$). A Chi-square test for independence (with Yates Continuity Correction) indicated no significant association between offender status and ethnicity. Age was significantly correlated with anxiety ($r = .18$, $p = .045$), with older age associated with slightly higher anxiety. Ethnicity was significantly correlated with cognitive PT (first order: $r = .23$, $p = .008$; second order: $r = .20$, $p = .022$), but not affective PT. Non-Indigenous identification was associated with better cognitive PT. In contrast, SES was significantly correlated with affective PT ($r = .21$, $p = .018$), but not cognitive PT. Higher SES was associated with better affective PT. Both age ($r = -.36$, $p > .001$) and ethnicity ($r = .30$, $p = .001$) were correlated with structural language, with younger age and non-Indigenous identification associated with better structural language skill.

Table 15 *Descriptive Statistics, Group Differences and Zero Order Correlations*

T-test	Youth Offender (n = 81)		Non-Offender (n = 49)			95% Confidence Interval of Mean Difference		Effect
	M	*SD*	*M*	*SD*	*t*	Lower	Upper	Size
CU Traits	27.74	8.62	23.35	6.69	3.05**	1.55	7.24	.57
Anxiety	6.23	4.18	4.67	4.11	2.08*	.07	3.05	.38
Perspective Taking								
Cognitive - 1st Order	11.70	1.98	12.57	1.76	-2.53*	-1.55	-.19	.46
Cognitive - 2nd Order	10.98	2.21	12.10	1.89	-2.98**	-1.88	-.38	.54
Affective	12.79	1.75	13.57	1.19	-3.02**	-1.29	-.27	.52
Structural Language	70.00	17.17	95.35	16.35	-8.30***	-31.39	-19.31	1.51
Demographic								
Age	16.88	1.28	15.54	1.05	6.46***	.93	1.75	1.14
SES	3.54	2.12	2.80	1.27	2.51*	.16	1.34	.42

Chi-square	Indigenous (n = 60)		Non-Indigenous (n = 70)			
Ethnicity	Count	%	Count	%	χ^2	phi
Youth Offender	40	49	41	51	.59	.08
Non-offender	20	41	29	59		

Correlation			Perspective Taking				Demographic	
	CUT	Anx	Cog 1	Cog 2	Aff	SL	Age	Eth
CU Traits								
Anxiety	-.09							
Perspective Taking								
Cognitive - 1st Order	.01	.03						
Cognitive - 2nd Order	-.02	.04	.64***					
Affective	.06	.06	.59***	.63***				
Structural Language	-.18*	.01	.46***	.56***	.40***			
Demographic								
Age	.13	.18*	.10	.08	.01	-.36***		
Ethnicity	-.11	.03	.23**	.20*	.07	.30***	-.09	
SES	.08	.02	.13	.13	.21*	.08	.06	.03

Notes: *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

Variables: CU Traits (CUT; ICU total scale score); Anxiety (Anx; YSR anxious-depressed subscale score); Perspective Taking (TASIT, Social Inference Minimal): Cognitive 1st Order (Cog 1; sum of "Belief" scores); Cognitive 2nd Order (Cog 2; sum of "Intent" scores); Affective (Aff; sum of "Feel" scores); Structural Language (SL; CELF4-A, Core Language Score); Demographic: Age (at time of assessment, based on official records for date of birth); Ethnicity (Eth; based on self-report of cultural identification; for correlation: Indigenous = 1, Non-Indigenous = 2); SES (in terms of SEIFA categories, based on self-report of most recent address).

Youth offenders had significantly higher levels of CU traits (M = 27.74, SD = 8.62; $t(128) = 3.05$, $p = .003$) and anxiety (M = 6.23, SD = 4.18; $t(128) = 2.08$, $p = .040$) than non-offenders (CU traits: M = 23.35, SD = 6.69; Anxiety: M = 4.67, SD = 4.11). In contrast, youth offenders had significantly lower scores for cognitive PT (first order: M = 11.70, SD = 1.98; $t(128) = -2.53$, $p = .013$; second order: M = 10.98, SD = 2.21; $t(128) = -2.98$, $p = .004$), affective PT (M = 12.79, SD = 1.75; $t(128) = -3.02$, $p = .003$), and structural language (M = 70.00, SD = 17.17; $t(128) = -8.30$, $p < .001$) than non-offenders (first order cognitive PT: M = 12.57, SD = 1.76; second order cognitive PT: M = 12.10, SD = 1.89; affective PT: M = 13.57, SD = 1.19; structural language: M = 95.35, SD = 16.35). There were no significant correlations between CU traits or anxiety and either cognitive or affective PT. Structural language was negatively correlated with CU traits ($r = -.18$, $p = .047$), with better structural language skill associated with lower CU traits. Structural language was positively correlated with both cognitive PT (first order: $r = .46$, $p > .001$; second order: $r = .56$, $p > .001$), and affective PT ($r = .40$, $p > .001$). In each case, better structural language skill was associated with better PT skills.

7.3.2 Tests of Main Study Hypotheses

The results of hierarchical regression analyses testing main effects of CU traits, anxiety and offender status, as well as interactions between CU traits and anxiety, on cognitive and affective perspective taking appear in Table 16.

In the model testing predictors of first order cognitive PT there was a significant main effect for offender status (ß = -.40, $p < .001$), in which status as an offender was associated with poorer first order cognitive PT. There were no significant main effects for CU traits or anxiety. However, there was a significant interaction between CU traits and anxiety in this model (ß = -.28, $p = .001$). This significant interaction was probed by testing the conditional

Table 16 *Hierarchical Regression Analyses for Cognitive and Affective Perspective Taking with Predictors CU traits, Anxiety and Offender Status*

	Cognitive Perspective Taking						Affective Perspective Taking		
	First Order			Second Order					
	β	*b* [95% CI]	R^2	*β*	*b* [95% CI]	R^2	*β*	*b* [95% CI]	R^2
Age	.28**	.40 [.14, .66]		.27**	.43 [.14, .72]		.16	.18 [-.04, .40]	
Ethnicity	.23**	.88 [.24, 1.50]		.19*	.82 [.12, 1.51]		.05	.17 [-.36, .69]	
SES	.18*	.19 [.03, .36]		.19*	.21 [.03, .40]		.26**	.23 [.08, .37]	
Offender Status	-.40***	-1.60 [-2.37, -.84]		-.44***	-1.93 [-2.78, -1.08]		-.42***	-1.37 [-2.01, -.73]	
ICU	.10	.02 [-.02, .06]		.08	.02 [-.03, .06]		.14	.03 [-.01, .06]	
Anxiety	.05	.02 [-.06, .10]		.07	.04 [-.05, .12]		.11	.04 [-.02, .11]	
			.20***			.20***			.17***
ICU x Anxiety	-.28***	-.02 [-.03, -.01]		-.36***	-.02 [-.03, -.01]		-.26**	-.01 [-.02, -.01]	
			.23***			.31***			.23**

Notes: *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$. *β* = standardized beta, *b* = unstandardized beta, CI = confidence interval.

Variables: Age (centred); Ethnicity (dichotomised with weighted effect size: Indigenous Australian = -.54; non-Indigenous Australian = .46); SES (centred); Offender Status (dichotomised with weighted effect coding: Youth offender = .38; Non-offender = -.62); CU Traits (ICU total scale score; centred); Anxiety (YSR anxious-depressed sub-scale score; centred); Perspective Taking (TASIT, Social Inference Minimal): Cognitive 1st Order (sum of "Belief" scores); Cognitive 2nd Order (sum of "Intent" scores); Affective (sum of "Feel" scores).

effects of CU traits on first order cognitive PT at high and low anxiety (as illustrated in Figure 8). CU traits were significantly related to first order cognitive PT when anxiety was low (ß = .36, $p = .001$), but not when anxiety was high. That is, higher scores on CU traits were associated with better first order cognitive PT, but only for youth low in anxiety (i.e. primary variant CU traits). For youth high in anxiety (i.e. secondary variant CU traits), there were no significant associations between CU traits and first order cognitive PT.

In the model testing predictors of second order cognitive PT there was a significant main effect for offender status (ß = -.44, $p < .001$), in which status as an offender was associated with poorer second order cognitive PT. There were no significant main effects for CU traits or anxiety. However, there was a significant interaction between CU traits and anxiety in this model (ß = -.36, $p < .001$). This significant interaction was probed by testing the conditional effects of CU traits on second order cognitive PT at high and low anxiety (as illustrated in Figure 9). CU traits were significantly related to second order cognitive PT when anxiety was low (ß = .41, $p < .001$), as well as when anxiety was high (ß = -.30, $p = .009$). That is, higher scores on CU traits were associated with better second order

Figure 8 *Associations Between First Order Cognitive PT and CU Traits Among Youth with High Versus Low Levels of Anxiety*

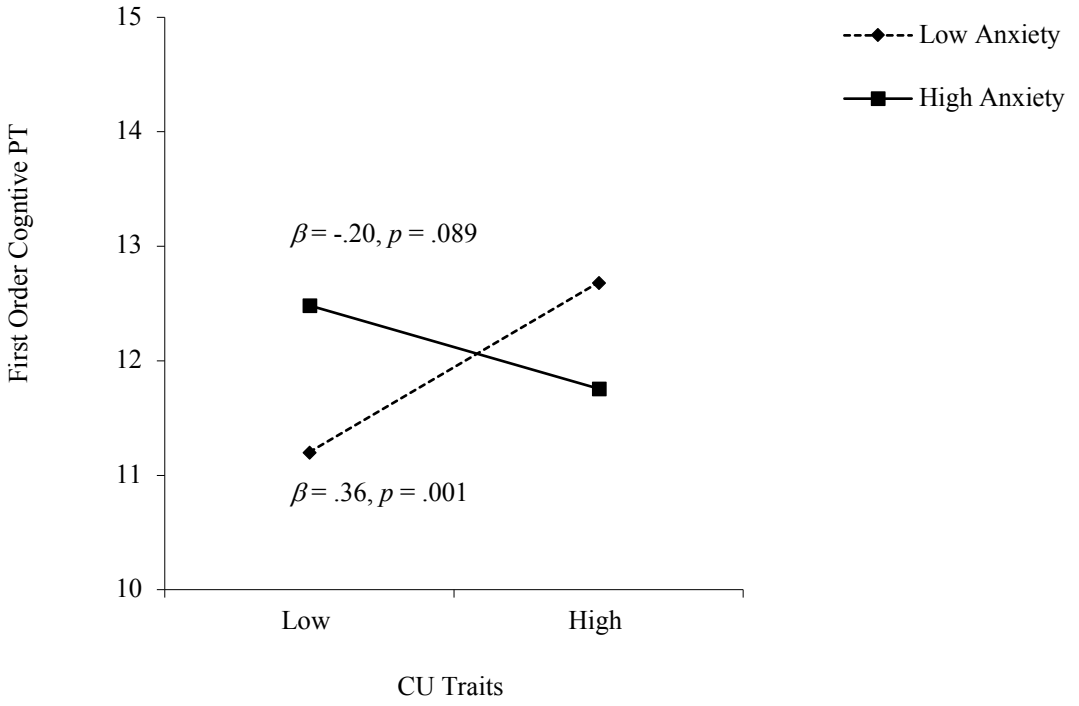
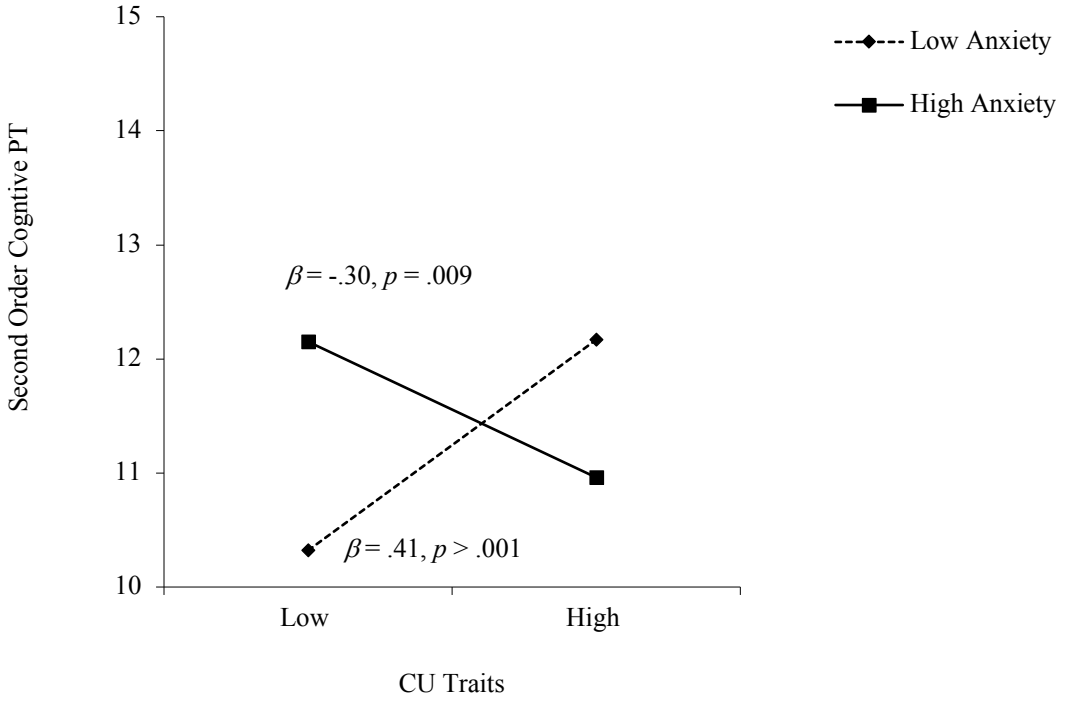


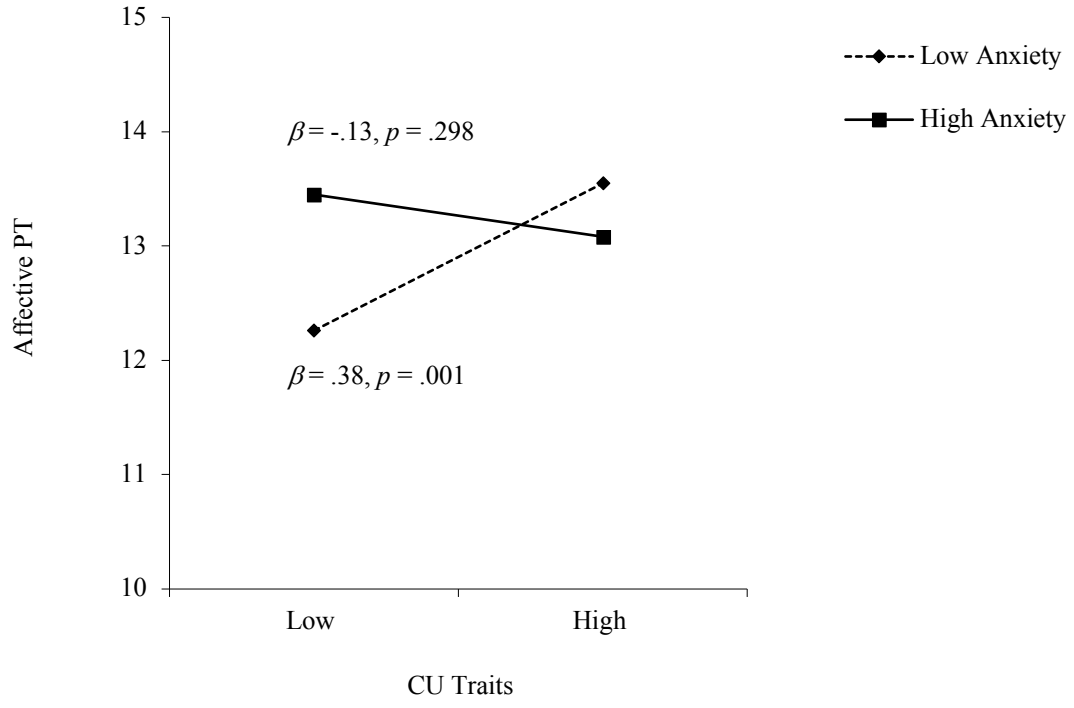
Figure 9 *Associations Between Second Order Cognitive PT and CU Traits Among Youth with High Versus Low Levels of Anxiety*



cognitive PT for youth low in anxiety (i.e. primary variant CU traits), but with poorer second order cognitive PT for youth high in anxiety (i.e. secondary variant CU traits).

In the model testing predictors of affective PT there was a significant main effect for offender status (ß = -.42, $p < .001$), in which status as an offender was associated with poorer affective PT. There were no significant main effects for CU traits or anxiety. However, there was a significant interaction between CU traits and anxiety in this model (ß = -.26, $p = .003$). This significant interaction was probed by testing the conditional effects of CU traits on affective PT at high and low anxiety (as illustrated in Figure 10). CU traits were significantly related to affective PT when anxiety was low (ß = .38, $p = .001$), but not when anxiety was high. That is, higher scores on CU traits were associated with better affective PT, but only for youth low in anxiety (i.e. primary variant CU traits). For youth high in anxiety (i.e. secondary variant CU traits), there were no significant associations between CU traits and affective PT.

Figure 10 *Associations Between Affective PT and CU Traits Among Youth with High Versus Low Levels of Anxiety*



7.3.3 Post Hoc Analyses

To test whether the significant effects in the previous regression models were independent of individual differences in structural language, the models were repeated with the addition of structural language skills to step one.

In the model testing predictors of first order cognitive PT there was a significant main effect for structural language (ß = .48, $p < .001$), in which better language skill was associated with better first order cognitive PT. There were no significant main effects for offender status, CU traits or anxiety. However, there was a significant interaction between CU traits and anxiety (ß = -.23, $p = .003$). This significant interaction was probed by testing the conditional effects of CU traits on first order cognitive PT at high and low anxiety. CU traits were significantly related to first order cognitive PT when anxiety was low (ß = .31, $p = .004$), but not when anxiety was high. That is, higher scores on CU traits were associated with better first order cognitive PT, but only for youth low in anxiety (i.e. primary variant CU traits). For youth high in anxiety (i.e. secondary variant CU traits), there were no significant associations between CU traits and first order cognitive PT.

In the model testing predictors of second order cognitive PT there was a significant main effect for structural language (ß = .63, $p < .001$), in which better language skill was associated with better second order cognitive PT. There were no significant main effects for offender status, CU traits or anxiety. However, there was a significant interaction between CU traits and anxiety (ß = -.29, $p < .001$). This significant interaction was probed by testing the conditional effects of CU traits on second order cognitive PT at high and low anxiety. CU traits were significantly related to second order cognitive PT when anxiety was low (ß = .34, $p < .001$), as well as when anxiety was high (ß = -.24, $p = .017$). That is, higher scores on CU traits were associated with better second order cognitive PT for youth low in anxiety (i.e.

primary variant CU traits), but with poorer second order cognitive PT for youth high in anxiety (i.e. secondary variant CU traits).

In the model testing predictors of affective PT there was a significant main effect for structural language (ß = .37, p = .001), in which better language skill was associated with better affective PT. There were no significant main effects for offender status, CU traits or anxiety. However, there was a significant interaction between CU traits and anxiety (ß = -.22, p = .008). This significant interaction was probed by testing the conditional effects of CU traits on affective PT at high and low anxiety. CU traits were significantly related to affective PT (ß = .34, p = .003) when anxiety was low, but not when anxiety was high. That is, higher scores on CU traits were associated with better affective PT, but only for youth low in anxiety (i.e. primary variant CU traits). For youth high in anxiety (i.e. secondary variant CU traits), there were no significant associations between CU traits and affective PT.

As such, and as can be seen in Table 17, when structural language was included in regression models offender status was no longer associated with indices of PT. Conversely, the interaction between CU traits and anxiety remained uniquely associated with these indices, independent of structural language.

7.4 Discussion

The current study investigated associations between antisocial behaviour, variants of CU traits, and cognitive and affective perspective taking. Findings support the hypothesis that associations between CU traits and cognitive PT are moderated by anxiety and therefore differ between putative variants of CU traits. Specifically, for youth with primary variant CU traits, higher levels of these traits were associated with better cognitive PT skills (both first and second order). This finding is consistent with Kahn et al. (2017), who found that CU traits were associated with better cognitive PT, but only among adolescents with primary

Table 17 *Hierarchical Regression Analyses for Cognitive and Affective Perspective Taking with Predictors CU traits, Anxiety, Offender Status and Structural Language*

	Cognitive Perspective Taking						Affective Perspective Taking		
	First Order			Second Order					
	β	*b* [95% CI]	R^2	β	*b* [95% CI]	R^2	β	*b* [95% CI]	R^2
Age	.33***	.47 [.22, .71]		.33***	.52 [.27, .77]		.19*	.22 [.01, .44]	
Ethnicity	.11	.44 [-.17, 1.05]		.04	.18 [-.45, .81]		-.03	-.11 [-.64, .42]	
SES	.09	.10 [-.07, .26]		.07	.08 [-.09, .25]		.20*	.17 [.03, .31]	
Offender Status	-.12	-.47 [-1.32, .38]		-.07	-.29 [-1.17, .60]		-.20	-.65 [-1.39, .09]	
ICU	.09	.02 [-.02, .06]		.07	.02 [-.02, .06]		.14	.03 [-.01, .06]	
Anxiety	-.02	-.01 [-.08, .07]		-.01	-.01 [-.08, .07]		.07	.03 [-.04, .09]	
Structural Lang	.48***	.05 [.03, .06]		.63***	.07 [.05, .09]		.37***	.03 [.01, .05]	
			.32***			.41***			.26***
ICU x Anxiety	-.23**	-.01 [-.02, -.01]		-.29***	-.02 [-.03, -.01]		-.22**	-.01 [-.02, -.01]	
			.38**			.49***			.29**

Notes: *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$. β = standardized beta, *b* = unstandardized beta, CI = confidence interval.

Variables: Age (centred); Ethnicity (dichotomised with weighted effect size: Indigenous Australian = -.54; non-Indigenous Australian = .46); SES (centred); Offender Status (dichotomised with weighted effect coding: Youth offender = .38; Non-offender = -.62); CU Traits (ICU total scale score; centred); Anxiety (YSR anxious-depressed sub-scale score; centred); Structural Language (CELF-4, Core Language Score; centred); Perspective Taking (TASIT, Social Inference Minimal): Cognitive 1st Order (sum of "Belief" scores); Cognitive 2nd Order (sum of "Intent" scores); Affective (sum of "Feel" scores).

variant CU traits. Among youth with secondary variant CU traits in the current sample there was no association between these traits and first order cognitive PT. Higher secondary variant CU traits were, however, associated with poorer second order cognitive PT. This evidence that associations between CU traits and cognitive PT may be somewhat specific both to variant of CU traits, as well as first or second order forms of cognitive PT, may provide some insight into the prior finding of a non-significant negative association between CU traits and overall cognitive PT in individuals with secondary variant CU traits (Kahn et al., 2017).

The current findings are also consistent with broader conceptualisations of primary and secondary variant CU traits. In the current sample adolescents with secondary variant CU traits demonstrated poorer skills for inferring what a speaker intended another to believe (second order cognitive PT), suggesting deficits in more complex cognitive PT skills. This is consistent with evidence that the secondary variant of CU traits is associated with more severe childhood maltreatment (Cecil et al., 2018; Kahn, Frick, et al., 2013; Kimonis, Frick, et al., 2012), which has been linked to delayed development of higher level theory of mind (Cicchetti, Rogosch, Maughan, Toth, & Bruce, 2003; O'Reilly & Peterson, 2015; Pears &

Fisher, 2005). In contrast, individuals with primary variant CU traits in the current sample demonstrated enhanced ability to infer both what a speaker believed and what a speaker intended another to believe.

As noted by Kahn et al.(2017), the finding that primary CU traits are associated with better cognitive perspective taking can be seen as consistent with theories and past research suggesting that individuals with these traits have an enhanced ability to notice when others are vulnerable, which may facilitate self-serving manipulative behaviour towards others (Cleckley, 1941; Salekin, Andershed, & Clark, 2018; Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003). Not only was this form of cognitive empathy associated with primary variant CU traits in our sample, but so too was affective PT - the other major form of cognitive empathy indexed. It is noteworthy that affective PT was previously found to be unrelated to primary CU traits in the only study that has investigated this specific association to date (Kahn et al., 2017). It is unclear whether methodological differences in sampling or measurement in the current study, such as the use of a particularly real-world test of PT comprising video-based interpersonal cues (McDonald, Flanagan, Martin, & Saunders, 2004), may account for the mixed findings between these studies. The current study nonetheless raises the possibility that the better PT skills demonstrated by youth with primary CU traits may be more generalised than has previously been suggested.

In terms of associations between antisocial behaviour and perspective taking, participant status as an offender was associated with both significantly poorer cognitive PT (first and second order) and significantly poorer affective PT. This is consistent with predictions, and with previous research that has found adolescent and adult offenders to have poor perspective taking skills in general (Chandler, 1973; Morosan et al., 2017; Newbury-Helps et al., 2017). However, in the current study offender status was no longer associated with either cognitive or affective PT when structural language was controlled for. This is noteworthy, given the

role that language is known to play in social cognition. Evidence has shown that language ability and perspective taking ability are highly correlated (Gore, Barnes-Holmes, & Murphy, 2010). Research focusing on children with language and communication deficits has provided evidence to suggest that language ability is a key element for success in tasks requiring understanding of the perspectives of others (Andrés-Roqueta, Adrian, Clemente, & Katsos, 2013; Ford & Milosky, 2003; Nilsson & López, 2015; Norbury, 2005; Spanoudis, 2016). Further, some researchers have demonstrated developmental linkages between language skill, social cognitive skill and social behavioural outcomes (Botting & Conti-Ramsden, 2008; Im-Bolter et al., 2013). One study has even provided evidence that language functioning may mediate the association between social cognition and antisocial behaviour (Yaghoub Zadeh et al., 2007). Likewise, there has been some research to indicate that CU traits are associated with individual differences in language skills (e.g., Hervé et al., 2003; Kiehl et al., 1999; Stephen Long & Titone, 2007; Vaughn et al., 2011). Despite this, our data indicate that associations between variants of CU traits and PT are not explained by language deficits, which may be implicated in other risk processes for antisocial behaviour

When interpreting the results reported for this study a number of limitations must be taken into consideration. The current sample included only male participants. It is important that findings are replicated with female participants because there is evidence that different associations exist between CU traits and anxiety (Dadds et al., 2009), empathy (D. Jolliffe & Farrington, 2007), and antisocial behaviour (Hicks et al., 2010) in females. In addition, as this was a cross-sectional study, it is essential that results relating to differential associations between variants of CU traits and forms of perspective taking are not interpreted in terms of causal mechanisms. Ideally, the findings from the current and related (e.g., Kahn et al., 2017; Lui et al., 2016) studies will inform future longitudinal investigations of the temporal development of different facets of cognitive and affective PT among youth at high risk for

developing primary or secondary variants of CU traits. Finally, although multiple forms of PT were examined in the current study, these were nonetheless indexed by a single test. In future research, assessment made up of a number of tests of these capacities could provide more detailed evidence of the differences in PT skill profiles (e.g., Dziobeck et al., 2006) between individuals exhibiting primary and secondary variants of CU traits. Also, analysis of composite measures of multiple tests may potentially provide more robust support for the emerging evidence that primary variant CU traits may be associated with better PT ability.

7.4.1 Conclusions

The findings of the current study highlight the value of applying a fine-grained conceptualisation to a number of the developmental factors implicated in current models of antisocial behaviour. Our findings support the distinction between primary and secondary variants of adolescent CU traits based on level of anxiety, which in our sample were associated with significantly different skill profiles for perspective taking. This may in turn indicate that these subgroups of youth may benefit from distinct intervention. Our findings may also inform models of the developmental mechanisms that contribute to antisocial outcomes and CU traits across childhood and adolescence. That higher levels of cognitive and affective PT skills distinguished primary from secondary variants of CU traits in the manner seen here suggests that perception of the beliefs, intentions and feelings of others may facilitate manipulative antisocial behaviour in individuals with primary variant CU traits. Further, that inclusion of structural language skill in analyses, although negating associations between offender status and PT, had minimal impact on associations between variants of CU traits and PT, reinforces the importance of this relationship. While literature on psychopathy and CU traits has generally emphasised deficits in empathy, it has become apparent that this is not universal to all manifestations of psychopathy or CU traits, or all forms of empathy. As

has been demonstrated in the current study, a key strategy in developing understanding of the subtleties of these associations is to employ a nuanced perspective.

7.5 Making the Link

The main purpose of the current study was to examine associations between PT skills, CU traits and youth offending. In addition, investigation was made of the influence of structural language skills on these associations. Findings supported an association between better cognitive and affective PT skills and primary variant CU traits, and between poorer second order cognitive PT skills and secondary variant CU traits. These associations were not significantly altered by the introduction of structural language to analyses. However, the relationship between cognitive and affective PT and youth offending was significant only when structural language was not controlled for. The findings of this study highlight the complex interplay between variables in association with antisocial behaviour. Differences in associations between language variables and youth offending, based on levels or subtypes of other variables were apparent in empirical study 1 (Chapter 5), and further demonstrated in empirical study 2 (Chapter 6). The current study reinforced these findings, as well as extending the concept to include associations between aspects of empathy and youth offending. Further, the current study provides a clear response to the limited research regarding linkages between key biopsychosocial factors and associations between oral language deficits and youth offending (as outlined in Chapter 2). With empirical study 2 (Chapter 6), findings from the current study provide some of the first evidence I am aware of relating to the complex interrelationships between specific oral language skills, youth offending, variants of CU traits and specific aspects of empathy.

CHAPTER 8 - GENERAL DISCUSSION

Antisocial behaviour in children and adolescents inflicts a high cost on society, as well as on those engaged in such conduct. Evidence suggests that a range of individual and contextual factors increase the risk of youth participation in antisocial behaviour (e.g., Darrick Jolliffe et al., 2017). One of the most well established individual risk factors for antisocial behaviour is oral language deficits (e.g., Yew & O'Kearney, 2013). Understanding of the mechanisms underlying this risk have been constrained by a focus on general indices of oral language (such as measures of cognitive verbal ability), as well as more limited investigation of the relationship between typical or superior oral language skills and antisocial behaviour. Growing evidence has also suggested that the role of oral language deficits and other risk factors may differ across heterogeneous subgroups of antisocial youth. In recent years considerable evidence of this kind has come from research into subgroups characterised by high versus low levels of callous unemotional (CU) traits (e.g., Frick et al., 2005). While oral language skills and CU traits have been separately demonstrated to have strong associations with antisocial behaviour, only a small number of studies have investigated interactions between these two factors in relation to antisocial outcomes. Further, emerging evidence suggests that exploring variants of CU traits (distinguished by high and low levels of anxiety) is likely to provide more clarity regarding interactions with different dimensions of oral language skills, as well as with different dimensions of empathy in associations with antisocial behaviour.

The overall aim of the current research was to examine associations between oral language deficits, CU traits, cognitive empathy and adolescent antisocial behaviour. The major focus was on increasing understanding of the complexity of interrelationships between these variables by concentrating on discrete subtypes of each. Existing research in which

discrete dimensions of oral language, CU traits, cognitive empathy and/or antisocial behaviour have been assessed has revealed that different associations exist between these factors at a fine-grained level. However, while a range of research has implicated oral language deficits, CU traits and some aspects of cognitive empathy in the development of antisocial behaviour, relatively little research has investigated how these variables are interrelated. Research into the interplay between these variables is therefore needed and stands to contribute significantly to current models of antisocial behaviour in youth.

8.1 Principle Findings

8.1.1 Systematic Review

In order to examine the current evidence regarding associations between discrete oral language skills and criminal behaviour in children and adolescents, a systematic review of published research was first conducted (see Chapter 2). Seventeen studies, reporting on 16 independent samples were identified. Findings indicated a strong association between oral language deficits and antisocial behaviour. Specifically, youth offender groups consistently demonstrated poorer scores on language measures than non-offenders, and relatively high proportions of youth offenders met criteria for clinically significant language disorder. The extent to which discrete oral language skills were particularly problematic for youth offenders was, however, less clear. Generally, youth offenders performed poorly across all language skills. A few studies investigated differences between scores on receptive and expressive components of language but overall, findings were inconsistent.

Findings also provided limited information regarding the biopsychosocial factors demonstrated to influence the oral language skill-antisocial behaviour association. There was some evidence that gender, ethnicity, education, neurobiological disorders and early maltreatment influenced the association between oral language profiles and youth offending.

However, as evidence relating to these factors was only found in a small number of studies, and few studies used sophisticated statistical techniques to investigate these relationships, it was difficult to form firm conclusions. Overall, the systematic review provided clear evidence that youth offenders tend to have poor oral language, across a range of discrete skills. More importantly, the systematic review highlighted the need for research directed towards investigating the biopsychosocial mechanisms that influence the association between discrete oral language profiles and youth offending.

8.1.2 Higher Order Language Skills: Risk-Promotive-Protective Associations

In study 1 (see Chapter 5) the associations between discrete higher order language (HOL) skills and youth offending were examined through the risk-promotive-protective paradigm (outlined by Farrington et al., 2016). As anticipated the three HOL skills investigated – understanding ambiguity, making inferences, and understanding figurative language, all demonstrated both risk and promotive associations with youth offending. That is, for each HOL skill, weaker skills were associated with a higher probability of being a youth offender, while stronger skills were associated with a higher probability of being a non-offender. Interestingly, only two of these three HOL skills demonstrated the predicted significant risk-based protective association for those deemed at risk of offending due to their low nonverbal ability (NVA). Specifically, higher levels of understanding ambiguous and figurative language, but not making inferences, predicted a lower probability of youth offending among youth with low NVA.

The findings from this study were consistent with research that has demonstrated low verbal ability to be a risk factor for antisocial and criminal behaviour (e.g., Beaver et al., 2013), as well as research that has shown youth offenders to have poorer HOL skills than their non-offending peers (e.g., Snow & Powell, 2011a). More importantly, evidence from

this study adds to the small body of research showing that stronger oral language skills have a promotive association with youth offending, through the prediction of a higher probability of being a non-offender (Farrington et al., 2016; Loeber et al., 2007). Most significantly, this study provides the first evidence that specific HOL skills may mitigate the risk for offending in youth at risk due to poor NVA. This risk-based protective effect has only been previously shown for verbal ability, and not in relation to another cognitive risk factor (Farrington et al., 2016; J. L. White et al., 1989).

8.1.3 Oral Language Skills, Variants of CU Traits, Patterns of Antisocial Behaviour

In study 2 (see Chapter 6), associations between discrete oral language skills, variants of CU traits (differentiated by high or low anxiety) and antisocial behaviour were investigated. Status as a youth offender was strongly associated with poorer structural, higher order, and conversational inferential language skills. Findings supported the notion that both variant of CU traits and specific oral language skill would influence associations between CU traits and oral language skills. For individuals with secondary variant CU traits (i.e. high CU traits, high anxiety), higher CU traits were significantly associated with poorer higher order, narrative and conversational inferential language skills, and demonstrated a trend towards a significant association with poorer structural language skills.

In contrast, individuals with primary variant CU traits (i.e. high CU traits, low anxiety) demonstrated no significant association between level of CU traits and structural, higher order and narrative language skills. Unexpectedly, for these youth there was a significant association between higher CU traits and better skills in conversational inference. Further, among youth offenders, those with primary variant CU traits and higher structural language skills demonstrated significantly higher levels of violent offending. Also, youth offenders

with primary variant CU traits and higher conversational inference skills demonstrated a significantly earlier age of first offence.

The findings from this study were consistent with previous research evidence that youth offending is associated with deficits in a range of discrete oral language skills (e.g., Hopkins et al., 2017), that CU traits are associated with different patterns of oral language skill (e.g., K. Blair et al., 2006), and that CU traits moderate the association between oral language skill and specific patterns of offending (e.g., Johansson & Kerr, 2005; Munoz et al., 2008). However, by investigating specific, rather than global, measures of oral language skill, this study provided novel evidence regarding the complex associations between discrete oral language skills and variants of CU traits. Further, by differentiating between primary and secondary variants of CU traits, this study provided the first evidence that primary variant CU traits, specifically, interact with higher levels of oral language skills in relation to indices of offending.

8.1.4 Variants of CU Traits, Cognitive Empathy, Antisocial Behaviour

In study 3 (see Chapter 7), associations between antisocial behaviour, primary and secondary variants of CU traits, and cognitive and affective perspective taking (PT) were investigated. For individuals with primary variant CU traits (i.e. high CU traits, low anxiety), findings supported the prediction that higher CU traits would be associated with better first and second order cognitive PT. Unexpectedly, among individuals with primary variant CU traits, higher CU traits were also associated with better affective PT. For individuals with secondary variant CU traits (i.e. high CU traits, high anxiety), no association was found between level of CU traits and first order cognitive or affective PT. Higher levels of CU traits were, however, associated with poorer second order cognitive PT. These associations between

variants of CU traits and indices of PT remained when structural language skill was added to analyses.

Consistent with predictions, participant status as an offender was associated with poorer cognitive PT (first and second order) and poorer affective PT. Yet, consistent with evidence of developmental linkages between oral language skills, social cognitive skills and social behavioural outcomes (e.g., Im-Bolter et al., 2013), these associations were no longer statistically significant when structural language skill was controlled for. The findings from this study were partially consistent with Kahn et al. (2017), who found associations between primary variant CU traits and higher levels of cognitive PT. More importantly, findings from the current study extend upon this prior research, with evidence that deficits in cognitive PT among individuals with secondary variant CU traits may be specific to second order cognitive PT (i.e. understanding what another intends). In addition, current findings provide an alternative perspective regarding the potential association between primary variant CU traits and affective PT.

8.2 Implications for Theoretical Perspectives on Antisocial Behaviour

8.2.1 A Complex Interplay Between Risk Factors

Findings from the three empirical studies included in the current thesis are consistent with developmental models in which antisocial behaviour results from a complex interplay between risk factors (Moffitt, 1993). In each study, components of individual risk factors for antisocial behaviour were demonstrated to have different relationships with components of other individual risk factors in association with different patterns of antisocial behaviour. For example, in study 1 (Chapter 5), understanding ambiguous and figurative language, but not making inferences, had risk-based protective associations with youth offending for youth potentially at-risk due to low nonverbal ability. In study 2 (Chapter 6), primary variant CU traits, but not secondary variant CU traits, interacted with better skills in specific oral

language dimensions in associations with specific indices of offending. In study 3 (Chapter 7), secondary variant CU traits were associated with poorer second order cognitive perspective taking, but had no association with first order cognitive PT or affective PT. These and other findings from the current thesis exemplify the complexity of associations that may ultimately influence antisocial and criminal outcomes for adolescents. However, by investigating established risk factors for antisocial behaviour at a fine-grained level the current research has provided novel evidence that may inform theories of the possible mechanisms through which these risk factors contribute to antisocial outcomes.

8.2.2 Demarcating Unique Subgroups of Antisocial Youth: Variants of CU Traits

Findings from studies 2 and 3 (Chapters 6 and 7) of the current thesis provide support for theoretical models in which higher CU traits designate a unique subgroup of antisocial youth. More importantly, the current research findings add to a growing body of evidence that individuals with primary (i.e. high CU traits, low anxiety) and secondary (i.e. high CU traits, high anxiety) variants of CU traits are distinguished by different risk profiles, neurocognitive deficits and behavioural outcomes (e.g., Kahn, Frick, et al., 2013; Kimonis, Frick, et al., 2012). In the current research secondary variant CU traits were associated with poorer pragmatic language, across three distinct skills (higher order, narrative and conversational inference), as well as poorer second order cognitive PT. These findings are consistent with secondary variant CU traits being associated with more severe childhood maltreatment (e.g., Sharf et al., 2014). Specifically, research has found links between adverse childhood experiences and delayed and/or deficient development of oral language skills (e.g., Sylvestre et al., 2015) and components of cognitive empathy (e.g., O'Reilly & Peterson, 2015).

Current findings also indicated that for youth with secondary variant CU traits, poorer structural language skills were associated with more violent offending. This is consistent with

theoretical predictions that secondary variant CU traits are associated with emotional dysregulation and behavioural activation. Such executive functions are thought to interact with oral language skills in associations with antisocial behaviour (e.g., Eme, 2009; Nigg & Huang-Pollock, 2003). The current research findings imply that deficits in structural language skills specifically (i.e. those relating to the reception and expression of the form and content of language; Paul & Norbury, 2012) potentially play a role in reactive aggression. It has been suggested that the mechanisms that may underpin this association relate to reduced ability to manipulate oral language to internally verbalise alternate solutions or externally negotiate positive outcomes in situations of conflict (Petersen et al., 2013).

In the current research, primary variant CU traits were associated with better skills specifically in conversational inference (a higher level pragmatic language skill), as well as better skills in cognitive (both first and second order) and affective perspective taking. These findings are consistent with conceptualisations of individuals with primary variant CU traits being relatively free from the adverse childhood experiences (e.g., Dadds et al., 2018) potentially associated with delayed or deficient development of oral language and cognitive empathy. Current findings are also consistent with models in which individuals with primary variant CU traits or psychopathy have an enhanced ability to notice when other individuals are vulnerable, and have the skills to engage in self-serving manipulative behaviour towards others (Cleckley, 1941; Salekin et al., 2018; Skeem et al., 2003). Current research findings also suggested that among individuals with primary variant CU traits, better structural language skills were associated with higher levels of violent offending. Primary variant CU traits have been found to be associated with under-arousal of affect (S. Craig & Moretti, 2019) and less engagement with distressing emotional stimuli (Kimonis, Frick, et al., 2012). These affective deficits have been suggested to account for findings of higher levels of pro-active aggression among adolescents with conduct disorder and high CU traits (Lozier,

Cardinale, VanMeter, & Marsh, 2014), as well as enjoyment of callous treatment of others (Foulkes, McCrory, Neumann, & Viding, 2014) and pride in antisocial behaviour (Hare, 1999) among adult offenders with high levels of psychopathic traits. Perhaps, a better capacity to specifically manipulate oral language form and content may facilitate these processes.

The current research further indicated that better skills in conversational inference were associated with an earlier age of first offence among youth with primary variant CU traits. This finding is consistent with Johansson and Kerr's (2005) notion that individuals high on psychopathy or CU traits may be motivated to demonstrate their potential by applying superior skills (in the current research, in conversational inference) to antisocial activities. Conceivably, an antisocial pathway may be one of the limited options available to individuals with primary variant CU traits or psychopathy. This is because the affective deficits associated with high CU/psychopathy would diminish capacity to succeed in the sort of socially valued activities that would generally be accessible to an individual with, for example, superior skills in conversational inference (Johansson & Kerr, 2005).

8.2.3 Oral Language Skills as Risk Factors for Antisocial Behaviour

Poor verbal ability has long been associated with antisocial and criminal behaviour in children and adolescents (e.g., Isen, 2010). Developmental theories of antisocial behaviour propose that oral language deficits may confer risk for antisocial behaviour through interrelationships with executive functions (e.g., attention, inhibition, flexibility, regulation), which influence social problem solving ability and adaptability (Eme, 2009; Nigg & Huang-Pollock, 2003). Two key findings from the current research are consistent with this notion. First, better skills in understanding ambiguous and figurative language, but not making inferences, met criteria for risk-based protective associations with youth offending in youth

with lower NVA. Based on this finding, it could be argued that the capacity to engage with the sort of abstract linguistic concepts inherent in these tasks may benefit individuals whose capacities may be otherwise impacted by limitations in nonverbal functions (Baddeley, 2003). Second, for youth with secondary variant CU traits poorer pragmatic language skills across three dimensions (higher order language, narrative, and conversational inference) were associated with higher CU traits. Secondary variant CU traits are considered to be linked with a history of childhood maltreatment, which has also been shown to be associated with deficits in executive function (e.g., Fay-Stammbach, Hawes, & Meredith, 2017). The current findings are consistent with an interplay between poorer executive functioning and specific oral language skills resulting in ineffective social interaction and antisocial behaviour (e.g., Giancola & Mezzich, 2000).

Another way in which oral language skills are theorised to influence antisocial behaviour is through a combination of neuropsychological deficits (including deficits in oral language skills) disrupting typical socialisation (Lynam & Henry, 2000; Moffitt, 1993). In the current research, two key findings support this model. First, stronger skills in understanding ambiguous and figurative language, as well as the capacity to make accurate inferences were associated with a higher probability of being a non-offender. This implies that these specific skills may be particularly important for prosocial behaviour in adolescence. Second, offender status was not associated with either cognitive or affective PT when structural language was controlled for. This is consistent with conceptualisations of oral language skills as integral to understanding the perspectives of others and developing skills of social cognition (e.g., Spanoudis, 2016; Yaghoub Zadeh et al., 2007).

While an emphasis in prior research has been on associations between oral language deficits and antisocial outcomes, findings from a growing body of research demonstrate that higher levels of oral language skills do not always protect against engagement in antisocial

behaviour (e.g., Munoz et al., 2008). In the current research, primary variant CU traits were associated with better skills in conversational inference. Those with primary variant CU traits and better conversational inference skills also demonstrated a significantly earlier age of first offence, and those with primary variant CU traits and better structural language skills demonstrated significantly higher levels of violent offending. These findings are consistent with theoretical models in which a complex interplay of factors result in antisocial and criminal outcomes (e.g., Darrick Jolliffe et al., 2017). Typically, normative or superior oral language skills are considered to facilitate the development of prosocial behaviour (e.g., Girard, Pingault, Doyle, Falissard, & Tremblay, 2017). However, based on current findings, it seems possible that the neuropsychological deficits associated with primary variant CU traits (e.g., poor responsiveness to distress and punishment cues) could interact with normative or superior oral language skills to stimulate a different social developmental trajectory.

8.3 Implications for Intervention and Service Provision for Antisocial Youth

8.3.1 Early Identification

Previous research has revealed that individuals on the most severe and persistent trajectories for antisocial and criminal behaviour typically began engaging in disruptive behaviours early in life (e.g., DeLisi, 2006). High levels of CU traits, in particular, have been shown to be associated with a persistent pattern of antisocial behaviour (e.g., Frick et al., 2005). As indicated by the current research, however, it may be important to distinguish individuals with primary and secondary variants of CU traits at earlier stages of development. Current findings suggest that by adolescence, individuals with primary variant CU traits may have already begun to adapt skills (such as oral language and perspective taking) for antisocial purposes. Therefore, by this stage of development, their patterns of temperamental style, socio-cognitive skill-set and empathetic understanding may have become well

entrenched (e.g., Moul et al., 2018). Findings from the current research also indicate that for individuals with secondary variant CU traits, poorer skills in oral language and perspective taking may have increased vulnerability to engagement in antisocial behaviour by adolescence. Earlier identification could, at the very least, provide opportunities for development of core skills (such as oral language and perspective taking) that might facilitate more appropriate socialisation (e.g., Cecil et al., 2018; Hawes, Price, & Dadds, 2014).

Findings from the current research are consistent with the idea that efforts to improve oral language skills early in life could potentially mitigate risk for youth engagement in antisocial and criminal behaviour, including for youth with secondary variant CU traits. Existing research has demonstrated that oral language difficulties indicative of ongoing problems can be identified prior to school age (e.g., Chiat & Roy, 2013). Such early identification of oral language problems is important because children who begin school with oral language deficits are at risk of developing literacy difficulties (e.g., Catts, Fey, Zhang, & Tomblin, 1999) and experiencing poor educational attainment (e.g., Conti-Ramsden et al., 2009), both of which are also risk factors for antisocial behaviour (e.g., Murray & Farrington, 2010). Also, as children develop, oral language skills have been shown to be increasingly important for engagement in positive peer relationships (e.g., Fujiki, Brinton, Hart, & Fitzgerald, 1999), the inverse of which has also been shown to be associated with antisocial behaviour (e.g., Thornberry & Krohn, 2001).

8.3.2 Appropriate Assessment

A key contribution of the current research is that it highlights the importance of examining risk and prognostic factors for antisocial behaviour at a fine-grained, and/or dimensional level. The findings add to a growing body of evidence that distinguishing between primary and secondary variants of CU traits is important for understanding an

individual's involvement in antisocial behaviour. The inclusion of the limited prosocial emotions specifier for conduct disorder in the DSM-5 has promoted investigation of CU traits in the assessment of antisocial behaviour. However, current findings that indicate different associations between variants of CU traits and other risk factors associated with antisocial behaviour highlight the contribution assessment of anxiety could bring to understanding both developmental histories and future prospects of antisocial individuals with high levels of CU traits. This is particularly important for youth engaged with the justice system, where the risk-need-responsivity model (RNR; Bonta & Andrews, 2012) and risk assessment inventories (e.g., Shepherd, Luebbers, Ogloff, Fullam, & Dolan, 2014) influence both the level of supervision and type of intervention an individual is likely to receive in response to their criminal behaviour (A. P. Thompson & Putnins, 2003). While some of the risk assessment instruments commonly utilised with youth offenders in Australia include questions that capture some aspects of CU traits (e.g., Hoge & Andrews, 1995), these are unlikely to provide adequate information to distinguish between primary and secondary variant CU traits.

Findings from the current research also support the importance of assessing specific, rather than global aspects of oral language skills among children and adolescents engaged in antisocial behaviour. Although youth offenders generally performed poorly on all measures of oral language skill, discrete skills were shown to interact differently with other risk factors in association with antisocial behaviour. Evidence from the current research, therefore, indicates that developing a comprehensive language profile could be important for youth already involved, or at risk of becoming involved, in antisocial and criminal behaviour. Due to disordered language learning experiences associated with disrupted presence at home or in school (e.g., Sylvestre et al., 2015), these youth may exhibit unusual patterns of language deficits. In addition, these youth may have developed strategies (such as acquisition of social scripts, or provision of brief responses) to mask their oral language deficits (Hayes & Snow,

2013). However, in the current research, both poorer and better skills in specific oral language dimensions were shown to be related to patterns of antisocial behaviour, dependent on variant of CU trait. It is, therefore, important that investigation of oral language skills among antisocial youth does not focus solely on deficits. Establishing the association between oral language skills and variant of CU traits is particularly important in youth justice detention settings, where individuals with primary CU traits and better oral language skills may use these skills to manipulate peers and/or staff (Hare, 1998).

8.3.3 Targeted intervention

The oral language deficits found to be associated with antisocial behaviour in the current research imply that youth offenders could have a limited capacity to engage in intervention targeted toward remediating their antisocial behaviour. Current research findings suggest that intervention for antisocial behaviour in children and adolescents may need to be preceded, or at least accompanied, by intervention to remediate oral language deficits (e.g., Bryan & Gregory, 2013; Linares-Orama, 2005). Due to the diverse oral language profiles among antisocial youth and the complexity of the oral language system however, it may be necessary for oral language intervention to be individualised, especially in the case of severe deficits (Kaiser & Roberts, 2011). At the very least, current findings support suggestions that programs directed towards antisocial and criminal behaviours in youth should involve modification of resources and instructional language to ensure that these are accessible to participants (e.g., Lount, Hand, et al., 2017; Snow, 2019). However, it is clear from the current research that it should not be assumed that all youth who engage in antisocial behaviour will require intervention to improve their oral language skills. It seems possible that for youth with primary variant CU traits specifically, enabling oral language development in isolation could unintentionally facilitate more severe antisocial behaviour.

Although antisocial individuals with high levels of CU traits have been shown to have poorer response to intervention than other antisocial youth (Frick et al., 2014b), research has demonstrated that children with high levels of CU traits do demonstrate reductions in both CU traits and antisocial behaviour following intervention (e.g., Wilkinson, Waller, & Viding, 2016). A growing body of research has suggested that youth with high levels of CU traits generally, and primary variant CU traits specifically, may potentially benefit from different intervention strategies to those shown to be beneficial for other antisocial youth (Frick, 2016). There is evidence to suggest that reward-oriented approaches to promoting the development of skills in empathy and prosocial behaviour may be more effective for children and adolescents with high levels of CU traits engaged in antisocial behaviour (Dadds, Cauchi, Wimalaweera, Hawes, & Brennan, 2012). It has been suggested that individuals with primary variant CU traits may be more responsive to such approaches, in which emphasis is placed on the personal benefits to be gained from modification of beliefs and behaviours associated with aggression and violence (Docherty et al., 2016). In contrast, based on their probable concurrent deficits in oral language and perspective taking skills, implied in the current research, individuals with secondary variant CU traits may require pre-intervention or integrated remediation of oral language and perspective taking skills to support programming designed to reduce antisocial behaviours and CU traits.

8.4 Limitations

There are several common limitations across the studies reported in this thesis. First, the cross sectional nature of the current data precludes the drawing of causal inferences regarding the associations reported. While findings from the current research suggest that oral language deficits potentially play a role in the development of antisocial behaviour, only analysis of longitudinal data can confirm this (e.g., Brownlie et al., 2004). Further, current findings

indicate that individuals with primary variant CU traits may be more likely to have intact or superior oral language skills in adolescence, while individuals with secondary variant CU traits appear to have poorer oral language skills at this developmental period. Longitudinal data would be able to demonstrate how these associations manifest, as well as relationships between these and patterns of antisocial behaviour during development. Finally, longitudinal data would provide a fuller record with regard criminal careers, which would better facilitate investigation of associations between individual risk factors and different aspects of criminal careers, such as frequency, duration and severity.

Second, the current sample included only youth within the adolescent age-range. Use and understanding of discrete oral language skills changes over development stages, with specific skills having particular importance for effective learning and social engagement at different developmental periods (Nippold, 2016). Similarly, skills associated with empathy develop throughout childhood and adolescence, demonstrating different associations with oral language skill (Adshead, 2014) and antisocial (Lovett & Sheffield, 2007) or prosocial (Eisenberg et al., 1999) behaviour at different developmental stages. Further, differences have been found in relationships between CU traits and elements of empathy between childhood and adolescence (Dadds et al., 2009). It is therefore important that patterns reported in the current research are investigated in earlier developmental periods before any conclusions regarding consistency or change can be made.

Third, the inclusion of only male participants across the studies reported in this thesis confines the generalisation of the present result to samples of males. There is substantial evidence that females present with different rates and patterns of antisocial and criminal behaviour, compared to males (Moffitt et al., 2001). In addition, evidence from prior research suggests that females demonstrate different associations between oral language skills and antisocial behaviour (e.g., Snow et al., 2016), CU traits and antisocial behaviour (e.g., Hicks

et al., 2010), CU traits and empathy (e.g., D. Jolliffe & Farrington, 2007), and CU traits and anxiety (e.g., Dadds et al., 2009). It is also becoming evident that the complex interplay of risk factors resulting in antisocial outcomes is different for females than males (e.g., Javdani, Sadeh, & Verona, 2011). With statistics indicating that female participation in antisocial and criminal behaviour during childhood and adolescence is increasing (Holmes, 2010), it is important that associations between oral language skills, CU traits, empathy and antisocial behaviour are investigated in samples of female youth.

Fourth, for ethical and practical reasons, the current research did not assess symptoms of autism spectrum disorder (ASD). Although recent reviews suggest that individuals with ASD are not disproportionately over-represented in the justice system (e.g., King & Murphy, 2014; Rutten, Vermeiren, & Van Nieuwenhuizen, 2017), ASD is associated with key risk factors for antisocial behaviour. Specifically related to the current research, ASD has been shown to have strong associations with oral language deficits (e.g., Taylor, Maybery, Grayndler, & Whitehouse, 2015), and perspective taking skills (e.g., R. L. Young & Brewer, 2019), which potentially impact broader social cognitive skills and behaviour (e.g., Helland & Helland, 2017). Further, research has found that some individuals with ASD demonstrate high levels of CU traits (Leno et al., 2015), but that ASD and CU traits are associated with different profiles of deficits in cognitive and affective empathy (Pasalich, Dadds, & Hawes, 2014). In light of the associations between ASD and individual risk factors for antisocial behaviour investigated in the current research, it must be acknowledged that potentially undiagnosed ASD (e.g., Sutton et al., 2012) may have influenced some findings.

8.5 Directions for future research

8.5.1 Severity and patterns of antisocial behaviour

The focus of the current thesis was specifically on youth whose antisocial behaviour was defined by engagement with the criminal justice system. Research with this cohort of highly vulnerable youth is important for developing understanding of the risk processes that may underlie extreme antisocial behaviour, as well as informing justice related interventions. In the current research, information relating to aspects of individual participants' criminal career was provided by the youth justice agency. In future research, sourcing of information through a range of criminal justice entities, including the police and court systems, could provide more comprehensive findings, specifically relating to associations with patterns of offending (e.g., Ringland, 2014). It would therefore be beneficial for future studies to investigate the associations identified in the current research with a broader range of antisocial youth.

8.5.2 Components of empathy and social cognition

In the current research, investigation of associations between antisocial behaviour, oral language skills, CU traits and social cognition focussed specifically on cognitive empathy, in the form of perspective taking skills. Empathy and social cognition, however, can be indexed through a wide range of skills, behaviours and biological indicators. Valuable insights regarding the mechanisms that underlie antisocial behaviour can be gained from investigating associations between these different elements of empathy and social cognition and other risk factors for antisocial behaviour. For example, Kahn et al. (2017) found different associations between different measures of cognitive and affective empathy and primary and secondary variants of CU traits among youth offenders. Research has further demonstrated that investigating interactions between different elements of empathy and social cognition in

association with other risk factors for antisocial behaviour can better inform understanding of antisocial outcomes. For example, Lui, Barry and Sacco (2016) found that the association between CU traits and affective empathy was partially mediated by affective perspective taking, but not facial emotion recognition. Future research could apply some of the measures and data analyses employed in such studies to extending the findings of the current research. This would have the potential to further clarify associations between specific oral language skills, variants of CU traits, elements of empathy and patterns of antisocial behaviour.

8.5.3 Aboriginal and Torres Strait Islander Perspectives

In Australia, Aboriginal and Torres Strait Islander people are disproportionately over-represented within the youth justice system – representing 5% of youth aged 10 to 17, but 49% of youth aged 10 to 17 under supervision of youth justice agencies (Australian Institute of Health and Welfare, 2019). Consistent with this over-representation, the current research included a high proportion of Indigenous Australians. In order to manage potential impacts of this on results, ethnicity was statistically controlled for in all multivariate analyses. It was beyond the scope of the current thesis to separately analyse results on the basis of ethnicity. However, it is important to understand the potential differences between Indigenous and non-Indigenous Australians in terms of risk processes associated with antisocial behaviour. On the basis of the current research, it is proposed that two key areas may be particularly important for further investigation, if considered a priority by Indigenous Australian stakeholders.

The current research utilised a number of well-validated instruments to investigate CU traits, anxiety and PT skills. However, concern has been expressed regarding the use of psychological measures developed for socio-culturally dominant ethnicities when conducting research with Indigenous Australians (e.g., Newton, Day, Gillies, & Fernandez, 2015). Particular apprehension is associated with the potential negative consequences for Indigenous

Australians when psychological assessment is applied within a deficit model (Rickwood, Dudgeon, & Gridley, 2010) and symptoms or behaviours not necessarily considered problematic or atypical within Indigenous communities are pathologized (Dingwall & Cairney, 2010). Although the Indigenous Australian population is heterogenous, research has demonstrated that widely used psychological assessment instruments can be adapted for use with Indigenous Australians (e.g., Dingwall & Cairney, 2010; Newton et al., 2015). Also, research involving Indigenous New Zealanders (e.g., Ogden, Cooper, & Dudley, 2003) and Canadians (e.g., McCuish, Mathesius, Lussier, & Corrado, 2018) indicates that measures similar to those used in the current study can be successfully validated with Indigenous populations. Active consultation and engagement with Indigenous Australian researchers and communities could, therefore, lead to the effective adaptation of measures used in the current research to be more reflective of Aboriginal and Torres Strait Islander perspectives (Drew, Adams, & Walker, 2010; National Health and Medical Research Council, 2018).

Another potentially important way in which Australian research in this field could be enhanced concerns the assessment of language skills among Aboriginal and Torres Strait Islander populations. All of the participants in the current sample met the inclusion criteria of having undertaken the majority of their schooling in an English-speaking country, and reported that their primary language for communication was Standard Australian English (SAE). Nevertheless, linguists suggest that a substantial proportion of Australia's Indigenous population speak a form of Aboriginal English (Butcher, 2008; Eades, 2013), which can differ from SAE in systematic ways on a variety of levels, including phonology, vocabulary, semantics, pragmatics, and cultural conceptualisations (Eades, 2013; Malcolm, 2013; Sharifian, 2010). In the current research efforts were made to ascertain the extent to which participants engaged with non-standard forms of English. However, linguistic boundaries between SAE and forms of Aboriginal English can be subtle, vary extensively along a

continuum, are not systematically distributed throughout Australia at a community level and may not be clearly apparent to and/or acknowledged by users (Eades, 2013; Sharifian, 2008). Recent research has shown that Indigenous Australians engaged with the youth justice system demonstrate differences on oral language assessment performance, compared to non-Indigenous Australians (Snow et al., 2016), especially when SAE is not their first language (Kippin et al., 2018). The current research has provided novel evidence of associations between deficits in the dominant language system, other risk factors for antisocial behaviour and patterns of antisocial behaviour. More detailed investigations of how use of Aboriginal English and/or Indigenous languages impacts these associations could better inform targeted intervention for Indigenous Australians at risk for or engaged in antisocial behaviour.

8.6 Conclusions

It has been widely recognised that heterogeneity among groups of antisocial children and adolescents is linked to a complex interplay of risk factors experienced during development. Extensive research has demonstrated that oral language deficits and CU traits represent two important individual risk factors for antisocial outcomes. However, there have been limited attempts in previous research to investigate relationships between these two variables, especially at the fine-grained level. The overall aim of this thesis was to examine interrelationships between well-established individual risk factors for antisocial behaviour (oral language deficits, CU traits, empathy) and offender status among adolescents. A systematic review revealed that there was a need for more sophisticated analysis of the biopsychosocial factors potentially influencing the association between oral language deficits and youth offending. Together, findings from the three empirical studies demonstrated that relationships between oral language skills, CU traits and cognitive empathy varied depending on the elements or variants of each factor. Findings from the current research indicated that

discrete oral language skills had different associations with participation in, as well as patterns of antisocial behaviour in association with other risk factors, such as nonverbal ability and variants of CU traits. In addition, current findings suggested that primary and secondary variant CU traits were associated with different patterns of oral language and perspective taking skill and that, in some cases, this was associated with different patterns of antisocial behaviour. It is hoped that the findings from the current research will inform further investigation regarding the interplay between, oral language, CU traits, and antisocial behaviour, and more importantly, the translation of evidence regarding this interplay into effective intervention practices.

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APPENDICES

Appendix A: Key Characteristics of Studies Relevant to Systematic Review

Study	Country (Ethnicity)	Sample Size & Type‡	Age range (years)	% female	Measure of Language	Measure of Youth Offending	Other Measures	Evidence of language deficits
Bryan et al. (2017)	UK	118 (YO-I)	11-16	0	CELF-4; BPVS	JJU; offence type		11-42.4% of YO scored =/> 1.5SD below norm on language measures
Hopkins et al. (2017)	UK (mixed)	77 (YO-CB, *n* = 52; C, *n* = 25)	13-18	22	CELF-4; SALT-E	JJO	EA;SES; WASI	13-93% of YO scored 2SD or greater below norm on language measures Higher language scores associated with increased likelihood of being a non-offender (OR = 1.5 to 4.8)
Hughes et al. (2017)	UK	93 (YO-I)	15-18	0	TOWK	JJU	CHAT; K-BIT; RPC; SRS	30-47% of YO scored =/> 1.5SD below norm on language measures Language impairment associated with self-harm and alcohol use
Kippin et al. (2018)	Aus	98 (YO-I)	13-18	6	CELF-4; NWR	JJU	Audit-C; WASI(PRI) /WNSA	46% YO scored =/> 2SD below norm on language measures – 21% of SAE; 67% of AE; 25% of EAL
Lount et al. (2017)	NZ	72 (YO-I, *n* = 33; C, *n* = 39)	14-17	0	CELF-4; TNL	JJU	APTB; TONI-3	64% YO versus 10% C identified as language impaired
Winstanley et al. (2019)	UK	145 (YO-CB)	12-17	33	CELF-4	JJO	IMD; TAS-20; TOWRE-2; WIAT-II; WASI	58% male, 67% female YO met criteria for DLD – no sig gender differences DLD group sig poorer nonverbal, reading

‡ YO: Youth Offender; I: Incarcerated; CB: Community Based; C: Comparison. AE: Aboriginal English speaker; SAE: Standard Australian English speaker ; EAL: English as an Additional Language speaker. DLD: Developmental Language Disorder.

Language Measures: BPVS-II: British Picture Vocabulary Scale; CELF- 4: Clinical Evaluation of Language Fundamentals – /4th ed.; NWR: nonword repetition; SALT-E: Systematic Analysis of Language Transcripts, Expository Discourse task; TNL: Test of Narrative Language; TOWK: Test of Word Knowledge. **Youth Offending Measures:** JJO: Juvenile Justice Order; JJU: Juvenile Justice Unit. **Other Measures: APTB:** Auditory processing test battery; Audit-C: Alcohol Use Disorders Identification Test-Consumption; CHAT: (mental health assessment); EA: Education Attendance; IMD: Index of Multiple Deprivation: K-BIT: Kaufman Brief Intelligence Test; RPC: Rivermead Post Consciousness Symptoms Questionnaire; SES: Socio-Economic Status; SRS: Social Responsiveness Scale; TAS-20: Toronto Alexithymia Scale; TONI-3: Test of Nonverbal Intelligence); TOWRE-2: Test of Word Reading Efficiency; WAIT-II: Wechsler Individual Achievement Test; WASI: Wechsler Abbreviated Scale of Intelligence (PRI: Perceptual Reasoning Scale); WNSA: Wechsler Nonverbal Scale of Ability.

Appendix B: Semi-structured Interview Record Form

Monash Minimum Data Tool

Date ____ /____ / ____ ID #: _____ Participant Group:_____

Date of Birth: ____ /____ /____ Age: _____ Gender: M F

Sections A-E to be completed in a semi-structured interview format with the young person.

A: Cultural and Linguistic Diversity

1. Does the young person have a cultural or ethnic background other than Caucasian Australian? (If ATSI background: In which community has the young person spent most of their upbringing?)	☐ NO	☐ YES Background: ..... Community: .....
2. Does the young person speak a language other than English? (If ATSI background: Does the young person speak Aboriginal English?)	☐ NO	☐ YES Details: .....
3. Is English the young persons' preferred language of communication?	☐ NO Preferred Language:	☐ YES

B: Residential Experience

1. Has the young person ever lived in out of home care?	☐ NO	☐ YES	☐ Foster ☐ Kinship ☐ Residential Unit ☐ Other: ..... Age at first removal from parental care: .....

C: Health Experience - Has the young person ever been diagnosed with:

1. Hearing Impairment	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
2. Traumatic Brain Injury with loss of consciousness	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
3. Foetal Alcohol Syndrome	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
4. ADHD	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
5. Autism Spectrum Disorder (including Asperger's Syndrome)	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
6. Speech, language or communication disorder (e.g., SLI, stuttering, dyspraxia, dyslexia)	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
7. Intellectual Impairment (IQ < 70)	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
8. Depression	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
9. Anxiety	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
10. Psychosis	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
11. Other:	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE

D: Education and School Experience

1. When was the young person last enrolled at school?	Age:.....	Year level:	Last full year level completed:.....	
	Period elapsed since leaving school: ☐ 0-6 months	☐ 7-12 months	☐ 1-2 years >	☐ 2 years
	School location: ☐ Metropolitan	☐ Regional	☐ Rural	☐ Remote

3. Foetal Alcohol Syndrome	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
4. ADHD	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
5. Autism Spectrum Disorder (including Asperger's Syndrome)	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
6. Speech, language or communication disorder (e.g., SLI, stuttering, dyspraxia, dyslexia)	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
7. Intellectual Impairment (IQ < 70)	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
8. Depression	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
9. Anxiety	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
10. Psychosis	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE
11. Other:	☐ NO	☐ YES	When: ..... By Whom:	☐ UNSURE

D: Education and School Experience

1. When was the young person last enrolled at school?	Age:.....	Year level:	Last full year level completed:.....	
	Period elapsed since leaving school: ☐ 0-6 months	☐ 7-12 months	☐ 1-2 years >	☐ 2 years
	School location: ☐ Metropolitan	☐ Regional	☐ Rural	☐ Remote

Appendix C: Codification of Offence Data

Coding Offending Variables from Youth Justice NSW data

Variable	Step/Calculation	Notes YJ NSW
Separate Offence Contact[#]	1. Organise offence data by: a) Alphanumeric Code b) Offence Category c) Offence Description d) Proceeding ID e) Offence ID f) Order ID g) Order Start Date 2. Differentiate separate offence occurrences by: a) All rows with same Proceeding ID grouped to represent 1 offence occurrence b) Data rows with *Null* under Proceeding ID distributed to Offence Occurrences based on: • Matching of Offence Category & Offence Description • Repetition/sequencing of Offence ID, Order ID, Order Start Date 3. Recode Offence Categories a) If Offence category listed does not match ANZSOC Division based on Offence Description information: • Highlight & note • Recode to relevant ANZSOC Division b) If inadequate information appears under Offence Category or Offence Description: • Highlight • Do not tally data row 4. Categorise & Tally Offences a) Categorise based on JJ NSW Offence Category & Mapping Offence rules b) Place a 1 under relevant ANZSOC Division heading on the bottom row of the group	Based on Admissions & Orders data This represents a conservative technique for accounting for data rows that lack ProceedingIDs This technique allows matching of most data rows with Null ProceedingID to data with ProceedingIDs
Age of Onset	(date 1st contact - date of birth)/365.025	In all cases order and sentence start dates are based on the first listed order/sentence within an offence occurrence, when orders are listed in date order
Criminal Career	assessment completed date - date of 1st contact	
Official Supervision	total days of custody admissions + total days of community supervision admissions	

Notes: [#] used to calculate frequency of offending, total number of offences, total number of violent offences

Mapping ANZSOC codes to Youth Justice NSW codes

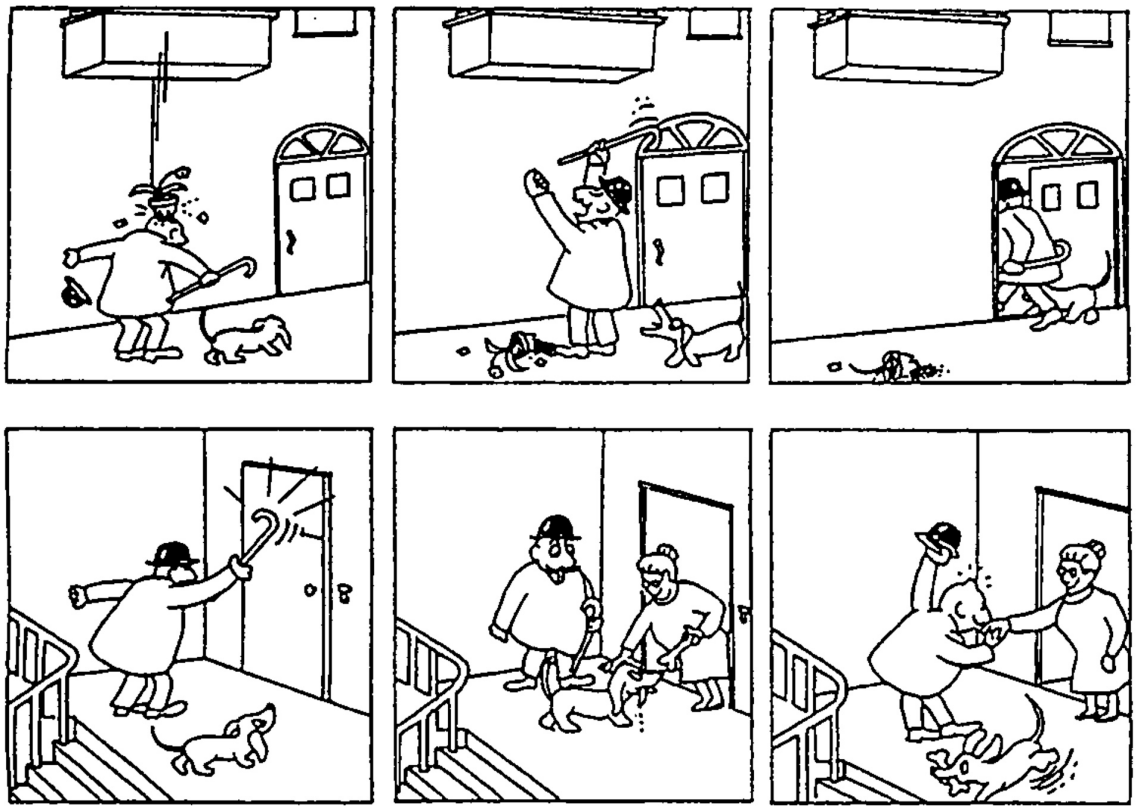
ANZSOC	Youth Justice NSW
1. Homicide and Related Offences	
Murder	Murder
Manslaughter & Driving Causing Death	Manslaughter
Attempted Murder	Attempted Murder; Shoot at with intent to murder
2. Acts Intended to Cause Injury (Aggravated Assault/Other Acts Intended to Cause Injury)	
Assault	
Serious assault resulting in injury	Reckless wounding; Reckless wounding - in company; Recklessly wound any other person; Wound person with intent to cause grievous bodily harm Recklessly cause grievous bodily harm in company; Reckless grievous bodily harm - in company Assault occasioning actual bodily harm (AOABH); AOABH in company of other; AOABH whilst armed and in company; Assault occasioning actual bodily harm (DV); Assault occasioning actual bodily harm; ABH; Use etc offensive weapon with intent to commit indictable offence
Serious assault not resulting in injury	Threaten injure person in company with intent indictable offence; Threaten injury to person with intent commit indictable offence; Aggravated enter dwelling with intent - inflict ABH
Common assault	Common Assault Assault officer in execution of duty; Assault police officer in execution of duty; Assault or obstruct police office; Assault law officer (not police officer); Use etc offensive weapon in company to prevent detention
Other Acts Intended to Cause Injury	
Stalking	Stalk/intimidate intend fear physical etc harm (personal); Stalk/intimidate intend fear physical etc harm (domestic)
Other acts intended to cause injury	
3. Sexual Assault & Related Offences (Aggravated Sexual Assault/Other Sexual Assault & Related Offence)	
Sexual Assault	
Aggravated sexual assault	Aggravated sex assault - victim under the age of 16 years; Aggravated sexual intercourse person >=10 & <14 years; Aggravated sex assault- offender in company with other person/s; Aggravated sexual assault in company and deprive liberty; Aggravated indecent assault; Aggravated indecent assault - offender in company; Commit act of indecency with person under 16 years Have sexual intercourse with person >=10 & <14 years (DV); Sexual intercourse with person under age of 10 years (DV); Indecent assault person under 16 years of age
Non-aggravated sexual assault	
Non-assaultive sexual offences	
Non-assaultive sexual offences against children	
Child pornography offences	
Sexual servitude offences	
Non-assaultive sexual offences NEC	
4. Dangerous/Negligent Acts Endangering Person (Aggravated Drink Driving Other Dangerous/Negligent Acts Endangering Person)	
Dangerous/negligent operation of a vehicle	Drive recklessly/furiously or speed/manner dangerous; Dangerous driving; Police pursuit - not stop - drive recklessly
Other dangerous/negligent acts endangering person	
5. Abduction, Harassment & Related Offences (Abduction & Related Offences)	
Abduction & kidnapping	Take/detain person with intent to obtain advantage
Deprivation of liberty/false imprisonment	
Harassment & threatening behaviour (NOT face-to-face)	
6. Robbery, Extortion and Related Offences (All Robbery, Extortion & Related Offences)	
Robbery	
Aggravated Robbery	Aggravated Robbery
Inflict Injury	Robbery in company cause wounding/GBH; Demand property by force in company with intent to steal; Assault with intent to rob in company; Assault with intent to rob armed with offensive weapon; Aggravated steal from person and use corporal violence; Aggravated robbery with offensive weapon
Commit in Company	Robbery in Company
Possess Weapon	Robbery armed with offensive weapon
Non-aggravated Robbery	
Robbery with no aggravating circumstances	Robbery; Enter Dwelling with intent (steal)
Demand money with menaces	Demand property in company with menaces with intent to steal
Blackmail & Extortion (coercive measures)	

7. Unlawful Entry with Intent/Burglary, Break & Enter (Break & Enter; B&E)	
	Special aggravated B&E & commit serious indictable offence-weapon; Aggravated B&E & commit serious indictable offence-in company; Aggravated B&E with intent - in company; Aggravated enter dwelling with intent - offender in company; Aggravated B&E & commit serious indictable offence-in company; Aggravated B&E & commit serious indictable offence - people there; Aggravated enter dwelling with intent - knowing people there, B&E with intent - knowing person there; Break & enter intend to commit serious indictable offence; Break enter and steal Break & Enter house etc steal value <= $60,000; Break & Enter house etc destroy etc property <= $60,000 Break and enter dwelling-house etc with intent (steal); Break & enter intend to commit serious indictable offence; Enter building/land with intent commit indictable offence
8. Theft & Related (Other Theft and Related)	
Motor vehicle theft & related offences	
Theft of a motor vehicle	Steal motor vehicle
Illegal use of a motor vehicle	Take & drive conveyance w/o consent of owner; Drive conveyance taken w/o consent of owner; Be carried in conveyance taken w/o consent of owner
Theft of motor vehicle parts/contents	
Theft (except motor vehicles)	
	Larceny; Larceny value <$2000; Larceny value >$ 2000 & <=$ 5000; Shoplifting; Shoplifting value <=$2000; Steal property in dwelling-house
Theft from a person (excluding by force)	Steal from the person
Theft of intellectual property	
Theft from retail premises	
Theft (except motor vehicle) nec	
Receive/handle proceeds of crime	Goods in personal custody suspected of being stolen; Goods in Custody; Goods suspected stolen in/on premises; Unlawfully obtain goods; Unlawfully obtained goods (personal custody); Receiving; Receive/dispose stolen property-min. indict. off. <=$5000; Receive property-theft=serious indictable offence <=$5000; Deal with property suspected proceeds of crime; Receive tainted property
Illegal use of property (except motor vehicles)	
9. Fraud, Deception & Related Offences (Deception Offences (eg fraud, forgery))	
Obtain benefit by deception	
Forgery & counterfeiting	Dishonestly obtain property by deception; Dishonestly obtain financial advantage etc by deception; Give false name/address to constable
Deceptive business/government practices	
Other fraud & deception	
10. Illicit Drug Offences	
Import/export illicit drugs	
Deal/traffic illicit drugs	Supply prohibited drug; Possession of equipment for administering prohibited drugs
Manufacture/cultivate illicit drugs	Cultivate prohibited drug
Possess/use illicit drugs	Possess prohibited drug
Other	
11. Prohibited & Regulated Weapons & Explosives Offences (Weapons & Explosives Offenses)	
Prohibited weapons/explosives offences	Not keep firearm safely-prohibited firearm; Possess shortened firearm (not pistol) w/o authority; Possess unregistered firearm-prohibited firearm
Regulated weapons/explosives offences	Possess or use a prohibited weapon without permit; Possess unregistered firearm-not prohibited firearm/pistol; Possess unauthorised firearm; Use unauthorised firearm; Carry cutting weapon upon apprehension; Possess ammunition w/o holding licence/permit/authority; Enter building/land with firearm or imitation firearm; Fire firearm manner likely injure persons/property; Fire firearm in or near public place; Give firearm to person not authorised by licence/permit
12. Property Damage and Environmental Pollution (including malicious damage)	
Property Damage	
Property damage by fire or explosion	Cause or set fire to the property of another, or Crown Damage property by fire/exp <=$2000-T2; Damage property by fire/exp >$ 2000 &<=$ 5000; Malicious damage property by fire/exp Damage property by fire/exp (DV)
Graffiti	Damage and deface any premises/property with graffiti implement; Intentionally mark premises etc without prescribed consent; Intentionally mark premises etc without consent – aggravated; Possess graffiti implement with intent to contravene s 4(2)
Property damage NEC	Destroy or damage property >$ 5000 & <=$15000; Destroy etc property in company use fire etc >$5000 Destroy or damage property; Destroy or damage property <=$2000; Destroy or damage property >$ 2000 & <=$ 5000; Damage police property; Maliciously destroy or damage property
Environmental Pollution	

13. Public Order Offences (eg trespass, offensive language)	
Disorderly conduct	
Trespass	Enter enclosed land not prescribed premises w/o lawful excuse; Unlawful entry on prescribed land; Enter prescribed premises of any person w/o lawful excuse; Enter vehicle or boat without consent of owner/occupier
Criminal Intent	Participate criminal group contribute criminal activity; Knowingly participate in criminal group assist crime
	Armed with intent commit indictable offence; Possess housebreaking implements
Riot & Affray	Affray
Disorderly conduct nec	Behave in offensive manner in/near public place/school; Use offensive language in/near public place/school
Regulated public order offences	Wilful and obscene exposure in/near public place/school
	Person under 18 possess liquor in public place
Offensive conduct	Custody of knife in public place; Wield knife in a public place; Have custody of an offensive implement in a public place; Commit an act of cruelty upon an animal
14. Traffic & Motor Vehicle Regulatory Offences (Road Traffic and Motor Vehicle Regulatory Offences)	
Driver licence offences	Never licensed person drive vehicle on road; Unlicensed for Class, Class C, R, LR or MR; Drive motor vehicle during disqualification period; Possess Australian driver licence w/o authority/excuse; Driver never licensed; Driver never licensed (section 53(5))
Vehicle registration & roadworthiness offences	Use unregistered registrable Class A motor vehicle on road
Regulatory driving offences	Special category driver drive with special range PCA; Negligent driving (not occasioning death/gbh); Possess implements to enter/drive conveyance; Motor bike rider (alone) not wear/secure fit approved helmet; Rider with helmet ride with 1 passenger w/o helmet; Use uninsured motor vehicle; Drive in dark no lights - not Class B/C S-T-C, ave speed; Disobey request/signal to stop for breath test
Pedestrian offences	
15. Offences Against Justice Procedures, Government Security & Government Operations (Justice Offences (eg abscond, breach order, fail to appear))	
Breach of custodial order	Inmate escape/attempt to escape from lawful custody
Breach of community-based orders	Fail to appear; Fail to appear in accordance with bail undertaking; Breach Bail
Breach of violence & non-violence orders	Contravene prohibition/restriction in AVO (Personal); Contravene prohibition/restriction in AVO (Domestic)
Offences against government operations	Make false call to emergency service number
Offences against government security	
Offences against justice procedures	Conceal serious indictable offence of another person
	Resist officer in execution of duty ; Resist or hinder police officer in the execution of duty
	Conspiracy to commit offence unspecified
16. Miscellaneous Offences	
Defamation, libel and privacy offences	
Public health & safety offences	
Sanitation Offences	Break bottle/glass/syringe in public place
Transport regulation offences	Travel or attempt to travel without valid ticket - minor (Transport Offences); Not pay train fare and hold valid ticket; Proceed on foot at pace may cause injury, damage etc (Transport Offences); Go onto or into or remain on or in running lines etc
Commercial/industry/financial regulation	
Other miscellaneous offences	
Environmental regulation offences	Buy/sell/possess/control protected fauna

Notes: Not included (from Youth Justice NSW data): Detention application – arrest; Variation application notice after breach etc; Warrant; Breach of Bail - application to re-determine; Application for final compulsory schooling order.

Appendix D: The Flowerpot Incident



Appendix E: Institutional Approvals

Research Integrity
Human Research Ethics Committee

Thursday, 5 June 2014

Dr David Hawes
Email: david.hawes@sydney.edu.au

Dear David

I am pleased to inform you that the University of Sydney Human Research Ethics Committee (HREC) has approved your project entitled "**Correlates of oral language skills of young offenders.**"

Details of the approval are as follows:

Project No.: **2014/345**

Approval Date: **5 June 2014**

First Annual Report Due: **5 June 2015**

Authorised Personnel: **Hawes David; Anderson Stavroola; Snow Pamela;**

Documents Approved:

Date	Type	Document
14/04/2014	Participant Consent Form	Consent Form (Schools)
14/04/2014	Advertisements/Flyer	Information Flyer (Schools)
14/04/2014	Organisation Approval	Juvenile Justice: In-Principle Approval
14/04/2014	Questionnaires/Surveys	Monash Minimum Data Tool
14/04/2014	Questionnaires/Surveys	Abridged MMDT
14/04/2014	Participant Consent Form	Consent Form (Juvenile Justice)
14/04/2014	Advertisements/Flyer	Information Flyer (Juvenile Justice)
14/04/2014	Other Instruments/Tools	The Flowerpot Incident
14/04/2014	Other Instruments/Tools	Picture This Booklet
14/04/2014	Questionnaires/Surveys	La Trobe Communication Questionnaire
14/04/2014	Questionnaires/Surveys	Inventory of Callous-Unemotional Traits
21/05/2014	Participant Info Statement	PIS (Schools)_Version 2
21/05/2014	Participant Info Statement	PIS (Centre)_Version 2
21/05/2014	Participant Info Statement	PIS (Office)_Version 2

HREC approval is valid for four (4) years from the approval date stated in this letter and is granted pending the following conditions being met:

Research Integrity
Research Portfolio
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The University of Sydney
NSW 2006 Australia

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E ro.humanethics@sydney.edu.au
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ABN 15 211 513 464
CRICOS 00026A

File #: 13/03520
Doc Ref: D14/05956
Contact Name: Monique Mathis
Telephone: 9219 9458

Dr David Hawes
School of Psychology
Brennan MacCallum Building (A18)
The University of Sydney, NSW, 2006

Dear Dr Hawes

RE: RESEARCH PROJECT "Correlates of Oral Language Skills in Young Offenders"

Thank you for your application to conduct research in Juvenile Justice.

The Juvenile Justice Research and Evaluation Steering Committee approved your application to conduct the research project entitled "Correlates of Oral Language Skills in Young Offenders" on May 5, 2014.

The committee however has requested that due to the length of each interview, careful consideration is given negotiating interview times with Centres and when scheduling interviews to ensure minimal impact on the young person's daily activities.

For your records, a signed copy of the JJ Research Agreement is attached. Please ensure that your project meets the requirements outlined in your application and adheres to the conditions outlined in the attached Research Agreement. Any variations will need to be submitted to the JJ Research and Evaluation Steering Committee for review.

You may now proceed with the implementation of your research project. Please contact Monique Mathis, Research Psychologist, Research and Information Unit on 9219 9458 or monique.mathis@djj.nsw.gov.au for assistance with this. Congratulations and good luck with your research.

Yours sincerely

Valda Rusis 13.6.14.
Chief Executive

Ms Stavroola Anderson
9/87 Ocean Street
WOOLLAHRA NSW 2025

CORP14/50585
DOC15/40779
SERAP 2014149

Dear Ms Anderson

I refer to your application to conduct a research project in NSW government schools entitled *Correlates of oral language skills of young offenders*. I am pleased to inform you that your application has been approved. You may contact principals of the nominated schools to seek their participation. **You should include a copy of this letter with the documents you send to schools.**

This approval will remain valid until 02 February 2016.

The following researchers or research assistants have fulfilled the Working with Children screening requirements to interact with or observe children for the purposes of this research for the period indicated:

Name	**Approval expires**
Stavroola Anna Sophia Anderson	04/12/2018.

I draw your attention to the following requirements for all researchers in NSW government schools:

- School principals have the right to withdraw the school from the study at any time. The approval of the principal for the specific method of gathering information must also be sought.
- The privacy of the school and the students is to be protected.
- The participation of teachers and students must be voluntary and must be at the school's convenience.
- Any proposal to publish the outcomes of the study should be discussed with the research approvals officer before publication proceeds.

When your study is completed please email your report to: serap@det.nsw.edu.au.

You may also be asked to present on the findings of your research.

I wish you every success with your research.

Yours sincerely

Dr Susan Harriman
Leader, Quality Assurance Systems
2 February 2015

Policy, Planning and Reporting Directorate
NSW Department of Education and Communities
Level 1, 1 Oxford Street, Darlinghurst NSW 2010 – Locked Bag 53, Darlinghurst NSW 1300
Telephone: 02 9244 5060 – Email: serap@det.nsw.edu.au