Callous-Unemotional Traits in the School Context:

Relationships with Intra-individual and Interpersonal School-related Factors

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Doctor of Philosophy

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Declaration

I, Suhlim Hwang, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I can confirm that this has been indicated in the thesis.

Signature:_____

Date:_____

Acknowledgements

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Abstract

Callous-unemotional (CU) traits have been shown to be a temperamental risk factor identifying a subgroup of antisocial children with more severe and persistent antisocial behaviour. While existing research has demonstrated that antisocial children with CU traits show particularly severe impairment across multiple domains, much of this research has focused on the family context. Therefore, the current thesis aimed to explore CU traits in the school context. The four empirical studies included in this thesis use longitudinal data collected in South Korean primary schools (N = 218, aged 10–12 years; 52% boys) to examine questions regarding: 1) the validity of the CU traits measure in South Korean children; 2) unique associations of CU traits in predicting the trajectories of school-related outcomes; 3) the moderating effect of CU traits on teacher classroom strategies; and 4) associations between CU traits and social affiliation in school. The results of a confirmatory factor analysis supported the validity of the revised CU traits scale in the current sample. Furthermore, the results of latent growth curve modelling showed that CU traits are a unique predictor of a stable pattern of school disengagement across the school year. There was a significant interaction effect between CU traits and teacher strategies in predicting child engagement, such that harsh discipline predicted lower engagement only among children with low CU traits. A cross-lagged model analysis showed significant longitudinal associations between CU traits and social affiliation, such that CU traits predicted decreased teacher affiliation, and in turn, increased CU traits. The current thesis also includes a cross-sectional study examining the indirect effect of CU traits on academic grades via punishment insensitivity in secondary school students in the United Kingdom (N = 437, aged 11–14 years; 51% boys). The results of the mediation analysis showed that CU traits had a significant indirect effect on the association between CU traits and poor Maths and Science but not English grades via punishment insensitivity. The findings from this thesis support the validity of a measure of CU traits in South Korean primary schools in relation to a wide range of school-related outcomes, highlighting the importance of considering CU traits in the school context to identify at-risk children and targets for intervention.

Impact Statement

Antisocial behaviour is the most common mental health problem that occurs in childhood and operates at a high cost to society, increasing public service usage across criminal justice, education, health, and social services (Loeber & Farrington, 2001). In particular, the education sector bears the brunt of the financial burden (Snell et al., 2013), with the cost of educating children with behaviour problems estimated to be 18 times the cost for those without (Knapp, Scott, & Davies, 1999; Robb et al., 2011). Understanding the heterogeneous pathways to antisocial behaviour is important in order to understand how to individualise assessment and treatment to promote optimal outcomes in high-risk children.

Prior research has established that there are distinct differences in the presentation, correlates and outcomes for antisocial behaviour for children with high and low levels of CU traits (Frick, Ray, Thornton, & Kahn, 2014). However, most research on environmental factors has been conducted in the family context, while the school context has been largely neglected. Schools need to acknowledge the role of CU traits in influencing behavioural, social and academic adjustment in order to provide more individualised support for antisocial children in schools. This thesis advances our knowledge of CU traits in the school context for the following reasons:

First, the use of data collected at three separate time points across a whole academic year enable inferences about longitudinal associations, therefore providing useful information about the directionality of the associations between CU traits and school factors. Previous studies have been largely cross-sectional and/or based on qualitative findings. The findings of the studies presented in the current thesis clarify the nature of the contribution of CU traits to both intra-individual and interpersonal school-related outcomes over time.

Second, this research programme is one of only a few to examine the relationship between CU traits and environmental factors (e.g., teacher-child relationships, peer acceptance) outside Western countries. Consistent with past research in East Asian children, there is evidence for possible cultural diversity regarding the presentation and correlates of CU traits (Sng, Hawes, Hwang, Allen, & Fung, 2020; Sng et al., 2018). Most past studies on CU traits in East

Asian samples have been conducted with Chinese children. The present studies included South Korean children, therefore broadening our knowledge and generalisability of the CU traits construct to this population.

Third, the findings highlight the importance of identifying classroom environment factors that contribute to school-related outcomes among children with CU traits. They suggest that promoting positive teacher-child relationships and providing teachers with support to implement reward strategies will help to promote school engagement and reduce disruptive behaviour in antisocial children high in CU traits.

Finally, the present studies make a substantial contribution to our understanding of how to adapt existing school-based interventions for antisocial children based on both their individual characteristics and interpersonal relationships in order to promote school-related outcomes.

These outputs also have been published or submitted to international peer-reviewed journals and presented at international conferences to ensure that the research has a wide impact:

Hwang, S., Waller, R., Hawes, D. J., & Allen, J. L. (2020). Callous-unemotional traits and antisocial behaviour in South Korean Children: Links with academic motivation, school engagement, and teachers' use of reward and discipline. *Journal of Abnormal Child Psychology, 48*, 1183-1195.

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CHAPTER 1:

Literature review

1.1. Introduction

Antisocial behaviour in childhood is a major challenge for schools, with negative outcomes for both students and teachers, and the education system bearing the brunt of the associated economic burden (Snell et al., 2013). In addition to the financial impact, antisocial behaviour is strongly associated with impairment in several domains of school functioning. Children with antisocial behaviour are more likely to experience school dropout (French & Conrad, 2001), rejection by their peers, and poor academic achievement (McEvoy & Welker, 2000). Poor school engagement and failure at school are likely to be coupled with negative environmental factors, such as a deviant peer group and ineffective parenting, so that increases the risk for an antisocial lifestyle trajectory (Allen, Hwang, & Huijding, 2020a). In the long term, antisocial children are at risk of a host of maladaptive outcomes, including substance abuse, physical health problems, relationship instability, unemployment, and criminal offending (Moffitt, 2018; Rivenbark et al., 2018), and this is especially true for childhood-onset antisocial behaviour (Moffitt, Caspi, Harrington, & Milne, 2002; Piquero, Farrington, & Blumstein, 2007).

Given its significant negative impact on both the individual and society, factors that serve to increase the risk for or perpetuate antisocial behaviour have been extensively studied, including dispositional (e.g., neurochemical

irregularities, cognitive ability, poor emotional regulation, and temperament) and contextual risk factors (e.g., parenting practices, association with deviant peers, violent neighbourhoods). Furthermore, prior research has demonstrated that these different types of risk factors interact with one other, influencing the development of antisocial behaviour (Raine, 2002). That is, the same developmental outcomes (i.e., antisocial behaviour) can result from very different developmental processes, supporting the concept of equifinality in developmental psychopathology (Frick & Viding, 2009). Considering that there may be different mechanisms contributing to the development and persistence of antisocial behaviour for different subgroups of children, a suggested distinction that has received much empirical support is the age of onset of antisocial behaviour. There is consistent evidence indicating that children who show antisocial behaviour as early as preschool age (childhood-onset) have more severe and persistent antisocial behaviour than children for whom behaviour problems emerge with the onset of adolescence (adolescent-onset) (Moffitt, 1993, 2003). Childhood-onset antisocial behaviour has a stronger association with both dispositional and contextual risk factors, with behaviour problems developing through a transactional process between child vulnerabilities (e.g., deficits in executive functions, difficult temperament) and harsh environmental experiences (e.g., harsh parental discipline, poor neighbourhood). This transactional process disrupts a child's social interaction, influencing psychosocial maladjustment across multiple domains of functioning, resulting in the long-term persistence of antisocial behaviour. In contrast, adolescent-onset antisocial behaviour is considered to reflect an exaggerated process of adolescent rebellion against authority and is related to deviant peer affiliation rather than to enduring vulnerability factors. Therefore, antisocial behaviour that emerges in adolescence is less likely to persist into adulthood (Moffitt, 1993, 2006; Moffitt, Caspi, Dickson, Silva, & Stanton, 1996). This distinction between childhood-onset and adolescent-onset antisocial behaviour is a specifier for the diagnosis of conduct disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V; American Psychiatric Association, 2013).

However, there is also some evidence for heterogeneity within the childhood-onset group, such that only a small percentage of these 'early

starters' account for the most severe and chronic antisocial behaviour (Frick & Loney, 1999), with the remainder desisting from conduct problems prior to adolescence (Moffitt, 2006). These findings suggest that a further distinction can be made within this group, and the presence of psychopathic traits has been established as a critical way of identifying different pathways to antisocial behaviour in children with an early onset of conduct problems (Hare & Neumann, 2006; Patrick, 2006). Adults with psychopathic traits show more severe and violent antisocial behaviour accompanied by unique cognitive, affective, biological, and interpersonal deficits (Hemphill, Hare, & Wong, 1998; Kiehl et al., 2001; Levenston, Patrick, Bradley, & Lang, 2000). There is evidence that the three psychopathic trait dimensions in children correspond to those identified in adults, including CU traits (affective), narcissism (interpersonal), and impulsivity (behavioural) (Frick & Dickens, 2006; Vitacco, Rogers, & Neumann, 2003). Although all of these trait dimensions have been identified in children, CU traits are widely considered to be the hallmark feature of psychopathy in children, due to their utility in predicting a more severe, varied and chronic pattern of antisocial behaviour(Frick & Dickens, 2006; Leistico, Salekin, DeCoster, & Rogers, 2008). For example, Christian, Frick, Hill, Tyler, and Frazer (1997) found that two conduct problems clusters were distinctive depending on children's levels of CU traits, rather than impulsivity and narcissism. Antisocial children who exhibited high levels of CU traits had more severe and varied antisocial behaviour, a stronger history of police contact, and a greater likelihood that a parent had antisocial personality disorder.

1.2. Conceptualising CU traits

1.2.1. Defining CU traits

CU traits are a temperament dimension defined as reduced empathy, lack of guilt or remorse, restricted or shallow emotions, and a lack of concern for performance (Waller et al., 2020b). There is now extensive research that supports the subtyping of childhood antisocial behaviour based on psychopathic features (see Frick, Ray, Thornton, & Kahn, 2014). This subgroup of antisocial

children with high levels of CU traits show more severe and chronic behaviour problems than those without CU traits, a consistent finding across community, adjudicated and clinical samples (e.g., Dadds, Fraser, Frost, & Hawes, 2005; Kruh, Frick, & Clements, 2005; Stafford & Cornell, 2003), and including a wide range of ages from the preschool years (Kimonis et al., 2006) to adolescence (Brandt, Kennedy, Patrick, & Curtin, 1997; Silverthorn, Frick, & Reynolds, 2001). The strong association between CU traits and antisocial behaviour is evident both cross-sectionally and longitudinally (Campbell, Porter, & Santor, 2004; Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005). Longitudinal studies suggest that CU traits are relatively stable across development including early childhood and adolescence (Barry, Barry, Deming, & Lochman, 2008; Dadds et al., 2005; Pardini & Loeber, 2008), with genetic factors making a substantial contribution to this stability (Blonigen, Hicks, Krueger, Patrick, & Iacono, 2006; Forsman, Lichtenstein, Andershed, & Larsson, 2008). In fact, conduct problems in children with elevated level of CU traits have shown a stronger genetic influence than those with low levels of CU traits (Viding, Blair, Moffitt, & Plomin, 2005; Viding, Jones, Frick, Moffitt, & Plomin, 2008).

The most recent edition of the DSM-5 (American Psychiatric Association, 2013) introduced CU traits as a specifier for Conduct Disorder, under the term 'limited prosocial emotions (LPE)' due to concerns regarding stigma. Children may be given the LPE specifier when they meet more than two of the following set criteria for at least 12 months: (1) lack of remorse or guilt when they do something wrong; (2) callousness and lack of empathy toward others; (3) unconcern about performance at school, at work, or in other important activities; and (4) shallow or deficient affect toward others except when emotional expressions are used for gain. It has been suggested that between 10% and 50% of youth with conduct problems would be grouped under the term CU traits; however, this rate of elevated CU traits varies greatly depending on the type of sample, measurement, and defined cut-off (Kahn, Frick, Youngstrom, Findling, & Youngstrom, 2012). For example, Kahn et al. (2012) found that 10% to 32% of children were designated as having high levels of CU traits in the community sample, while 21% to 50% of children met the criteria for elevated CU traits in the clinic-referred sample depending on the informant, using the diagnostic assessment of DSM. There is no agreed cut-off for CU traits in

children, with little evidence in support of conceptualising CU traits as a taxon (Kimonis, Fanti, & Singh, 2014). Therefore, CU traits are predominantly viewed and studied as a dimensional construct (see Frick et al., 2014).

Interestingly, some longitudinal studies have suggested that CU traits can occur in the absence of antisocial behaviour (Barker, Oliver, Viding, Salekin, & Maughan, 2011; Kumsta, Sonuga-Barke, & Rutter, 2012; Rowe et al., 2010). In fact, children with CU traits without antisocial behaviour have shown high levels of later conduct problems (Frick, Cornell, Barry, Bodin, & Dane, 2003a), more severe emotional problems, poor quality peer relationships, and elevated levels of hyperactivity (Rowe et al., 2010). These prior studies imply that CU traits may be a useful indicator of increased risk for psychosocial maladjustment in addition to their utility in subtyping childhood conduct problems. However, it should be noted that in another study that used latent profile analysis to identify groups based on the levels of CU traits and conduct problems, the group presenting with high CU traits without conduct disorder did not have other psychopathological problems such as anxiety, depression, narcissism, and aggression (Eisenbarth, Demetriou, Kyranides, & Fanti, 2016). These conflicting findings suggest that further study on children who have high levels of CU traits without behaviour problems is warranted.

1.2.2. Assessment of CU traits

Several different measures have been developed to assess CU traits in children. The youth version of the Psychopathy Checklist (PCL:YV; Forth, Kosson, & Hare, 2003) is an interview adapted from the Hare Psychopathy Checklist-Revised (PCL-R; Hare, 1991) for incarcerated youth aged 12 to 18 years. Items were modified for adolescents and focused on symptoms in peer, family, and school settings. Although the PCL:YV has shown good reliability and validity for adolescents (Kosson et al., 2013; Neumann, Kosson, Forth, & Hare, 2006), interview-based instruments are laborious, requiring more training and time to complete than a questionnaire, and their usage is limited to institutional samples. In addition, only four of the 20 items covered are directly related to CU traits (Kimonis et al., 2008) and the number of underlying factors identified has produced somewhat mixed results in prior studies (Cooke & Michie, 2001; Hare & Neumann, 2005).

To assess CU traits in community samples of children of a younger age (ages 6 to 13 years), Frick and Hare (2001) developed the Antisocial Process Screening Device (APSD). The APSD has parent and teacher versions, and was created by eliminating developmentally irrelevant items in the PCL-R (Hare, 1991). A youth-self report version was later developed by Munoz and Frick (2007). The APSD consists of 20 items rated on a three-point scale and assesses the three different dimensions of psychopathic traits in children: callous-unemotional (CU) traits, narcissism (NAR), and impulsivity (IMP). Since the single six-item factor of the scale (i.e., CU traits) provides a unidimensional screening of CU traits, this scale has commonly been used to assess CU traits in children. The validity of the APSD has been supported in many studies across all informants, with teacher, parent, and youth self-reporting of CU traits showing significant associations with an early onset of offending and poor treatment outcomes (Fite, Greening, Stoppelbein, & Fabiano, 2009; Marsee, Silverthorn, & Frick, 2005; Vitacco et al., 2003). However, while the total ASPD score has shown good internal reliability, the internal reliability for the six-item CU traits subscale is weak to moderate (Bijttebier & Decoene, 2009; Fink, Tant, Tremba, & Kiehl, 2012; Munoz & Frick, 2007).

To overcome this limitation, Frick (2004) developed the Inventory of Callous-Unemotional Traits (ICU), designed specifically to assess CU traits in community samples of youth. The four items from the APSD CU scale that most consistently loaded on the CU traits factor in community and clinical samples were expanded, with six items generated from each of these four items, resulting in a total of 24 items to provide more in-depth coverage of CU traits. A study of the factor structure of the ICU supported a three-bifactor model consisting of not only a general factor of CU traits but also independent subfactors, Callousness, Uncaring, and Unemotional traits (Essau, Sasagawa, & Frick, 2006). The items loaded on the three different factors as well as onto a general CU traits factor, justifying the use of subscales or the total scale (Patrick, Hicks, Nichol, & Krueger, 2007). The CU traits scale has been shown to be significantly related to different forms of antisocial behaviour including delinquency, aggression (Fanti, Frick, & Georgiou, 2009; Kimonis et al., 2008), and sexual offending (White, Cruise, & Frick, 2009), as well as low empathy and restricted affect (Kimonis et al., 2008). Furthermore, the subfactors of the ICU

scale have been differentially related to a number of correlates, such that the Callous and Uncaring scales are more strongly related to antisocial behaviour and poor academic achievement than the Unemotional scale (Berg et al., 2013; Ciucci, Baroncelli, Franchi, Golmaryami, & Frick, 2014). However, several later studies testing the bifactor model fit revealed that the model, including a general factor as well as three subfactors, was not a good fit in either community or clinic-referred samples of youth (e.g., Feilhauer, Cima, & Arntz 2012; Pihet, Etter, Schmid, & Kimonis, 2015). In addition, the unemotional scale in particular has shown low internal consistency and poor criterion validity, leading to questions concerning the validity of the use of subscales separately (e.g., Byrd, Kahn, & Pardini, 2013; Kimonis et al., 2008). It has also led to calls to use short forms of the ICU that include only items from the Callousness and Uncaring scales (Cardinale & Marsh, 2020; Hawes, Price, & Dadds, 2014). However, Ray and Frick (2018) argued that the Unemotional scale is a critical contributor to the overarching CU construct, as it represents important aspects of cognitive and emotional functioning that differ between children with versus those without CU traits, helping to designate these different subgroups of antisocial children.

Another important issue regarding the measurement of CU traits is the potential overlap in variance for items assessing CU traits and antisocial behaviour. In fact, the APSD total score shares a large amount of variance with behaviour problems (Burns, 2000) and the CU traits, narcissism and impulsivity subscales are highly correlated with one other (Blair, Colledge, Murray, & Mitchell, 2001), calling into question the ability of the APSD CU traits scale to differentiate CU traits from other antisocial constructs. In order to establish the construct validity for the CU traits scale and its predictive validity in relation to later antisocial behaviour, Dadds et al. (2005) examined the APSD in conjunction with the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) which is a more generalised measure of child adjustment. A factor analysis on the combined items of the APSD and SDQ produced the University of New South Wales (UNSW) system that supports a common model of psychopathy that features antisocial behaviour, hyperactivity-impulsivity, and CU traits as separate dimensions. The UNSW CU traits index forms a separate dimension from the antisocial behaviour index, and the CU traits index also predicted later antisocial behaviour in young children aged 4 to 9 years. The

internal consistency and construct validity of the UNSW CU traits index has been supported in many studies of children and adolescents with alphas ranging from .69 to .89, and scores correlating with antisocial behaviour (e.g., Dadds, El Masry, Wimalaweera, & Guastella, 2008; Hawes, Kimonis, Diaz, Frick, & Dadds, 2019; Pasalich, Dadds, Hawes, & Brennan, 2011). However, data from different cultures is scarce as most studies using the scale have been conducted in Australia (e.g., Hawes, Dadds, Brennan, Rhodes, & Cauchi, 2013; Hawes et al., 2019) or the United Kingdom (e.g., Centifanti et al., 2019; Dadds et al., 2014).

1.2.3. Aetiology of CU traits

When considering mechanisms explaining the causation of psychopathology, the contributions of both genes and the environment should be taken into account. Twin studies that disentangled the influences of genes, shared environment, and non-shared environment showed that there is a moderate genetic influence on antisocial behaviour (range of 40–50%) regardless of assessment method, age, and gender (see review by Viding, Larsson, & Jones, 2008). However, the genetic influence on antisocial behaviour appeared larger in the subset of antisocial children presenting with elevated CU traits compared to the subgroup without CU traits (Fontaine, McCrory, & Viding, 2018). Genetic influences account for much of the stability of CU traits (Blonigen et al., 2006; Forsman et al., 2008), as well as individual differences in the development of CU traits (Fontaine, Rijsdijk, McCrory, & Viding, 2010).

In line with this view of relative greater genetic than environmental contribution to CU traits, temperamental deficits, as opposed to ineffective socialisation, have been viewed as a mechanism explaining severe and persistent antisocial behaviour in children with CU traits (Frick & Viding, 2009). A fearless and uninhibited temperament style rooted in amygdala dysfunction has been identified as a risk factor for the development of CU traits. Amygdala dysfunction is related to deficits in recognising and responding to emotions, particularly fear, which is critical in stimulus-reinforcement learning. According to integrated emotions systems (IES) theory (Blair, 2006), individuals with psychopathic traits have impaired withdrawal responses to negative stimuli;

therefore, these individuals fail to learn not to harm others, leading to a continuation of aggressive behaviour. Due to this lack of inhibition, children with CU traits are viewed as more likely to persist with violent behaviour, taking advantage of others or pursuing rewards, regardless of the risk of harm to themselves or their victims (Blair, 2001; Marsh & Ambady, 2007). The presence of temperamental fearlessness is also related to poor conscience development in children (Kochanska, 1993). Children who lack negative arousal in response to discipline (e.g., guilt, shame) fail to internalise the moral or social norm that his or her parent wishes to convey (Pardini & Frick, 2013).

However, the aetiology of CU traits is unlikely to be defined entirely by genetics (Blair, Mitchell, & Blair, 2005), and as with other forms of psychopathology, it can best be explained by the interplay between genetic and environmental factors (Esposito, Azhari, & Borelli, 2018). There is evidence showing that individual variability in the development of CU traits depends on environmental factors, implying that the same temperamental risk factor could produce different outcomes (Fanti, Colins, Andershed, & Sikki, 2017; Fontaine, McCrory, Boivin, Moffitt, & Viding, 2011). In particular, several studies have shown that positive parenting (e.g., support, acceptance, and warmth) predicts lower levels of CU traits (Pasalich et al., 2011; Waller et al., 2012; Waller, Shaw, & Hyde, 2017b) and negative parenting (e.g., harshness, intrusiveness, and inconsistency) predicts higher levels of CU traits over time (Barker et al., 2011; Trentacosta et al., 2019). In particular, Trentacosta et al. (2019) found that parental harshness predicted increased CU traits over and above the presence of gene and environmental correlations using an adoption study. However, little is known about CU traits and contextual factors outside the family environment. One longitudinal study found higher levels of academic achievement, peer support, and school connectedness in the group showed a decreasing trajectory of CU traits over a two-year period (Fanti et al., 2017). Although findings indicate that several school-related factors may serve as protective factors for the development CU traits, no study has yet examined directional associations between CU traits and these factors. A better understanding of aetiological pathways can be promoted by identifying other contextual factors that influence, and are influenced by, CU traits.

1.2.4. Gender differences in CU traits

CU traits are more severe in boys than girls (Essau et al., 2006; Vitale & Newman, 2001). Boys also show a higher heritability of CU traits than girls (Bezdjian, Raine, Baker, & Lynam, 2011; Fontaine et al., 2010). The development of CU traits seems to be largely related to shared environmental influences in girls, especially in girls with stable-high CU traits, implying potential gender differences in genetic versus environmental risk (Fontaine et al., 2010). While boys have higher levels of CU traits and are at higher risk of co-occurring CU traits and conduct problems (Essau et al., 2006; Fanti, 2013), girls are at higher risk of co-occurring CU traits and internalising problems (Cardinale & Marsh, 2020; Essau et al., 2006). Other study findings suggest that CU traits are a stronger predictor of aggression in girls than boys (Frick et al., 2003a; Marsee et al., 2005). For example, Frick et al. (2003) found that CU traits in the absence of conduct problems better predicted delinquency for girls than for boys, whereas delinquency in boys was better predicted by CU traits when combined with conduct problems. Marsee et al. (2005) also found that higher CU traits predicted higher aggression among girls but not boys when controlling for narcissism and impulsivity. When considering total psychopathic traits scores, higher psychopathic traits were more strongly associated with overt aggression among boys, and covert aggression among girls.

Other correlates of CU traits including biological (Loney, Butler, Lima, Counts, & Eckel, 2006), psychosocial (Cardinale & Marsh, 2020), and academic factors (Bird, Chhoa, Midouhas, & Allen, 2019) also showed gender differences. In a study of adolescents aged 12 to 18, CU traits were significantly associated with lower cortisol levels among boys but not girls (Loney et al., 2006). Since cortisol levels represent a marker for trait anxiety (Scerbo & Kolko, 1994), the result suggested that CU traits in boys may be more strongly associated with low anxiety, evidenced by impaired fear reactivity or elevated sensation seeking (Kagan, Reznick, & Snidman, 1988; Rosenblitt, Soler, Johnson, & Quadagno, 2001). Consistent with this finding, in a recent meta-analysis, CU traits showed a stronger association with internalising symptoms in females compared to mixed gender or male only groups (Cardinale & Marsh, 2020). Lastly, in a study of adolescents aged 11 to 14 years, CU traits were significantly associated with poor Science grades among boys but not girls (Bird et al., 2019). This was

attributed to the lower empathy and poorer social competence seen in boys (Haas, Becker, Epstein, & Frick, 2018; Stickle, Marini, & Thomas, 2012), making it more difficult for them to benefit from peer group learning activities that commonly occur in Science classes. Overall, existing evidence indicates that there are gender differences in the presentation, patterns of comorbidity, and correlates of CU traits.

1.2.5. Cultural differences in CU traits

The majority of the research on CU traits has been conducted in Western countries including Europe (Cyprus, Germany, the Netherlands, the UK), the USA, and Australia. However, there is emerging evidence of cultural variation in the presentation of CU traits and its correlates. Notably, several studies conducted in East Asian countries did not show a significant association between CU traits and conduct problem severity, which has typically been found to occur at higher levels among children with CU traits in Western samples (Frick et al., 2014). For example, in two studies conducted in China and Singapore, respectively, CU traits were not significantly related to higher reactive aggression (Wang, Deng, Armour, Bi, & Zeng, 2015) or to both proactive and reactive aggression (Sng et al., 2018). Another study of Singaporean adolescents even showed significant negative association, such that higher CU traits were related to lower levels of reactive aggression (Li, Chan, Ang, & Huan, 2017). In another study of a large sample of Chinese children (N = 2081, age = 11–19 years), CU traits were not significantly related to rule-breaking and aggressive behaviour after controlling for other psychopathic trait dimensions, such as grandiose-manipulative (narcissism) and impulsive-irresponsible traits (Wang et al., 2017a).

Although most studies in Asian cultures have focused on the assessment of CU traits, a few that have examined environmental factors have also produced different findings to studies in Western samples. While children with CU traits tend to engage more with a delinquent peer group (Muñoz, Kerr, & Bsic, 2008b; Pardini & Loeber, 2008) even in the absence of conduct problems (Kimonis, Frick, & Barry, 2004), two different studies in East Asia reported that CU traits were not significantly associated with deviant peer affiliation (Ang, Huan, Chan, Cheong, & Leaw, 2015; Chu, Daffern, Thomas, Ang, & Long,

2014). It may be that the role of peer relations is less significant in Asian cultures or the meaning of deviant peer affiliation may differ from that in Western culture. More research investigating cross-cultural differences is needed to draw firm conclusions.

In general, youth antisocial behaviour has been relatively less of a problem in East Asia compared to Western countries (Bao & Haas, 2009; Shwalb et al., 2009). In collectivist cultures, group harmony is valued over the needs of the individual, thus Asian youth have a stronger tendency to conform to social expectations compared to Western children (Shwalb et al., 2009). Despite the lower levels of antisocial behaviour, Fung et al. (2009) found that parents of Hong Kong children reported higher CU traits than parents of children in the USA. Fung et al. (2009) suggested that the Asian cultural tradition of suppressing individual emotional expression may lead to higher scores on CU traits. Moreover, East-West comparison suggests that there are cultural differences in the manifestation of CU traits in children (Allen, Shou, Wang, & Bird, 2020b). An examination of measurement invariance of ICU items showed that Chinese and UK school children differed in their ratings on several items. For example, Chinese children were more likely to report feeling remorse for their behaviour, whereas English children felt less remorse for antisocial behaviour but were more likely than Chinese children to apologise for it (Allen et al., 2020b). That is, social norms emphasising the importance of avoiding ‘loss of face’ in China may prevent apologising even when regret is ‘felt’, whereas social norms emphasising the importance of saying sorry in British culture may promote this behaviour, even when children do not actually feel remorse. Future research on cultural variation in the psychological processes underlying CU traits and their relationship with external correlates such as antisocial behaviour, parenting, and other environmental factors is needed to better understand the mechanisms underlying cross-cultural differences.

1.3. CU traits in the school context

CU traits have been studied extensively in the last two decades, and established as an important tool for subtyping conduct problems to explain the different presentation, correlates, and outcomes of antisocial behaviour. There have been recent calls for research on CU traits to focus on the school context, an area which until recently has been largely neglected (Tyler, White, Thompson, & Blair, 2019). This is surprising given that from a young age, children spend significant amounts of time at school, and after parents, teachers and peers are the next social agents whom children are likely to interact with. Furthermore, children experience social and academic situations at school that do not occur at home. Research on CU traits in the educational context will help to increase our understanding of the aetiology and persistence of CU traits, and help guide school-based prevention and intervention efforts (Tyler et al., 2019; Waschbusch, Graziano, Willoughby, & Pelham Jr, 2015).

The few studies to examine CU traits in the school setting have found strong links between CU traits and poor school-related outcomes. Children with CU traits show high levels of disruptive behaviour in school over and above the effect of conduct disorder and attention-deficit hyperactivity disorder (Waschbusch et al., 2015). They are more likely to bully their peers in both direct and indirect ways (Fanti, Kokkinos, Voulgaridou, & Hadjicharalambous, 2019; Muñoz, Qualter, & Padgett, 2011), have low levels of school connectedness (Fanti et al., 2017), poor quality relationship with teachers and peers (Crum, Waschbusch, & Willoughby, 2016; Haas et al., 2018; Horan, Brown, Jones, & Aber, 2016), and poor academic achievement (Bird et al., 2019; Ciucci et al., 2014; DeLisi et al., 2011). These difficulties are longstanding issues for antisocial children, with research on their social, behavioural and academic adjustment at school of great interest to educators, parents, and policy makers. However, until fairly recently, research on pathways to poor school-related outcomes in antisocial children did not include investigation of CU traits.

School is a very influential context for children and can play an important role in providing intervention to promote both academic engagement and prosocial behaviour (Allen, 2011). In fact, there has been an increasing

recognition in the benefits of school-based interventions for child mental health for many reasons (Patalay et al., 2017). School-based intervention is a convenient way to provide support to children on a day-to-day basis while avoiding stigmatisation and increasing inclusivity (Greenberg, 2010). In addition, school can utilise supportive networks of peers, teaching staff and parents (Jané-Llopis et al., 2008). Further, recent longitudinal research has indicated that several school-related factors such as peer support, academic achievement, and school connectedness may protect against the development of CU traits (Fanti et al., 2017). Therefore, it is important to examine the impact of CU traits on school-related outcomes, as well as the effect of school-related variables on CU traits to help identify potential targets for school-based intervention for children at high-risk of antisocial behaviour.

1.3.1. Antisocial behaviour, CU traits and academic-related outcomes

1.3.1.1. Antisocial behaviour and poor academic achievement

Academic performance is traditionally considered to be a defining feature of school success. Numerous studies have demonstrated a strong relationship between antisocial behaviour and academic failure, such that child antisocial behaviour either co-occurs with and/or predicts poor academic performance (see review by Maguin & Loeber 1996). In addition, better academic performance is associated with desistance from antisocial behaviour, preventing later crime or offending, while poor academic performance is related to higher levels of delinquency independent of child gender, socio economic status, deviant peer affiliation, and low self-esteem (Jakobsen, Fergusson, & Horwood, 2012). Furthermore, interventions that improve child academic outcomes simultaneously reduce delinquency (Arbuthnot & Gordon, 1986; Gottfredson, 1990). Several theories have been put forward to understand the connection between academic performance and antisocial behaviour, and the explanation with the most robust support is the presence of deficits in verbal intelligence in antisocial youth (Allen, 2017; Maguin & Loeber, 1996).

Poor verbal ability is known to be a strong predictor of antisocial behaviour (Moffitt, 1993) and low reading scores are a major predictor of difficulties in both academic and social situations (Scott & Shearer-Lingo, 2002; Strong, Wehby, Falk, & Lane, 2004). Moffitt (1990) theorised that verbal deficits

make it difficult for antisocial children to perform well academically as well as to understand and communicate with others. That is, poor verbal ability is associated with emotion dysregulation and poor development of self-control, leading to interpersonal conflict at home and school. During childhood, parent verbal instructions are converted to an internal self-control system; however, children who possess verbal deficits may fail to internalise these attempts at socialisation by parents, which also hinders the development of a good quality parent-child relationship (Luria & Hamskaya, 1964; Tarter, Hegedus, Winsten, & Alterman, 1984). At school, children with verbal deficits have difficulty learning basic academic skills; therefore, they are likely to experience school as stressful and feel less connected to it, which can, in turn, aggravate poor school adjustment including underachievement and poor quality teacher-child relationships (Rourke, 1982).

1.3.1.2. CU traits and poor academic achievement

The associations between verbal deficits, antisocial behaviour, and poor academic outcomes have been demonstrated in many previous studies (Maguin & Loeber, 1996; Moffitt, 1990); however, unlike antisocial children without CU traits, children with elevated levels of CU traits do not appear to possess lower verbal intelligence. Fontaine et al. (2008) conducted hierarchical regression analyses to identify the associations between child psychopathic traits and verbal/nonverbal intelligence. CU traits predicted poor cognitive ability; however, this association was no longer significant when controlling for conduct problems and hyperactivity. Allen et al. (2013) also examined the relationship between youth intelligence and psychopathic traits directly. Although narcissism predicted poor nonverbal intelligence, none of the psychopathic trait dimensions including CU traits were significantly related to verbal intelligence. Two other studies also found that there were no significant mean differences in IQ (DeLisi et al., 2011) and receptive verbal ability (Muñoz, Frick, Kimonis, & Aucoin, 2008a) between children with high and low levels of CU traits. Therefore, poor cognitive ability appears unlikely to account for poor academic outcomes in children with CU traits.

Nonetheless, studies have consistently found a significant negative relationship between CU traits and academic performance, even when

controlling for behaviour problems (Bird et al., 2019; Horan et al., 2016; Vaughn et al., 2011). This negative relationship between CU traits and academic outcomes has been found in variable centred studies (Bird et al., 2019; Vaughn et al., 2011), as well as person-centred studies identifying groups based on CU traits, such that children presenting with high levels of CU traits showed the lowest levels of achievement (DeLisi et al., 2011; Fanti et al., 2017). Furthermore, the association is consistent across methods of assessment, including teacher ratings (Ciucci et al., 2014; Fanti et al., 2017), curriculum set assessments (Bird et al., 2019), or standardised achievement tests (DeLisi et al., 2011; Horan et al., 2016; Vaughn et al., 2011).

Different explanations have been proposed to explain why CU traits are linked to poor academic achievement. DeLisi et al. (2011) suggested that children high in CU traits possess an indifferent and unengaged attitude towards school, resulting in poor academic performance. Children high in CU traits are not as distressed by the negative consequences of poor academic outcomes (e.g., parent or teacher disapproval) as those low on CU traits and therefore lack the motivation to perform up to others' expectations (Ciucci et al., 2014). Consistent with this explanation, in a mixed methods study, teachers viewed children with elevated levels of CU traits as less self-motivated to perform well in school despite possessing the ability to perform well (Allen, Bird, & Chhoa, 2018). Teachers also reported that children with CU traits were less likely to respond to rewards or encouragement, so more intense monitoring and feedback were required to ensure that students were engaged with their schoolwork. However, these findings were based on a cross-sectional study featuring qualitative interviews with teachers (N =12), precluding controls for potential confounds such as antisocial behaviour and the ability to determine the directionality of relationships. Thus, longitudinal quantitative research is needed to investigate the relationships between CU traits and academic outcomes over time.

DeLisi et al. (2011) also pointed out that the decreased sensitivity of children with CU traits to punishment cues, including teacher discipline or peer rejection, might prevent these children from learning prosocial behaviour and engaging with schoolwork. Likewise, Horan et al. (2016) also identified the social context as important in explaining the relationship between CU traits and

poor academic achievement. Based on their finding that CU traits are associated with poor quality teacher-child relationships, they speculated that CU traits may elicit more harsh discipline, less encouragement, and less feedback from their teachers, and that these negative interactions with teachers may exacerbate the poor academic and behavioural adjustment of children with elevated CU traits. Finally, another view is that emotion processing deficits lead to poor academic outcomes in children with CU traits (Hiatt & Newman, 2006). It is well known that CU traits are associated with deficits in the understanding of emotion-laden information, and academic tests, especially reading comprehension, inevitably rely on the understanding of emotion to some degree (Vaughn et al., 2011). However, there is no research testing this theory by examining whether emotionally evocative words are related to poor reading comprehension test scores.

1.3.1.3. Antisocial behaviour and school engagement

Along with academic achievement, school engagement is another key competency outcome that promotes developmental pathways towards psychosocial well-being and later employment (Creed, Muller, & Patton, 2003). Jimerson et al. (2003) proposed three different dimensions of school engagement (behavioural, emotional, and cognitive engagement), and these three dimensions have been heavily studied in relation to academic outcomes (Hirschfield & Gasper, 2011). Behavioural engagement refers to the absence of disruptive behaviour and how well students participate in school-related activities, such as following classroom norms (Birch & Ladd, 1997; Finn & Rock, 1997). Emotional engagement refers to students' affective responses towards educational processes in school, including emotional reactions to school or teachers, a sense of belonging and the valuing of school success (Stipek, 2002; Voelkl, 1997). The cognitive dimension indicates the level of investment in academic tasks, so it is closely related to a student's willingness to engage in hard work and to cope with failure (Connell & Wellborn, 1991). Thus, school engagement indicates both academic and social integration in the school context, such as attending classes, complying with teacher requests, and possessing a positive attitude towards school (Fredricks, Blumenfeld, & Paris, 2004). The direct relationship between low levels of school engagement and

poor academic performance has been consistently confirmed in various empirical research studies, and applies regardless of gender, ethnicity, and socioeconomic status (Finn & Rock, 1997; Johnson, McGue, & Iacono, 2006).

The association between antisocial behaviour and school engagement has also been frequently reported in empirical research (Brookmeyer, Fanti, & Henrich, 2006; Cernkovich & Giordano, 1992). Children with low levels of school engagement are more likely to engage in antisocial behaviour (Carter, McGee, Taylor, & Williams, 2007; Manlove, 1998), substance use (Resnick et al., 1997), and to drop out of school (South, Haynie, & Bose, 2007). In addition, children's behaviour problems often elicit negative interpersonal interactions with teachers, in turn exacerbating disengagement from school (Bachman et al., 2008). In contrast, higher engagement has been shown to predict decreased child misconduct in school (e.g., Hirschfield & Gasper, 2011; Whitlock, 2006; Wong, 2005). However, very few studies have examined the association between child antisocial behaviour and school engagement as a multidimensional construct, and the findings of these studies are somewhat mixed. In one study of school children aged 10 to 14 in the United States, delinquency predicted decreased cognitive engagement only (Hirschfield & Gasper, 2011), while in another study of school children aged 12 to 17, delinquency and substance use predicted decreased behavioural and emotional engagement, but not cognitive engagement (Wang & Fredricks, 2014). In a study of two groups of children aged 8 to 12 and 12 to 14 years, both age groups showed significant associations between externalising problems and behavioural engagement, but not emotional or cognitive engagement (Olivier, Morin, Langlois, Tardif-Grenier, & Archambault, 2020). However, prior studies did not consider the overlap between these three dimensions of school engagement and CU traits as potential confounding factors that may account for these inconsistent findings.

1.3.1.4. CU traits and school engagement

Lack of concern for school performance is included as a core feature of CU traits, outlined in the limited prosocial emotions (LPE) specifier for conduct disorder in the recent edition of DSM-5 (American Psychiatric Association, 2013). As mentioned previously, some researchers have suggested that poor

school engagement and a lack of motivation, rather than deficits in cognitive ability, are important contributors to the poor academic outcomes of children with elevated CU traits (Allen et al., 2018; DeLisi et al., 2011). However, very few studies have examined the association between CU traits and school engagement. Wall et al. (2016) assessed the school engagement of children aged 7 to 11 at three time points to identify why some of the children with high levels of CU traits do not display conduct problems and others do. CU traits were assessed by parent report on the ICU (Frick, 2004) and school connectedness was assessed by student report of items that were selected from the National Longitudinal Study of Adolescent Health (Brookmeyer et al., 2006). Latent profile analysis revealed five different groups based on the severity of conduct problems and CU traits (low risk, high CP/Low CU, moderate CP/CU, high CU, and high CP/CU). There was a significant main effect of group on school connectedness. Specifically, the high CU group showed significantly higher school connectedness than the high CP/CU group, suggesting a buffering effect of emotional engagement on the development of conduct problems in children with elevated CU traits. Furthermore, Fanti et al. (2017) also found that school connectedness acted as a protective factor in the development of CU traits in a longitudinal study featuring the same sample as Wall et al.'s. Latent Class Growth analysis identified four different CU traits trajectories (low, increasing, decreasing, and stable high). While the stable high and the increasing groups showed low school connectedness, the low and the decreasing groups showed high levels of school connectedness.

Thus, the limited available evidence suggests that school engagement may be one factor that can increase or decrease poor school outcomes for children with CU traits. However, whether CU traits are uniquely associated with school engagement controlling for antisocial behaviour has not been explored. In addition, no studies have investigated CU traits in relation to specific dimensions of engagement; instead, all have focused solely on emotional engagement. Given that the core features of CU traits include motivational deficits in social affiliation (Waller et al., 2020a) and a lack of concern for school performance (Frick et al., 2014), CU traits may have stronger associations with the emotional (i.e., related to caring about the expectations of others) and cognitive (i.e., related to investment in academic tasks) dimensions of school

engagement than antisocial behaviour which may be more strongly related to behavioural engagement. Research examining the three types of school engagement in relation to child functioning can provide richer information than focusing on engagement as a unidimensional construct, thereby helping to identify more specific intervention targets for antisocial children (Christenson & Thurlow, 2004).

In addition to child behaviour problems, school engagement also has a strong association with the quality of the teacher-student relationship (Pianta, Hamre, & Allen, 2012). A student's sense of social connection is provided through good quality interaction with teachers, and this predicts higher school engagement and better academic performance (Connell & Wellborn, 1991). In qualitative research, teachers also reported that children with CU traits who had poor relationships with their teacher had reduced levels of academic motivation and school engagement (Allen et al., 2018). Given the fact that the classroom is a complex context with many interconnected variables likely to contribute to academic performance, it is important to examine both intra-individual level and interpersonal level factors in order to identify the associations between CU traits and school maladjustment.

1.3.2. Responsiveness to teacher classroom strategies

1.3.2.1. Teacher classroom management strategies

Teacher classroom management strategies are a central factor underpinning student learning and behaviour in school (Wang, Haertel, & Walberg, 1993). Teacher classroom management strategies draw on social learning theory principles (Patterson & Fisher, 2002), emphasising the role of rewards to promote students' prosocial behaviour and engagement with school work, and the role of discipline to minimise disruptive behaviour in the classroom (Conduct Problems Prevention Research Group, 1992; Webster-Stratton, 2001). Teachers' use of rewards and calm, consistent, non-physical discipline is associated with children's development of academic skills and positive outcomes, such as increased on-task behaviour (Sutherland, Wehby, & Copeland, 2000). In contrast, coercive or harsh punishment is associated with increased antisocial behaviour, poor development of personal responsibility, and decreased school engagement (Lewis, Romi, Qui, & Katz, 2005; Mitchell &

Bradshaw, 2013). According to social learning theory principles (Patterson & Fisher, 2002), cycles of coercive teacher-child interaction are maintained and amplified through escape-avoidance learning processes, where the aversive behaviours of both teachers (e.g., yelling and criticism) and children (e.g., refusing to work) are rewarded and serve to escalate child disruptive behaviour in the classroom (Gunter & Coutinho, 1997; Sutherland & Morgan, 2003). Thus, the interaction between teachers and children is transactional and mutually reinforcing. Teachers tend to use harsh and inconsistent discipline more frequently with antisocial children, with these coercive discipline practices lead to even greater student disengagement and noncompliance with teacher requests (Nelson & Roberts, 2000; Skinner & Belmont, 1993). In contrast, positive and warm interactions are associated with decreased aggression and disruptive behaviour and are considered fundamental for establishing a supportive classroom environment (Kleinman & Saigh, 2011; Lannie & McCurdy, 2007).

1.3.2.2. CU traits and differential responses to reward and punishment

As described in the previous section on aetiology, a lack of inhibition is a central feature of aetiological models of CU traits. CU traits are associated with distinct socioemotional correlates, such as reduced recognition of and responses to others' distress cues (Blair et al., 2005; Marsh & Blair, 2008) and a lack of concern about the potential consequences of antisocial behaviour including disciplinary action (Foulkes, McCrory, Neumann, & Viding, 2014; Pardini & Byrd, 2012). In particular, when a reward is primed, children with high CU traits show decreased punishment sensitivity, and as such they have often been described as 'reward-dominant' (Byrd, Loeber, & Pardini, 2014; Frick et al., 2003b). Children with elevated CU traits seek to establish a sense of social dominance with increased expectations of positive consequences from aggression (Pardini, Lochman, & Frick, 2003). Past research indicates that children with elevated CU traits appear to be more strongly motivated by rewards that enhance their social status or inverted social reward in which being cruel is enjoyable than those that involve social approval or affiliation (Allen, Morris, & Chhoa, 2016; Foulkes et al., 2014). In contrast, other studies have found evidence for reduced sensitivity to rewards in computational gambling

tasks than that experienced by those with low levels of CU traits (Centifanti & Modecki, 2013; Marini & Stickle, 2010). However, in the presence of peers, boys with higher levels of CU traits showed increased sensitivity to monetary rewards in computational gambling tasks, making faster decisions to take risks than those with low levels of CU traits (Centifanti & Modecki, 2013). These inconsistent findings suggest that children with high CU traits may respond differently to different types of reward and context that are given, potentially responding more strongly to rewards that enhance their social status or ability to dominate others.

The evidence linking CU traits and impaired responsivity to rewards and punishment has fuelled interest in their influence on child responses to parenting strategies, with early studies suggesting that harsh parental discipline predicted more severe antisocial behaviour among children with low, but not high levels of CU traits (i.e., a significant moderation effect) (Hipwell et al., 2007; Oxford, Cavell, & Hughes, 2003). That is, children with CU traits appear to be higher on temperamental fearlessness (Waller et al., 2017b; Waller et al., 2016) and may be less sensitive to negative reinforcement from the environment, including parental discipline. However, later evidence from longitudinal studies also suggests that parents may increase the harshness of their discipline when faced with a child who is less responsive to negative reinforcement, but in doing so increase the risk for both CU traits and behaviour problems (Kroneman, Hipwell, Loeber, Koot, & Pardini, 2011; Trentacosta et al., 2019; Waller et al., 2015).

When examining the positive dimension of parenting, two longitudinal studies found that CU traits did not significantly moderate the association between higher levels of positive parenting and reduced behaviour problems (i.e., non-significant moderation effect) (Hyde et al., 2013; Waller et al., 2015). However, two other studies did find a significant moderating effect of CU traits, such that higher levels of positive parenting practices were specifically related to lower behaviour problems among children with elevated levels of CU traits (Clark & Frick, 2018; Kochanska, Kim, Boldt, & Yoon, 2013). In sum, findings from these studies on parenting practices suggest that CU traits are associated with reduced responsivity to punishment; however, harsh discipline may lead to child poor outcomes in the long-term. In contrast, children with CU traits seem

to benefit from positive parenting (e.g., rewards and warmth) similarly to or even more so than children low in CU traits.

1.3.2.3. CU traits and differential responses to teacher strategies

Studies have rarely investigated the important role that teacher socialisation and discipline efforts might play in the aetiology of CU traits, nor how children's educational outcomes are impacted. CU traits are associated with more severe disruptive behaviour in the classroom; therefore, teachers are likely to increase their use of discipline with antisocial children high in CU traits (Ciucci et al., 2014; Waschbusch et al., 2015; Waschbusch & Willoughby, 2008). Two mixed methods studies found that teachers perceived both reward and discipline strategies as less effective overall for children with elevated CU traits (Allen et al., 2018; Allen et al., 2016). Teachers reported that children high in CU traits were less responsive to the teacher's facial expression including both positive non-verbal cues (e.g., smiles, nods) and disciplinary non-verbal cues (e.g., frowns) as well as the tangible rewards unrelated to enhancing social status (Allen et al., 2016). In contrast, they responded more aggressively and confrontationally to teacher discipline, and showed less guilt or shame when reprimanded for misbehaviour. However, teachers reported praise given in front of the class, time out, and establishing a positive teacher-child relationship as effective strategies for children with elevated CU traits (Allen et al., 2018). In some studies, poor quality teacher-child interaction has been identified as a potential risk factor for poor school outcomes in children with CU traits (Bird et al., 2019; DeLisi et al., 2011; Horan et al., 2016). That is, children with CU traits may not derive the same benefits from teacher classroom management strategies that promote motivation, engagement and prosocial behaviour in typically developing children, and conversely, callous-unemotional features may elicit harsher discipline, fewer rewards and less encouragement from teachers.

However, in contrast to parenting practices, the potential moderating effect of CU traits on the association between teacher reward and discipline strategies and school-related outcomes has not been investigated. Furthermore, prior studies examining teacher rewards and discipline strategies in relation to CU traits have all been cross-sectional, prohibiting an examination

of the direction of effects between teacher strategies and child outcomes. The literature on parenting has shown that CU traits may differentially impact child responsiveness to parenting practices (Clark & Frick, 2018; Hipwell et al., 2007; Kochanska et al., 2013; Oxford et al., 2003). In addition, there is evidence that parents may increase their use of harsh discipline and decrease rewards as a result of their children's lack of responsiveness (Hawes, Dadds, Frost, & Hasking, 2011). Further, these associations between parenting practices and CU traits appear to be reciprocal, such that lower parental warmth (Waller et al., 2014) and harsh parenting predicted increases in CU traits (Trentacosta et al., 2019). Likewise, exploring the links between teacher strategies, CU traits, and school-related outcomes within a quantitative longitudinal design would provide greater rigour when investigating the contribution of teacher reward- and discipline-based strategies to the relationship between CU traits and school outcomes. In fact, Frederickson et al. (2013) demonstrated positive effects of a school-based intervention that focuses on reward-based teacher strategies rather than punishment in reducing conduct problems in children with CU traits. The current thesis will also examine whether findings on the effect of teacher reward and discipline strategies in children with CU traits can be extended to other outcomes, such as a child's academic motivation and engagement, when controlling for conduct problems. Furthermore, the direct, potentially reciprocal associations between teacher reward and disciplines strategies and CU traits will also be explored to identify if CU traits influence a teacher's use of reward and punishment, or if a teacher's classroom management strategies influence the development of CU traits.

1.3.3. Motivational deficits in social affiliation

Warm and supportive relationships with significant others play an important role in child development, with these relationships shaped through repeated and reciprocal transactions between child temperament and the social context (Nigg, 2006; Rothbart, Posner, & Kieras, 2006). Children are intrinsically motivated to form attachment bonds, with close relationships viewed as an affiliative reward (Waller et al., 2020a). However, there are individual differences in sensitivity to affiliative rewards, with psychopathic traits associated with motivational deficits in establishing and maintaining affiliative

bonds (Foulkes et al., 2014; Foulkes, Neumann, Roberts, McCrory, & Viding, 2017; Sherman & Lynam, 2017; Viding & McCrory, 2019; Waller et al., 2020a). Furthermore, children with CU traits are known to lack interest in social approval and to pursue antisocial means to achieve their desired goals, ignoring potential consequences including others' distress (Pardini & Byrd, 2012; Waller & Wagner, 2019). This unique interpersonal style of children with elevated CU traits contributes to disruptions in social bonding with others (Crum et al., 2016; Hawes et al., 2011).

1.3.3.1. Affiliation with teacher

The developmental importance of good quality relationships with significant adults is very well-documented (Pianta, 1997), and teachers provide one of the key interpersonal relationships that make a unique contribution to children's social, emotional and cognitive outcomes (Wubbels, Brekelmans, & Hooymayers, 1991). Good quality teacher-child relationships that are characterised by warmth, closeness, and open communication have been shown to be positively related to child school adjustment (Birch & Ladd, 1997), the development of effortful control (Silva et al., 2011), academic motivation (Goh & Fraser, 2000), and higher grades (Roorda, Koomen, Spilt, & Oort, 2011). In contrast, poor quality teacher-child relationships characterised by a high degree of conflict and a lack of rapport are associated with school avoidance (Birch & Ladd, 1997), aggressive behaviour (Birch & Ladd, 1998), and poor social competence (Pianta, Steinberg, & Rollins, 1995). Antisocial behaviour is associated with less closeness and greater conflict in the teacher-child relationship (Doumen et al., 2008; Pianta & Steinberg, 1992). However, research has also found that antisocial children who have a good quality relationship with their teacher achieve better academic outcomes (Howes et al., 2008), highlighting the importance of a positive teacher-child relationship for children at risk of behaviour problems.

Despite the fact that CU traits have been shown to influence the quality of teacher-child relationships even when controlling for antisocial behaviour (Crum et al., 2016; Horan et al., 2016), very few studies have been conducted to explore the role of CU traits in the association between teacher-child relationship quality and the school adjustment of antisocial children. Limited

previous studies indicate that CU traits are strongly associated with poorer quality teacher-child relationships, specifically less closeness and greater conflict (Allen et al., 2018; Crum et al., 2016; Horan et al., 2016). This negative relationship has been identified as a potential contributing factor to poor academic outcomes in children with elevated CU traits (Horan et al., 2016). In fact, children with CU traits do not perform well academically (Bird et al., 2019), but unlike antisocial children without CU traits, they do not possess poor verbal intelligence (Allen et al., 2013). In a mixed methods study of secondary school students, teachers perceived poor quality teacher-child relationships as exerting a negative impact on the academic motivation of children with elevated CU traits, but conversely, they viewed a good quality relationship as helpful in motivating them to engage in school work (Allen et al., 2018).

Another issue that remains unclear is the direction of the relationship between CU traits and teacher-child relationship quality, as most previous studies have been cross-sectional in nature. Previous studies on parenting and CU traits that employed a cross-lagged model have supported the presence of reciprocal effects between parenting and child CU traits over time (Trentacosta et al., 2019; Waller et al., 2014), such that CU traits led to increased harsh parenting and decreased parental warmth, and at the same time, parental warmth predicted decreases in CU traits, while harsh parenting predicted increases in CU traits. These findings highlight the importance of considering directional associations between CU traits and interpersonal relationships. However, only one study to date has examined potential reciprocity between CU traits and teacher-child relationship quality (Baroncelli & Ciucci, 2020). Their results indicated no significant effect of CU traits on the quality of the teacher-child relationship, whereas a good quality teacher-child relationship reduced CU traits over time. However, they focused on middle school-aged children who interact with different teachers for each subject and who are expected to show a high degree of autonomy in their learning. As such, these findings may not generalise to the primary school period where more intensive interaction occurs between the classroom teacher and children, and teachers provide more support to children in both their learning and social-emotional development. This warrants more studies that consider the directionality of the association between teacher-child relationship quality and CU traits to provide a better

understanding of potential school-based intervention targets for antisocial children with elevated CU traits. The current thesis therefore will examine the associations between teacher-child relationship and CU traits in South Korean primary school children, as during this period of schooling children experience more intense and ongoing interaction with the same class teacher throughout the school year.

1.3.3.2. Affiliation with peers

As children grow up and start school, peers start to become increasingly influential (Steinberg, Dornbusch, & Brown, 1992). Positive relationships with peers predict better child adjustment including school outcomes and mental health (Bierman, 2004; Parker & Asher, 1993), while antisocial children tend to have poor quality peer relationships (Becker, Luebbe, & Langberg, 2012; Webster-Stratton & Lindsay, 1999). Antisocial behaviour is associated with a lack of social skills, including conflict management and problem-solving skills (Chang et al., 2005; Russell, Hart, Robinson, & Olsen, 2003). Therefore, unsurprisingly, aggressive children are more likely to be rejected by peers and to experience difficulties in maintaining good quality friendships (Coie, 1990). In contrast, prosocial behaviour is a significant predictor of greater peer acceptance and better social adjustment (Ladd, 1990). However, little is known about the role of CU traits in relation to the link between antisocial behaviour and poor peer relationships.

Core features of CU traits including a lack of empathy, motivational deficits in affiliation, and callous insensitivity to others' feelings appear to make a unique contribution to poor functioning in the domain of peer relationships. In one recent study, CU traits were associated with poor peer functioning in children aged 8 to 13 years, over and above the effect of externalising problems (Haas et al., 2018). Similarly, a longitudinal study of younger children found that CU traits at age 3 predicted lower levels of peer-liking at age 10 (Waller, Hyde, Baskin-Sommers, & Olson, 2017a). A person-centred study that identified groups based on levels of CU traits and conduct problems also found that groups presenting with high levels of CU traits (i.e., the high CU and high conduct problem group and the high CU and low conduct problem group) showed lower levels of peer support (Fanti, 2013). Another person-centred

study by Fanti et al. (2017) identified groups based on the trajectory of CU traits during a two-year period, and found that the stable high group and the increasing group showed lower levels of peer support. In contrast, the low-risk group and the decreasing group did not differ in terms of peer support, suggesting that peer social support might play a role as a protective factor in the development of CU traits. However, these previous studies did not examine direct and potentially reciprocal relationships between CU traits and peer support and only identified peer support as a potential protective factor.

Although some existing studies found that CU traits are significantly related to poor peer functioning, some studies failed to find a unique effect of CU traits on peer functioning independent of antisocial behaviour. For example, Haas et al. (2011) found that conduct problems, but not CU traits, were significantly related to lower ratings for peer sociometric status. Pardini and Fite (2010) also found no significant association between peer acceptance and CU traits, but peer acceptance was related to symptoms of attention-deficit and hyperactivity disorder and oppositional defiant disorder. Gender differences in peer relations may provide an explanation for these inconsistent findings. Girls are more accepted by peers given their tendency towards more cooperative and emotionally close interactions with peers (Fanti et al., 2017; Maccoby, 1999). Significant gender differences have also been demonstrated in the association of peer acceptance with other variables, such that emotion expression was significantly linked to lower peer acceptance only for boys (Perry-Parrish & Zeman, 2011) and girls' relational aggression predicted more peer-liking by boys, but not by girls (Smith, Rose, & Schwartz-Mette, 2010). As mentioned previously, there are also gender differences in the manifestation and correlates of CU traits, with boys showing more severe CU traits, externalising problems and lower empathy, and girls showing more severe internalising problems and better social competence (Cardinale & Marsh, 2020; Essau et al., 2006). Thus, girls high in CU traits may fare better in peer relationships compared to boys.

CHAPTER 2:

The present thesis

2.1. Introduction

The last few decades of research on CU traits has greatly expanded our understanding of heterogenous pathways for youth antisocial behaviour. CU traits are associated with more severe, varied and persistent antisocial behaviour, and reduced effectiveness of treatment (Frick et al., 2014). CU traits are now included as a specifier for conduct disorder in the DSM-5 (APA, 2013) and there has been much effort directed towards identifying risk and protective factors to help improve our understanding of their development and course across childhood and adolescence. However, research on environmental factors and CU traits has largely been limited to the family context, with the school setting receiving less attention. Most children start formal schooling by the age of around 5 years and begin to spend more time in their classroom and outside the home. The importance of the school context for child development is well-documented, with studies consistently finding a strong association between antisocial behaviour and poor school adjustment. It is vital to investigate CU traits in the school context to inform the identification of at-risk youth, and to guide personalised assessment and treatment.

The current thesis therefore consists of five different empirical studies that explore CU traits in the school context. In this chapter 2, I outline the overall

structure of the empirical research studies that will be presented in the following chapters. The research aims of each study, sample, and recruitment procedures are described in the following sections.

2.2. Thesis aims

The objective of the current thesis is to investigate how CU traits are related to school-related outcomes including both intra-individual (i.e., academic achievement, academic motivation, and school engagement) and interpersonal factors (teacher classroom strategies, the quality of the teacher-child relationship, peer acceptance) among South Korean primary school children and secondary school children in the United Kingdom. To achieve this aim, five different studies were conducted, and the specific issues addressed in each study are outlined below:

1. **Examining reliability and validity of the UNSW CU traits index in South Korean children.**
   In the study described in **Chapter 3**, a confirmatory factor analysis was used to test the internal reliability and validity of the UNSW system in South Korean primary school children (**Figure 2.1**). Furthermore, the longitudinal invariance of the measure was examined to see if the UNSW system assesses CU traits in the same manner over time. Its convergent validity was also examined using correlations between child and teacher reports of CU traits.

2. **Examining the unique associations between CU traits and antisocial behaviour in relation to trajectories of school engagement and academic grades.**
   In the study described in **Chapter 4**, a conditional latent growth curve model was used to test the unique associations between CU traits and antisocial behaviour in relation to trajectories of school-related outcomes (engagement, academic performance). The potential interaction effects between CU traits and antisocial behaviour on i)

school engagement (behavioural, emotional, and cognitive), and ii) academic grades (Maths and Korea) were also explored (**Figure 2.2**).

3. **Examining whether CU traits affect teacher classroom strategies and school-related outcomes.**
   In the study described in **Chapter 5**, a moderation analysis was used to test the interaction effect between teacher reward and discipline strategies and CU traits in predicting child academic motivation and school engagement. Furthermore, the direct relationships between CU traits and teacher use of reward and discipline strategies were also examined using a cross-lagged analysis model (**Figure 2.3**).

4. **Examining the longitudinal associations between CU traits and school-based affiliative relationships.**
   In the study described in **Chapter 6**, a cross-lagged model analysis was used to test longitudinal associations between CU traits and social affiliation with teachers (**Figure 2.4**) and peers (**Figure 2.5**). The potential moderating effect of gender in relation to these associations were also examined using multiple group structural equation modelling (SEM).

5. **Examining whether punishment insensitivity mediates the associations between CU traits and poor academic outcomes.**
   In the study described in **Chapter 7**, a mediation analysis within a SEM was used to test if punishment insensitivity mediates the link between CU traits and three different academic grades (English, Maths, and Science) (**Figure 2.6**).

2.3. Study approach

Four out of the five studies contain data that were collected at three different time points (March, July, and December 2018) during one academic year in South Korean primary schools. Prior to reporting each study, the sampling and recruitment procedures for this research are described in the following sections to give a brief overview of the study approach. The last study used cross-sectional data collected in a UK secondary school and the participants and procedures are described in Chapter 7.

2.3.1. Participants for Chapters 3 to 6

2.3.1.1. Children

Children aged 10 to 12 years (M = 11.03 years, SD = 0.65) from two public primary schools in a large south-eastern city of South Korea participated in the study. The child participants were in Years 5 and 6, which are the two highest grades of the six grades included in the Korean primary school period. In total, 218 students across 11 classrooms (Year 5, *n* = 3; Year 6, *n* = 8) completed the questionnaire at the first time-point in March 2018. All the participants were Korean and 51.8% were boys. The minority of children (*n* = 17, 8%) reported living with a single parent, largely consistent with the 10.9% reported living with a single parent family rate in South Korea (Statistics Korea, 2017). Only 10% (*n* = 21) were eligible for free milk in school, an index of low socioeconomic status in South Korea.

2.3.1.2. Teachers

Teacher participants included 11 form teachers. The age of teacher participants ranged from 30 to 55 years (*M* = 40.45, SD = 6.39). Most teachers were female (*n* = 7, 64%), and 7 teachers (64%) were in the position of director in each department. Years' work experience as a teacher ranged between 3 and 34.08 years (*M* = 15.05, SD = 8.49).

2.3.2. Procedures for Chapters 3 to 6

The child (see Appendix A) and teacher questionnaire protocol (see Appendix B) was initially translated into Korean by the researcher. The Korean version of the questionnaire was back-translated into English by another Korean who has been living in the UK for approximately 20 years and who holds British citizenship. On examining the second back-translated English version of the questionnaires, translation errors and some ambiguous words that could potentially have been misunderstood were altered and adjusted.

Public primary schools in South Korea were invited to participate in the research through an invitation letter to the school principals. Following the provision of a summary of the study (see Appendix C) sent to interested schools, two public primary schools in Daegu, South Korea were recruited. The teachers of Years 5 and 6 in each school were then informed of the research aims and procedures in an information sheet for teachers (see Appendix B) during the researcher's visit in early March, 2018. Of the 18 teachers invited to participate in the study, 7 declined to complete the questionnaires, giving a participation rate of 61.1%. Three Year 5 teachers and eight Year 6 teachers agreed to participate in the research and these form teachers distributed the information sheet to parents (see Appendix D) through their students. The parents were informed of the research aims and procedures (N= 274) and parental opt-out consent was obtained. Twenty percent of parents (n = 56) opted out of consent, resulting in 218 students who had consent to be approached to participate in the study. Children were also informed of the aims of the research and what their participation would entail using an information sheet (see Appendix A). Child assent was sought on the day of the first assessment, and all agreed to participate. Students completed the written questionnaires in their classroom during study hall time under exam conditions, and children who did not participate had study hall time as usual. Participants were given the option of not completing questions or returning an incomplete questionnaire and were informed that their answers were entirely confidential. Subjects were given an ID number which was used to link classroom and questionnaire data, so no names were recorded on any of the results.

Teacher participants also completed their questionnaires in their classroom at the same time. Teachers were asked to report on the four

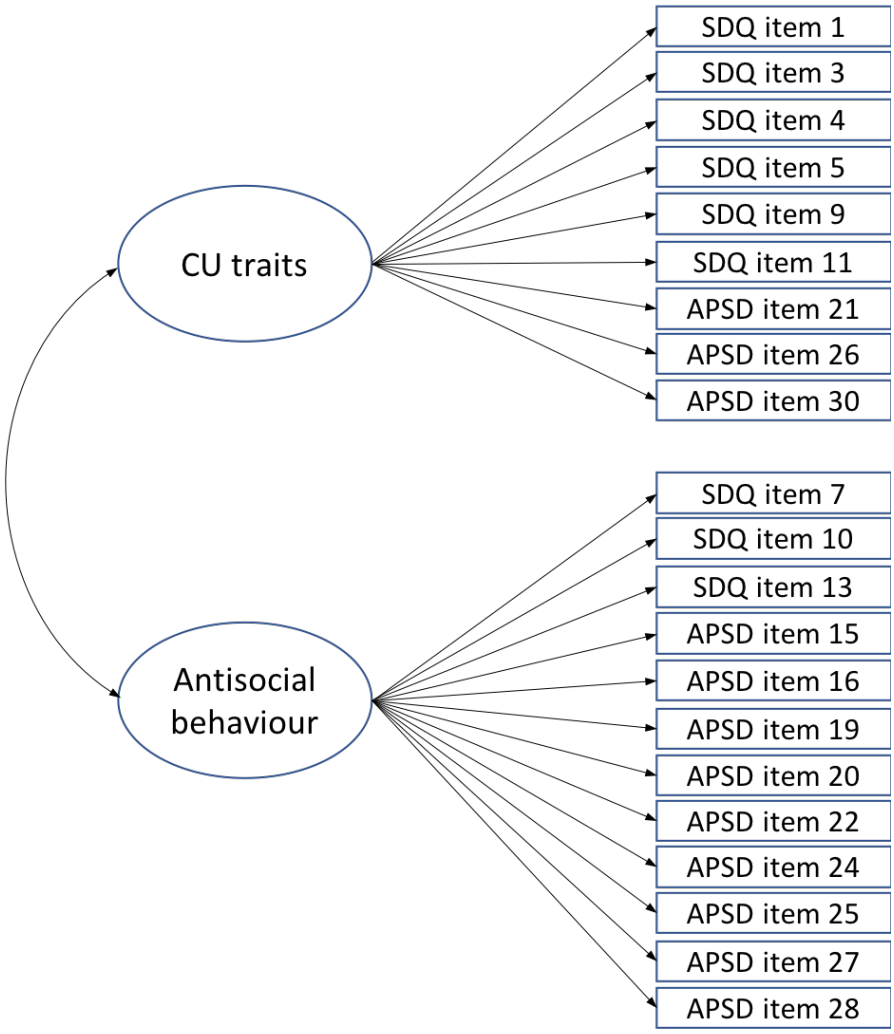
students from their classroom whom they judged to exhibit the most behaviour problems generally, or behaviour problems that negatively impact on the child's school outcomes. The aim of this selection strategy was to ensure significant variability in CU traits to enable the testing of convergent validity of the measure with the child reports, while reducing the assessment burden on teachers.

The first assessment was conducted in March 2018, at the start of the new academic year and the two follow-up data collection points were conducted at approximately 4.5-month intervals in July and December, respectively. In South Korea, the winter vacation runs from late December to late January, and after the winter vacation, schools have reduced hours until the term ends in February. The end of the academic year is in December, and the last academic assessment is also conducted then. All the measures used at the first data collection were administered at the following two time points, with the exception of child verbal ability and the sociodemographic information on teachers and children. Teacher participants reported on the same four students from the first data collection time-point at each wave of data collection.

Before the first round of data collection commenced, an ethical review was processed in line with the policy of the UCL research ethics committee. The proposed research was registered with the UCL Data Protection Officer and ethical approval obtained from the UCL IOE ethics committee. The following items were identified as potential issues that gave rise for concern: vulnerable participants, sensitive topics, international research, confidentiality and data security. The details of each item can be found in Appendix E.

Figure 2.1

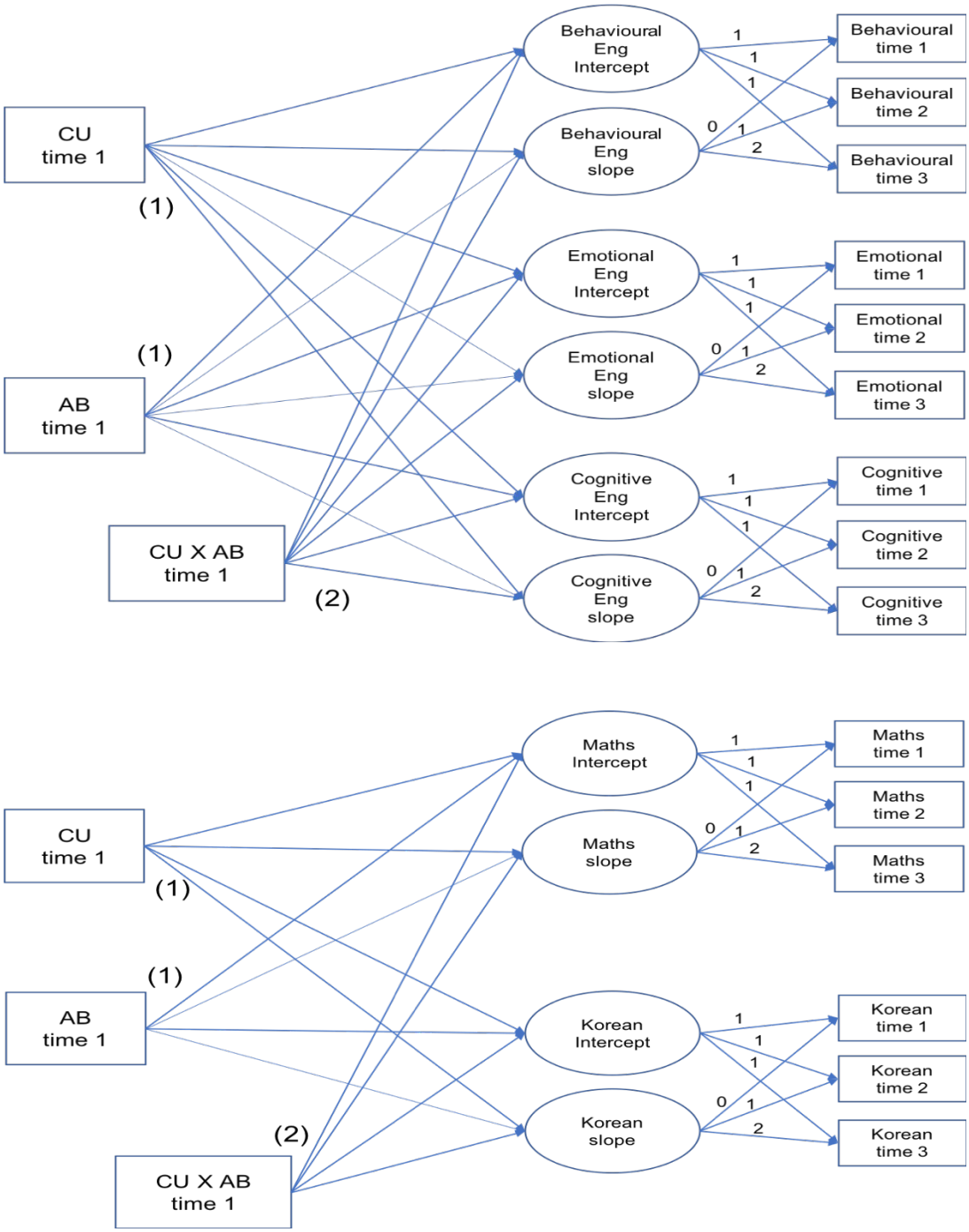
Measurement Model of the UNSW CU Traits Index and Antisocial Behaviour Scales in South Korean Children



Note. CU traits = Callous-unemotional traits, SDQ = Strength and Difficulties Questionnaire (Goodman, 1997), APSD = Antisocial Process Screening Device (Frick & Hare, 2001).

Figure 2.2

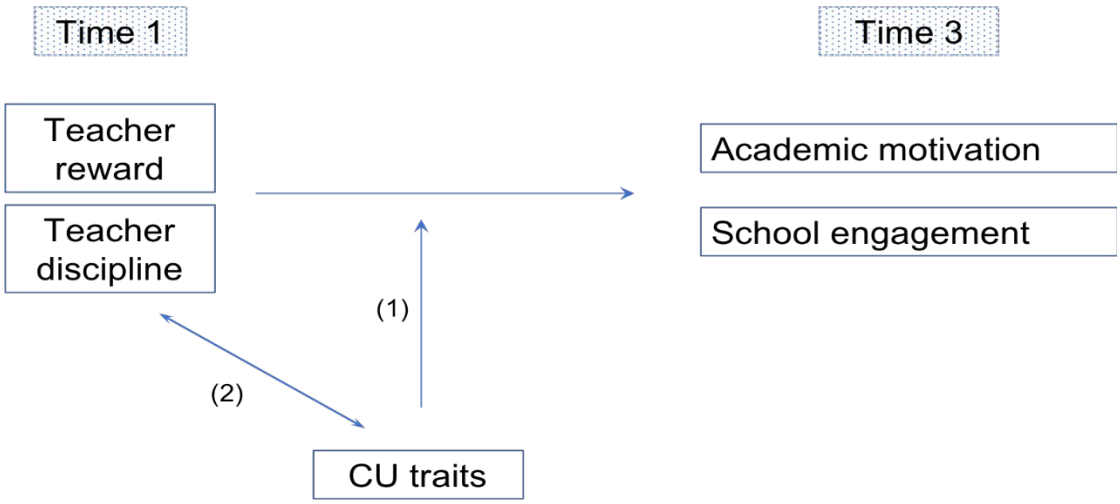
Models to Explore School Outcome Trajectories in relation to CU Traits and Antisocial Behaviour



Note. CU traits = Callous-unemotional traits, AB = antisocial behaviour, Eng = Engagement. (1) Unique associations between CU traits and antisocial behaviour in predicting trajectories of school engagement and academic achievement, and (2) the interaction effects between CU traits and antisocial behaviour in predicting these trajectories.

Figure 2.3

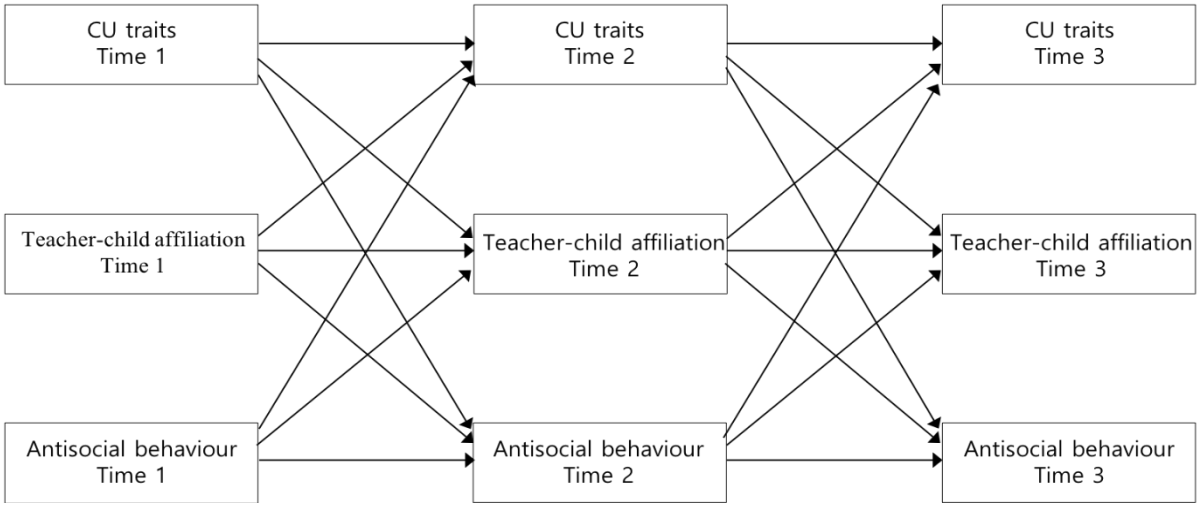
Model to Explore the Association between Teacher Classroom Strategies, School Outcomes, and CU Traits



Note. CU traits = Callous-unemotional traits. (1) The moderating effect of CU traits on the association between teacher classroom strategies, motivation, and engagement and (2) the direct relationship between CU traits and teacher classroom strategies.

Figure 2.4

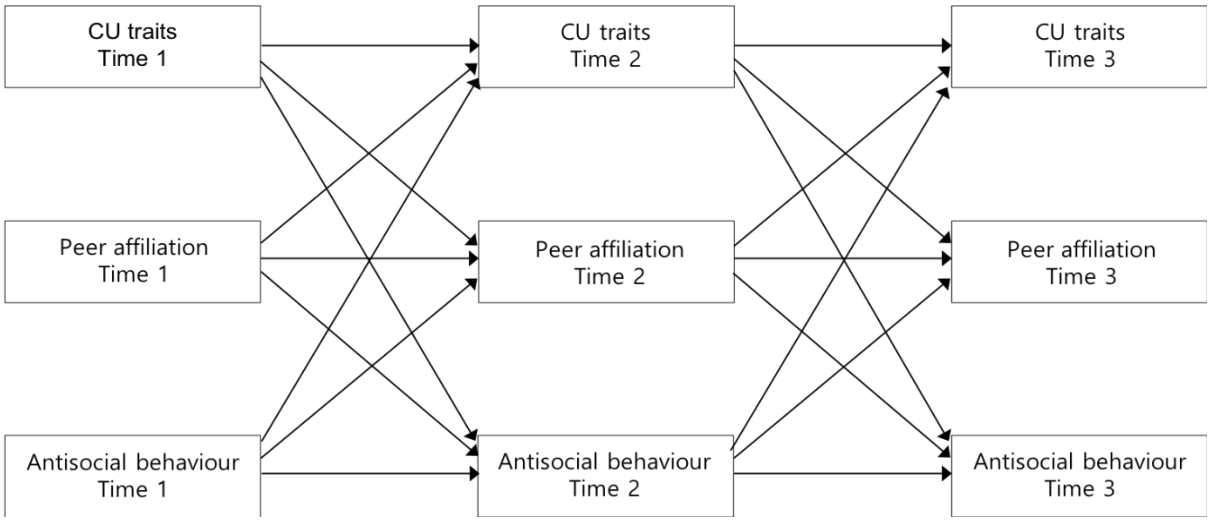
Model to Explore the Longitudinal Associations among CU Traits, Teacher-Child Affiliation, and Antisocial Behaviour



Note. CU traits = Callous-unemotional traits.

Figure 2.5

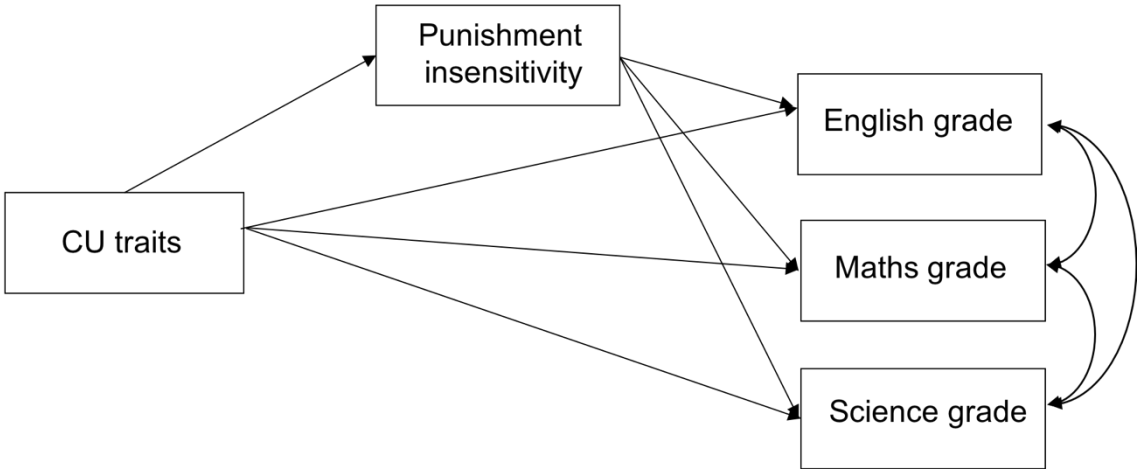
Model to Explore the Longitudinal Associations among CU Traits, Peer Affiliation, and Antisocial Behaviour



Note. CU traits = Callous-unemotional traits.

Figure 2.6

Model to Explore the Mediating Effect of Punishment Insensitivity on the Associations between CU Traits and Academic Grades



Note. CU traits = Callous-unemotional traits.

CHAPTER 3:

The reliability and validity of the UNSW CU traits measure in South Korean primary school students

3.1. Introduction

Callous-unemotional (CU) traits have been the subject of intensive research for the last two decades, as a critical tool for identifying a meaningful subgroup of children with more severe and persistent antisocial behaviour (Frick et al., 2014). CU traits are associated with an early onset of antisocial behaviour and show distinct biological, emotional, cognitive correlates from antisocial children without CU traits, suggesting the importance of individualised assessment and intervention for these at-risk children (Frick & Moffitt, 2010). However, most research on CU traits has been conducted in Western countries, despite potential cultural differences in the presentation of CU traits, as well as different correlates between Western and East Asian nations (see review by Sng, Hawes, Hwang, Allen, & Fung, 2020). In particular, most research in Asian countries has been conducted in China, with only one study on CU traits in

South Korea published to date (Kim & Chang, 2019). One study examining CU traits in South Korean children found a significant association between CU traits and poor social competence, consistent with findings in the Western literature (e.g., Haas, Becker, Epstein, & Frick, 2018; Piatigorsky & Hinshaw, 2004); however, this study used an unvalidated measure of CU traits that was formed by selecting theoretically-relevant items from the Child Behaviour Checklist (CBCL; Achenbach & Rescorla, 2000).

Research findings suggest potential East-West cultural differences in the assessment of CU traits, such that CU traits assessed by the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) did not show a significant association with aggression (Sng et al., 2018; Wang et al., 2017a; Wang et al., 2015), which is a well-established correlate of CU traits in Western samples. Another study found that parent reports of CU traits on the APSD on children in Hong Kong showed higher scores than those provided by parents of children in the USA (Fung et al., 2009). The differences in Asian countries may be related to different interpretations of individual items across cultures, such as cultural display rules around emotion (Allen et al., 2020b). In fact, one study examined the measurement invariance of the self-report version of the Inventory of Callous-Unemotional Traits (ICU; Frick, 2004) in students in China and the United Kingdom (UK) and found that several items were systematically rated higher or lower by children from these different countries, most likely due to differing social norms across cultures (Allen et al., 2020b). Therefore, in this chapter, I will examine the reliability and validity of a CU traits measure in South Korean children, to provide evidence supporting its use in the current sample.

One of the important issues regarding the assessment of CU traits is whether measures assess a construct distinct from antisocial behaviour. The two most widely used measures of CU traits, the APSD and the ICU, did not consider the possible overlap between their CU traits construct and antisocial behaviour during measure development and validation. In order to improve the discriminant validity of the APSD CU traits measure, Dadds et al. (2005) developed the UNSW system that uses pooled items from the APSD (Frick & Hare, 2001) and Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). Using confirmatory factor analysis (CFA), they established that the UNSW CU traits index forms a separate dimension from the UNSW antisocial

behaviour index. The CU traits measure also predicted later antisocial behaviour, providing support for its predictive validity. Many studies have since found support for the internal consistency (*range*, α = .69−.89) and construct validity of both the UNSW CU traits index and antisocial behaviour index (Centifanti et al., 2019; Hawes et al., 2013; Hawes et al., 2019a). However, most studies were conducted in Australia or the UK; no study to date has determined if the same item-factor structure would be obtained with South Korean children, despite the potential differences between Western and Asian samples given different social norms and cultural values, such as individualism versus collectivism. Further, the UNSW system has generally been used as parent report, thus little is known about the psychometrics of youth self-report on this measure. However, children may also be an important, and often overlooked, source of information on antisocial behaviour, especially children with CU traits, since adults are not always aware of children's deceitful or covert antisocial acts (Frick, Barry, & Kamphaus, 2010). The current study therefore investigated the psychometric properties of youth self-report on the UNSW system to provide information about its use in future research.

As a first aim, the current study will therefore explore whether the factor structure of the CU traits and antisocial behaviour scales identified by Dadds et al. (2005) generalises to a sample of South Korean primary school children. The longitudinal invariance of these scales will also be investigated to see if these constructs are assessed in the same manner over time. Based on past research, it was hypothesised that two separate CU traits and antisocial behaviour factors would be identified among the current sample and there would be no time variance across the three study time points. The second aim of the current study is to explore the internal reliability and validity of the CU traits and antisocial behaviour scales in the current sample by computing the alphas and testing correlations between youth and teacher reports of CU traits and antisocial behaviour. It was hypothesised that both child and teacher reporting of CU traits and antisocial behaviour would show good internal consistency and that these two scales would be significantly associated with each other at all three time points.

3.2. Methods

3.2.1. Participants

As described in Chapter 2, participants were 218 South Korean primary school students (mean age = 11.03, *SD* = 0.65, 52% male). Teacher participants included 11 form teachers and their ages ranged from 30 to 55 years (M = 40.45, *SD* = 6.39, 64% female). To establish the convergent validity of measures, teachers reported on the CU traits and antisocial behaviour of the four students from their classroom whom they judged to exhibit the most severe behaviour problems, resulting in a subsample of 44 students.

3.2.2. Measures

Callous-unemotional traits and antisocial behaviour. CU traits and antisocial behaviour were assessed using the University of New South Wales (UNSW) system (Dadds et al., 2005). The UNSW system was developed via the pooled items of the SDQ (Goodman, 1997) and the APSD (Frick & Hare, 2001) to enhance the specificity and validity of the assessment of CU traits in children. The reliability and construct validity of the UNSW CU traits and antisocial behaviour index has been supported in many studies including samples of children and adolescents with alphas ranging from .69 to .91, and with CU traits scores shown to correlate with child antisocial behaviour (e.g., Dadds, Jambrak, Pasalich, Hawes, & Brenna, 2011; Hawes, Kimonis, Diaz, Frick, & Dadds, 2019; Pasalich, Dadds, Hawes, & Brennan, 2011). Although most prior studies assessed parent reports of CU traits and antisocial behaviour, the few studies that employed child self-reporting also showed good reliability with alphas ranging from .77 to .90 (Centifanti et al., 2019; Dadds, Kimonis, Schollar-Root, Moul, & Hawes, 2018). However, in the current sample, the alphas were slightly low: .67 at Time 1, .67 at Time 2, and .70 at Time 3 for CU traits, and .66 at Time 1, .70 at Time 2, and .67 at Time 3 for antisocial behaviour. However, teacher reports of CU traits and antisocial behaviour showed good internal consistency with alphas ranging from .77 to .91 at all three time points.

3.2.3. Data analysis

Aim 1: Evaluation of factor structures within South Korean children

CFA was used to assess the fit of a model specifying items to load onto separable CU traits and antisocial behaviour factors. The chi-square ratio, the comparative fit index (CFI), the Tucker Lewis index (TLI), the root mean squared error of approximation (RMSEA), and the standardised root mean square residual (SRMR) were used as indicators of fit adequacy. A chi-square ratio value lower than 2 is considered good and a value lower than 1 is considered very good (Byrne, 2010). The recommended cut-offs for the rest of the indices are debated, however values for the CFI and TLI higher than .90, the RMSEA lower than .10, and the SRMR lower than .10 are generally accepted to indicate adequate fit, whereas values for the CFI and TLI higher than .95, the RMSEA lower than .06, and the SRMR lower than .05 indicate a good model fit (Hox & Bechger, 1998; Hu & Bentler, 1999). If the original scales do not fit the current model, it will be revised based on the factor loadings and in accordance with theories on CU traits and antisocial behaviour.

To make sure the scales measure the same latent constructs in the same manner over time, longitudinal invariance of the specified model across all three-time points was tested using multiple group CFA. Each group by time point has two latent variables corresponding to the measures for CU traits and antisocial behaviour (**Figure 3.1**). The baseline model is defined without any constraints to test if the factor structure is similar across time points. The successive models, which are increasingly stringent by adding constrained loadings, intercepts, and residuals one by one, were tested for their fit and compared to the fit for each previous model. A Satorra-Bentler-scaled chi-square test (Satorra & Bentler, 2001) and the variance of the CFI and the RMSEA were used to compare the difference of the fit between models. A non-significant increase in the chi-square value indicates that the constraints across time are possible, suggesting longitudinal invariance. The recommended cut-offs for invariance in the change of CFI and RMSEA are when ΔCFI is lower than .01 and ΔRMSEA is lower than .015 (Chen, 2007).

Aim 2: Examining the reliability and convergent validity of the scales

Alphas were computed for both child and teacher reports of CU traits and antisocial behaviour to test the internal reliability of the revised measure in the current sample. To establish the convergent validity of the measures, correlations between child reports of CU traits and antisocial behaviour and teacher reports on the same scales among a subset of the sample (n = 44) were examined.

3.3. Results

3.3.1. Confirmatory factor analysis

Two constructs of CU traits and antisocial behaviour that include items from the original UNSW system showed a poor fit in the current sample (χ^2 (df=188) = 319.35, p < .001; χ^2/df = 1.70; CFI = .87; RMSEA = .06; SRMR = .11). In addition, both the CU traits and antisocial behaviour scales showed poor internal consistency with alphas of .67 and .66, respectively, and were also not significantly associated with each other (r = .09, p = .204).

Therefore, two scales were revised based on the face validity of items in accordance with theories of CU traits and antisocial behaviour and factor loadings of individual items (excluding items with a factor loading less than .30) and the revised two-factor model was validated using CFA in the current sample. One (i.e., ‘usually do as I am told’) and three items (i.e., ‘brag a lot about your abilities, accomplishments or possessions’, ‘can act charming and nice to get what you want’, ‘think you are better or more important than other people’) that showed poor factor loadings were excluded from the original UNSW CU traits and antisocial behaviour indices, respectively. Instead, one item (i.e., ‘care about how well you do at schoolwork or work’) from the UNSW hyperactivity index moved to the revised UNSW CU scale, and another three items (i.e., ‘act without thinking of consequences’, ‘get bored easily’, ‘do not plan ahead or leave things until the last minute’) were moved to the revised UNSW antisocial behaviour scale.

In the revised scale, CU traits were assessed using 5 items from the SDQ measuring prosocial behaviour, or lack thereof (e.g., 'inconsiderate of other people's feelings', 'helpful if someone is hurt, upset, or ill'), as well as 4 items from the APSD assessing callousness (e.g., 'concerned about the feelings of others') and lack of guilt (e.g., 'feel bad or guilty when you do something wrong'). The item assessing lack of guilt showed a factor loading less than .30; however, it was included in the revised scale given that it is a core feature of CU traits that distinguishes this construct from antisocial behaviour. Similarly, antisocial behaviour was assessed using 3 items from the SDQ that tap into aggression and rule-breaking (e.g., 'often fights with other children', 'steals from home and elsewhere') and 6 items from the APSD that assess broader symptoms of externalising disorders (e.g., 'gets bored easily', 'blames others').

The revised two-factor model showed adequate model fit (χ^2 (*df*=134) = 200.70, p < .001; χ^2/df = 1.49; CFI = .90; RMSEA = .05; SRMR = .09) and antisocial behaviour and CU traits were significantly related to each other (*r* = .35, *p* < .001) suggesting that the items formed distinct, albeit related, constructs (see **Table 3.1** for factor loadings and model fit statistics). In addition, both scales were not significantly associated with child age or free school milk, supporting the discriminant validity of the revised measures. The internal consistency of the revised scale was .73 for CU traits and .72 for antisocial behaviour showing improved reliability compared to that of the original scale in the current sample.

The results for the longitudinal invariance of the revised scales are presented in **Table 3.2**. The configural model that allows the parameters to differ across time points showed adequate fit (χ^2 (*df*=402) = 558.71, *p* < .001; χ^2/df = 1.38; CFI = .96; RMSEA = .04; SRMR = .09). The comparison between the weak invariance and configural models was not significant (ΔSB- χ^2(*df*=36) = 37.88, *p* = .383) and the variations of CFI and RMSEA were within the margin for accepting invariance (ΔCFI = .01; ΔRMSEA = .01). Likewise, the results supported strong invariance across time (ΔSB- χ^2(*df*=32) = 22.05, *p* = .905; ΔCFI = .00; ΔRMSEA = .00). Last of all, the chi-square statistic testing the difference between the strict and strong models was significant (ΔSB- χ^2(*df*=6) =

32.02, $p < .001$); however, the ΔCFI and the ΔRMSEA values supported strong invariance, showing no differences compared to the strong invariance model across time (ΔCFI = .00; ΔRMSEA = .00).

3.3.2. Reliability and convergent validity of child and teacher report

The internal consistency of both child and teacher reports on the revised CU traits was good with alphas ranging from .73 to .81 (**Table 3.3**). Child and teacher reports on the revised antisocial behaviour index also showed improved internal consistencies with alphas ranging from .68 to .92 (**Table 3.4**). The correlations between child reports and teacher reports on the revised CU traits scale are presented in **Table 3.3**. The convergent validity of child and teacher reports on CU traits was supported by significant correlations across all time points (Time 1, $r = .47$, $p < .01$; Time 2, $r = .52$, $p < .01$; Time 3, $r = .62$, $p < .01$), as well as moderate intra-class correlations (ICCs) ranging from .62 to .76. Likewise, the convergent validity of child and teacher reports on the revised antisocial behaviour scale was also supported with significant correlations across all time points (Time 1, $r = .39$, $p < .01$; Time 2, $r = .50$, $p < .01$; Time 3, $r = .32$, $p < .05$), as well as moderate ICCs ranging from .47 to .59 (**Table 3.4**).

Table 3.1

Factor Loadings for Each Item in the Revised Scale and Model Fit Indices

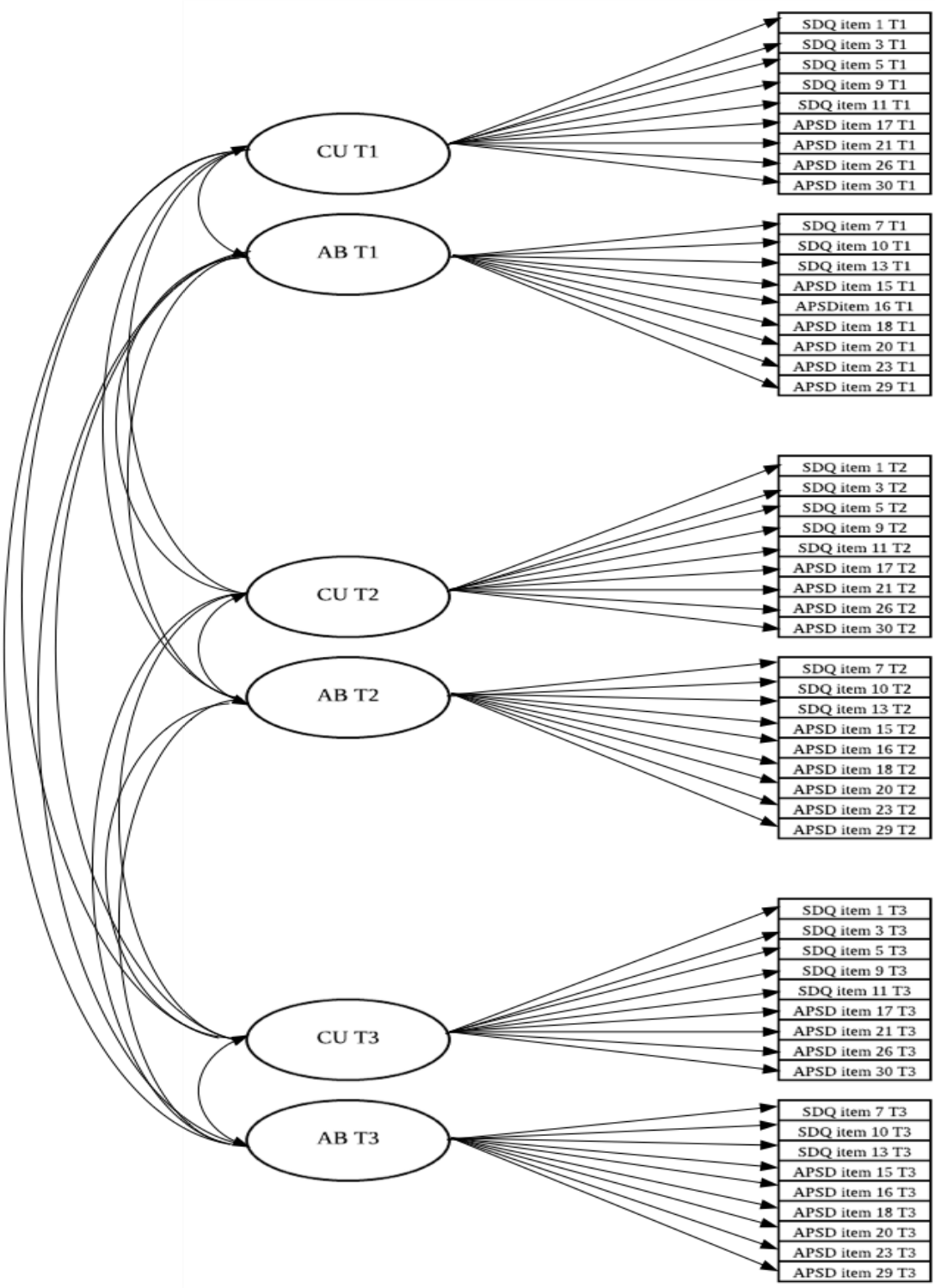
Item	CU	AB
SDQ Item 1. Inconsiderate of other people's feelings	.70***	
SDQ Item 3. Does not share with other children	.52***	
SDQ Item 5. Unhelpful if someone is hurt, upset, or ill	.75***	
SDQ Item 9. Not kind to younger children	.49***	
SDQ Item 11. Does not volunteer to help others	.70***	
APSD Item 17. Not motivated in schoolwork	.54***	
APSD Item 21. Breaks promises	.64***	
APSD Item 26. No guilt	.26***[1]	
APSD Item 30. Unconcerned regarding others feelings	.64***	
SDQ Item 7. Often fights with other children		.39***
SDQ Item 10. Often lies or cheats		.88***
SDQ Item 13. Steals from home and elsewhere		.85***
APSD Item 15. Blames others		.60***
APSD Item 16. Breaks rules		.71***
APSD Item 18. Acts without thinking		.55***
APSD Item 20. Lies easily		.63***
APSD Item 23. Gets bored		.59***
APSD Item 29. Puts things off		.68***
χ^2	200.70***	
Df	134	
CFI; TLI; RMSEA; SRMR	.90; .89; .05; .09	

Note. CU traits = Callous-unemotional traits; AB = Antisocial behaviour. SDQ = Strengths and Difficulties Questionnaire (Goodman, 1997); APSD = Antisocial Process Screening Device (Frick & Hare, 2001). ****p* < .001.

[1] Lack of guilt is an important feature of CU traits that distinguishes this construct from antisocial behaviour. Thus, APSD item 26 was included in the revised measure despite its low factor loading.

Figure 3.1

Representation of the Model for Assessing Longitudinal Measurement Invariance



Note. CU traits = Callous-unemotional traits; AB = Antisocial behaviour. T1 = Time 1; T2 = Time 2; T3 = Time 3. SDQ = Strengths and Difficulties Questionnaire (Goodman, 1997); APSD = Antisocial Process Screening Device (Frick & Hare, 2001).

Table 3.2

Model Fit Statistics for Tests of Longitudinal Invariance across Time 1, Time 2, and Time 3 of the Revised Scale

Model	χ^2	*df*	CFI	RMSEA	ΔSB-χ^2	ΔCFI	ΔRMSEA
Configural	558.71	402	.96	.04			
Weak	651.09	438	.95	.05	37.88	.01	.01
Strong	664.93	470	.95	.05	22.05	.00	.00
Strict	709.64	476	.95	.05	32.02***	.00	.00

Note. S-Bχ^2 = Satorra-Bentler chi-square; *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation. ***p < .001.

Table 3.3

Correlations between Child and Teacher Report on the Revised CU traits Scale and the Alphas for Each Scale

	N	α	1	2	3	4	5
1. CU Time 1 (Child)	214	.73					
2. CU Time 2 (Child)	215	.73	.59**				
3. CU Time 3 (Child)	211	.74	.46**	.66**			
4. CU Time 1 (Teacher)	44	.78	.47**	.56**	.49**		
5. CU Time 2 (Teacher)	44	.81	.42**	.52**	.73**	.65**	
6. CU Time 3 (Teacher)	44	.81	.31*	.38*	.62**	.63**	.83**

Note. CU = Callous-unemotional traits. *p < .05. **p < .01.

Table 3.4

Correlations between Child and Teacher Report on the Revised Antisocial Behaviour Scale and the Alphas for Each Scale

	N	α	1	2	3	4	5
1. AB Time 1 (Child)	213	.72					
2. AB Time 2 (Child)	211	.72	.51**				
3. AB Time 3 (Child)	211	.68	.59**	.66**			
4. AB Time 1 (Teacher)	44	.88	.39**	.34*	.30*		
5. AB Time 2 (Teacher)	44	.90	.51**	.50**	.44**	.71**	
6. AB Time 3 (Teacher)	44	.92	.42**	.32*	.32*	.69**	.85**

Note. AB = Antisocial behaviour. *$p < .05$. **$p < .01$.

3.3. Discussion

In this chapter, the factor structure of the UNSW system assessing CU traits and antisocial behaviour in a sample of South Korean children, as well as the convergent validity of the measures between child and teacher reports were examined. In relation to the first study aim, the results did not support the hypothesis that the UNSW system would be validated in South Korean children. Therefore, revised scales were constructed on the basis of the face validity and factor loadings for individual items, and their reliability and validity were evaluated again using CFA. The revised two-factor model showed a good fit in the current sample, with findings indicating that the revised CU traits and antisocial behaviour scales are two distinct, albeit related, constructs. In

addition, there was no longitudinal invariance suggesting that the revised scale assessed the same constructs across all three time points.

The revised scale also showed improved internal reliability, with alphas ranging from .68 to .74 (**Table 3.3** for CU traits; **Table 3.4** for antisocial behaviour). Teacher reports for the revised CU traits and antisocial behaviour scale also showed good internal consistency, with alphas ranging from .78 to .92. The alphas of the revised UNSW CU traits and antisocial behaviour measures are largely similar to those found in past studies that used the UNSW system with alphas ranging from .69 to .89 (e.g., Hawes et al., 2019; Pasalich et al., 2011).

Using the teacher report on a subset of the sample, the convergent validity was examined. Child and teacher reports on the revised UNSW CU traits index were significantly correlated at all three time points. The correlations between child and teacher reports on CU traits in the current study at all three time points (range, r = .47–.62) were higher than those found in past research on the convergent validity of child reports and mother reports on the original UNSW CU traits index (r = .32) or between child reports and teacher reports (r = .24) (Dadds et al., 2018). Another study that examined correlations between children and other informants on CU traits also found good convergent validity, such that child reports of the UNSW CU traits index and combined parent, teacher, and child ratings for this same index showed a significant association with r = .63 (Dadds et al., 2011).

There were also significant associations between teacher and child reports on the revised UNSW antisocial behaviour index at all three time points (range, r = .32–.50). Although no previous research has examined the convergent validity between child and teacher reports on the UNSW antisocial behaviour index, some studies have investigated correlations between child and teacher reports on externalising problems. The correlations between child and teacher reports on antisocial behaviour in the current study is similar to, or slightly better than that reported for teacher and child reports on externalising problems in previous research, for example, r = .37 (Gresham, Elliott, Cook, Vance, & Kettler, 2010) or r =. 38 (Walters, Ronen, & Rosenbaum, 2010).

The original UNSW system has been validated in many prior studies as a useful measure that overcomes the limitation of other measures assessing CU

traits (e.g., APSD or ICU) in terms of overlap of the CU construct with antisocial behaviour (Dadds et al., 2005; Pasalich et al., 2011). The reliability and construct validity of the UNSW system have been supported among the different age groups and informants, as well as in both a clinical and community sample (e.g., Dadds et al., 2014; Dadds et al., 2018; Hawes, Dadds, Brennan, Rhodes, & Cauchi, 2013; Hawes, Straiton, & Howie, 2019). However, most research has been conducted in Western countries, with only one study in an East Asian country, China (Huang, Fan, Lin, & Wang, 2019). Although Huang et al. did not examine the factor structure of the UNSW system, it seems to support the construct validity of the UNSW system among Chinese children, as identifying different psychopathic tendency groups based on CU traits, antisocial behaviour, and anxiety, which is consistent with previous findings in Western literature. However, it should be noted that they only examined parent reports using the UNSW system, and while the alpha was acceptable for CU traits (.74), it was modest for antisocial behaviour (.67).

The current study is the first to examine the factor structure, reliability and validity of child report on the UNSW system among South Korean children. Existing studies have shown good reliability of child self-report in both clinic-referred and community samples (Centifanti et al., 2019; Dadds et al., 2018). However, child self-reports on the original scale showed a poor model fit in the current sample, as well as low internal consistency. The current study did not test the measurement invariance of the UNSW system across different countries; however, the poor fit of the original UNSW system in the current sample suggests that there may be cultural differences in the presentation or interpretation of individual items designed to assess CU traits and antisocial behaviour. In particular, the items that showed poor factor loadings (e.g., ‘usually do as I am told’, ‘brag a lot’, ‘think I am better/more important than others’) seem to reflect different cultural values, in that Korean culture promotes vertical collectivism over individualism and considers modesty and reticence as important virtues (Foster, Campbell, & Twenge, 2003; Kim, Wang, Kondo, & Kim, 2007). More research is warranted to further investigate cultural differences in the assessment of CU traits to ensure the optimal adaptation of measures for East Asian cultures.

The current study should be interpreted in the light of several limitations. First, the participants were all Korean, so the results may not generalise to other East Asian nations. Future studies should examine whether the current findings are replicated in other East Asian cultures, especially given that the construct validity of the UNSW system in assessing Chinese children's CU traits and antisocial behaviour was supported by Huang et al. In addition, the sample for teacher reports on CU traits and antisocial behaviour was small, precluding the investigation of measurement invariance between the two different informants. Although the current study showed significant associations between child and teacher reports for both CU traits and antisocial behaviour at all three time points, future research including child, teacher and parent reports with a larger sample would provide a more rigorous examination of the validity of the revised measure. Lastly, the present sample consisted of non-clinically referred children attending two primary schools in South Korea, with low variability in the levels of CU traits and antisocial behaviour. Therefore, it is unclear if the current findings can be generalised to clinical or adjudicated samples.

Nevertheless, the current study highlights the importance of evaluating the validity of the UNSW system when it is used in a non-Western culture, as the original scales showed a poor fit in South Korean children and low factor loadings for some items. The revised scale showed improved reliability and good model fit providing the support for two distinct, but related, constructs of CU traits and antisocial behaviour. Furthermore, correlations between child and teacher reports and tests of longitudinal invariance indicate that the revised scales assess the same construct over time and between different informants. The present study is the first to provide support for the reliability and validity of a relatively brief measure of CU traits in South Korean children, therefore these findings will hopefully encourage more research on CU traits in this nation and East Asian countries.

CHAPTER 4:

The unique associations between CU traits and antisocial behaviour in predicting trajectories of engagement and academic grades

Part of Chapter 4 has been submitted for publication as Hwang, S., Waller, R., Hawes, D. J., & Allen, J. L. (under review). Antisocial behaviour and callous-unemotional traits: Associations with trajectories of school outcomes in South Korean children. *Journal of Youth and Adolescence.*

4.1. Introduction

In Chapter 3, the reliability and validity of the UNSW system assessing CU traits and antisocial behaviour in South Korean primary school children was examined. The revised CU traits and antisocial behaviour scales showed a good model fit and improved internal reliability for child reports, as well as significant associations between child and teacher reports in a subset of the sample (n = 44). Furthermore, there was no longitudinal variance for the revised measures. Thus, the findings of the study presented in the previous chapter support the validity of the following empirical studies that examine CU traits in

the school context within a longitudinal study design. In this chapter, I examine whether CU traits and antisocial behaviour are unique predictors of two key competency outcomes that relate to school success: school engagement and academic performance.

Poor educational outcomes are a common problem for antisocial children, with both academic and behavioural problems exerting a negative impact on school and later life outcomes such as school dropout, unemployment, and criminal offending (Doll, Spies, & Champion, 2012; Renda, Vassallo, & Edwards, 2011). Several potential underlying factors have been explored, and one of the most robust findings is the link between low verbal ability and antisocial behaviour (Hinshaw, 1992). Verbal ability deficits are a strong predictor of both antisocial behaviour and academic failure (Moffitt, 1990); however, CU traits do not appear to be associated with low verbal intelligence (Allen et al., 2013; DeLisi et al., 2011). However, there is consistent evidence for a relationship between CU traits and poor academic-related outcomes including poor school engagement (Fanti et al., 2017; Wall et al., 2016) and low academic grades (Bird et al., 2019; Ciucci et al., 2014; DeLisi et al., 2011; Horan et al., 2016). The present study therefore aims to explore how antisocial behaviour and CU traits, separately and interactively, predict academic-related outcomes trajectories (i.e., school engagement and academic grades), controlling for verbal ability.

In particular, the present chapter examines school engagement as a multidimensional construct, thus it could provide richer information concerning specific intervention targets for antisocial children with and without CU traits. As described in Chapter 1, existing studies that have examined longitudinal associations between antisocial behaviour and school engagement as a multidimensional construct have shown significant links with decreases in behavioural (Olivier et al., 2020; Wang & Fredricks, 2014), emotional (Wang & Fredricks, 2014), and cognitive engagement (Hirschfield & Gasper, 2011). However, prior studies did not consider CU traits as a potential confounding factor and did not explore the three different dimensions of school engagement in a single model, thus failing to account for their overlap (Fredricks, Blumenfeld, Friedel, & Paris, 2005; Jimerson et al., 2003). Given the core features of CU traits that include reduced motivation in social affiliation

(Sherman & Lynam, 2017; Viding & McCrory, 2019; Waller et al., 2020a) and a lack of concern for school performance (Frick et al., 2014), CU traits may be more strongly associated with low emotional (i.e., related to caring about the expectations of others) and cognitive (i.e., related to investment in academic tasks) dimensions of engagement than antisocial behaviour.

Despite the potential implication for providing specific intervention targets for different subtypes of antisocial children according to the levels of CU traits, very few studies have examined the associations between CU traits and school engagement. Some researchers have suggested that the poor school engagement may contribute to the poor academic performance of children with CU traits rather than cognitive or verbal deficits (Allen et al., 2018; DeLisi et al., 2011). In addition, two longitudinal studies identified lower emotional school engagement among antisocial children with CU traits than among antisocial children without CU traits (Fanti et al., 2017; Wall et al., 2016). However, no prior studies have directly examined the association between CU traits and school engagement independently of antisocial behaviour, and existing studies have all focused on the emotional dimension rather than all three dimensions of school engagement.

Another key competency outcome, academic achievement, is also known to be impaired by antisocial behaviour and CU traits (Bird et al., 2019; McEvoy & Welker, 2000). However, most of the studies that have examined these associations were conducted in Western countries, thus it remains unclear whether these findings are applicable to East Asian countries. To the best of my knowledge, no study has been conducted in any East Asian country exploring the association between academic achievement and CU traits. Moreover, the few studies that have examined associations between academic achievement and antisocial behaviour in East Asian countries have shown no (Li & Armstrong, 2009) or only a weak relationship (Fu, Chen, Wang, & Yang, 2016) between them. Researchers have also recently started to explore potential cultural differences in child academic motivation and engagement (Lan et al., 2009; Qu, Pomerantz, Wang, Cheung, & Cimpian, 2016), as well as the presentation and correlates of CU traits (see Sng et al., 2020) between West and East Asian countries. Confucianism based culture considers diligence and persistence to achieve high academic performance as a moral endeavour (Li,

2004); thus, this cultural values may lead to different findings on the development of school engagement and academic achievement, and their associations with antisocial behaviour and CU traits.

The aim of the present study is thus to explore whether antisocial behaviour and CU traits distinctively predict trajectories of school-related outcomes in South Korean primary school children. Unique associations between child antisocial behaviour and CU traits and trajectories of academic grades in two different subjects (i.e., Maths and Korean) and three different dimensions of school engagement (i.e., behavioural, emotional, and cognitive engagement) were examined, controlling for verbal ability. The participants are from the highest two grades (Years 5 and 6; ages 10 to 12 years) in South Korean primary schools, in which children are likely to show decreased academic engagement and achievement, combined with increased antisocial behaviour (Kim, Jo, Lee, & Byeon, 2013; Lee, 2000). It is hypothesised that antisocial behaviour and CU traits would be uniquely associated with lower school engagement and academic grades at the start of the academic year. In relation to changes in outcomes, it is also hypothesised that both antisocial behaviour and CU traits would be associated with decreasing trajectories for school engagement and academic grades. However, it was expected that CU traits would be related to steeper decreases in emotional and cognitive engagement than antisocial behaviour, given the link between CU traits and motivational deficits in relation to both social affiliation (Waller et al., 2020a) and academic performance (Frick et al., 2014).

4.2. Methods

4.2.1. Participants

As described in Chapter 2, participants were 218 South Korean primary school children (mean age = 11.03, *SD* = .65, 52% boys) at a baseline assessment. Children completed two follow-up assessments at 4.5-month intervals. Retention rates were high (98.6% at Time 2 and 97.7% at Time 3); only seven children missed one or both follow-ups.

4.2.2. Measures

Callous-Unemotional traits. Children completed the revised UNSW CU traits index (see Chapter 3) which features combined items from the SDQ (Goodman, 1997) and the APSD (Frick & Hare, 2001) at the first assessment. The 9-item measure assesses child lack of guilt and callousness (e.g., 'I feel bad or guilty when I do something wrong', 'I try to be nice to others and care about their feelings') using a 3-point scale from 0 (not true) to 2 (certainly true). The alpha of the revised scale was .73 and there is evidence for construct validity, including significant associations with antisocial behaviour (see Chapter 3).

Antisocial behaviour. Child antisocial behaviour was assessed using child self-report on the revised UNSW antisocial behaviour index at Time 1 (see Chapter 3). The 9-item measure assesses aggression and externalising symptoms (e.g., 'I fight a lot', 'I am often accused of lying or cheating') using a 3-point scale from 0 (not true) to 2 (certainly true). The revised scale showed good internal consistency (α=.72) and significant associations with CU traits (see Chapter 3).

Verbal ability. Child verbal ability was assessed using a verbal fluency test at the first assessment (Shao, Janse, Visser, & Meyer, 2014). The test includes category fluency and letter fluency tasks. The category fluency task asks children to produce as many words as possible in one minute within two categories (i.e., animals and food). The letter fluency task is conducted in the same way but, this time, involves words starting with a given letter (i.e., Korean letters ㄱ and ㅅ). The total number of unique correct words produced in the four tasks was recorded but the names of people or places were excluded from the score. The validity of the task has been supported in prior studies, with scores showing significant associations with attention deficit/hyperactivity disorder (Hurks et al., 2004) and prenatal alcohol exposure (Rasmussen & Bisanz, 2009) in children. The alpha of the combined scale of category and letter fluency tasks was .71 in the current sample.

School engagement. The School Engagement Scale (SES; Fredricks, Blumenfeld, Friedel, & Paris, 2005) assesses child reports of school engagement level at all three time points. The scale includes items assessing student perceptions of social and academic context, and these are categorised

into three factors: Behavioural Engagement (5 items), Emotional Engagement (6 items), and Cognitive Engagement (8 items). The SES comprises 19 items rated on a 5-point Likert scales from 1 (never) to 5 (all of the time). In Fredricks et al. (2005), the SES was used with children in Years 3 and 5, and adequate internal consistency was found for all scales (alphas ranging from .72 to .86). The scale also demonstrated good validity in their study with task challenges related to cognitive engagement, while teacher support was related to emotional engagement. Cronbach's alphas in the current sample were .78 at Time 1, .79 at Time 2, and .78 at Time 3 for behavioural engagement, .93 at Time 1, .91 at Time 2, and .93 at Time 3 for emotional engagement, and .86 at Time 1, .87 at Time 2, and .87 at Time 3 for cognitive engagement.

Academic grades. Maths and Korean exam scores were used to measure child academic grades at all three time points. The first exam is set by the Korean government to assess the scholastic level of students and identify whether students are ready to begin the new school year in March (i.e., Time 1). The next two exams are set separately by schools to assess students' achievement at the end of each term and are conducted in July (Time 2) and December (Time 3). To allow for comparison between students, both Maths and Korean exam scores at each time point were converted to standardised z-scores. This method has been used in previous studies on academic performance and has shown good validity, with academic achievement scores showing significant association with child social functioning (Walker & Nabuzoka, 2007) and cooperative learning (Hsiung, 2010).

Demographic information. Child age, gender (0 = male, 1 = female), family type (0 = two parent, 1 = single parent), and eligibility for free school milk (0 = no, 1 = yes) were included as covariates in the models.

4.2.3. Data analysis

First, descriptive statistics and bivariate correlations between variables across all three time points were examined. Next, an unconditional latent growth curve model (LGCM) was fit to estimate levels of school engagement (behavioural, emotional, and cognitive engagement) and academic grades (Maths and Korean grades) at the initial point (i.e., intercept) and whether change (i.e., slope) accounted for observed changes in these constructs across

three time points. In order to avoid overfitting, a quadratic term was not included, given the small number of measurement occasions in the current study (i.e., three). To capture baseline levels, intercept factor loadings were fixed to 1 for all three time points. Slope factor loadings were fixed to 0 for Time 1, 1 for Time 2, and 2 for Time 3, with all time points reflecting the same time interval (i.e., 4.5 months). To examine whether CU traits and antisocial behaviour at Time 1 were related to trajectories of school engagement or academic grades during one academic year, a conditional LGCM was fit with regressions onto scores for CU traits and antisocial behaviour. Separate models for school engagement and academic grades were examined, resulting in two different conditional models. For both models, child verbal ability, age, gender, family type, and free school milk were controlled for, with regressions on all latent growth parameters. To test potential interaction effects between CU traits and antisocial behaviour, a product term 'CU traits × antisocial behaviour' was also included in each model. Given the sample was nested within 11 classrooms, dummy codes for each classroom were included as covariates in both models to account for potential classroom effects on the outcomes. Dummy codes were created with a value of one assigned to each classroom at that level and zero for all the others. Model fit was assessed by Chi-Square Test of Model fit, CFI, TLI, SRMR, and RMSEA. CFI and TLI values greater than .90 and SRMR and RMSEA values lower than .10 are considered to indicate acceptable fit (Hu & Bentler, 1999). The models were fitted using R software (R Core Team, 2013).

4.3. Results

4.3.1. Descriptive statistics

Descriptive statistics for each variable at all three time points are presented in **Table 4.1**. Child verbal ability was normally distributed, while the distributions of antisocial behaviour and CU traits were positively skewed. Behavioural and emotional engagement appeared to show a slight negatively skew, while cognitive engagement scores were normally distributed. Before

they were standardised, both Maths and Korean test scores were highly skewed, with mean scores over 80 and a range of scores from 0 to 100 at all three time points (**Table 4.1**). Bivariate correlations are presented in **Table 4.2**. All outcome variables including school engagement and academic grades were modestly-to-highly stable across the three time points (range, *r*s = .21−.74, *p*s < .01). CU traits showed a significant positive association with antisocial behaviour at Time 1; however, there were no significant associations with verbal ability. Verbal ability was not significantly related to antisocial behaviour either. Antisocial behaviour was moderately correlated with lower behavioural school engagement at all three time points (range, *r*s = -.41−-.36, *p*s < .01), while only modestly correlated with lower emotional and cognitive engagement (range, *r*s = -.32−-.24, *p*s < .01). CU traits were moderately-to-strongly correlated with lower school engagement on all three dimensions (range, *r*s = -.52−-.28, *p*s < .01). The results of Fisher's *r* to *z* transformations indicated that the differences between correlations of CU traits and antisocial behaviour with school engagement were significant. The transformations showed that associations between CU traits and emotional engagement at Time 1 and cognitive engagement at Time 1 and Time 2 were significantly greater than the associations for antisocial behaviour (range, *z*s = -.2.88−-2, *p*s < .05).

CU traits showed a significant negative correlation with Maths grades at Time 1, while antisocial behaviour showed a significant negative correlation with Korean grades at Time 2. Verbal ability showed significant positive correlations with emotional engagement, but not behavioural or cognitive engagement, at Time 2 and Time 3. Child verbal ability also showed a significant positive correlation with Korean grades at Time 1 and Time 2, but not with Maths grades at any time point. Behavioural and cognitive engagement showed significant positive correlations with Maths and Korean grades both cross-sectionally and longitudinally (range, *r*s = .14−.30, *p*s < .05). Emotional engagement at Time 2 showed a significant correlation with Korean grades at Time 2 only, while emotional engagement at Time 3 showed significant positive associations with both Maths and Korean grades at Time 2.

Table 4.1

Descriptive Statistics for the Sample across all Time Points

	Time 1				Time 2				Time 3			
Variable	N	M	SD	range	N	M	SD	range	N	M	SD	range
CU traits	214	6.68	3.01	0 – 18	-	-	-	-	-	-	-	-
AB	213	2.59	2.47	0 – 17	-	-	-	-	-	-	-	-
Verbal ability	218	40.77	11.74	13 – 70	-	-	-	-	-	-	-	-
Behavioral Eng	214	20.22	2.94	9 – 25	215	19.74	3.24	10 – 25	212	19.51	3.21	9 – 25
Emotional Eng	216	21.94	5.43	6 – 30	215	22.25	5.30	6 – 30	211	21.80	5.52	6 – 30
Cognitive Eng	215	24.37	6.54	8 – 40	215	24.33	6.49	8 – 40	211	23.29	6.70	8 – 40
Math grade	218	82.48	15.45	28 – 100	218	79.73	19.44	9 – 100	218	81.86	18.52	16 – 100
Korean grade	218	91.16	9.78	20 – 100	218	88.11	12.67	38 – 100	218	92.07	9.88	55 – 100

Note. CU = Callous-unemotional traits, AB = Antisocial behaviour, Eng = school engagement.

Table 4.2

Bivariate Cross-Sectional and Longitudinal Correlations among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. CU traits																	
2. AB	.20**																
3. Verbal ability	-.10	.03															
4. Behavioural Eng T1	-.50**	-.41**	.09														
5. Behavioural Eng T2	-.37**	-.40**	.11	.69**													
6. Behavioural Eng T3	-.30**	-.36**	.13	.61**	.72**												
7. Emotional Eng T1	-.42**	-.28**	.08	.50**	.42**	.39**											
8. Emotional Eng T2	***-.44***	***-.27***	.14*	.48**	.61**	.51**	.74**										
9. Emotional Eng T3	-.33**	-.24**	.14*	.41**	.47**	.56**	.65**	.69**									
10. Cognitive Eng T1	***-.52***	***-.32***	.07	.54**	.46**	.35**	.57**	.54**	.46**								
11. Cognitive Eng T2	***-.49***	***-.25***	.11	.45**	.59**	.45**	.47**	.58**	.50**	.71**							
12. Cognitive Eng T3	-.28**	-.27**	.07	.34**	.46**	.43**	.39**	.46**	.54**	.55**	.72**						
13. Math grade T1	-.16*	-.03	.12	.15*	.15*	.18**	.05	.04	.10	.04	.18**	.19**					
14. Math grade T2	-.03	-.11	.06	.16*	.25**	.25**	.00	.12	.18**	.08	.17*	.23**	.45**				
15. Math grade T3	-.06	-.13	.05	.18**	.09	.02	.11	.06	-.01	.14*	.08	-.01	.26**	.21**			
16. Korean grade T1	-.13	-.10	.23**	.14*	.10	.17*	.02	.08	.12	.07	.17*	.14*	.44**	.39**	.14*		
17. Korean grade T2	-.10	-.14*	.21**	.16*	.30**	.28**	.07	.15*	.16*	.14*	.28**	.26**	.33**	.50**	.24**	.45**	
18. Korean grade T3	-.06	-.12	.02	.20**	.09	.04	.11	.08	.04	.17*	.12	.03	.17*	.07	.77**	.10	.21**

Note. CU traits = Callous-unemotional traits; Eng = Engagement; T1 = Time 1; T2 = Time 2; T3 = Time 3. *$p < 0.05$. **$p < 0.01$. Differences between correlations for CU traits and antisocial behaviour were examined using the Fisher r-to-z transformations and significantly different correlations are presented in italics.

4.3.2. Unconditional latent growth curve models

Both unconditional LGCM for school engagement and academic grades showed acceptable-to-good fits to the data (engagement; χ^2(*df*=18)=76.47, *p*<.001; CFI=.95; TLI=.91, SRMR=.04; RMSEA=.13 and academic grades; χ^2(*df*=7)=12.48, *p*=.086; CFI=.99.; TLI=.98, SRMR=.03; RMSEA=.06). In the school engagement model, behavioural (B=-.37, SE=.10, β=-.39, *p*<.001) and cognitive engagement (B=-.55, SE=.21, β=-.25, *p*<.001) showed significant decreases over time, however there were no significant changes in emotional engagement (B=-.09, SE=.16, β=-.11, *p*=.547). All intercepts of three engagement dimensions were positively correlated with each other (range, *r*s=.64−.74, *p*s<.001), such that a higher starting level in one dimension of engagement was related to higher starting levels in other dimensions of engagement. Likewise, all slopes of three engagement dimensions were also positively correlated with each other (range, *r*s=.38−.75, *p*s<.001), showing all three dimensions of engagement showed decreased changes over time. In the academic grades model, both Maths and Korean grades did not show significant changes over time. Although there were no significant correlations between the slopes for two academic grades, two of their intercepts were significantly related to each other, such that the starting levels for Maths and Korean grades were highly related to each other (*r*=.76, *p*<.001).

4.3.3. CU traits and antisocial behaviour as predictors of the latent growth curve models

The results of conditional LGCM that included regressions onto CU traits and antisocial behaviour are presented in **Table 4.3** for school engagement model and in **Table 4.4** for the academic grades model, respectively. Both CU traits and antisocial behaviour were significantly related to lower school engagement for all three dimensions at the starting point (range, *β*s=-.52−-.14, *p*s<.05), but the magnitude of the associations was larger for CU traits than for antisocial behaviour. CU traits, but not antisocial behaviour, were significantly related to slope factors for behavioural and cognitive school engagement. To probe these relationships, each trajectory of behavioural and cognitive engagement was plotted for children with high versus low CU traits (i.e., median split). Children with high CU traits showed stable low behavioural engagement

(B=19.15, SE=.32, β=-.28, *p*<.001) that did not change over time (B=-.11, SE=.13, β=-.03, *p*=.379). In contrast, children with low CU traits showed higher behavioural engagement (B=22.14, SE=.03, β=.32, *p*<.001) that decreased over time (B=-.55, SE=.18, β=-.14, *p*<.001) (**Figure 4.1**). Similar patterns were found for the trajectory for cognitive engagement. Children with high CU traits showed lower initial levels of cognitive engagement (B=21.83, SE=.72, β=-.30, *p*<.001) that were stable across time (B=.08, SE=.29, β=.01, *p*=.775), while children with low CU traits showed higher cognitive engagement at the start of the academic year (B=28.74, SE=1.04, β=.33, *p*<.001) that significantly decreased over time (B=-1.31, SE=.42, β=-.16, *p*<.001) (**Figure 4.2**).

Potential interaction effects between CU traits and antisocial behaviour were also examined in relation to both the slope and intercept factors for three dimensions of school engagement. There were no significant interaction effects on any of the slopes, but there was on one intercept for behavioural engagement (B=.40, SE=.19, β=.15, *p*=.035). To probe this significant interaction, the intercepts of behavioural engagement were compared among children with high versus low antisocial behaviour (AB) and high versus low CU traits, resulting in four different groups: the high AB high CU group, the high AB low CU group, the low AB high CU group, and the low AB low CU group (**Figure 4.3**). The high AB high CU group showed the lowest levels of behavioural engagement at the start of the academic year (range t = -7.96−-2.97, ps < .05), while the low AB low CU group showed the highest starting levels of behavioural engagement (range t = -7.96−-2.88, ps < .05). There was no significant difference in the baseline of behavioural engagement between the high AB low CU group and the low AB high CU group (**Table 4.5**).

In the LGCM for academic grades, there were no significant relationships between CU traits or antisocial behaviour and the intercept or slope factors for both Maths and Korean grades. There were also no significant interaction effects between CU traits and antisocial behaviour on any of the intercept and slope factors for both academic grades. Instead, verbal ability, and receiving free school milk were significantly related to intercepts for both academic grades. Higher verbal ability was related to higher Maths and Korean grades, while receiving free school milk was related to lower Maths and Korean grades at the start of the academic year (**Table 4.4**).

Table 4.3

Callous-Unemotional Traits and Antisocial Behaviour Predicting School Engagement Growth Trajectories

	Model 1 (school engagement)											
	Behavioural engagement				Emotional engagement				Cognitive engagement			
	Intercept		Slope		Intercept		Slope		Intercept		Slope	
Predictor	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
CU traits	-.44 (.06)	-.47***	.09 (.03)	.28**	-.65 (.12)	-.41***	.04 (.06)	.19	-1.09 (.14)	-.52***	.23 (.08)	.32**
AB	-.37 (.07)	-.35***	.02 (.04)	.05	-.38 (.14)	-.21**	.04 (.07)	.16	-.34 (.17)	-.14*	-.03 (.10)	-.03
Verbal ability	.01 (.02)	.06	.03 (.01)	.35**	.06 (.03)	.16*	.02 (.02)	.46	.04 (.04)	.08	.02 (.02)	.11
Age	.23 (.33)	.06	-.41 (.19)	-.30*	-1.35 (.67)	-.19*	-.02 (.33)	-.02	-1.48 (.79)	-.16	-.21 (.45)	-.06
Gender	.24 (.34)	.04	.02 (.19)	.01	.93 (.68)	.10	.12 (.33)	.10	1.13 (.88)	.10	-.29 (.46)	-.06
Family type	-.38 (.68)	-.04	.12 (.38)	.04	-1.75 (1.35)	-.10	.11 (.66)	.05	-2.03 (1.59)	-.09	.08 (.91)	.01
Free school milk	-.40 (.64)	-.04	-.01 (.36)	-.00	.83 (1.27)	.05	1.06 (.62)	.53	1.37 (1.50)	.07	.37 (.86)	.05

Note. CU traits = Callous-unemotional traits; AB = Antisocial behaviour. Dummy codes for classroom effects were all entered as covariates, but are not shown in the table. A two-way interaction between CU traits and antisocial behaviour was not significantly related to any of the slopes, thus not shown in the table for parsimony.
*$p < .05$. **$p < .01$, ***$p < .001$

Table 4.4

Callous-Unemotional Traits and Antisocial Behaviour Predicting Academic Grades Growth Trajectories

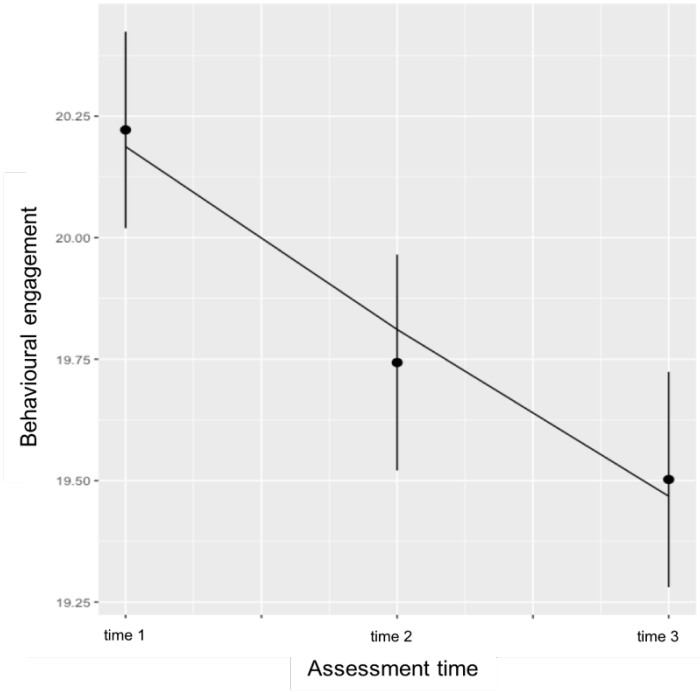
	Model 2 (academic grades)							
	Maths grades				Korean grades			
	Intercept		Slope		Intercept		Slope	
Predictor	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
CU traits	-.05 (.02)	-.17	-.01 (.01)	-.07	-.03 (.02)	-.13	-.02 (.01)	-.18
AB	-.02 (.03)	-.05	-.02 (.01)	-.14	-.01 (.03)	-.05	-.01 (.02)	-.09
Verbal ability	.01 (.01)	.19*	.01 (.00)	.21	.02 (.01)	.35***	.00 (.00)	.00
Age	.08 (.14)	.07	.08 (.06)	.17	.01 (.14)	.00	.07 (.08)	.15
Gender	-.21 (.14)	-.13	.04 (.07)	.07	.07 (.14)	.05	.10 (.08)	.18
Family type	.21 (.28)	.07	.15 (.13)	.13	.14 (.28)	.05	.16 (.16)	.14
Free school milk	-.58 (.27)	-.21*	-.12 (.13)	-.12	-.64 (.27)	-.25*	.21 (.15)	.20

Note. CU traits = Callous-unemotional traits; AB = Antisocial behaviour. Dummy codes for classroom effects were all entered as covariates, but are not shown in the table. A two-way interaction between CU traits and antisocial behaviour was not significantly related to any of the slopes, thus not shown in the table for parsimony.
*$p < .05$. **$p < .01$, ***$p < .001$

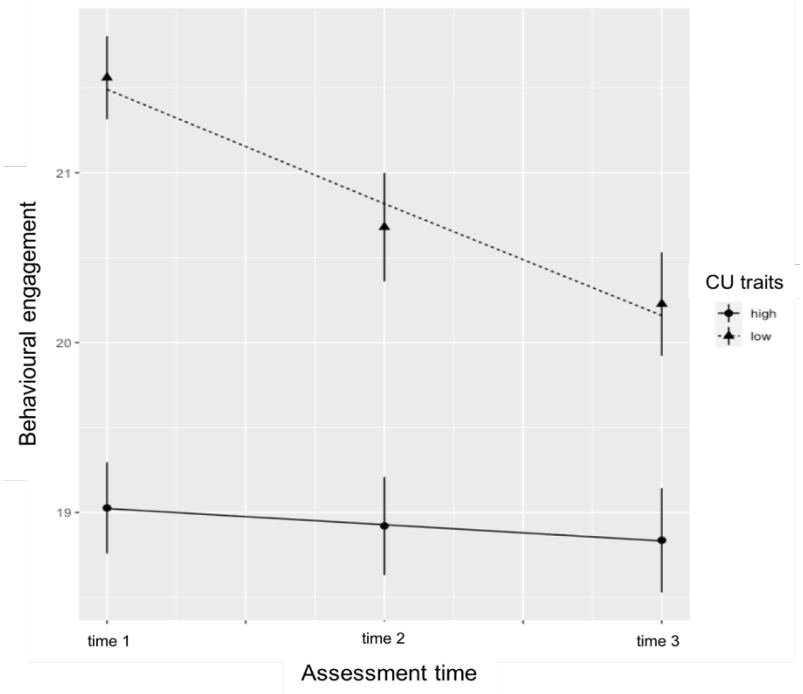
Figure 4.1

High and Low CU Traits Predicting the Intercepts and Slopes of the Behavioural Engagement Trajectory

A



B

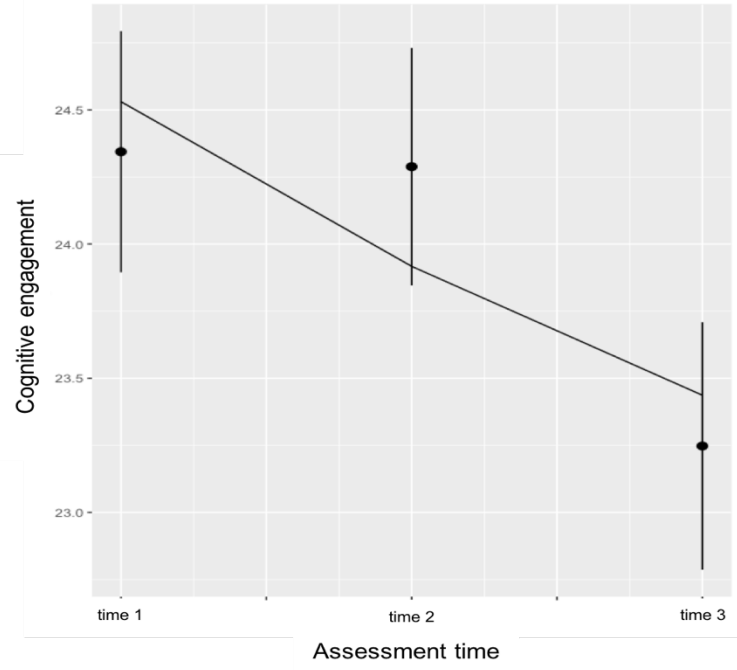


*Note***.** CU = Callous-unemotional traits. **A.** Change in behavioural engagement in the total sample. There was a significant decrease in behavioural engagement over time (intercept, B=20.22, SE=.21, β=7.57*, p*<.001; slope, B -.37, SE=.10, β=-.39*, p*<.001). **B.** Change in behavioural engagement in sample split according to level of CU traits (high vs. low based on median split).

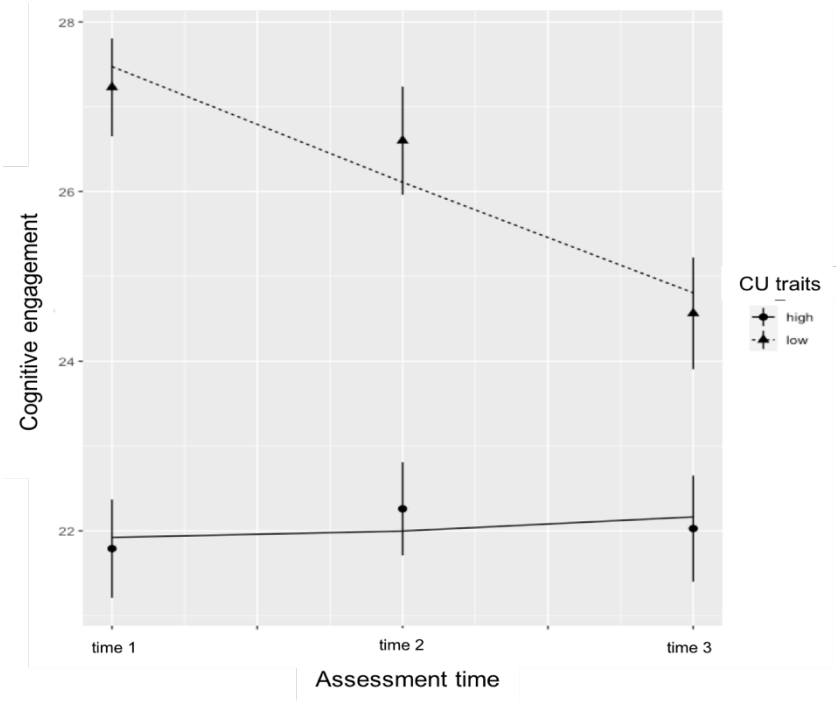
Figure 4.2

High and Low CU Traits Predicting the Intercepts and Slopes of the Cognitive Engagement Trajectory

A



B



Note. CU = Callous-unemotional traits. **A.** Change in cognitive engagement in the total sample. There was a significant decrease in cognitive engagement over time (intercept, B = 24.58, SE = .45, β = 4.21, *p*<.001; slope, B = -.55, SE = .21, β = -.25, *p* = .011). **B.** Change in cognitive engagement in sample split according to level of CU traits (high vs. low based on median split).

Table 4.5

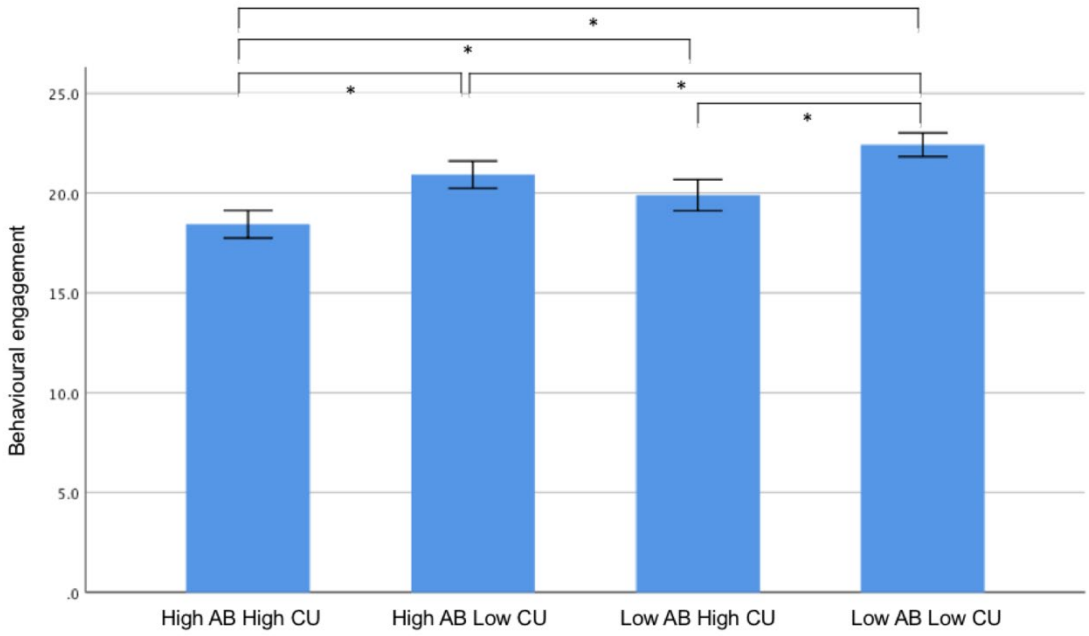
ANOVA Results comparing Identified Groups on Intercepts for Behavioural Engagement

Comparison		Intercept difference	SE	df	t	*p*
HighAB HighCU	HighAB LowCU	-2.50*	.46	210	-5.44	<.001
	LowAB HighCU	-1.46*	.49	210	-2.97	.020
	LowAB LowCU	-3.99*	.50	210	-7.96	<.001
HighAB LowCU	LowAB HighCU	1.04	.51	210	2.05	.247
	LowAB LowCU	-1.49*	.52	210	-2.88	.026
LowAB HighCU	LowAB LowCU	-2.52*	.54	210	-4.65	<.001

Note. AB = Antisocial behaviour, CU = CU traits. * denotes significant differences between groups at the .05 level in post-hoc pairwise comparisons using the Bonferroni procedure.

Figure 4.3

Differential Associations between Antisocial Behaviour and the Intercepts of the Behavioural Engagement Trajectory for Children with High and Low CU traits



Note. AB = Antisocial behaviour, CU = CU traits; Each Intercept for behavioural engagement trajectory is presented according to groups based on the levels of antisocial behaviour and CU traits. * *p*<.05 (Bonferroni corrected).

4.4. Discussion

The current study is the first to examine how CU traits and antisocial behaviour were separately and interactively associated with school engagement and academic grade trajectories over one academic year. The findings partly supported the hypothesis that antisocial behaviour and CU traits are associated with school engagement and academic grades, controlling for their overlap, showing significant associations with different dimensions of school engagement, but not academic grades. Specifically, both CU traits and antisocial behaviour were significantly related to lower initial levels of school engagement in all three dimensions. However, CU traits were more strongly associated with low initial levels of school engagement, especially in emotional and cognitive engagement. Emotional engagement refers to caring about the wishes and expectations of teachers and peers (Hirschfield & Gasper, 2011). Given that the core features of CU traits include interpersonal callousness, decreased sensitivity to others' emotions, and reduced motivation in social affiliation (Waller et al., 2020a), it stands to reason that CU traits are associated with lower emotional engagement. The stronger association between CU traits and low cognitive engagement is also consistent with the view that CU traits are associated with a lack of motivation to invest in academic tasks, which leads to poor academic outcomes, rather than deficits in cognitive ability (Allen et al., 2018; DeLisi et al., 2011).

In relation to changes in school-related outcomes, antisocial behaviour was not significantly associated with slopes of behavioural and cognitive engagement, with the same steadily decreasing trajectories in children regardless of antisocial behaviour. Previous studies have reported that child school engagement starts to decline as early as third grade, showing steadily decreasing trajectories since then (Fredricks et al., 2005; Gruman, Harachi, Abbott, Catalano, & Fleming, 2008). This suggests that children may have negative experiences as the school year progresses that dampen their initial enthusiasm and involvement in school activities, such as decreased teacher support, increased academic pressure, and peer problems (Smith, Ito, Gruenewald, & Yeh, 2010). The current findings also showed steadily decreasing behavioural and cognitive engagement trajectories and this pattern

was shown regardless of the levels of antisocial behaviour. Although antisocial behaviour was related to lower initial levels of school engagement, the rate of decreasing trajectories of engagement was not aggravated by antisocial behaviour. This is in the contrast to the current hypothesis and prevailing views on antisocial behaviour as a detrimental factor for the development of school engagement (Wang & Fredricks, 2014). In fact, another previous study of secondary school children that examined the school engagement trajectory also found that child aggression was related to lower initial levels of school engagement, but not to its changes over four years (Engels et al., 2017). These results suggest that a universal intervention in promoting school engagement is warranted regardless of levels of antisocial behaviour. However, future research should examine antisocial children and their poor school engagement at an earlier stage of schooling to identify potential targets to prevent lower initial levels of school engagement.

On the other hand, the current findings indicated that CU traits were related to different trajectories for behavioural and cognitive school engagement. Specifically, children with low CU traits showed higher initial levels of school engagement that decreased over time, while children with high CU traits showed stable low engagement throughout the academic year. This suggests that children with high CU traits may be less susceptible to factors that decrease school engagement, such as cumulative experience of failure, increased academic pressure, or decreased teacher support (D. C. Smith et al., 2010). However, children with high CU traits showed significantly lower initial levels of school engagement than those with low CU traits, and this position did not change across all time points despite the decreasing engagement in children with low CU traits. That is, lower initial levels of school engagement of children with high CU traits may be driven by different factors than for children with low CU traits, and likely reflects core features of CU traits characterised by motivational deficit in achievement and social approval (Frick et al., 2014; Waller et al., 2020a). Given these findings, typical intervention that aims to promote child school engagement may not be effective for children with high CU traits. There are qualitative findings suggesting that good quality of teacher-child relationship and effective use of discipline in classroom management strategies may help children with high CU traits to engage in schoolwork (Allen

et al., 2018). However, this has yet to be formally tested, thus future study should examine the mechanisms of changes in response to several different potential intervention targets including teacher-child interaction according to the levels of CU traits.

Additional evidence supporting the needs of individualised intervention was related to the lack of an interaction effect between CU traits and antisocial behaviour. Although both CU traits and antisocial behaviour were detrimental to child school engagement, there were no significant interaction effects between these variables on any of the intercepts and slopes for the three dimensions of school engagement, except the intercept for behavioural engagement. Therefore, it is likely to be the case that CU traits and antisocial behaviour uniquely affect the development of school engagement due to different, and unrelated risk factors. This highlights the equifinality principle that explains multiple developmental pathways to poor child outcomes (Frick & Viding, 2009), as well as the importance of examining different risk factors related to CU traits and antisocial behaviour for poor school outcomes. However, it should be noted that the small sample size in the current study may be underpowered to detect a significant interaction effect. In addition, as this is the first study that has examined school engagement trajectories in relation to both CU traits and antisocial behaviour, additional studies in this area are warranted to see if these findings are replicated.

In terms of the relationship with academic grades, CU traits showed significant negative correlation with Maths grades and antisocial behaviour showed a significant relationship with Korean grades at Time 1 in the correlational analysis. However, in the conditional latent growth curve model that controlled for verbal ability and other demographic variables, the results showed no significant associations of antisocial behaviour or CU traits with either Maths or Korean grades. These findings are inconsistent with prior studies that identified a strong relationship between antisocial behaviour and poor academic grades (McEvoy & Welker, 2000; Stipek & Miles, 2008) or those that found a unique contribution of CU traits to low grades even when controlling for antisocial behaviour (Bird et al., 2019; Horan et al., 2016). However, unlike these past studies, the current study controlled for verbal ability which found a significant link between both antisocial behaviour and poor

academic achievement (Moffitt, 1990). In addition, academic grades may show greater stability across the relatively short timeframe of one academic year. Indeed, prior longitudinal studies that found a significant association between antisocial behaviour and poor academic grades were conducted over a four- or five-year time period (Stipek & Miles, 2008; Zhou, Main, & Wang, 2010).

Another explanation for the inconsistent findings in the current study may relate to cultural differences, as most research in this area has been conducted in Western countries. In line with this, previous studies conducted in China showed either no or a weak association between antisocial behaviour and academic failure. For example, Li and Armstrong (2009) found that antisocial behaviour was not significantly associated with academic grades in Chinese adolescents. Another study of Chinese children also showed that antisocial behaviour was not related to rates of change for any of the different academic achievement trajectories, but only to a high increasing trajectory with less growth over five years (Fu et al., 2016). The authors attributed their contradictory findings to those typically seen in Western samples to Chinese cultural values emphasising scholastic achievement, so that children do not have the time or motivation to engage in behaviour that disrupts academic performance. Likewise, South Korea has a culture that is highly competitive when it comes to education and students have a strong sense of obligation to achieve high-performance outcomes (Park & Kim, 2006).

The current findings should be interpreted in the light of several limitations. First, children were the sole informants for most of the main study variables including CU traits, antisocial behaviour, and school engagement; thus, associations between these variables may be inflated due to the shared method variance. Future research including multiple informants, such as teachers or parents, would help to gain a more comprehensive view of the associations between child CU traits, antisocial behaviour, and academic-related school outcomes. Second, while the validity of the verbal ability measure used in the present study has been supported in prior studies (Hurks et al., 2004; Rasmussen & Bisanz, 2009), it may be worth including a more formal and standardised measure of child verbal ability. There is consistent evidence for a link between antisocial behaviour and verbal deficits in prior research with Western children (Moffitt, 1990), however the current study did not find any

significant associations between antisocial behaviour and verbal ability. Therefore, replication of the current study including a more traditional, standardised measure of verbal ability, such as the Wechsler Intelligence Scale for Children (WISC-V; Wechsler, 2014), in an East Asian sample would clarify whether the current finding reflects measurement variance or are due to cultural differences. However, it should be noted that the measure of verbal ability in the current study showed good internal consistency and significant positive associations with Korean grades, supporting the validity of the measure in the current sample. Third, since participants in the current study were all South Korean, the generalisability of the current findings to other cultures may be limited. Along with recent evidence on potential cultural differences in presentation and correlates of CU traits (see Sng et al. 2020), the nature of the educational system of Korea, based on Confucianism that emphasises scholastic achievement (Park & Kim, 2006), may lead to different findings in other cultures. Lastly, this study only included children from two grades in primary school, which is late childhood/early adolescence. Thus, future research should examine different developmental periods at different stages of schooling, such as early childhood, where there may be greater malleability in academic performance (Kasanen, Räty, & Eklund, 2009).

Although there is extensive literature supporting the link between antisocial behaviour and poor academic-related outcomes, research on the effect of CU traits and verbal ability on these relationships is very limited and has chiefly been cross-sectional in nature. This study extends prior research by using a short-term longitudinal design to test whether antisocial behaviour and CU traits are unique predictors of academic-related outcomes trajectories. In addition, examining school engagement as a multidimensional construct allows for a more nuanced understanding of the relationships between antisocial behaviour, CU traits, and school engagement. The current findings indicate that both antisocial behaviour and CU traits are detrimental to school outcomes even after controlling for their overlap, verbal ability, and social economic indices. In sum, the findings suggest that school-based interventions for antisocial children should consider CU traits, to ensure that any planned intervention is the optimal approach based on the child's unique characteristics. The current findings also added to further evidence for potential cultural

differences between Eastern and Western countries in relation to the correlates of CU traits and antisocial behaviour. Future research may wish to examine the psychological process underlying both antisocial behaviour and CU traits in different cultural contexts to enhance our understanding of risk and protective factors for poor school engagement and academic grades in children at risk.

CHAPTER 5:

The moderating effect of CU traits on different school domains in relation to teacher classroom strategies

Part of Chapter 5 has been published as Hwang, S., Waller, R., Hawes, D. J., & Allen, J. L. (2020). Callous-unemotional traits and antisocial behaviour in South Korean Children: Links with academic motivation, school engagement, and teachers' use of reward and discipline. *Journal of Abnormal Child Psychology, 48*, 1183-1195.

5.1. Introduction

In Chapter 4, the unique associations between CU traits and antisocial behaviour in predicting school engagement and academic grade trajectories were examined. CU traits were more strongly associated with poor school engagement and showed stable low levels school engagement over time, suggesting differential intervention targets may be needed for children with and without CU traits. Despite the evidence that supports the unique role of CU traits in contributing to poor school outcomes, very little is known about how to

promote school-related outcomes in children with CU traits. In particular, given the core feature of CU traits, including abnormal responsiveness to punishment and reward (Blair et al., 2005; Centifanti & Modecki, 2013; Marsh & Blair, 2008; Pardini et al., 2003), the association between teacher discipline and reward-based classroom strategies and CU traits should be investigated to establish whether targets for promoting school outcomes should differ for children with and without CU traits. This chapter will therefore examine the association between teacher classroom strategies and school-related outcomes in relation to CU traits.

Antisocial behaviour in the classroom is a major challenge for teachers because of its substantial detrimental effect on maintaining a desirable classroom environment (Thomas, Bierman, Powers, & Conduct Problems Prevention Research Group, 2011; Westling, 2010). Teacher classroom management strategies draw on social learning theory principles (Patterson & Fisher, 2002), and feature the use of reward strategies to promote students' positive behaviours and discipline strategies to minimise negative behaviours in the classroom (Conduct Problems Prevention Research Group, 1992; Webster-Stratton, 2001). Reward techniques are closely related to positive child outcomes, such as increased on-task behaviour (Sutherland et al., 2000). Consistent non-physical discipline is related to reduced disruptive behaviour in the classroom (Webster-Stratton, 2001), whereas coercive reinforcement techniques including harsh punishment or yelling are negatively associated with child outcomes, such as decreased responsibility and school engagement (Mitchell & Bradshaw, 2013; Sutherland et al., 2000). CU traits have been associated with atypical responses to reward and punishment cues (see Section 1.3.2.2 in Chapter 1), with evidence suggesting that such traits may shape a caregiver's use of reward and punishment practice over time (Foulkes et al., 2014; Marsh & Blair, 2008). However, little is known about the role of CU traits in relation to teachers' use of classroom management strategies.

In particular, reduced responsiveness to teacher classroom management strategies has been suggested as one potential reason for poor academic outcomes in children with CU traits (Allen et al., 2018; DeLisi et al., 2011; Horan et al., 2016). While verbal ability deficits are known to contribute to poor academic outcomes in antisocial children (Moffitt, 1993), CU traits seem to be

unrelated to poor verbal ability (Allen et al., 2013; DeLisi et al., 2011; Fontaine et al., 2008). This implies that there may be heterogeneous pathways to poor academic outcomes in antisocial children depending on their level of CU traits, with poor responsivity to teacher strategies suggested to contribute to poor school outcomes (DeLisi et al., 2011; Horan et al., 2016). On the other hand, children with high CU traits may not be negatively affected by a teacher's use of harsh discipline, given prior parenting literature showing a significant moderating effect of CU traits on the relationships between child conduct problems and harsh parental discipline. Harsh parental discipline was associated with more severe conduct problems only among children with low levels of CU traits (Hipwell et al., 2007; Oxford et al., 2003). However, later longitudinal studies found that children with high CU traits also showed increased antisocial behaviour in response to harsh parenting discipline over time (Kroneman et al., 2011; Waller et al., 2015). However, only a handful of studies have examined the associations between CU traits and children's responses to teacher reward and discipline strategies in relation to school outcomes; thus, it is unclear if there is any interaction effect of CU traits with teacher strategies in relation to school-related outcomes.

One intervention study found that placing a strong emphasis on teacher reward strategies while de-emphasising discipline significantly reduced conduct problems in children with CU traits (Frederickson et al., 2013). However, the multi-component nature of the intervention prevents any conclusions being drawn about the specific contribution of teacher strategies to child outcomes. Two mixed method studies that examined the association between CU traits and responsiveness to teacher classroom strategies found that teachers perceived both rewards and discipline strategies as less effective for children with CU traits overall. However, they reported that praise and a positive teacher-child relationship can help children with CU traits to engage in prosocial behaviour and schoolwork (Allen et al., 2018; Allen et al., 2016).

Reduced responsiveness to teacher strategies may be coupled with severe disruptive behaviour, thus potentially leading to an increased frequency of teacher discipline, and reduced frequency of rewards for children with elevated CU traits (Ciucci et al., 2014; Waschbusch et al., 2015; Waschbusch & Willoughby, 2008). Thus, it is important to account for the influence of antisocial

behaviour when examining the relationship between CU traits and teacher classroom management strategies. Furthermore, other researchers have raised the possibility of a reciprocal association between CU traits and teacher strategies. CU traits may elicit greater use of teacher harsh discipline and fewer rewards and less encouragement, and this poor quality of interaction with the teacher may lead to poorer child outcomes (Bird et al., 2019; DeLisi et al., 2011; Horan et al., 2016). Conversely, coercive teacher-child interactions and low levels of encouragement towards the child may increase the severity of CU traits and antisocial behaviour. However, prior studies are cross-sectional and are therefore unable to identify the direction of relationships between teacher strategies and CU traits.

The aim of the current study is therefore to investigate the longitudinal relationship between CU traits and a teacher's use of classroom management strategies in relation to children's academic motivation and school engagement. Given that motivation and engagement are related but distinct constructs, the current study considered both variables as correlated outcomes and examined their unique relationship with CU traits. A longitudinal design with data collection points all taking place within one academic year enabled the assessment of the same classroom teacher's behaviour at multiple time points. First, to examine child responsiveness to teacher strategies in relation to CU traits, the potential moderating effect of CU traits on the associations between teacher reward and discipline strategies at Time 1 on both school engagement and academic motivation at Time 2 was tested. It was hypothesised that CU traits would significantly moderate the relationship between a teacher's use of harsh discipline and later school outcomes, such that harsh discipline would predict low motivation and engagement only among children with low CU traits. In contrast, it was hypothesised that teacher reward strategies would predict better outcomes regardless of the level of CU traits. The second aim was to examine longitudinal, potentially reciprocal relationships between teacher strategies and CU traits. Antisocial behaviour was controlled for in the model to identify any specific relationships with CU traits. It was hypothesised that CU traits would uniquely affect a teacher's use of strategies over time, such that high levels of CU traits would predict significantly less use of reward strategies and greater use of harsh discipline by teachers.

5.2. Methods

5.2.1. Participants

As in Chapter 2, participants were 218 students in Years 5 and 6 in two public primary schools in South Korea (mean age = 11.03, *SD* = .65, 52% boys). Of the 218 students who participated in the first assessment, 214 students (97.7%) were retained at the follow-up assessment completed nine months later. Although I conducted three assessments (see Chapter 2) during one academic year, the current study excludes the second assessment data to focus on examining whether teacher classroom management strategies and CU traits at the start of the academic year predicted child motivation and engagement at the end of the academic year.

5.2.2. Measures

Callous-Unemotional Traits. CU traits were assessed at both time points using child self-report on the revised version of the UNSW CU traits index that was validated in the current sample in the study presented in Chapter 3. The 9 items tapped into the presence of callousness and a lack of guilt (e.g., 'I am helpful if someone is hurt, upset or feeling ill', 'I feel bad or guilty when I do something wrong'), with each item rated on a 3-point scale from 0 (not true) to 2 (certainly true). The internal consistency of the revised CU traits scale in the current sample was good at both time points (Time 1, α=.73; Time 3, α=.74) and construct validity was supported, with the scale showing significant associations with more severe antisocial behaviour and poor school engagement (see Chapter 4).

Antisocial behaviour. Antisocial behaviour was also assessed at both time points using child self-report on the revised version of the UNSW antisocial behaviour index (see Chapter 3). The revised antisocial behaviour index included 9 items assessing aggression and externalising problems (e.g., 'I fight a lot', 'I take things that are not mine from home, school or elsewhere'). Children rated items on a 3-point scale ranging from 0 (not true) to 2 (certainly true). The reliability and construct validity of the revised antisocial behaviour scale was established in studies presented in Chapters 3 and 4, for example showing significant correlations with both higher levels of CU traits and poor school

engagement. The internal consistency for the scale was .72 at Time 1 and .68 at Time 3 in the current sample.

Teacher reward and discipline strategies. Teacher's use of reward and discipline strategies was assessed using child reports on the classroom discipline strategies questionnaire (Lewis, 2001) at both time points. The reward dimension (5 items) assesses how well teachers respond to the good behaviour of students using reward-based strategies (e.g., 'reward individual students who behave properly', 'praises the class for good behaviour'). The harsh discipline dimension (5 items) measures teacher's response to child misbehaviour using coercive and inconsistent discipline strategies (e.g., 'yells angrily at students who misbehave', 'deliberately embarrasses students who misbehave'). Children rated each of 10 items on a 5-point scale ranging from 1 (never) to 5 (always). The internal consistency for the scales was acceptable-to-high at both time-points for reward strategies (α = .70, α = .81, respectively) and harsh discipline (α = .75, α = .76, respectively).

Academic motivation. Child academic motivation was assessed using self-report of the Elementary School Motivation Scale (ESMS; Guay et al., 2010). The scale assesses the innate pleasure and satisfaction that children derive from schoolwork (e.g., 'I like reading', 'Writing interests me a lot', 'I do maths even when I do not have to'). Children rated 9 items on a 5-point scale from ranging from 1 (always no) to 5 (always yes). Internal consistencies were high at both time points (α=.83, α=.89, respectively).

School engagement. Child school engagement was assessed using self-report on the School Engagement Scale (SES; Fredricks, Blumenfeld, Friedel, & Paris, 2005). The scale assesses school engagement including participation in school activities, feelings toward school, the teacher, and peers, and psychological investment in learning (e.g., 'I pay attention in class', 'My classroom is a fun place to be', 'I read extra books to learn more about things we do in school'). Children rated 19 items on a 5-point scale from 1 (never) to 5 (all of the time). The scale consists of three dimensions as outlined in the previous chapter (i.e., behavioural, emotional, and cognitive); however, a bifactor model, that assumes that all items form an overall engagement factor as well as belonging to specific subfactors has shown good model fit in a previous study (Ben-Eliyahu, Moore, Dorph, & Schunn, 2018). Therefore, the

current study includes only overall engagement, so that the focus is on CU traits and responsivity to teacher strategies, rather than specific associations between the different dimensions of engagement. The internal consistency of the overall engagement scale was high with alphas of .92 and .93, respectively.

Demographic information. Children reported their age and gender (0 = male, 1 = female) at the first assessment. As indices of socioeconomic status, teachers reported on child family type (0 = two parent, 1 = single parent) and receipt of free school milk (0 = no, 1 = yes).

5.2.3. Data analysis

Descriptive statistics and bivariate correlations of the main study variables were examined prior to analysis. To examine Aim 1 exploring whether CU traits moderate the associations between teacher strategies at the start of the academic year and child school outcomes at the end of the academic year, multiple regression analysis was conducted. The main effects (i.e., teacher rewards, harsh discipline, and CU traits at Time 1) and interaction effects ('teacher rewards × CU traits' and 'harsh discipline × CU traits') were entered simultaneously in the model with two child outcomes (i.e., motivation and engagement) as correlated dependent variables (r = .54, p < .001). To control for autoregressive effects, earlier child outcomes at Time 1 were included as covariates in the model, as well as child demographic information (i.e., age, gender, family type, free school milk). Further, antisocial behaviour was also included as a covariate to test the specificity of the relationship between CU traits and antisocial behaviour. To probe the significant interactions, slopes plotted at low and high (1 *SD* below the mean and 1 *SD* above the mean, respectively) levels of CU traits were examined and the significance of the slopes was tested (Cohen, Cohen, West, & Aiken, 2003).

Second, to examine Aim 2 exploring the direct, potentially reciprocal associations between CU traits and teacher strategies, a cross-lagged analysis was conducted. Pathways from antisocial behaviour at both time points were included in the model to test the specificity of the relationships between teacher strategies and CU traits. The model also included pathways from the following covariates to variables at both time points: child age, gender, family type, and

free school milk. As with the study in the previous chapter, dummy codes for each classroom were included as covariates in both the regression and cross-lagged models to account for potential classroom effects. All models were fitted using R software (R Core Team, 2013).

5.3. Results

5.3.1. Descriptive statistics

Descriptive statistics for all study variables at both time points are presented in **Table 5.1.** As in the previous chapter, CU traits and antisocial behaviour were positively skewed, however school engagement as a unidimensional scale and child intrinsic motivation were normally distributed at both time points. Child perceptions of teacher's use of reward strategies was negatively skewed, while harsh discipline was positively skewed at both time points. Bivariate correlations between them are presented in **Table 5.2**. All variables were moderately-to-highly stable over time (range, r = .41−.67, ps < .01). CU traits showed significant positive associations with antisocial behaviour both cross-sectionally and longitudinally. CU traits also showed significant associations with less use of teacher rewards both cross-sectionally and longitudinally, whereas only CU traits at Time 3 were significantly related to greater use of teacher harsh discipline at Time 1. In contrast, antisocial behaviour showed significant positive associations with teacher harsh discipline at both time points, whereas only antisocial behaviour at Time 3 was significantly related to less use of teacher rewards at both time points. In terms of child school outcomes, CU traits showed significant negative associations with academic motivation and school engagement both cross-sectionally and longitudinally. Similarly, antisocial behaviour was also significantly related to low motivation and engagement both cross-sectionally and longitudinally. Teacher reward strategies showed significant positive associations with child motivation and school engagement, while teacher harsh discipline showed significant negative associations with motivation and engagement both cross-sectionally and longitudinally.

5.3.2. Aim 1: explore whether CU traits moderate the relationship of teacher classroom management strategies on school outcomes

The results of a multiple regression analysis are presented in **Table 5.3**. There was a significant moderating effect of CU traits on the association between teacher harsh discipline and child school engagement, such that greater use of harsh discipline at Time 1 predicted lower school engagement at the end of the school year only among children with low (β = -.61, p = .033), but not high levels of CU traits (β = .13, p = .645) (**Figure 5.1**). However, there was no significant interaction effect of CU traits with reward strategies in predicting later school engagement. In bivariate correlations, both CU traits and antisocial behaviour showed significant negative associations with academic motivation and school engagement; however, the relationships were no longer significant in the regression model that accounted for these constructs as covariates, as well as earlier levels of motivation and engagement. Likewise, there was no significant main effect of either teacher rewards or discipline at Time 1 on academic motivation at Time 3 in the regression model. There was no significant moderating effect of CU traits on the associations of teacher rewards at Time 1 on either motivation or engagement at the end of the academic year.

Table 5.1

Descriptive Statistics for the Main Study Variables

Variable	N	M	SD	Range	Skewness (SE)	Kurtosis (SE)
CU Traits Time 1	214	6.68	3.01	0-18	.17 (.17)	.39 (.33)
CU Traits Time 3	211	5.92	2.95	0-16	.07 (.17)	-.39 (.33)
AB Time 1	213	2.59	2.47	0-17	1.7 (.17)	5.39 (.33)
AB Time 3	211	2.72	2.30	0-10	.83 (.17)	.30 (.33)
Teacher Strategies						
Rewards Time 1	212	19.29	3.79	10-25	-.20 (.17)	-.62 (.33)
Rewards Time 3	212	19.17	3.73	8-25	-.07 (.17)	-.50 (.33)
Harsh Discipline Time 1	213	10.93	3.95	5-25	.58 (.17)	.16 (.33)
Harsh Discipline Time 3	212	11.67	4.24	1-23	.26 (.17)	-.24 (.33)
Academic Motivation Time 1	217	26.66	6.96	9-45	-.06 (.17)	.32 (.33)
Academic Motivation Time 3	213	26.37	8.06	9-45	-.02 (.17)	-.18 (.33)
School Engagement Time 1	214	66.53	12.53	23-95	-.18 (.17)	.66 (.33)
School Engagement Time 3	211	64.63	12.83	26-95	-.26 (.17)	.59 (.33)

Note. CU traits = Callous-unemotional traits; AB = Antisocial behaviour.

Table 5.2

Bivariate Correlations between Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
19. Gender															
20. Single Parent	-.01														
21. Free School Milk	.13*	.41**													
22. Age	-.01	-.10	-.03												
23. CU Traits Time 1	-.17*	-.04	.06	.03											
24. CU Traits Time 3	-.33**	.04	.05	.09	.46**										
25. AB Time 1	-.22**	.13	.10	.10	.20**	.20**									
26. AB Time 3	-.21**	.15*	-.01	.05	.18**	.30**	.59**								
27. Reward Strategies Time 1	.10	-.04	-.03	-.11	-.20**	-.20**	-.07	-.18**							
28. Reward Strategies Time 3	.05	-.07	-.01	-.09	-.19**	-.31**	-.03	-.16*	.41**						
29. Harsh Discipline Time 1	-.11	.03	-.00	.21**	.09	.16*	.37**	.27**	-.25**	-.08					
30. Harsh Discipline Time 3	-.08	-.11	-.14*	.31**	.08	.13	.30**	.28**	-.12	-.11	.53**				
31. Motivation Time 1	.15*	-.07	.02	-.05	-.44**	-.34**	-.29**	-.28**	.20**	.20**	-.19**	-.21**			
32. Motivation Time 3	.15*	-.05	.02	-.24**	-.27**	-.44**	-.22**	-.26**	.16**	.21**	-.27**	-.27**	.66**		
33. School Eng Time 1	.24**	-.10	-.01	-.13	-.58**	-.48**	-.38**	-.36**	.33**	.31**	-.29**	-.27**	.74**	.55**	
34. School Eng Time 3	.22**	-.10	-.01	-.22**	-.36**	-.55**	-.34**	-.42**	.27**	.33**	-.27**	-.29**	.59**	.73**	.67 **

Note. CU traits = Callous-unemotional traits; AB = Antisocial behaviour; Eng = Engagement. *$p < 0.05$. **$p < 0.01$.

Table 5.3

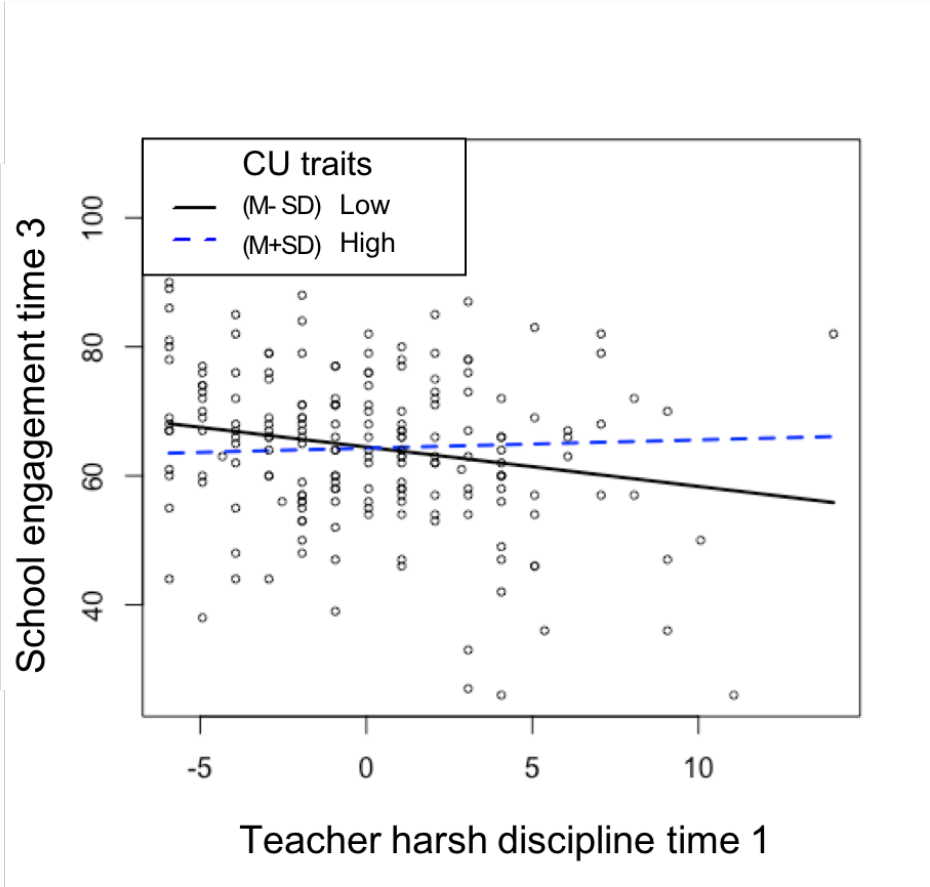
Longitudinal Regression Analysis Testing Moderation by CU Traits on the Association between Teacher Rewards/Harsh Discipline Strategies and Child School Outcomes

Variable	Academic motivation time 3				School engagement time 3			
	B	SE	β	*p*	B	SE	β	*p*
Age	-1.99	.95	-.16	.037	-3.00	1.53	-.15	.053
Gender	.74	.89	.05	.408	1.09	1.43	.04	.447
Family type	-.96	1.74	-.03	.583	-3.25	2.80	-.07	.248
Free school milk	.79	1.71	.03	.646	5.45	2.75	.12	.048
Antisocial behaviour	.19	.21	.06	.356	-.32	.33	-.06	.331
Motivation Time 1	.70	.09	.59	<.001	.49	.15	.26	.001
School Eng Time 1	.03	.06	.05	.615	.38	.10	.36	<.001
CU traits	-.03	.19	-.01	.868	-.03	.30	-.01	.911
Reward strategies	-.11	.12	-.05	.404	.12	.20	.04	.558
Harsh discipline	-.20	.14	-.10	.141	-.21	.22	-.06	.338
CU × Reward strategies	-.01	.04	.00	.982	.03	.06	.03	.626
CU × Harsh discipline	.06	.04	.09	.097	.13	.06	.12	.035

Note. CU = callous-unemotional traits; Eng = engagement. CU traits and teacher reward/harsh discipline were centred for interpretation.

Figure 5.1

Longitudinal Associations between Teacher Harsh Discipline and Child School Engagement at High (1 SD above the mean) and Low (1 SD below the mean) Levels of CU Traits



Note. CU = callous-unemotional traits. Greater use of teacher harsh discipline at Time 1 was related to lower school engagement at Time 3 when children show low (β = -.61, p = .033), but not high (β = .13, p = .645) levels of CU traits. CU traits and teacher harsh discipline were centred for interpretation.

5.3.3. Aim 2: explore whether CU traits uniquely shape teacher's use of reward or discipline strategies over time

Standardised estimates of all pathways between teacher rewards and harsh discipline, CU traits, and antisocial behaviour are presented in **Table 5.4**. All four variables were moderately stable over time (range, β = .35−.48, *p*s < .001), and CU traits and antisocial behaviour were significantly related at both time points. CU traits were significantly associated with less use of teacher rewards at both time points, while antisocial behaviour showed significant associations with greater use of teacher harsh discipline at both time points.

There was a significant effect of CU traits on teacher's use of reward strategies, such that higher CU traits at the start of the academic year predicted less use of rewards by teachers at the end of the school year, but not vice versa. In contrast, higher levels of antisocial behaviour at Time 3 were predicted by greater use of harsh discipline at Time 1, but not vice versa, showing a significant effect of teacher harsh discipline on the development of antisocial behaviour over time (**Figure 5.2**).

In bivariate correlations, teacher harsh discipline at Time 1 was significantly related to higher CU traits at Time 3, however this relationship was no longer significant in a cross-lagged model accounting for overlap with antisocial behaviour, as well as child demographic variables.

Table 5.4

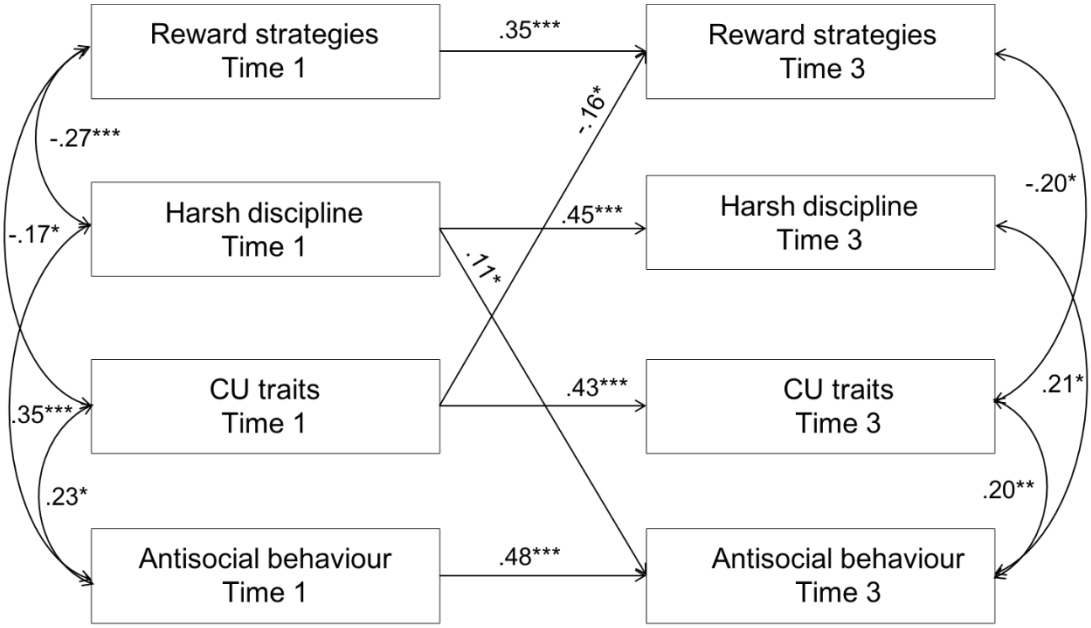
Unstandardised and Standardised Estimates of all Paths from the Cross-lagged Model

Parameter	B	SE	β	*p*
Autoregressive Coefficients				
Reward Strategies T1 → Reward Strategies T3	.35	.07	.35	<.001
Harsh Discipline T1 → Harsh Discipline T3	.47	.07	.45	<.001
CU Traits T1 → CU Traits T3	.45	.06	.43	<.001
AB T1 → AB T3	.46	.09	.48	<.001
Teacher Strategies Predicting Child CU/AB				
Reward Strategies T1 → CU Traits T3	-.03	.05	-.04	.560
Reward Strategies T1 → AB T3	-.07	.04	-.11	.068
Harsh Discipline T1 → CU Traits T3	.00	.07	.00	.986
Harsh Discipline T1 → AB T3	.07	.03	.11	.041
Child CU/AB Predicting Teacher Strategies				
CU Traits T1 → Reward Strategies T3	-.21	.08	-.16	.010
CU Traits T1 → Harsh Discipline T3	.07	.08	.05	.416
AB T1 → Reward Strategies T3	.12	.12	.08	.296
AB T1 → Harsh Discipline T3	.17	.11	.10	.119
Concurrent Covariances				
Reward Strategies T1 & Harsh Discipline T1	-4.05	1.09	-.27	<.001
Reward Strategies T1 & CU Traits T1	-1.83	.84	-.17	.028
Reward Strategies T1 & AB T1	-.90	.74	-.10	.220
Harsh Discipline T1 & CU Traits T1	.91	.85	.08	.282
Harsh Discipline T1 & AB T1	3.40	.81	.35	<.001
CU T1 & AB T1	1.63	.78	.23	.037
Reward Strategies T3 & Harsh Discipline T3	-.34	.74	-.04	.646
Reward Strategies T3 & CU Traits T3	-1.52	.62	-.20	.012
Reward Strategies T3 & AB T3	-.39	.42	-.07	.357
Harsh Discipline T3 & CU Traits T3	.26	.46	.04	.258
Harsh Discipline T3 & AB T3	1.08	.42	.21	.010
CU Traits T3 & AB T3	.82	.29	.20	.005

Note. CU traits = Callous-unemotional traits; AB = Antisocial behaviour. Classroom, child age, gender, family type, and free school milk were also entered as control variables but are not shown in the table. T1 = Time 1 assessment; T3 = Time 3 assessment.

Figure 5.2

Cross-lagged Model between Teacher's Rewards and Harsh Discipline, CU Traits, Antisocial Behaviour at the Start of (time 1) and the End of the Academic Year (time 3)



Note. CU traits = Callous-unemotional traits. Classroom, child age, gender, family type, and free school milk were entered as control variables, but are not shown in the figure. Only significant pathways are shown; the rest of the coefficients are presented in Table 5.4. * $p < .05$. ** $p < .01$. *** $p < .001$.

5.4. Discussion

The current study investigated the moderating effect of CU traits on the associations between teacher reward and discipline strategies on child school outcomes, as well as the longitudinal relationships between CU traits and teacher's use of reward and discipline over time. The findings supported the hypothesis that teacher strategies would differentially predict child school outcomes depending on the level CU traits. Specifically, teacher harsh discipline predicted lower school engagement only among children with low, but not high levels of CU traits. This is consistent to prior studies showing the links between CU traits and reduced responses to harsh parental discipline (Hipwell et al., 2007; Oxford et al., 2003) and teachers' perspectives that discipline is reduced in its effectiveness for antisocial children with elevated CU traits (Allen et al., 2018; Allen et al., 2016).

The findings extend prior research on CU traits and reduced sensitivity to harsh parental discipline to teacher-child interactions, emphasising the role of punishment insensitivity in explaining the aetiology of CU traits (Blair, 2017; Pardini & Frick, 2013). It should be noted that there is some longitudinal evidence showing no moderating effect of CU traits on the associations between harsh parental discipline and the development of antisocial behaviour (Kroneman et al., 2011; Waller et al., 2015). However, the current findings suggest that the impact of teacher classroom strategies on child school outcomes may differ according to levels of CU traits. Prior studies examining the responsivity of children with CU traits to teacher discipline strategies have been cross-sectional and relied on qualitative teacher interviews (Allen et al., 2018; Allen et al., 2016); thus, the current longitudinal design advances our knowledge of child responsivity to teacher strategies in relation to CU traits.

However, the current findings did not support the hypothesis that greater use of teacher reward strategies would predict improved school outcomes regardless of CU traits. In addition, there was no significant main effect of teacher rewards on either of the school outcomes in the model that included interaction terms simultaneously. This is in conflict with past research that showed significant associations between teacher rewards and higher motivation and engagement in children (Kleinman & Saigh, 2011; Sutherland et al., 2000).

However, prior research has predominantly been conducted in Western countries, therefore inconsistent findings may be related to the different cultural contexts. South Korean culture values academic achievement, viewing it as a social obligation and a responsibility for students. Effort, rather than ability, is considered the key to success. Thus, South Korean children are more likely to be motivated and engaged in schoolwork than Western peers, therefore the impact of external rewards may be more limited (Heine & Buchtel, 2009; Shwalb et al., 2009). Likewise, the intensity of rewards provided by teachers may differ across Western and East Asian nations due to these cultural values, such that Korean teachers may provide fewer rewards for children's school work, producing less variability in reward experiences including expectations or attitudes towards teacher rewards (Koo, 2007). Another explanation for the conflicting finding may be related to the different types of sample. Although treatment research has consistently shown a positive effect of rewards in reducing antisocial behaviour in a clinically referred sample (Kaminski, Valle, Filene, & Boyle, 2008; Leijten et al., 2019), there is also evidence for the detrimental effect of external rewards on child prosocial behaviour and intrinsic motivation in community samples (Henderlong & Lepper, 2002; Warneken & Tomasello, 2008).

Two qualitative research studies that examined the effect of teacher rewards on children with CU traits highlight the complexity of this relationship, such that some reported iatrogenic effects (e.g., abuse of a position of responsibility), some reported no effect, and others reported a positive effect of some forms of reward (e.g., praise in front of class) (Allen et al., 2016; Allen et al., 2018). Further, responses to reward have been shown to vary as a function of reward type, with children with CU traits responding strongly to rewards that enhance their social status or opportunities for social dominance, but not to rewards that involve social affiliation or approval (Allen et al., 2016; Foulkes et al., 2014; Pardini et al., 2003). Further work delineating the relationship between CU traits and different types of reward is needed to provide a more nuanced understanding of the role of teacher rewards in relation to the school outcomes of children with CU traits.

Regarding the second aim investigating the direct relationship between CU traits and teacher strategies, the current findings partly supported the

hypothesis that CU traits would affect teacher's use of reward and discipline over time. Specifically, CU traits predicted significantly less use of teacher rewards over time over and above the effect of antisocial behaviour, while antisocial behaviour did not predict any change in teacher strategies controlling for CU traits. This is consistent with the findings of previous cross-lagged studies identifying CU traits, rather than antisocial behaviour, as a reason for changes in parenting practices (Salihovic, Kerr, Özdemir, & Pakalniskiene, 2012; Waller et al., 2014). That is, it may be harder for teachers to continue to be positive and rewarding in the face of children who they perceive to be callous, uncaring, and unemotional in their interpersonal style.

The hypothesis that CU traits would predict increased teacher harsh discipline over time was not supported. This conflicts with the parenting literature showing reciprocal effects between CU traits and harsh parenting (Hawes et al., 2011; Salihovic et al., 2012; Trentacosta et al., 2019). These results therefore highlight the need for future studies to continue to examine CU traits and social interaction in relation to differing roles and contexts, as clearly the nature, quality and intensity of the teacher-child relationship differs markedly from the parent-child relationship, potentially producing different outcomes. Compared to parents, teachers receive training and have a professional responsibility to avoid harsh reactions to child behaviour.

The current study also examined potential reciprocal relationships in the form of teacher- and child-driven effects on teacher and child behaviours. Although the parenting literature has revealed both child-driven and parent-driven effects on the links between parenting practices and the development of CU traits (Trentacosta et al., 2019; Waller et al., 2014), the current results did not show any significant effect of either teacher rewards or harsh discipline on CU traits over time. This may be a reflection of differences between the nature of parent and teacher discipline or the relatively short timeframe of the current study (i.e., nine months). Another possibility relates to age differences. Two studies that found both parent-driven and child-driven effects examined young children (ages ranging from 2 to 4.5 years) (Trentacosta et al., 2019; Waller et al., 2014), while one study which found only child-driven effect examined adolescents who were aged 13–15 years (Salihovic et al., 2012). The current study, which also found only a child-driven effect on teacher management

strategies, included children of a similar age (i.e., 10–12 years) to the study of adolescents. However, the current study showed a teacher-driven effect in the association with antisocial behaviour, such that greater use of teacher harsh discipline predicted increased antisocial behaviour over time. In sum, there appears to be a child-driven effect on teacher behaviour, such that CU traits reduces teacher's use of rewards, while there is a teacher-driven effect on antisocial behaviour, such that teacher harsh discipline elicits the development of antisocial behaviour. However, the current variable-centred analytic approach examined associations in the entire population sample, therefore it is unclear whether similar findings for teacher classroom management strategies, CU traits, and antisocial behaviour in the current study results would be present in subgroups of children with different characteristics. Furthermore, this is the first study to examine the direct associations between CU traits, antisocial behaviour, and teacher strategies, thus future study is warranted to establish the replicability of these findings.

There are some limitations that need to be considered in relation to the current findings. First, the study solely relied on child reports on study variables including antisocial behaviour, CU traits, school motivation and engagement, and teacher strategies; thus, significant relationships may be due to shared method variance. Future research including both child and teacher perspectives, as well as classroom observations are needed to overcome this limitation. Second, the current study examined the relationship between teacher reward and harsh discipline strategies and CU traits, however teacher-child interaction is more complex and multifaceted than these two dimensions (i.e., rewards and harsh discipline). For example, teacher-child relationships have been shown to be characterised by greater conflict and less closeness for children with CU traits (Crum et al., 2016; Horan et al., 2016), and as such, the responses of children to teacher's use of strategies may be affected by a poor quality relationship with their teacher. Furthermore, the questionnaire that assessed teacher reward strategies was limited in its ability to differentiate the different contexts that rewards are delivered in, for example, in the presence versus absence of peers, or rewards delivered to individual child versus those given to the class as a whole. Past research suggests that responsivity to rewards of children with CU traits may influenced by different contexts. For

example, children with CU traits have shown heightened responses to rewards in the presence of peers (Centifanti & Modecki, 2013) or to rewards that relate to self-interest, not social connection (Foulkes et al., 2014). Indeed, there are also major differences between the emotional intensity of social rewards delivered by parent and teachers, such as expressions of love and physical affection.

The present study advances our knowledge of the socioemotional and educational difficulties associated with CU traits by examining the role of teacher reward and discipline strategies in the South Korean school context. Research on CU traits and environmental factors has almost exclusively been conducted in Europe and the United States. Indeed, the small number of studies to examine the role of contextual factors for CU traits in East Asia have focused on Chinese Mandarin-speaking populations (e.g., China, Singapore) to the exclusion of other East Asian nations such as South Korea. Another strength of this study is the use of longitudinal data to enable inferences about the direction of the relationship between CU traits and teacher strategies. Furthermore, the current study is one of few to investigate child perspectives on teacher-child interactions. Past research on CU traits and teacher-child interactions has focused predominantly on teacher perspectives, which may suffer from self-presentation biases concerning their use of classroom strategies (Ciucci et al., 2014; Waschbusch & Willoughby, 2008). Much progress has been made in understanding the relationship between parenting practices and CU traits (see Waller, Gardner, & Hyde, 2013 for a review), while in contrast, research on teacher strategies has been limited. Finally, we examined differential associations between teacher strategies and antisocial behaviour and CU traits in a single model, thus enabling the assessment of the unique effect of CU traits on teacher reward and discipline strategies over time.

The current study findings indicate that CU traits affect the association between teacher strategies and child school outcomes, as well as having an influence on teacher strategies directly. School success is vital for children in establishing their healthy emotional and behavioural development (Henry, Knight, & Thornberry, 2012). At school, children have different social and academic experiences to home; therefore, it is important to examine unique or additive effects of teacher-child interactions on child development. The current

findings add to a growing body of research suggesting the importance of individualised assessment and intervention for antisocial children with CU traits. Specifically, findings suggest that teachers may need support in the use of reward strategies with children high in CU traits. Furthermore, the link between CU traits and reduced sensitivity to discipline suggests that school-based interventions may need to target child individual risk factors to promote school engagement. Future studies including additional dimensions (e.g., instructional methods) and consideration of the context in which the strategies are delivered (e.g., presence or absence of peers) may help to further inform school-based intervention for children with CU traits.

CHAPTER 6:

The longitudinal associations between CU traits and social affiliations with teacher and peers

Part of Chapter 6 has been submitted for publication as Hwang, S., Waller, R., Hawes, D. J., & Allen, J. L. (under review). Longitudinal associations between callous-unemotional traits and school-based affiliative relationships among South Korean children. *Journal of Clinical Child and Adolescent Psychology.*

6.1. Introduction

In Chapter 5, the associations between CU traits and teacher reward and discipline strategies were examined. CU traits showed diminished responsivity to teacher strategies, such that (1) harsh teacher discipline predicted poor school outcomes only among children with low levels of CU traits, (2) harsh teacher discipline predicted increased antisocial behaviour, but not CU traits, over time, and (3) high CU traits elicited decreased teacher rewards over time.

Children with CU traits show reduced responsivity to social cues and a unique interpersonal style characterised by a lack of interest in social approval

and the pursuit of antisocial means to achieve their goals (Pardini & Byrd, 2012; Waller & Wagner, 2019). CU traits have been significantly associated with poor quality social relationships and reduced desire for social bonding with others(Foulkes et al., 2017; Hawes et al., 2011; Viding & McCrory, 2019). However, little is known about CU traits and affiliative relationships outside the family context, despite the significant influence of teacher and peers on child social development (Howes, 2000). Given the existing evidence for longitudinal and reciprocal associations between CU traits and affiliation with parents (Waller et al., 2012; Waller et al., 2017b), investigating the directionality of the association of CU traits with teacher and peer affiliation will increase our understanding of the aetiology and persistence of these traits, as well as carrying the potential to identify malleable targets for school-based intervention. Therefore, in Chapter 6, the longitudinal, and potentially reciprocal relationships between CU traits and social affiliations with teacher and peers will be examined.

As mentioned in Section 1.3.3 of Chapter 1, motivational deficits in social affiliation and reduced capacity to develop positive social interactions underpin CU traits (Foulkes et al., 2014; Foulkes et al., 2017; Sherman & Lynam, 2017; Viding & McCrory, 2019; Waller et al., 2020a) . Since interventions for antisocial children often focus on improving the quality of social relationships to promote prosocial behaviour and well-being and reduce antisocial behaviour (e.g., Conduct Problem Prevention Research Group, 1992; Webster-Stratton, 2001), research on the association between CU traits and disrupted social affiliation has clear clinical relevance (Viding & McCrory, 2019). Indeed, positive affiliation with parents has been identified as an important protective factor for the development of CU traits (Pasalich et al., 2011), while poor affiliation with parents has been identified as a risk factor for the development of CU traits (Trentacosta et al., 2019). Furthermore, CU traits predicted decreased positive affiliation and increased negative affiliation with parents in a bidirectional cascade (Trentacosta et al., 2019; Waller et al., 2014; Waller et al., 2017b). Overall, children with elevated CU traits are more likely to experience difficulties forming positive affiliative relationships with their parent, and this poor quality of interaction in turn exacerbates the levels of CU traits over time. However, warm and supportive relationships with significant others in child development are still

very important for children with CU traits. Despite the increasing consensus on the benefits of the extended application of attachment theory from parenting to teacher-child affiliation (Myers & Pianta, 2008; Pianta & Steinberg, 1992) and peer affiliation (Bierman, 2004; Steinberg et al., 1992), little research has examined these perspectives in relation to social affiliation and CU traits in the school context.

Existing evidence indicates that CU traits are associated with particularly impaired teacher-child relationships. Crum et al. (2016) divided a large sample of children aged 5 to 12 into four groups: the conduct problems alone, CU traits alone, both conduct problems and CU traits, and neither conduct problems nor CU traits. Children in the conduct problems and CU traits group showed the highest level of conflict and lowest level of closeness with their teacher. Another study of elementary school students (ages 8 to 9 years) also found that CU traits predicted lower closeness, higher conflict, and higher dependency in the teacher-child relationship over and above the effect of conduct problems (Horan et al., 2016). In one mixed-method study of secondary school students (ages 11 to 14 years), CU traits were also associated with higher conflict with teachers, and teachers perceived that a poor quality teacher-child relationship reduced the academic engagement in children with high levels of CU traits (Allen et al., 2018). To date, only one study has examined the directional associations between CU traits and teacher-child relationship quality (Baroncelli & Ciucci, 2020). They found no significant effect of CU traits on teacher-child relationship over six months among Italian middle school children controlling for externalising problems. In contrast, the result showed a significant effect of teacher-child relationship quality on CU traits, such that higher affiliation with teachers predicted lower CU traits (Baroncelli & Ciucci, 2020). The current study will examine if these findings are replicated in South Korean children, as findings may differ during an earlier period of schooling given the intensity of interaction with teachers in middle school (i.e., they teach one subject) versus primary school, where the same teacher teaches most of the subjects.

Although the link between CU traits in children and poor peer relationships is well-documented in the literature (Piatigorsky & Hinshaw, 2004; Waschbusch & Willoughby, 2008), it is less clear whether CU traits are uniquely associated with poor peer relationships. Some studies indicate that CU traits

are not associated with poor peer functioning independent of behavioural problems. For example, a study of children aged 7 to 13 found that conduct problems, but not CU traits, were significantly related to less 'like' and more 'dislike' in peer ratings of sociometric status (Haas et al., 2011) and another longitudinal study of children of a similar age also found significant associations between lower levels of peer acceptance and externalising behaviour problems (i.e., attention-deficit/hyperactivity disorder and oppositional defiant disorder), but not CU traits (Pardini & Fite, 2010). However, some studies support the unique contribution of CU traits to poor social relationships with peers. For example, CU traits were associated with poor peer functioning in children aged 8 to 13 over and above the effect of externalising problems (Haas et al., 2018). This finding is consistent with the results of a longitudinal study of younger children showing that CU traits at age 3 predicted less peer-liking at age 10 (Waller et al., 2017a). In another study of Cypriot adolescents aged 12 to 14, Fanti (2013) identified five distinct groups in a large adolescent sample on the basis of the levels of CU traits and conduct problems (CP), and two of these groups who presented with high CU traits (i.e., the high CP-high CU group and the low CP-high CU group), showed lower peer support compared to the remaining groups including the high CP-low CU group. A later study identifying groups based on the development of CU traits during a two-year period also found a significant link between CU traits and low peer support (Fanti et al., 2017). The similar levels of peer support for the low-risk group and the decreasing CU traits group suggests that peer social support may play a role as a protective factor in the development of CU traits. However, the direct and potentially reciprocal relationship between CU traits and positive peer affiliation was not examined in these previous studies.

Another gap in the literature is a lack of consideration of gender differences in relation to CU traits and social relationships in school. CU traits tend to be higher among boys than girls (Cardinale & Marsh, 2020) and the correlates of CU traits also show gender differences, such as lower levels of cortisol (Loney et al., 2006), affective empathy (Stickle et al., 2012), social competence (Fanti et al., 2017), and Science grades among boys (Bird et al., 2019) and higher internalising problems among girls (Cardinale & Marsh, 2020). However, research has not yet examined the potential moderating effect

of gender on the links between social affiliation with teacher and peers and CU traits. There appears to be a female advantage in developing good quality of teacher-child relationships, with several studies showing more conflict and less closeness between boys and their teachers (Hamre & Pianta, 2001; Koepke & Harkins, 2008). However, evidence is mixed regarding the correlates of the teacher-child interactions. In some studies, girls are more susceptible to the quality of teacher-child relationships. For example, a close relationship with a teacher was a stronger predictor of higher behavioural competence for girls than boys (Ewing & Taylor, 2009) and a poor quality relationship was more predictive of poor Maths achievement among girls (McCormick & O'Connor, 2015). On the other hand, some studies found a stronger effect of teacher-child relationship quality on child outcomes among boys. For example, a negative relationship with their teacher was more predictive of aggressive behaviour and poor school adjustment for boys than girls (Ewing & Taylor, 2009; Hamre & Pianta, 2001).

There are also gender differences in the nature and quality of peer interaction. Girls also show greater peer acceptance based on their tendency towards more cooperative and emotionally close interaction within peer groups (Fanti et al., 2017; Maccoby, 1999). Furthermore, significant gender differences have been demonstrated in the correlates of peer acceptance, such that a child's emotional expression was significantly related to lower peer acceptance only for boys (Perry-Parrish & Zeman, 2011), and girls' relational aggression predicted higher peer-liking by boys, but not by girls (R. L. Smith et al., 2010). Social cognitive factors also predict peer acceptance differently for boys and girls, such that high verbal ability predicted greater peer acceptance only among boys, while greater ability to distinguish two conflicting emotions between appearance and reality predicted greater peer acceptance only among girls (Braza et al., 2009). Overall, evidence indicates the importance of considering gender when examining child social-emotional functioning within the peer context.

The current study therefore seeks to address a number of gaps in the literature and increase our knowledge of the associations between CU traits and social affiliation in the school context. Reciprocal associations between teacher and peer affiliation and CU traits in early adolescence, a period when

children begin to seek more independence from parents and develop greater self-consciousness concerning peer approval (Giordano, 2003), were examined in the current study. The pathways from child antisocial behaviour across all time points were also included to test if affiliation with teachers and peers is specifically associated with CU traits over and above the effect of antisocial behaviour. Potential gender differences in the associations among CU traits, affiliative relationships, and antisocial behaviour were also examined. Based on the extant literature, it was hypothesised that there would be reciprocal associations between CU traits and social affiliation with teacher and peers over and above the effect of antisocial behaviour, such that higher CU traits would predict poor quality teacher-child relationships and lower levels of peer acceptance, while lower affiliation with teacher and peers would predict higher levels of CU traits over time. It was also hypothesised that gender would moderate the association between CU traits and affiliation in school, such that CU traits are more predictive of poorer quality affiliation with teacher and peers among boys than girls.

6.2. Methods

6.2.1. Participants

Children aged 10 to 12 years from two public primary schools in South Korea participated in the study (N = 218, 52% boys). The details of the participants and procedures are described in Chapter 2. As with Chapter 4, children completed two follow-up assessments at 4.5-month intervals. The number of participants was 215 (112 boys, 103 girls) at Time 2 and 213 (109 boys, 104 girls) at Time 3.

6.2.2. Measures

Callous-unemotional traits. CU traits were assessed at all three time-points using child self-report on the 9 items of the revised UNSW index in Chapter 3. The reliability and construct validity of the revised CU scale was established in prior chapters, for example showing significant correlations with

antisocial behaviour, poor school engagement, and reduced teacher reward strategies, and alphas ranging from .73 to .74 across timepoints.

Antisocial behaviour. Child antisocial behaviour was assessed at all three time points using child self-report on the revised 9-item version of the UNSW antisocial behaviour index in Chapter 3. Likewise, the reliability and construct validity of the revised scale was supported in prior chapters, showing positive associations with CU traits and greater use of teacher harsh discipline, with alphas ranging from .68 to .72.

Teacher-child affiliation. Child perceptions of the affective quality of the relationship with their teacher were assessed using the affection subscale of the Quality of the Student-Teacher Relationship Scale (QSTR; Davis, 2001) at all three time points. Children rated six items on a 5-point scale from 1 (never true for me) to 5 (always true for me) (e.g., 'My teacher understands me', 'I like my teacher') and higher scores indicate greater trust and positive emotions towards their teacher. The validity of the scale was supported in previous studies, with scale scores showing significant relationships with student's perceptions of the classroom climate and academic achievement (Davis, 2001, 2006; Hohl, 2006). The internal consistency for the scale in the current sample was good across all three time-points (Time 1, α=.83; Time 2, α= .82; Time 3, α=.91).

Peer affiliation. Child affiliation with peers was assessed using a sociometric nomination procedure at all three time points. Children were asked to report the classmates whom they most liked to spending break time with at school. A greater number of nominations indicates a higher levels of peer acceptance. The number of nominations that each child received were standardised within each classroom to compare across the sample. Previous research has shown that this approach produces a reliable and valid assessment of peer acceptance, with scale scores showing significant associations with good quality of teacher child relationships and better academic skills (Bukowski, Cillessen, & Velasquez, 2012; Kiuru et al., 2015).

Demographic information. Children reported on their age and gender (0 = male, 1 = female) at the first assessment and their teacher reported on child family type (0 = two parent, 1 = single parent) and eligibility for free school milk (0 = no, 1 = yes).

6.2.3. Data analysis

Prior to analysis, descriptive statistics and bivariate correlations among the main study variables were explored. Primary analyses were cross-lagged panel models and conducted using the statistical software program R (R Core Team, 2013). To examine the first aim exploring reciprocal associations between CU traits and social affiliation in the school context over time, autoregressive cross-lagged models were tested. Reciprocal relationships between CU traits and the affective quality of the teacher-child relationship and peer acceptance were examined in separate models, resulting in two sets of models. Pathways from antisocial behaviour and demographic covariates at all time-points were also included in the models to test the unique associations between social affiliations and CU traits. In each model, scores for variables at Time 1 were simultaneously regressed onto scores for variables at Time 2, and those were again regressed onto scores for variables at Time 3. Variables were correlated at each time-point to control for any overlap.

Then, to examine the second aim exploring the moderating effect of gender on the associations between CU traits and social affiliation with teacher and peers, multi-group modelling was used. The fit of models in which all paths were free to vary between boys and girls (the unconstrained model) was compared with the fit of models in which the all the paths were fixed to be equal between these two groups (the constrained model). The fit of the constrained model and the series of models where each path was freed were also compared in order to explore whether each individual path differed significantly between the two groups, using the Satorra-Bentler-corrected Chi-Square difference test. As with the studies described in previous chapters, the current sample was nested within 11 classrooms, thus potential clustering effects were controlled for by including dummy codes for each classroom in each model.

6.3. Results

6.3.1. Descriptive statistics

Table 6.1 presents the means and standard deviations of each variable separately for Time 1, Time 2, and Time 3. While antisocial behaviour and CU

traits were positively skewed, teacher-child affiliation was negatively skewed at all three time points. Before the peer acceptance scores were standardised, the raw scores were positively skewed, however there were no outliers at any of the three time points. Bivariate correlations between all study variables are presented in **Table 6.2**. Stability between each variable was moderate-to-high both from Time 1 to Time 2 (range, r = .51−.59, ps < .01) and from Time 2 to Time 3 (range, r = .45−.66, ps < .01). CU traits were significantly related to antisocial behaviour both cross-sectionally and longitudinally across all time points (range, r =.18−.30, ps < .01). There were significant moderate correlations between CU traits and affection in the teacher-child relationships both cross-sectionally and longitudinally across all time points (range, r = -.37−-.20, ps < .01). In contrast, peer affiliation at Time 2 showed significant negative correlations with CU traits at Time 1 and Time 2 only. Antisocial behaviour was also significantly correlated with poor teacher-child relationship quality both cross-sectionally and longitudinally across all time points (range, r = -.36−-.24, ps < .01), while antisocial behaviour at Time 3 was significantly related to peer acceptance at Time 3 only. There were no significant correlations between teacher and peer affiliation at any of the time points.

6.3.2. Aim 1: explore whether there are longitudinal associations between CU traits and social affiliations with teacher and peers

To identify longitudinal, and potentially reciprocal associations between CU traits and social affiliation in the school context, two different cross-lagged models were examined: teacher-child affiliation (Model 1) and peer affiliation (Model 2). All estimated pathways including concurrent covariance of the Model 1 are presented in **Table 6.3** and those of the Model 2 are presented in **Table 6.4**. All variables were stable over time in both models (range, β = .46−.69, ps < .001).

In Model 1, higher levels of CU traits at Time 1 predicted less affection in the teacher-child relationship at Time 2, but not vice versa. On the other hand, less affection in the teacher-child relationship at Time 2 predicted higher levels of CU traits at Time 3, but not vice versa (**Figure 6.1**). Although there were significant longitudinal associations between CU traits and peer acceptance in bivariate correlations, peer acceptance was not significantly associated with

either CU traits or antisocial behaviour in the cross-lagged model that accounted for both of these constructs as well as demographic variables.

Table 6.1

Descriptive Statistics for the Main study Variables

Variable	N	M	SD	range	Skewness (SE)	Kurtosis (SE)
			Time 1			
AB	213	2.59	2.47	0 – 17	1.72 (.17)	5.39 (.33)
CU traits	214	6.68	3.01	0 – 18	.17 (.17)	.39 (.33)
Teacher-child affiliation	213	25.45	3.89	8 – 30	-1.03 (.17)	1.44 (.33)
Peer affiliation	218	1.73	1.49	0 – 6	.71 (.17)	-.24 (.33)
			Time 2			
AB	211	2.83	2.50	0 – 13	1.24 (.17)	1.67 (.33)
CU traits	215	6.25	2.84	0 – 13	.06 (.17)	-.68 (.33)
Teacher-child affiliation	214	25.19	4.06	10 – 30	-1.13 (.17)	1.37 (.33)
Peer affiliation	215	1.92	1.60	0 – 6	.64 (.17)	-.49 (.33)
			Time 3			
AB	211	2.72	2.30	0 – 10	.83 (.17)	.30 (.33)
CU traits	211	5.92	2.95	0 – 16	.07 (.17)	-.39 (.33)
Teacher-child affiliation	212	24.33	4.32	10 – 30	-.85 (.17)	.71 (.33)
Peer affiliation	214	2.41	1.74	0 – 7	.49 (.17)	-.34 (.33)

Note. CU = Callous-unemotional traits, AB = Antisocial behaviour.

Table 6.2

Bivariate Cross-sectional and Longitudinal Correlations between Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
35. Gender															
36. Single Parent	-.01														
37. Free School Milk	.13*	.41**													
38. Age	-.01	-.07	-.04												
39. AB T1	-.22*	.13	.05	.10											
40. AB T2	-.13	.26**	.24**	.04	.51**										
41. AB T3	-.21**	.15**	.10	.05	.59**	.66**									
42. CU traits T1	-.17*	-.04	-.03	.03	.20**	.22*	.18*								
43. CU traits T2	-.27**	-.01	.01	.09	.20**	.26**	.24**	.59**							
44. CU traits T3	-.33**	.04	.06	.09	.20**	.27**	.30**	.46**	.66**						
45. Teacher affiliation T1	.06	.01	.01	-.06	-.26**	-.25**	-.26**	-.32**	-.20**	-.28**					
46. Teacher affiliation T2	.06	-.04	-.02	-.04	-.33**	-.36**	-.30**	-.30**	-.32**	-.37**	.58**				
47. Teacher affiliation T3	.05	-.02	.08	-.09	-.24**	-.27**	-.29**	-.26**	-.28**	-.30**	.42**	.60**			
48. Peer affiliation T1	.22**	-.01	.05	.04	-.05	-.03	-.08	-.06	-.08	-.01	.06	.08	.01		
49. Peer affiliation T2	.12	-.02	.04	.07	-.10	-.07	-.07	-.17*	-.17*	-.04	-.01	.09	.08	.53**	
50. Peer affiliation T3	.16*	-.01	-.03	-.02	-.08	-.13	-.14*	-.10	-.10	-.07	.05	.10	.07	.44**	.58**

Note. AB = Antisocial behaviour; CU traits = Callous-unemotional traits. T1 = Time 1; T2 = Time 2; T3 = Time 3 *$p < 0.05$. **$p < 0.01$.

Table 6.3

Estimates of all Paths from the Cross-lagged Models for Teacher-Child Affiliation

Parameter	B	SE	β	*p*
Autoregressive Coefficients				
CU traits T1 → CU traits T2	.59	.07	.57	<.001
CU traits T2 → CU traits T3	.55	.05	.55	<.001
AB T1 → AB T2	.46	.13	.46	<.001
AB T2 → AB T3	.62	.06	.69	<.001
Teacher-child affiliation T1 → Teacher-child affiliation T2	.57	.07	.53	<.001
Teacher-child affiliation T2 → Teacher-child affiliation T3	.56	.09	.54	<.001
Teacher Affiliation Predicting Child Behaviour				
Teacher-child affiliation T1 → CU traits T2	-.02	.05	-.02	.747
Teacher-child affiliation T2 → CU traits T3	-.10	.04	-.14	.026
Teacher-child affiliation T1 → AB T2	-.09	.06	-.14	.130
Teacher-child affiliation T2 → AB T3	-.01	.03	-.02	.795
Child Behaviour Predicting Teacher Affiliation				
CU traits T1 → Teacher-child affiliation T2	-.21	.10	-.14	.034
CU traits T2 → Teacher-child affiliation T3	-.13	.08	-.09	.129
AB T1 → Teacher-child affiliation T2	-.22	.13	-.13	.085
AB T2 → Teacher-child affiliation T3	-.16	.13	-.09	.239
Child Behaviour Predicting Child Behaviour				
CU traits T1 → AB T2	.08	.06	.09	.229
CU traits T2 → AB T3	.05	.05	.06	.387
AB T1 → CU traits T2	.11	.12	.01	.358
AB T2 → CU traits T3	.11	.06	.10	.076
Concurrent Covariances				
CU traits T1 & Teacher-child affiliation T1	-3.17	.73	-.28	<.001

CU traits T1 & AB T1	1.61	.83	.22	.053
Teacher-child affiliation T1 & AB T1	-2.69	.83	-.27	.001
CU traits T2 & Teacher-child affiliation T2	-1.66	.49	-.23	.001
CU traits T2 & AB T2	.86	.47	.20	.069
Teacher-child affiliation T2 & AB T2	-1.15	.40	-.19	.004
CU traits T3 & Teacher-child affiliation T3	-.28	.47	-.04	.555
CU traits T3 & AB T3	.26	.23	.08	.252
Teacher-child affiliation T3 & AB T3	-.18	.34	-.03	.602

Note. CU traits = Callous-unemotional traits; AB = Antisocial behaviour; T1 = Time 1; T2 = Time 2; T3 = Time 3.

Table 6.4

Estimates of all Paths from the Cross-lagged Models for Peer Affiliation

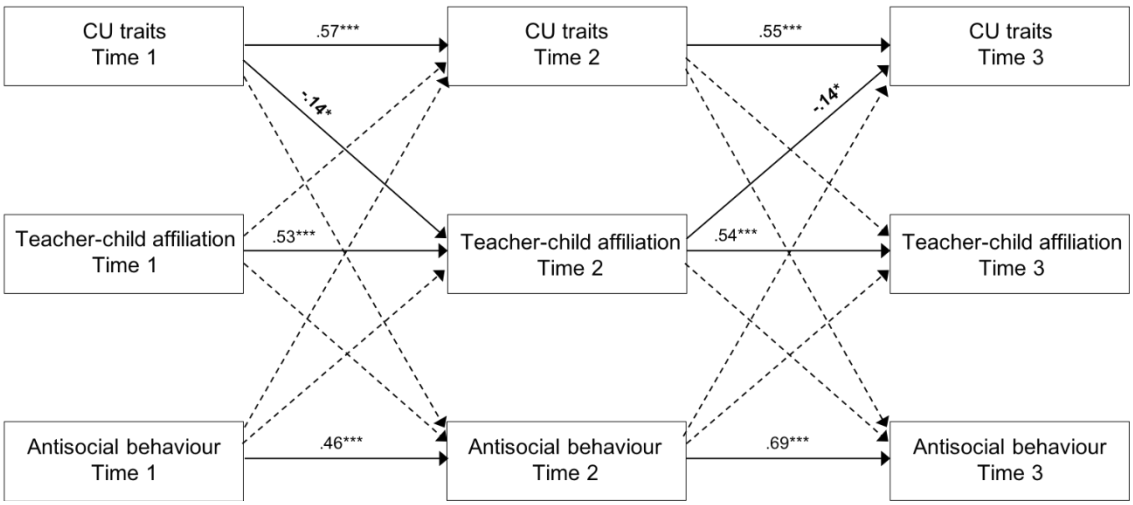
Parameter	B	SE	β	*P*
Autoregressive Coefficients				
CU traits T1 → CU traits T2	.59	.06	.58	<.001
CU traits T2 → CU traits T3	.60	.06	.60	<.001
AB T1 → AB T2	.50	.13	.49	<.001
AB T2 → AB T3	.58	.06	.65	<.001
Peer affiliation T1 → Peer affiliation T2	.66	.07	.56	<.001
Peer affiliation T2 → Peer affiliation T3	.65	.07	.59	<.001
Peer Affiliation Predicting Child Behaviour				
Peer affiliation T1 → CU traits T2	.31	2.05	.01	.901
Peer affiliation T2 → CU traits T3	2.78	2.08	.08	.182
Peer affiliation T1 → AB T2	-3.45	1.99	-.10	.083
Peer affiliation T2 → AB T3	.31	1.49	.01	.835

Child Behaviour Predicting Peer Affiliation				
CU traits T1 → Peer affiliation T2	-.00	.00	-.07	.271
CU traits T2 → Peer affiliation T3	.00	.00	.10	.101
AB T1 → Peer affiliation T2	-.00	.00	-.07	.260
AB T2 → Peer affiliation T3	-.00	.00	-.11	.142
Child Behaviour Predicting Child Behaviour				
CU traits T1 → AB T2	.10	.05	.11	.057
CU traits T2 → AB T3	.07	.05	.09	.171
AB T1 → CU traits T2	.11	.12	.09	.338
AB T2 → CU traits T3	.16	.06	.14	.004
Concurrent Covariances				
CU traits T1 & Peer affiliation T1	-.02	.02	-.08	.260
CU traits T1 & AB T1	1.62	.81	.23	.046
Peer acceptance T1 & AB T1	-.01	.01	-.04	.583
CU traits T2 & Peer affiliation T2	-.02	.01	-.12	.117
CU traits T2 & AB T2	.85	.50	.19	.086
Peer affiliation T2 & AB T2	.00	.01	.01	.936
CU traits T3 & Peer affiliation T3	-.00	.01	-.03	.678
CU traits T3 & AB T3	.33	.23	.10	.157
Peer affiliation & AB T3	-.01	.01	-.06	.389

Note. CU traits = Callous-unemotional traits; AB = Antisocial behaviour; T1 = Time 1; T2 = Time 2; T3 = Time 3.

Figure 6.1

Cross-lagged Model among CU Traits, Teacher-Child Affiliation, and Antisocial Behaviour at Time 1, Time 2, and Time 3



Note. Standardised coefficients are presented. Dashed lines indicate non-significant pathways. Classroom effect, child age, family type, and free school milk were entered as covariates, but are not shown in the figure. CU traits = Callous-unemotional traits. *p < .05, ***p <.001

6.3.3. Aim 2: explore whether gender moderates the longitudinal relationship between CU traits and social affiliation with teachers and peers

The potential moderating effect of gender was then examined by testing multi-group models across boys (n=108) and girls (n=103). For Model 1, the model that fully freed all of the paths among CU traits, teacher-child affiliation, and antisocial behaviour significantly improved model fit over the model in which all parameters were held equal between the groups ($\Delta\chi^2(99)=178.78$,

p<.001). Two of the four cross-lagged paths between CU traits and teacher-child affiliation in the unconstrained model were significant for boys, but none of these paths was significant for girls. In contrast, one of the four cross-lagged paths between antisocial behaviour and teacher-child affiliation was significant for girls, but not for boys. Finally, two of the four cross-lagged paths between CU traits and antisocial behaviour were significant for boys, but not for girls (**Figure 6.2**). However, only the model that freed the single pathway from teacher-child affiliation at Time 2 to antisocial behaviour at Time 3 had significant better fit relative to the fully constrained model ($\Delta\chi^2$=6.45, Δdf=1, *p*=.011), such that higher affection in the teacher-child relationship predicted lower antisocial behaviour in the girls, but not in the boys (**Table 6.5**). That is, although the overall model fitted differently among boys versus girls, there were no significant differences for any pathways between teacher-child affiliation and CU traits over time.

For Model 2, the model that fully freed all of the paths among CU traits, peer affiliation, and antisocial behaviour also significantly improved model fit over the fully constrained model between the two groups ($\Delta\chi^2(99)$=171.20, *p*<.001). One of the four cross-lagged paths between peer affiliation and antisocial behaviour in the unconstrained model was significant for girls, but not boys. Three of the four cross-lagged paths between CU traits and antisocial behaviour were significant for boys, but not girls, while one of those, pathway from CU traits at Time 2 to antisocial behaviour at Time 3, was significant for girls, but not boys (**Figure 6.3**). However, none of the cross-lagged paths were significantly different between groups when comparing the model that freed the individual path to the fully constrained model. Instead, the autoregressive associations for peer acceptance and antisocial behaviour from Time 1 to Time 2 were significantly different (peer acceptance; $\Delta\chi^2$=6.54, Δdf=1, *p*=.011, antisocial behaviour; $\Delta\chi^2$=4.92, Δdf=1, *p*=.027) (**Table 6.6**). Specifically, antisocial behaviour at Time 1 did not predict antisocial behaviour at Time 2 in girls, and this result was replicated in the model for teacher-child affiliation ($\Delta\chi^2$=5.86, Δdf=1, *p*=.015).

Table 6.5

Eighteen Models Exploring whether Gender Moderated Pathways among CU Traits, Teacher-Child Affiliation, and Antisocial Behaviour

	Pathway tested	*df* for model with freed path-way	*df* for fully fixed model	Δ *df*	χ^2 for model with freed pathway	χ^2 for fully fixed model	Δ χ^2	*p*-value
Teacher-child affiliation model comparing boys (*n*=108) vs. girls (*n*=103)	**CU traits T1→ CU traits T2**	234	235	1	528.14	528.27	0.11	.738
	CU traits T1→ teacher affiliation T2	234	235	1	527.45	528.27	0.57	.451
	CU traits T1→ AB T2	234	235	1	523.90	528.27	2.68	.102
	Teacher affiliation T1→ CU traits T2	234	235	1	524.87	528.27	3.38	.066
	Teacher affiliation T1→ teacher affiliation T2	234	235	1	528.27	528.27	0.00	.967
	Teacher affiliation T1→ AB T2	234	235	1	525.96	528.27	1.64	.201
	AB T1→ CU traits T2	234	235	1	525.03	528.27	1.45	.229
	AB T1→ teacher affiliation T2	234	235	1	526.10	528.27	1.40	.237
	AB T1→ AB T2	234	235	1	499.88	528.27	5.86	.015
	CU traits T2→ CU traits T3	234	235	1	528.26	528.27	0.01	.940
	CU traits T2→ teacher affiliation T3	234	235	1	528.26	528.27	0.01	.903
	CU traits T2→ AB T3	234	235	1	522.21	528.27	3.60	.058
	Teacher affiliation T2→ CU traits T3	234	235	1	526.63	528.27	1.43	.231
	Teacher affiliation T2→ teacher affiliation T3	234	235	1	527.73	528.27	0.37	.543
	Teacher affiliation T2→ AB T3	234	235	1	521.84	528.27	6.45	.011
	AB T2→ CU traits T3	234	235	1	528.23	528.27	0.05	.812
	AB T2→ teacher affiliation T3	234	235	1	527.29	528.27	0.93	.335
	AB T2→ AB T3	234	235	1	528.21	528.27	0.05	.826

Note. A full-fixed model was compared to the model fit when each pathway of interest was systematically freed using a Satorra-Bentler-corrected Chi-Square difference test. CU traits = Callous-unemotional traits; AB = Antisocial behaviour; T1 = Time 1; T2 = Time 2; T3 = Time 3.

Table 6.6.

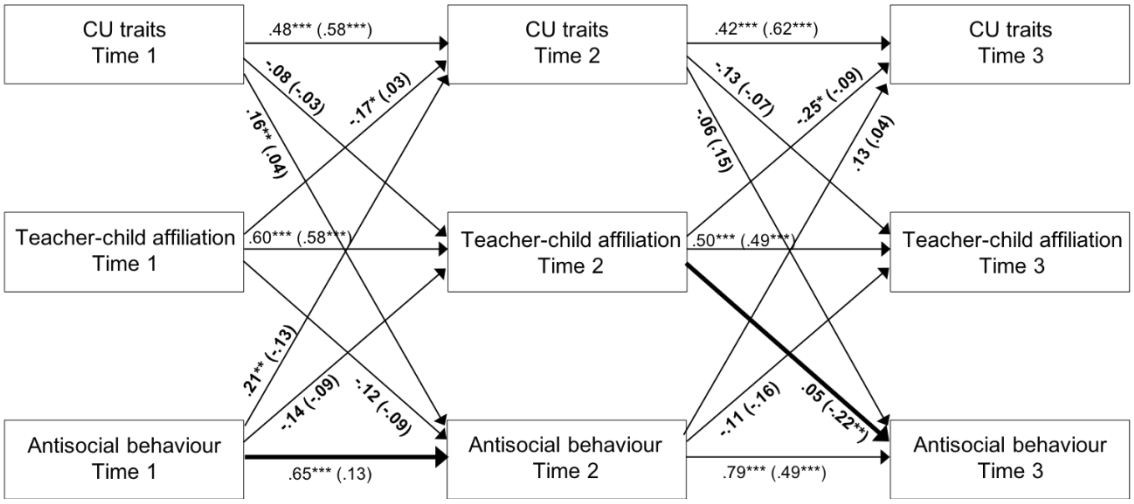
Eighteen Models Exploring whether Gender Moderated Pathways among CU Traits, Peer Affiliation, and Antisocial Behaviour

	Pathway tested	*df* for model with freed path-way	*df* for fully fixed model	Δ *df*	χ^2 for model with freed pathway	χ^2 for fully fixed model	Δ χ^2	*p*-value
Peer affiliation model comparing boys (*n*=108) vs. girls (*n*=103)	**CU traits T1→ CU traits T2**	234	235	1	466.98	467.11	0.11	.735
	CU traits T1→ peer affiliation T2	234	235	1	466.74	467.11	0.36	.547
	CU traits T1→ AB T2	234	235	1	461.62	467.11	2.57	.109
	Peer affiliation T1→ CU traits T2	234	235	1	466.37	467.11	0.66	.417
	Peer affiliation T1→ peer affiliation T2	234	235	1	462.99	467.11	6.54	.011
	Peer affiliation T1→ AB T2	234	235	1	467.10	467.11	0.01	.911
	AB T1→ CU traits T2	234	235	1	463.86	467.11	1.64	.201
	AB T1→ peer affiliation T2	234	235	1	466.69	467.11	0.53	.468
	AB T1→ AB T2	234	235	1	440.72	467.11	4.92	.027
	CU traits T2→ CU traits T3	234	235	1	466.74	467.11	0.55	.457
	CU traits T2→ peer affiliation T3	234	235	1	467.06	467.11	0.07	.796
	CU traits T2→ AB T3	234	235	1	461.48	467.11	3.38	.066
	Peer affiliation T2→ CU traits T3	234	235	1	466.13	467.11	1.08	.300
	Peer affiliation T2→ peer affiliation T3	234	235	1	465.81	467.11	1.47	.226
	Peer affiliation T2→ AB T3	234	235	1	466.57	467.11	0.51	.477
	AB T2→ CU traits T3	234	235	1	467.04	467.11	0.09	.762
	AB T2→ peer affiliation T3	234	235	1	466.17	467.11	1.03	.310
	AB T2→ AB T3	234	235	1	465.34	467.11	1.15	.283

Note. A full-fixed model was compared to the model fit when each pathway of interest was systematically freed using a Satorra-Bentler-corrected Chi-Square difference test. CU traits = Callous-unemotional traits; AB = Antisocial behaviour; T1 = Time 1; T2 = Time 2; T3 = Time 3.

Figure 6.2

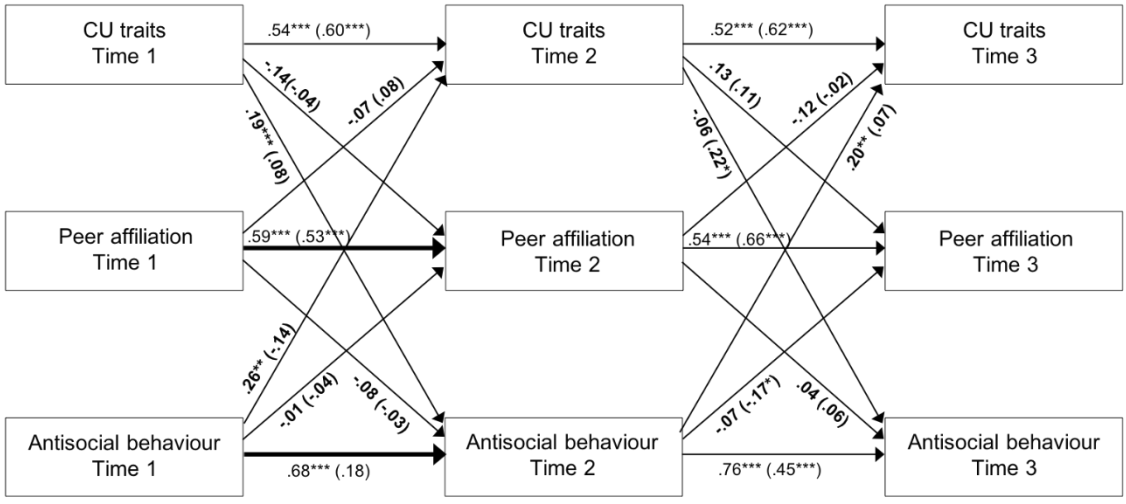
Unconstrained Cross-lagged Model among CU Traits, Teacher affiliation, and Antisocial Behaviour at Time 1, Time 2, and Time 3



Note. Standardised coefficients for the boys are presented first followed by the girls. Classroom effect, child age, family type, and free school milk were entered as covariates, but are not shown in the figure. CU traits = Callous-unemotional traits. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 6.3

Unconstrained Cross-lagged Model among CU Traits, Peer affiliation, and Antisocial Behaviour at Time 1, Time 2, and Time 3



Note. Standardised coefficients for the boys are presented first followed by the girls. Classroom effect, child age, family type, and free school milk were entered as covariates, but are not shown in the figure. CU traits = Callous-unemotional traits. * $p < .05$. ** $p < .01$. *** $p < .001$.

6.4. Discussion

The current study examined longitudinal bi-directional relationships between CU traits and social affiliation in the school context, as well as the potential gender differences in these associations. Significant longitudinal associations between teacher-child affiliation and CU traits were found even within a relatively short period time in the cross-lagged model that accounted for the effect of antisocial behaviour. Specifically, CU traits at Time 1 predicted lower teacher-child affiliation at Time 2, which in turn, predicted higher CU traits at Time 3. That is, both child-driven and teacher-driven effects were found, unlike in a previous study of middle school children that found an effect of teacher-child relationship on CU traits, but not vice versa (Baroncelli & Ciucci, 2020). These inconsistent findings may be related to the different time frame (i.e., 6 vs. 9 months) or the differing intensity of the interactions between students and middle school teachers compared to primary school teachers, as the latter have closer and more frequent involvement with students during the school year. The current results extend previous findings on bi-directional associations between parental warmth and CU traits (e.g., Waller et al., 2014) to the school context, and are consistent with theories emphasising the interactive and reciprocal dynamic nature of social affiliation (Waller & Wagner, 2019). This also highlights the importance of considering gene-environment correlation when interpreting the influence of environmental factors on child psychopathology (Larsson, Viding, Rijsdijk, & Plomin, 2008). In the current study, poor quality teacher-child affiliation may have been elicited by child CU traits, and this low affective quality of teacher-child affiliation may have in turn predicted increased CU traits over time.

Antisocial behaviour did not show any significant longitudinal associations with teacher-child affiliation in the cross-lagged model that accounted for the association with CU traits. While many studies have consistently demonstrated significant longitudinal associations between teacher-child conflict and child behavioural problems (Doumen et al., 2008; Roorda, Verschueren, Vancraeyveldt, Van Craeyevelt, & Colpin, 2014), teacher-child closeness did not show significant longitudinal associations with child behaviour problems (Ewing & Taylor, 2009; Roorda et al., 2014). Roorda

et al. explained that teachers may deliberately show more warmth and support to children with behavioural problems to promote child prosocial behaviour; thus, the effect of child behaviour problems on teacher-child closeness may level out over time. However, it is decreased conflict, rather than increased warmth, that appears to be influential in reducing child behaviour problems over time (Roorda et al., 2014). The current study did not consider the negative dimension of teacher-child relationship quality, focusing only on positive teacher-child affiliation. Future research that includes both positive and negative dimensions of teacher-child relationship quality, as well as both antisocial behaviour and CU traits, would inform a better understanding of the dynamics between teacher and antisocial children in the classroom.

Peer affiliation did not show any significant associations with CU traits, which is not consistent with several prior studies that found a unique effect of CU traits on poor peer functioning (Haas et al., 2018; Miron, Satlof-Bedrick, & Waller, 2020; Waller et al., 2017a). However, it is consistent with the findings of other studies that examined a similar age group, in which CU traits were not significantly associated with peer interaction when controlling for the symptoms of externalising disorders, such as attention-deficit hyperactivity disorder, oppositional defiant disorder (Pardini & Fite, 2010), or conduct problems (Haas et al., 2011). It is difficult to ascertain the reasons for these inconsistent findings since past studies used different measures to assess peer affiliation. Peer like and dislike are often interpreted as inversely correlated measures; however, the association with CU traits could be distinct after controlling for their correlation. Indeed, one prior study of children aged 6 to 12 years found that child psychopathic traits were significantly associated with peer dislike, but not with peer liking, controlling for overlap between these two nominated constructs (Piatigorsky & Hinshaw, 2004). Future studies should include both like and dislike assessments to take into account their distinctive features as well as their potential overlap. In addition, the current study asked children to report on peers with whom they want to spent break time together. Therefore, this measure may reflect peer popularity rather than acceptance. In fact, in one study of adolescents aged 14 to 15, aggression was positively related to popularity, but negatively associated with peer acceptance (Schwartz, Gorman, Nakamoto, & McKay, 2006). A further index, such as friendship quality (e.g.,

Miron et al., 2020) can also be considered to investigate more nuanced dynamics between CU traits and peer affiliation.

Other measurement-related explanations for the inconsistent findings concern different informants for peer affiliation. Since peer experiences occur beyond the view of adults, peer report/nomination is considered as a preferred method of assessing peer interaction (Wagner, Bowker, & Rubin, 2020). The current study employed peer report to assess peer affiliation and found no association with CU traits, consistent with prior research that employed peer nomination (Haas et al., 2011). However, this finding differs from other studies that used youth self-report (Miron et al., 2020) or teacher report of peer affiliation (Waller et al., 2017a) with significant longitudinal associations with CU traits. Furthermore, findings of a study by Muñoz et al. (2008b) indicated that children high in psychopathic traits appear to misperceive their relationships with friends. Children low in psychopathic traits did not see their relationship with children high in psychopathic traits as particularly conflictual or unsupportive, however those in high psychopathic traits perceived conflict in their relationship with friends. Different informants may contribute unique information, thus future research including multiple informants will be beneficial for providing a deeper understanding of the relationship between CU traits and peer affiliation.

A final explanation for the inconsistent findings relates to cultural differences. South Korea's cultural values encourage group-dependent behaviour over individual desires; therefore, social reticence may affect the expression of personal desires on peer preferences (Hart et al., 2000). They may be less willing to express personal preferences in peer liking, thus there might be less variability in the range of reported peer affiliation. Peer influence may also play a less significant role in East Asian cultures. Despite the consistent evidence for the association between CU traits and deviant peer affiliation in Western samples (Backman, Laajasalo, Jokela, & Aronen, 2018), two studies of Singaporean adolescents did not support this link (Ang et al., 2015; Chu et al., 2014). The findings warrant more studies in Asian countries to provide a better understanding of the implications of cultural differences regarding the relationship between CU traits and social affiliation.

The current study also examined potential gender differences in the associations between CU traits, antisocial behaviour, and social affiliation with teachers and peers. The overall model fit differently among boys versus girls, and the number of significant associations and variables included in the associations differed depending on gender for both the teacher and peer models. However, the longitudinal associations between CU traits and teacher affiliation did not differ by gender, suggesting that both boys and girls can benefit from a good quality teacher-child relationship, with this positive affiliative relationship reducing CU traits over time.

One specified pathway between teacher-child affiliation and antisocial behaviour was significantly different among boys versus girls. Teacher-child affiliation at Time 2 predicted lower antisocial behaviour at Time 3 only among girls, but not among boys. This is inconsistent with two prior studies that found stronger associations between a conflictual teacher-child relationship and behaviour problems among boys than girls (Ewing & Taylor, 2009; Hamre & Pianta, 2001). However, both prior studies employed regression analysis, so the results do not provide any information about the directionality of the associations. In addition, both studies assessed teachers' perceptions of teacher-child relationship quality; thus, their results may be a reflection of the greater risk of behavioural problems and the poor quality of teacher-child relationships for boys. In fact, one study that examined the relationship between teacher-child closeness and child behavioural competence showed stronger positive associations among girls than boys (Ewing & Taylor, 2009). The present study also assessed the positive dimension of teacher-child relationship quality and its associations with child outcomes. Those findings are consistent with the view that girls may be more responsive to teacher's behaviour, therefore girls may benefit more from teacher's emotional support than boys (Baker, 2006).

The present study has several strengths including the use of a longitudinal design, increasing our knowledge of the interactive nature of social affiliation in children with CU traits in the school setting. In this study antisocial behaviour was also controlled for, enabling to examine the unique associations of CU traits with the affective quality of teacher and peer relationships over time. However, these findings should be interpreted in light of several limitations.

First, examination of the link between CU traits and teacher-child affiliation relied only on child self-report. The affective quality of teacher-child affiliation may be appraised differently by different children according to their temperamental characteristics. For example, children with high levels of CU traits may be more likely to report low teacher-child affiliation even when their teacher displays warmth towards them, due to their lack of motivation and enjoyment of affiliative bonds (Foulkes et al., 2017; Viding & McCrory, 2019; Waller et al., 2020a). Future research including multiple informants (e.g., children, teachers, peers) could provide additional meaningful information to inform school-based intervention. Second, only peer nomination was used to assess peer affiliation, and past findings appear to differ across informants (Haas et al., 2018; Pardini & Fite, 2010; Waller et al., 2017a). Furthermore, the current study did not consider the gender of either the teacher or rater of peer nomination. Although the current study examined a potential gender effect in the association with teacher and peer relationships, the nature of interactions may be more complex and potentially differ according to gender matching between teachers and students. As with most studies that examine teacher-child relationship quality, the current sample was dominated by female teachers (82%). It has been suggested that the dominance of female teachers may be a risk factor for male students (Sadker & Sadker, 2002), with greater closeness to female students reported by female teachers (McGrath & Van Bergen, 2015). Therefore, the current findings may be influenced by a gender mismatch between children and teachers. Similarly, the link between peer affiliation and antisocial behaviour may differ due to a gender mismatch between students and gender role norms. For example, girls' aggressive behaviour showed positive associations with peer liking by boys, but not girls (R. L. Smith et al., 2010). Considering gender matching on both sides of social interaction would help to draw a clearer and more nuanced picture of the association between CU traits and social affiliation in the school context. Finally, the data were collected from only two different primary schools and all participants were South Korean. The homogeneity of the sample may limit the generalisation of the findings to other cultural contexts. In addition, the current study only includes school-based community sample, thus the findings may not generalise to clinical settings, in

which youths are likely to have higher levels of antisocial behaviour and CU traits and to have more conflictual relationships with their teachers and peers.

The current findings highlight the importance of social affiliation in the development of CU traits (Waller & Wagner, 2019). The findings indicate that teacher-child affiliation significantly contributes to the development of CU traits, even though the teacher-child relationship is relatively less concentrated and intense compared to the parent-child relationship. In addition, this finding did not differ by gender, suggesting that teacher-child affiliation can be an effective school-based target for reducing CU traits in both boys and girls. The findings did not support an association between peer affiliation and CU traits; thus, it may be better for interventions to focus on teacher-child interactions to reduce CU traits in children. However, since the current study is the first to examine bi-directional longitudinal associations between CU traits and social processes with both teachers and peers, future study needs to investigate whether the findings are replicated using a multiple informant and multimethod assessment of teacher and peer affiliation across different periods of schooling.

CHAPTER 7:

To what extent does punishment insensitivity explain poor academic performance in children with CU traits?

Part of Chapter 6 has recently been published as Hwang, S., Allen, J. L., Kokosi, T., & Bird, E. (2020). To what extent does punishment insensitivity explain the relationship between callous-unemotional traits and academic performance in secondary school students? *British Journal of Educational Psychology*.

7.1. Introduction

In previous chapters, CU traits were associated with reduced responsiveness to teacher discipline, with teacher harsh discipline exerting a negative impact on the school engagement of children low, but not high, in CU traits. In the extant literature, this reduced responsiveness to teacher discipline has been identified as one potential reason for poor academic outcomes in children with CU traits (DeLisi et al., 2011; Horan et al., 2016). CU traits are

associated with reduced emotionality and a lack of affective discomfort in response to negative stimuli (Pardini & Byrd, 2012). Therefore, children with CU traits may not be concerned about the negative consequences of academic failure or teacher discipline, leading to reduced school engagement and increased disruptive behaviour in the classroom, followed by poor academic performance (DeLisi et al., 2011; Horan et al., 2016). However, no studies to date have tested the mechanisms explaining poor academic outcomes in children with elevated CU traits using a quantitative research design. This chapter therefore will examine whether reduced responsivity to punishment explains the link between CU traits and low academic achievement.

Academic failure has long been a major issue for antisocial children (see review by Maguin & Loeber, 1996). One of the most robust findings in relation to factors underlying this link is the presence of verbal ability deficits in antisocial children (Allen, 2017; Masten & Curtis, 2000; Moffitt, 1990). However, CU traits do not appear to be related to deficits in verbal ability (Allen et al., 2013; DeLisi et al., 2011). Nevertheless, there is consistent evidence that CU traits are associated with low academic achievement even after accounting for antisocial behaviour (Bird et al., 2019; DeLisi et al., 2011; Horan et al., 2016; Vaughn et al., 2011). This negative association between CU traits and academic achievement has been identified across different academic subjects (i.e., Reading, Maths, Science), different forms of assessment (i.e., teacher ratings, standardised test scores), different stages of schooling (i.e., primary, secondary), and different study analytic approaches (i.e., person-centred, variable centred) (Bird et al., 2019; Ciucci et al., 2014; DeLisi et al., 2011; Horan et al., 2016; Vaughn et al., 2011). Overall, existing evidence suggests that there may be heterogeneous risk pathways to low academic achievement for antisocial children with and without CU traits.

Reduced sensitivity to other's distress and punishment cues (Blair et al., 2001; Byrd et al., 2014) are a central feature of theoretical models of the aetiology of CU traits. This lack of affective discomfort in response to negative stimuli or disciplinary action has been identified as one mechanism explaining reduced responsiveness to parental discipline and poor conscience development in children with CU traits (Blair, 2017; Hawes et al., 2014; Kochanska, 1993). That is, the punishment insensitivity of children with elevated

CU traits causes them to fail to internalise the moral or social norm that their parent or teacher wishes to convey (Pardini & Frick, 2013). Indeed, past research indicates that antisocial children with high levels of CU traits show less distress when time out is implemented compared to antisocial children with low levels of CU traits (Bansal et al., 2020; Hawes & Dadds, 2005).

In relation to schoolwork, children with CU traits are less motivated to perform to teacher or parent expectations. In addition, their decreased responsiveness to teacher discipline strategies may be related to the challenges teachers experience not only in promoting the engagement of these high-risk children in school activities, but also in reducing disruptive behaviour during class (DeLisi et al., 2011). In fact, one study of preschool children found that teachers' use of time out is less effective for children with high CU traits (Garcia, Graziano, & Hart, 2018). In another study that conducted qualitative interviews, teachers reported that discipline strategies were less effective for children with CU traits, and that greater monitoring and feedback was needed to encourage these children to engage in their schoolwork (Allen et al., 2018). Overall, the evidence suggests that poor academic outcomes in antisocial children with CU traits may be closely related to reduced responsiveness to teacher classroom management strategies.

Although theory highlights the importance of considering teacher-child interaction in explaining heterogenous pathways for poor academic outcomes in antisocial children with high and low levels of CU traits (DeLisi et al., 2011; Allen et al., 2018), punishment insensitivity has yet to be formally tested as a mechanism explaining the association between CU traits and low grades. A better understanding of how CU traits relate to school performance may help to individualise interventions aimed at promoting academic achievement in antisocial children based on their unique temperament. The current study focuses on children attending secondary school, as during this period of schooling students encounter more challenging academic work and are expected to work more independently, receiving different instructions from multiple teachers for each subject (Midgley & Urdan, 1992; Salmela-Aro & Upadyaya, 2014). Therefore, there would be a greater influence of responsivity to teacher discipline in child academic outcomes, and this may differ across different subjects.

The current study therefore aims to investigate punishment insensitivity as a mechanism explaining the associations between CU traits and academic grades. As mentioned in Chapter 2, the present study used cross-sectional data collected in a UK secondary school that has previously featured in three published papers (Allen et al., 2018; Allen et al., 2020b; Bird et al., 2019). All of these studies featured different aims and hypotheses to the current study, and none examined mechanisms explaining the relationship between CU traits and low grades. In the current model, sociodemographic disadvantage and child externalising problems were included as covariates and the academic grades of three core subjects (i.e., English, Maths, and Science) were included as correlated outcomes. This allows potential differences in pathways for each subject to be examined in relation to different characteristics or teaching methods between these subjects, as well as accounting for the relationships between students' performance in each subject. Since a previous study featuring the current sample already identified significant associations between CU traits and poor academic grades in all three subjects separately (Bird et al., 2019), the present study examined a model that included indirect paths from CU traits to academic grades via punishment insensitivity simultaneously for all three subjects. It was hypothesised that CU traits would be indirectly related to English, Maths and Science grades via punishment insensitivity, controlling for sociodemographic variables and externalising problems. Specifically, CU traits would be significantly related to higher punishment insensitivity, which in turn, would predict low English, Maths, and Science grades.

7.2. Methods

7.2.1. Participants

Participants were secondary school students aged 11 to 14 years in England (N = 437, mean age = 12.5 years, 51% boys). Students were from different English (*n* = 8), Science (*n* = 9), and Maths classes (*n* = 9). The median number of participants per classroom was 21, with a range of 12 to 30 students. A large proportion of the sample (96%) were White and the remainder

of 17 students (4%) were identified as Black, Mixed Black and White, Asian, or Mixed White and Asian. Of the 437 participants, 336 students (77%) had English as their first language, 70 students (16%) reported living with a single parent, and 46 students (11%) were eligible for free school meals, largely consistent with the official rates in the UK (22% and 13%, respectively) (Department for Education, 2015; Office for National Statistics, 2017).

7.2.2. Procedures

Study procedures were approved by the university ethics board and permission to approach students to participate was sought through an invitation letter to the school. The opt-out parental consent forms were sent to parents through the school and a week was given to return the form if parents did not want their child to participate. Nobody returned a reply slip, thus all 503 students were approached and informed of the study aims and procedures. Of the 503, 437 students agreed to take part in the study, giving an 87% participation rate. Students completed the written questionnaires during their regular lesson time under exam conditions and were given the option of omitting all or certain items without giving a reason.

7.2.3. Measures

Callous-Unemotional Traits. CU traits were assessed using child self-report on the Inventory of Callous Unemotional Traits (ICU; Frick, 2004). Of the original 24 items, two items (i.e., items 2 and 10) were excluded due to poor item-total correlations (i.e., less than .10) (Ray, Frick, Thornton, Steinberg, & Cauffman, 2016). The 22-item measure assesses child CU traits (e.g., ‘I feel bad or guilty when I do something wrong’, ‘I do not care who I hurt to get what I want’) using a 4-point scale from 0 (not true at all) to 3 (definitely true). The revised scale demonstrated good reliability and validity in previous studies, showing significant associations with low empathy and high aggression (Kimonis et al., 2008; Ray et al., 2016). The internal consistency for the scale was .79 in the current sample.

Punishment insensitivity. Punishment insensitivity was assessed using child self-report on the punishment insensitivity scale of the Multidimensional Assessment Profile of Disruptive Behaviour (MAP-DB; Wakschlag et al., 2012).

Children rated 7 items on a 6-point scale from 0 (never) to 5 (always) (e.g., 'You do not care when you are punished', 'You continue to misbehave no matter what your teacher does'). The child-report version of the scale has shown good reliability and validity in the previous studies of both preschool children and secondary school children, showing significant associations with CU traits and low empathy (Allen et al., 2016; Nichols et al., 2015). The internal consistency for the scale was .88 in the current sample.

Academic grades. English, Maths, and Science grades were collected from school records. Scores of compulsory set assessments corresponding to the National Curriculum programmes of study were converted to 9-point scales and recorded for English, Maths, and Science. Higher scores indicate higher grades.

Externalising problems. Child externalising problems were assessed by selected items from the revised Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ-C; Colder et al., 2011). Specifically, 9 items from the Reward Sensitivity that tap into antisocial behaviour, hyperactivity symptoms, and deficits in attention and inhibition were selected (e.g., 'Finds it difficult to focus if there is alternative', 'Engages in risky behaviour to obtain reward') to assess child externalising problems. The construct validity of the selected items was supported in a previous study featuring the current sample, with excellent model fit to the data (CFI = 1.00, SRMR = .01, RMSEA = .00) and scale scores were significant related to child report of CU traits and teacher reports of externalising problems (Bird et al., 2019). The internal consistency for the scale was .75 in the current sample.

Sociodemographic information. Children reported their age, gender (0 = female, 1 = male), English as a second language (0 = no, 1 = yes), family composition (0 = two parent, 1 = single parent), and receipt of free school meals (0 = no, 1 = yes).

7.2.4. Data analysis

The descriptive statistics and bivariate correlations among the study variables were first explored. To test if punishment insensitivity explains the associations between CU traits and academic grades, mediation analysis was conducted within a structural equation model (SEM). To check the fit of the

mediation model, Chi-Square Test of Model Fit, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standardised Root Mean squared Residual (SRMR), and Root Mean Square Error of Approximation (RMSEA) were used. CFI and TLI are considered to indicate an acceptable fit if the values are between .90 and .95, with the values higher than .95 indicating a good fit (Hox & Bechger, 1998). SRMR values between .05 and .10 indicate an acceptable fit, with values lower than .05 are considered to be a good fit. Similarly, RMSEA values lower than .05 are considered to be a good fit, while values between .05 and .08 indicate an acceptable fit (Hu & Bentler, 1999). All three academic grades were entered as correlated outcomes in one model and child externalising problems, age, gender, family type, free school meals, and English as a second language were included as covariates.

The current sample was nested within 8 classrooms for English, 9 classrooms for Maths, and 9 classrooms for Science, respectively. Each subject showed intra-class correlations (ICCs) ranging from .00 to .12, thus multilevel modelling should be considered to control for potential clustering effects, as in a a previous study featuring the current sample (Bird et al., 2019). However, the current SEM model featured a large number of parameters (N = 558), compared to a small number of clusters (N = 8 or 9), therefore multilevel modelling is likely to have poor estimation accuracy (Meuleman & Billiet, 2009; Schunck, 2016). Therefore, dummy codes for each classroom were included in the model as covariates instead of using multilevel modelling.

7.3. Results

7.3.1. Descriptive statistics

Descriptive statistics for all study variables are presented in **Table 7.1**. The mean score of CU traits was largely similar to those in previous studies with community samples of children of a similar age (mean score of CU traits = 22.50; age = 13−14 years old), that also used the 22-item version of the ICU (Essau et al., 2006). Punishment insensitivity showed a slight positive skew with most scores falling towards the lower end of the distribution, with a range of 7 to

42 across all time points. However, all main study variables appeared to be normally distributed (**Table 7.1**). Bivariate correlations between the study variables are presented in **Table 7.2**. Child age showed significant negative associations with English and Maths grades, but not with Science grades. English grades were lower for boys than girls. Maths and Science grades were lower for students from a single parent family, and Science grades were lower for students who received free school meals. Students who were eligible for free school meals showed higher CU traits and punishment insensitivity. CU traits, externalising problems, and punishment insensitivity were higher for boys than girls. Externalising problems showed significant positive associations with CU traits and punishment insensitivity, while CU traits were positively correlated with punishment insensitivity. Academic grades for all three subjects showed significant negative associations with CU traits, punishment insensitivity, and externalising problems (range, r = -.33−-.06, ps < .05). All three academic grades were significantly positively correlated with each other (range, r = .41−.72, ps < .01).

7.3.2. Structural equation modelling and mediation analysis

Standardised estimates of all pathways from CU traits to punishment insensitivity and grades in each subject are presented in **Table 7.3**. Child age, gender, and English as a first language were significant predictors of English grades, while child age, single parent family status, and English as a first language predicted Maths grades. Similarly, single parent family status, free school meals, and English as a first language were significant predictors of Science grades independently of the other covariates. Punishment insensitivity was a significant predictor of Maths and Science grades, but not English grades. Although CU traits were significantly related to academic grades of all three subjects in bivariate correlations, the effect of CU traits on academic grades were not significant in the SEM model that controlled for all covariates and the mediator, punishment insensitivity.

CU traits were a significant predictor of punishment insensitivity controlling for all covariates, and this association in turn predicted Maths and Science grades, but not English grades. Specifically, higher levels of CU traits predicted higher punishment insensitivity, which in turn predicted low Maths and

Science grades. There was no significant direct effect between CU traits and Maths grades; however, the total effect and the indirect effect of punishment insensitivity on the association between CU traits and Maths grades were significant (**Table 7.4**). Likewise, while there was no significant direct effect, the total effect and the indirect effect of punishment insensitivity on the link between CU traits and Science grades were both significant (**Table 7.4**). In sum, CU traits were indirectly associated with Maths and Science, but not English grades, via punishment insensitivity (**Figure 7.1**).

Table 7.1

Descriptive Statistics for Study Variables

Variable	N	M (SD)	range	Skewness (SE)	Kurtosis (SE)
Externalising Problems	436	26.99 (5.63)	13 – 42	.26 (.12)	-.16 (.23)
CU Traits	435	21.28 (7.88)	3 – 45	.31 (.12)	-.34 (.23)
Punishment Insensitivity	437	14.54 (6.55)	7 – 42	1.34 (.12)	2.11 (.23)
English Grades	414	3.65 (1.37)	1 – 7	-.33 (.12)	-.66 (.24)
Maths Grades	414	3.90 (1.20)	1 – 8	-.79 (.12)	.49 (.24)
Science Grades	420	4.08 (1.04)	1 – 9	.07 (.12)	1.68 (.24)

Note. CU traits = Callous-unemotional traits.

Table 7.2

Bivariate Correlations between Study Variables

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Age	1										
2. Gender	.04	1									
3. Single Parent	.08	-.06	1								
4. Free School Meals	-.07	-.13**	.14**	1							
5. English as First Language	-.07	-.01	.09	-.04	1						
6. Externalising Problems	-.06	-.14**	.04	.06	-.03	1					
7. CU traits	.09	-.14**	.07	.12*	-.02	.21**	1				
8. Punishment Insensitivity	-.01	-.12*	.12*	.14**	-.01	.55**	.59**	1			
9. English Grades	-.46**	.16**	-.06	-.05	-.05	-.06*	-.16**	-.13**	1		
10. Math Grades	-.14**	.02	-.15**	-.05	-.11*	-.19**	-.18**	-.31**	.53**	1	
11. Science Grades	.09	.09	-.15**	-.17**	-.15**	-.19**	-.22**	-.33**	.41**	.72**	1

Note. CU traits = Callous-unemotional traits. *$p < 0.05$. **$p < 0.01$.

Table 7.3

Fully-adjusted Paths for all Academic Grades

Parameter	B	SE	β	95% CI
Direct Paths to English				
Punishment Insensitivity → English	-.02	.01	-.08	-.04, .00
CU Traits → English	-.01	.01	-.05	-.03, .01
Age → English	-.62	.07	-.44***	-.75, -.48
Gender → English	-.42	.12	-.15***	-.65, -.19
Single Parent → English	-.00	.15	.01	-.31, .27
Free School Meals → English	-.27	.15	-.06	-.58, .04
English as First Language → English	.27	.13	.08*	.01, .52
Externalising Problems → English	.00	.06	.01	-.12, .12
Direct Paths to Maths				
Punishment Insensitivity → Maths	-.05	.01	-.27***	-.08, -.02
CU Traits → Maths	-.01	.01	-.01	-.02, .02
Age → Maths	-.19	.06	-.15**	-.31, -.06
Gender → Maths	.07	.12	.03	-.16, .31
Single Parent → Maths	-.34	.16	-.10*	-.66, -.03
Free School Meals → Maths	-.03	.17	-.01	-.38, .31
English as First Language → Maths	.32	.14	.11*	.07, .61
Externalising Problems → Maths	-.07	.06	-.06	-.18, .04
Direct Paths to Science				
Punishment Insensitivity → Science	-.04	.01	-.23***	-.06, -.02
CU Traits → Science	-.01	.01	-.05	-.02, .01
Age → Science	.09	.05	.08	-.02, .20
Gender → Science	-.04	.10	-.02	-.23, .15
Single Parent → Science	-.27	.12	-.10*	-.53, -.05
Free School Meals → Science	-.34	.17	-.10*	-.68, -.02
English as First Language → Science	.33	.11	.14**	.12, .55
Externalising Problems → Science	-.05	.06	-.05	-.16, .06
Direct Paths to Punishment Insensitivity				
CU traits → Punishment Insensitivity	.41	.04	.49***	.34, .49

Note. CU traits = Callous-unemotional traits. Dummy codes for each classroom were included as control variables in the model but these are not shown in the table. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Table 7.4

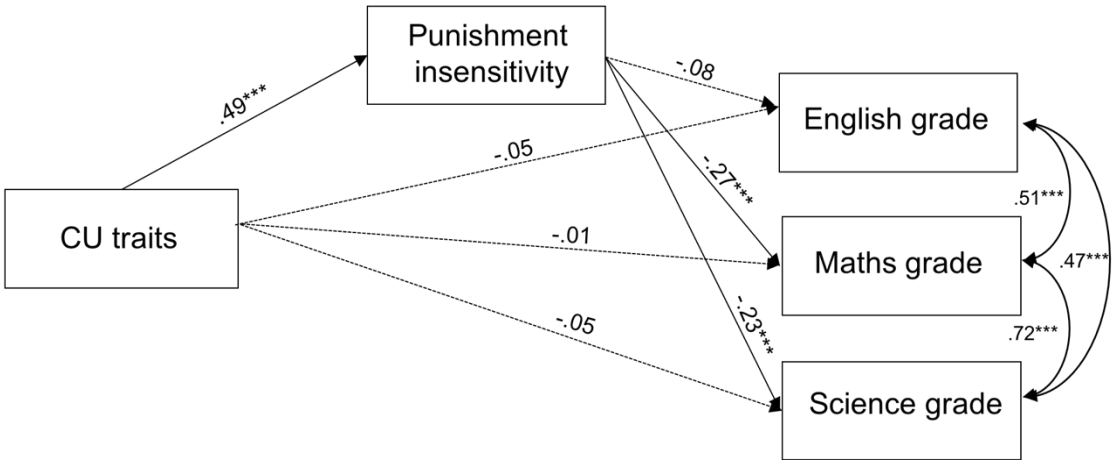
Total, Direct, and Indirect Effects of Punishment Insensitivity on Academic Grades

	English		Maths		Science	
	β (SE)	*95% CI*	*β* (SE)	*95% CI*	*β* (SE)	*95% CI*
Total effect	-.08 (.01)	-.169, .000	-.14 (.01)**	-.254, -.040	-.16 (.01)**	-.255, -.067
Direct effect	-.05 (.01)	-.145, .052	-.01 (.01)	-.126, .109	-.05 (.01)	-.153, .057
Indirect effect	-.04 (.00)	-.086, .009	-.13 (.01)***	-.211, -.064	-.11 (.00)**	-.185, -.050

Note. **$p < 0.01$. ***$p < 0.001$.

Figure 7.1

Structural Equation Model to Depict Indirect Associations between CU Traits and Academic Grades via Punishment Insensitivity



Note. Child age, gender, single parent, free school meal, language, externalising problems, and classroom effects were entered as control variables, but these are not shown. Standardised coefficients are presented. Double-sided arrows present covariances between outcomes. ** $p < .01$. *** $p < .001$.

7.4. Discussion

The current study explored the indirect effect of CU traits on academic grades via punishment insensitivity, and is the first to formally test a potential mechanism explaining the link between CU traits and academic grades. The findings partly supported the hypotheses, with punishment insensitivity explaining the associations between CU traits and Maths and Science, but not English grades. Specifically, high CU traits were related to greater punishment insensitivity, and this association in turn predicted lower grades in Maths and Science. Although past research has shown independent associations between CU traits and both poor academic achievement (Ciucci et al., 2014; Horan et al.,

2016) and punishment insensitivity (Frick et al., 2014), a potential mechanism underlying this relationship has not been empirically tested before. The current study therefore extends prior work highlighting the role of teacher-child interaction in explaining poor academic outcomes in children with elevated CU traits (DeLisi et al., 2011; Horan et al., 2016) by identifying punishment insensitivity as a mediator of the association between CU traits and poor academic grades. In particular, the results of the current study model showed full mediation for both Maths and Science grades, suggesting that responsiveness to discipline plays a critical role in explaining poor achievement in these two subjects for children with elevated CU traits. Existing interventions aiming to promote academic grades in secondary school are largely focused on improving literacy levels (Ofsted, 2013). However, the current findings suggest that interventions to improve academic grades for antisocial children with CU traits should include support for teachers to implement their discipline strategies effectively.

In contrast, the link between high CU traits and low English grades was not explained by punishment insensitivity. This finding may be related to structural differences between the different subjects. The sequential nature of Maths and Science lessons requires student understanding of earlier content and the ability to apply previously learnt knowledge and skills. Therefore, these subjects are more likely to be influenced by teacher discipline and students' engagement in class (Johnson, 2000; Stodolsky & Grossman, 1995). However, children with high CU traits are less responsive to teacher attempts at discipline and limit setting, and therefore do not derive the same educational benefits from these strategies (DeLisi et al., 2011). These students are also more likely to be sent out of class, resulting in reduced learning opportunities (Allen et al., 2018). In contrast, verbal skills are easier to pick up outside the classroom (Berninger, Abbott, Vermeulen, & Fulton, 2006), thus English grades may not be as dependent on child responsiveness to teacher discipline as Maths or Science grades (Slater, Davies, & Burgess, 2012). Instead, it may be that deficits in understanding emotional language may influence poor English grades in children with CU traits (Hiatt & Newman, 2006). Therefore, alternative mechanisms explaining the link between CU traits and low academic grades should be explored in future research.

The current study tested a theoretically derived mechanism between CU traits and low academic grades, and thus contributes to expanding our understanding of factors contributing to poor academic outcomes in children with CU traits. However, several limitations should be taken into account when interpreting the current findings. First, the current study model tested the association between CU traits, punishment insensitivity, and academic grades cross-sectionally, thus the direction of these relationships over time could not be examined. Since there is no prior research on potential mechanisms explaining the link between CU traits and poor academic grades, initial investigation using a cross-sectional design provides useful information with an effective way to inform longitudinal research which requires more time and resources. However, a significant indirect effect in a model that is defined by theoretical considerations is not sufficient to support a cause and effect relationship between the predictor, mediator, and outcomes (Wiedermann & von Eye, 2015). For example, a mediator in the defined model may simply be a correlate of the unmeasured true mediator, or the mediator may actually have caused the predictor (Lemmer & Gollwitzer, 2017). Therefore, future research should consider these alternative theories that may explain the relationship among CU traits, poor academic grades, and punishment insensitivity. In addition, we only tested one proposed mechanism of the link between CU traits and academic performance. Future research should test multiple theoretically-derived mechanisms simultaneously to determine their relative influence on grades, including child characteristics (e.g., verbal ability, motivation, deficits in emotion processing) and contextual factors (e.g., teacher classroom management strategies, instructional methods).

Second, CU traits and punishment insensitivity relied solely on child report, thus the relationship between these variables may be inflated by the shared method variance. Future research including multiple informants may benefit to gain a more comprehensive picture of the associations between child behaviour, characteristics, and academic outcomes. Furthermore, a multi-method study that includes classroom observation would help to provide a more objective assessment of child responses to teacher discipline as well as the frequency and nature of teacher discipline in real time. Despite the term punishment insensitivity being applied to both perceived response to real-life

punishment and atypical performance in fear conditioning paradigms (Blair, 2001; Byrd et al., 2014) and in response modulation paradigms (Patterson & Newman, 1993), youth self-report of response to discipline may represent a different construct to the atypical response to punishment in neurocognitive paradigms seen in children with high levels of CU traits (Blair, 2006; Viding & McCrory, 2012). Children high in CU traits may also fail to attend to the punishment cue in the first instance, given deficits in the processing of emotional and affective stimuli (Blair, 2006; Newman & Lorenz, 2003). Therefore, it is important to acknowledge that the construct of punishment insensitivity in the current study assessed as self-perceived insensitivity to discipline, rather than punishment insensitivity as conceptualised and assessed within neurocognitive models of psychopathic traits in children (e.g., Blair, 2006; Viding & McCrory, 2012).

Lastly, although the sociodemographic characteristics of the current sample were largely similar to the general English population based on national statistics (see Section 7.2.1), the sample was recruited through only one secondary school, thus the generalisability of the current findings may be limited. Results may also differ for a different age group, such as for children of primary school age. The secondary school period is characterised by increased academic pressure and expectations for students, coupled with less intensive support from teachers. In contrast, in the primary school setting, children receive more intensive emotional and practical support from teachers.

The current study is the first to show that insensitivity to punishment may be an important mechanism explaining poor academic outcomes in children with CU traits. Although these findings need to be replicated within a longitudinal design to provide clearer support for the directionality of associations, current findings are consistent with theories highlighting the importance of teacher-child interactions in explaining poor academic achievement in children with CU traits (DeLisi et al., 2011; Horan et al., 2016). The findings suggest that teachers are likely to need additional support when implementing discipline strategies with antisocial children high in CU traits, and that this support may be beneficial for their academic performance. Unlike Maths and Science, the link between CU traits and low English grades was not explained by punishment insensitivity. Therefore, current findings indicate that

potential mechanisms should be explored separately for each subject, rather than combining grades into a single measure of academic achievement. Future research may benefit from investigating other potential factors proposed to represent alternative means of promoting child academic achievement to teacher discipline, such as good quality teacher-child relationships.

CHAPTER 8:

General discussion

8.1. Introduction

This thesis aims to provide a further understanding of CU traits in the school context. The first study (Chapter 3) examined the validity of the UNSW measure of CU traits in South Korean children using CFA. The second study, presented in Chapter 4, used latent growth curve modelling to explore the unique associations between CU traits and antisocial behaviour in predicting child school outcomes. In Chapter 5, moderation and cross-lagged analysis were used to examine the associations between CU traits and teacher classroom management strategies. The study in Chapter 6 explored the associations between CU traits and social affiliation in the school context, as well as potential gender differences in these relationships using cross-lagged analysis and multi-group SEM. The final study (Chapter 7) used mediation analysis to test if punishment insensitivity explains the link between CU traits and poor academic grades.

This chapter will summarise the main findings from the empirical chapters in this thesis. I will then discuss the contributions of the findings for our understanding of the development and maintenance of CU traits, implications for practice, as well as the limitations of the research. Finally, the chapter will discuss directions for future research that would be helpful for increasing our understanding of CU traits in the school setting.

8.2. Summary of main findings

8.2.1. CU traits as a unique predictor of school outcomes

Numerous studies have investigated distinct correlates of CU traits in a wide range of domains of child functioning including biological, emotional, social and cognitive domains; however, most research on CU traits and environmental factors has been conducted in the family context. The current thesis therefore examined CU traits in relation to child school-related outcomes including both intra-individual and interpersonal variables, with findings highlighting the importance of considering the role of CU traits when investigating risk and protective factors for poor school functioning in antisocial children.

First, CU traits were more strongly associated with lower school engagement than antisocial behaviour. The greater magnitude of the associations was especially true for emotional and cognitive engagement in both bivariate correlations and a conditional latent growth curve model. Moreover, CU traits, but not antisocial behaviour, were significantly related to the slopes of trajectories for behavioural and cognitive engagement. Children with low CU traits showed higher engagement that decreased over time, while children with high CU traits showed stable levels of low engagement over time. In contrast, antisocial behaviour was not related to any of the trajectories for school engagement, suggesting that children with antisocial behaviour show declining engagement over time in a similar pattern to children without antisocial behaviour, despite these children showing lower engagement at the start of the school year (Chapter 4).

Second, although longitudinal associations between CU traits and academic grades in Korean and Maths were not supported in the latent growth curve model that examined in the study of South Korean children (Chapter 4), CU traits were significantly associated with low academic grades in a cross-sectional study of English secondary school children. This association was significant over and above the effects of externalising problems and variables indexing sociodemographic disadvantage across three subjects, including English, Maths, and Science (Chapter 7).

Third, CU traits showed a significant association with less use of teacher rewards, but not harsh discipline, both cross-sectionally and longitudinally when controlling for antisocial behaviour. In contrast, antisocial behaviour was significantly related to greater use of teacher harsh discipline, but not rewards, both cross-sectionally and longitudinally accounting for the associations with CU traits (Chapter 5).

Lastly, CU traits were significantly associated with teacher-child affiliation, such that CU traits predicted low affiliation with teachers over time, controlling for antisocial behaviour. In contrast, antisocial behaviour did not show significant longitudinal associations with the quality of teacher-child affiliation (Chapter 6).

8.2.2. Reduced responsivity to teacher classroom management strategies and school outcomes

The findings of this thesis showed that CU traits are significantly associated with reduced responsivity to teacher discipline. CU traits moderated the association between teacher discipline and later child outcomes, such that teacher's use of harsh discipline predicted low school engagement only among children with low CU traits (Chapter 5). Furthermore, CU traits predicted less teacher use of rewards over time, but teacher rewards did not reduce CU traits, suggesting the presence of child, but not teacher-driven effects (Chapter 5).

Although the reduced responsivity to teacher harsh discipline appears to be a protective factor for poor school engagement, frequent use of such strategies has been associated with decreased responsibility and school engagement (Lewis et al., 2005; Mitchell & Bradshaw, 2013). The use of calm, consistent discipline in the classroom has been linked to positive school

outcomes, including increased academic skills and on-task behaviour (Sutherland et al., 2000). Indeed, in the study of English secondary school students, CU traits were related to higher punishment insensitivity, which in turn, was related to low Maths and Science grades (Chapter 6).

8.2.3. Teacher-child affiliation as a protective factor for CU traits

The current thesis examined several school-related factors identified by theory as influencing CU traits over time. Teacher's use of reward and harsh discipline (Chapter 5), teacher-child affiliation, and peer affiliation (Chapter 6) were examined as potential risk and protective factors for the development of CU traits. The results from cross-lagged panel models showed that there was no significant effect of teacher classroom management strategies (i.e., rewards and harsh discipline) on later levels of CU traits (Chapter 5). Peer affiliation also did not significantly predict later levels of CU traits over time.

There was, however, a significant effect of teacher-child affiliation on CU traits, such that the child's self-reported affiliation with his or her classroom teacher predicted decreases in CU traits over time. In addition, this association did not differ for boys and girls, suggesting that promoting teacher-child affiliation can reduce CU traits in children regardless of gender. In contrast, the findings indicated that poor quality of teacher-child affiliation may increase CU traits over time, again regardless of child gender (Chapter 6).

8.3. Contributions and implications

This section will discuss three important implications for practice and contributions to theory of the current thesis findings. Each point is related to 1) increased knowledge of CU traits in the school context, 2) identification of intervention targets for children with and without CU traits, and 3) highlighting the importance of East-West cultural issues in research on CU traits in children.

8.3.1. Increasing our knowledge of CU traits in the school context

There is now extensive evidence that CU traits can distinguish a meaningful subgroup of antisocial children (Frick et al., 2014). However, the majority of the research on CU traits and environmental factors has been conducted in the family context. Given the relative dearth of research in the school context, it is unsurprising that the educational sector has yet to acknowledge the distinction between antisocial children with versus those without CU traits (Warren, Jones, & Frederickson, 2015). The current thesis has shown that there might be different aetiological pathways that explain poor school functioning for antisocial children with and without CU traits, highlighting the importance of considering the role of CU traits in contributing to the poor school functioning of antisocial children.

In the current thesis, CU traits were significantly associated with different aspects of poor school functioning, including low levels of school engagement, low academic grades, and poor-quality teacher-child relationships, controlling for antisocial behaviour. Some of the aforementioned school factors showed significantly stronger associations with CU traits than antisocial behaviour. For example, CU traits were more strongly associated with low initial levels of school engagement, especially emotional and cognitive engagement than antisocial behaviour. This study was the first to examine differential associations between CU traits and antisocial behaviour in relation to three dimensions of school engagement. The findings in the current thesis reflect the core features of CU traits including reduced motivation in social affiliation (i.e., related to low emotional engagement) and an uncaring attitude towards school performance (i.e., related to low cognitive engagement) (Allen et al., 2018; Waller et al., 2020a). Moreover, while CU traits were related to different trajectories for behavioural and cognitive engagement, antisocial behaviour was unrelated to these trajectories. Children showed decreasing behavioural and cognitive engagement over an academic year regardless of their level of antisocial behaviour. In contrast, CU traits moderated this association such that children high in CU traits showed stable levels of low engagement throughout the entire school year instead of the pattern seen in children low in CU traits, where a higher level of behavioural and cognitive engagement was present at the start of the year followed by a decreased trajectory.

In terms of the interpersonal school-related factors, CU traits also showed unique associations with teacher classroom management strategies. First, while CU traits were significantly associated with teacher's use of rewards, antisocial behaviour was significantly related to harsh teacher discipline. Specifically, CU traits predicted less use of teacher reward strategies when controlling for antisocial behaviour, while antisocial behaviour did not predict any change in teacher classroom strategies when accounting for CU traits. This is consistent with the findings from parenting literature, where CU traits are more strongly associated with low levels of positive parenting (i.e., warmth and attempted understanding) than antisocial behaviour or delinquency (Salihovic et al., 2012; Waller et al., 2014). However, in contrast to the parenting literature that found that CU traits significantly increased negative parenting (i.e., angry outbursts and cold rejection) (Salihovic et al., 2012; Trentacosta et al., 2019), the current thesis did not find any effect of CU traits on teacher's use of harsh discipline over time. This reflects the different nature of interaction with parents and teachers, such that teachers have a legal and professional responsibility to avoid harsh or negative emotional reactions to child behaviour.

CU traits were also significantly associated with teacher-child affiliation controlling for antisocial behaviour, such that high CU traits predicted less affiliation with teachers, which in turn predicted higher levels of CU traits over time. Interestingly, the pathways between teacher-child affiliation and antisocial behaviour did not show any significant associations in the cross-lagged model, suggesting CU traits are more influential on teacher-child affiliation than antisocial behaviour. This is consistent with previous findings showing that parenting practices change in response to CU traits rather than antisocial behaviour (Salihovic et al., 2012; Waller et al., 2014). That is, both parent and teachers are likely to experience difficulties in maintaining their positive attitude towards children with a callous and uncaring interpersonal style.

Overall, CU traits and antisocial behaviour were distinct constructs that predicted different school-related outcomes including both intra-individual and interpersonal factors. Some of the associations with interpersonal factors were similar to those found in the research in the family context. However, some of the findings differed from those in the parenting literature, highlighting the importance of investigating CU traits in different social contexts.

8.3.2. Individualised intervention in schools

The findings of the current thesis showed that many school-related factors have differential associations between CU traits and antisocial behaviour. The link between antisocial behaviour and poor school engagement is well-established in the literature (South et al., 2007; Wang & Eccles, 2012); however, very few studies have examined the relationship between CU traits and school engagement. The current thesis showed that although antisocial behaviour was associated with low engagement at the beginning of the school year, changes in engagement over the academic year did not differ according to levels of antisocial behaviour (Chapter 4). Behavioural and cognitive engagement showed decreasing trajectories, consistent with a general pattern of continuous decline in child school engagement across the years (Fredricks et al., 2004); however, antisocial behaviour did not aggravate these trajectories. This suggests that children are influenced by negative contextual factors to decrease school engagement over time regardless of levels of antisocial behaviour. Factors that have been shown to dampen child enthusiasm and involvement in school activities over time are a lack of meaningful classwork, decreased teacher support, and cumulative experiences of school failure (Pino-James, Shernoff, Bressler, Larson, & Sinha, 2019; D. C. Smith et al., 2010). Accordingly, these factors are targets in several interventions aimed at promoting school engagement (Pino-James et al., 2019; Turner, Christensen, Kackar-Cam, Trucano, & Fulmer, 2014).

In contrast to antisocial behaviour, CU traits were significantly related to different trajectories of behavioural and cognitive engagement, with stable low engagement for both of these dimensions present throughout the academic year (Chapter 4). That is, children with CU traits appear to be unaffected by common factors that decrease engagement among children with low CU traits. This is consistent with the view that children with high CU traits are less sensitive to external environmental factors such as others' distress cues (Blair et al., 2005; Marsh & Blair, 2008), harsh parental discipline (Hipwell et al., 2007; Oxford et al., 2003), and teacher discipline (Allen et al., 2018; Allen et al., 2016). Nevertheless, children high in CU traits showed a more consistent pattern of poor school engagement, with significantly lower levels of school engagement at the start of the academic year than children low in CU traits

which then remained stable throughout the year. This suggests that there might be different factors driving poor school engagement in children with CU traits and interventions should include these to help inform the promotion of school engagement in antisocial children with high CU traits. Therefore, future study should explore these potential targets and examine how they may work together to help inform individualised interventions aimed at school increasing engagement for antisocial children with CU traits.

The current thesis also provided information concerning the proposal that there may be different pathways for poor academic achievement in antisocial children with versus those without CU traits (DeLisi et al., 2011; Horan et al., 2016). Antisocial children tend to have poor educational outcomes, a finding which has been attributed to concomitant deficits in verbal ability (Botting & Conti-Ramsden, 2000; Menting, Van Lier, & Koot, 2011; Moffitt, 1990). In fact, past intervention studies have shown that enhancing verbal ability simultaneously reduced child antisocial behaviour and increased academic achievement (see McEvoy & Welker, 2000). However, unlike antisocial behaviour, CU traits are not related to deficits in verbal ability (Allen et al., 2013; DeLisi et al., 2011). In the current thesis, punishment insensitivity was examined as one theoretically-derived mechanism proposed to explain the link between CU traits and low academic grades (Chapter 7). Findings showed that CU traits exerted a negative impact on academic grades via punishment insensitivity for Maths and Science, but not English grades. This reflects different characteristics of the subjects, such that English performance is more influenced by verbal skills which can be picked up more easily outside the classroom (Berninger et al., 2006). Therefore, the result contributes to our understanding of the mechanisms explaining poor academic outcomes in children with CU traits, highlighting the need for individualised intervention targets for promote improved academic outcomes in antisocial children with and without CU traits.

The current thesis also examined direct longitudinal associations between CU traits and interpersonal factors. Specifically, teacher-child affiliation predicted lower CU traits over time regardless of gender, suggesting that both boys and girls can benefit from a good quality teacher-child relationship (Chapter 6). Teacher's use of harsh discipline predicted greater antisocial

behaviour, but not CU traits over time (Chapter 5). That is, reducing negative teacher-child interaction may be more effective for reducing antisocial behaviour, while increasing positive teacher-child interaction appears more influential for reducing CU traits. These findings are analogous to the findings in the parenting literature, which emphasise the importance of promoting positive relationships over discipline as the most effective means of reducing CU traits in children (Kroneman et al., 2011; Waller et al., 2015).

This thesis was the first longitudinal study to find a significant effect of teacher-child affiliation on the development of CU traits. One prior study that examined direct longitudinal associations between teacher-child affiliation and CU traits did not find a significant effect of teacher-child affiliation on CU traits 6 months later (Baroncelli & Ciucci, 2020). This study examined secondary school students who have multiple teachers for each subject, while the current thesis examined primary school students who have one teacher for most subjects, thus the differing nature and intensity of teacher-child interaction may explain these inconsistent findings. Future longitudinal research across different stages of schooling may be helpful to provide better understanding of the school-related protective and risk factors for the development of CU traits.

8.3.3. East-West cultural differences

To date most research on CU traits has been conducted in Western countries; however, recent evidence indicates that there may be cultural differences in the presentation and correlates of CU traits (Allen et al., 2020b; Sng et al., 2020). The current thesis therefore examined the validity of a self-report measure of CU traits in South Korean children in Chapter 3, prior to the conduct of other empirical research using this measure in later chapters. Although the reliability and validity of the original UNSW system which combines items from the SDQ (Goodman, 1997) and the APSD (Frick & Hare, 2001) has been supported in many previous studies conducted in Western countries (e.g., Centifanti et al., 2019; Hawes et al., 2013; Hawes et al., 2019a), the two original constructs of antisocial behaviour and CU traits were not an acceptable fit in the current sample of South Korean children. The CFA showed that some items did not load onto CU traits and antisocial behaviour at an acceptable level. These items were intended to assess narcissistic traits (e.g.,

‘you brag a lot about your abilities, accomplishments or possessions’, ‘you think you are better or more important than other people’). These poor loadings may reflect Korean cultural values which consider modesty and not promoting oneself as important virtues (Foster et al., 2003; Kim et al., 2007). The revised two-factor model excluding those items showed that CU traits and antisocial behaviour are distinct, but related constructs in South Korean children as well. The revised scale also showed improved internal consistency and significant associations between teacher and child reports (Chapter 3).

There have been some studies that examined validation of different measures of CU traits in Asian countries (Wang et al., 2017b; Zhang et al., 2019), mostly China, as well as one study that conducted an East-West comparison of the measurement of CU traits (Allen et al., 2020b). In a comparison of English and Chinese children, one of the ICU items, which related to feeling remorse, was systematically rated higher by Chinese children compared to English children, while another, which related to apologising, was systematically rated higher by English children than Chinese children (Allen et al., 2020b). The authors interpreted this finding as a reflection of Chinese social norms emphasising the importance of not ‘losing face’ which may lead to less apologising even when they feel regret. Although the studies in the current thesis did not involve a cross-cultural comparison, they also suggest that Western measures of CU traits do not function in the same manner in an East Asian context. In fact, one study found that Hong Kong children showed higher scores of parent-reported CU traits than those in USA children (Fung et al., 2009). However, it is unclear if this difference is related to a real difference in CU trait severity or to differing interpretations of items across cultures. Future studies should explore cross-cultural differences in CU traits to provide better understanding of the psychological processes underlying cultural variation.

The study in the chapter 7 showed that CU traits were significantly associated with low English, Maths, and Science grades in English secondary school students. These findings are consistent with prior studies conducted in Western countries that uniformly found associations between CU traits and poor academic achievement (Bird et al., 2019; Ciucci et al., 2014; DeLisi et al., 2011; Horan et al., 2016; Vaughn et al., 2011). In contrast, South Korean children did not show significant associations between CU traits and poor academic grades

(Chapter 4). Moreover, the current thesis found no significant association between antisocial behaviour and academic grades in South Korean children, whereas Western studies have consistently shown strong links between these two factors (Jakobsen et al., 2012; McEvoy & Welker, 2000). Few studies have examined the association between antisocial behaviour and academic achievement in East-Asian countries and the findings were somewhat mixed. For example, one study of Chinese primary school children found a significant effect of externalising problems on academic failure over a 4-year period (Zhou et al., 2010). However, another study that examined different trajectories of academic grades in Chinese primary school children for 4 years found no significant relationship between externalising problems and any of the intercepts or slopes for four different academic grade trajectories, except for the slope of the high increasing group, such that externalising problems were related to less growth in this group (Fu, Chen, & Wang, 2016). A cross-sectional study of Chinese high school children found no significant association between antisocial behaviour and academic achievement, consistent with the findings in the current thesis for South Korean school children (Li & Armstrong, 2009).

Overall, it seems that there is no or at least a weak association between antisocial behaviour and CU traits and poor academic achievement in East Asian children. This may be attributable to East Asian cultural values, which emphasise a strong work ethic and academic performance. From this cultural perspective, students are expected to be persistent in their motivation and to study diligently, which may leave students without the time or motivation to engage in antisocial behaviour (Li & Armstrong, 2009; Zhu, Tian, Zhou, & Huebner, 2019). Poor academic functioning and a lack of concern for school performance are included as criteria for the diagnosis of conduct disorder and the specifier of limited prosocial emotions, respectively, in the DSM-5. Therefore, examining the link between antisocial behaviour, CU traits and academic grades in East Asian countries may provide a better understanding of the validity and utility of these DSM criteria in different cultures. In sum, the current thesis adds to a growing body of research that suggests potential cultural differences in CU traits including its presentation and correlates.

8.3.4. Practical implications for teachers

The final implications pertain to teacher practices in school. Poor school adjustment has long been a problem for antisocial children; thus the teacher-child relationship quality has been a popular focus on investigation. However, the role of CU traits in this association has received little attention despite clear implications for individualised school-based intervention. The current findings showed that CU traits are uniquely associated with poor school engagement and academic grades over and above the effect of antisocial behaviour. In addition, findings suggest that the mechanisms explaining the link between CU traits and poor school outcomes seem to differ to those that explain the relationship between antisocial behaviour and poor school engagement and performance. Findings suggest that focusing on supporting teachers in the implementation of reward strategies and promoting the quality of teacher-child relationships may help to promote positive outcomes in children with high levels of CU traits in school. Future research that includes an assessment of different types of reward strategies (e.g., tangible rewards, praise and other forms of social reward) for examining the relationship with CU traits would help to provide more specific guidance for teachers.

More importantly, the current findings suggest that it is important for teachers to maintain a warm and positive manner towards children high in CU traits. While antisocial behaviour was influenced by teacher's use of harsh discipline, CU traits were influenced by the affective quality of teacher-child affiliation. Ensuring that teachers are supported in implementing calm, non-physical discipline appears to be more important for reducing antisocial behaviour, while increased teacher warmth seems to be more important for the reduction of CU traits. However, findings suggest that teachers may struggle to maintain their warmth towards children with a callous interpersonal style across the school year, and these child characteristics that are related to CU traits are also more likely to elicit negative or avoidant responses from teachers, further reducing the quality of teacher-child affiliation. Therefore, it is important that teachers are provided with ongoing support and strategies to prevent a reciprocal and escalating pattern of poor quality teacher-child interactions, despite the challenging behaviours that children with CU traits show in the

school setting due to their reduced responsiveness and motivation in regards to social affiliation.

8.4. Limitations of the current thesis

Although each empirical study includes a summary of its limitations in previous chapters, this section will discuss overarching limitations for the current thesis. First, the included research solely relied on a quantitative approach. Although quantitative data provide information on testing hypotheses and allow for the generalisation of findings, they may lack specific details of the complexity of the school context. For example, the context within which teacher's use of reward or discipline strategies are implemented, such as in the presence of peers versus in the absence of peers, or whether rewards/discipline are delivered to the individual child versus rewards/discipline measures for the whole class. Given the different responsivity of children with CU traits depending on the characteristics of rewards (e.g., rewards that enhance social status versus social affiliation) or the presence of peers in the previous studies (see Section 1.3.2.2., Chapter 1), the findings regarding teacher classroom strategies and child school outcomes may be different if the study employed classroom observation. Furthermore, observation could provide more objective information regarding teacher's use of classroom strategies as eliminating any potential bias that may accompany teacher or child reports, due to the presence of CU traits, antisocial behaviour and/or a poor-quality teacher-child relationship.

Second, the current thesis only included a sample of 218 children (see Chapter 4, 5, and 6) or a sample of 437 children (see Chapter 7) for complex study designs that employed SEM. Sensitivity analysis for each of the models showed that the minimum detectable effect sizes are .29 (LGCM engagement model, Chapter 4), .15 (LGCM academic grades model, Chapter 4), .46 (moderation model, Chapter 5), .30 (cross-lagged model, Chapter 5), .28 (cross-lagged teacher model, Chapter 6), .29 (cross-lagged peer model, Chapter 6), and .29 (mediation model, Chapter 7), respectively. Some of the

observed significant effect sizes were smaller than the minimum detectable effect size (e.g., antisocial behaviour predicting the starting levels of emotional and cognitive engagement in Chapter 4) which is the bound of what the studies were set to detect reliably. Therefore, the significant associations that were found in the models of the current thesis may not be representative of what we would expect in other populations.

Third, most of the empirical research in the current thesis employed a variable centred approach, which can only detect common associations in the sample as a whole population. This approach does not examine whether subgroups exist and any potential subgroup differences in school-related outcomes. Given that the studies included the current thesis collected data from children and teachers in regular state schools, the findings may not generalise to children who attend special education schools and/or children with clinical levels of CU traits or antisocial behaviour. In addition, there are likely to be more students who show both high levels of antisocial behaviour and CU traits than children who show high levels of CU traits only. Associations between CU traits, antisocial behaviour and teacher classroom management strategies, academic performance and affiliative relationship with teacher and peers may differ among these subgroups. Future studies employing a person-centred approach would provide information regarding subgroups of children with antisocial behaviour and CU traits, which may assist in identifying children at high risk for poor school-related outcomes.

Fourth, although the current thesis used a longitudinal design that collected data at three different time points, the time interval was relatively short (i.e., 4.5 months) to capture changes in the variables of interest over time. In particular, academic achievement and intrinsic motivation seemed to be stable when comparing school engagement over one academic year in the current study. Since one aim of the current thesis was to examine the associations between school outcomes and teacher-child interaction in relation to CU traits, it was difficult to conduct the data collection over more than one year as this would mean that children would change teachers when they advanced to the next grade. Nevertheless, it is noteworthy that the findings showed a significant effect of the affective quality in teacher-child affiliation in the development of CU

traits within a relatively short time period, even though the associations between CU traits and other school factors may differ across a longer time frame.

Fifth, although the current thesis collected teacher report for a subset of the data (N = 44) on child CU traits and antisocial behaviour, revealing good convergent validity between teacher and child reports, the main study variables used in statistical models relied on child self-report for the most part (see studies including academic grades, peer nominations and verbal ability for exceptions). Since most of the prior studies have only focused teachers' perspectives to examine the associations between teacher-child interaction and CU traits (e.g., Allen et al., 2016; Allen et al., 2018; Horan et al., 2016), the current study is one of very few studies to examine children's perspectives. There is growing recognition that children can be reliable and important informants about antisocial behaviour, especially since adults may not always be aware of children's covert or deceitful antisocial behaviour (Frick, Barry, & Kamphaus, 2009). However, future study including multiple informants would reduce the risk of shared-method variance and help to gain a broader understanding of the child's behaviour in different contexts (De Los Reyes, Cook, Gresham, Makol, & Wang, 2019).

Lastly, the current studies all included Korean children except for the study in Chapter 7. Some of the findings suggest several aspects that may be influenced by the effects of culture (i.e., poor fit of the original measurement of CU traits, no association between teacher rewards and school outcomes, and the lack of associations between antisocial behaviour/CU traits and academic grades/peer affiliation). However, the studies contained in the present thesis are the first to examine the validity of the UNSW system and correlates of CU traits in South Korean children. Moreover, there have been few studies examining CU traits in Asian countries, and even fewer have examined CU traits in the school context (Sng et al., 2020). Ongoing research is needed for a better understanding of potential cultural differences on risk and resilience processes for children with CU traits in the school context.

8.5. Future directions

Based on the points previously discussed, this section will suggest four main avenues for future research that should be considered to enhance our knowledge of CU traits in the school context.

8.5.1. Multi-method assessment

The complexity and nuances of social interaction that happen in the classroom are not likely to be captured entirely by questionnaire methods. To gain more insight into the relationship between CU traits, antisocial behaviour and teacher-child or peer interaction, more objective methods that enable a more detailed examination of sequences of teacher-child interaction in real-time such as classroom observation, are needed. Observation can be conducted in natural settings and assess both students' and teacher's behaviours and communication patterns in specific learning situations, thus enabling more detailed and in-depth information on classroom dynamics to be attained (Dunn, 2005; Lashley, 2017). In particular, observation may provide useful information for the adaptation or development of teacher classroom strategies for children with CU traits. Classroom observation would help to clarify whether the differential responsivity of children with CU traits to reward according to the social context, such as the presence versus absence of peers (Centifanti & Modecki, 2013) and the characteristics of rewards themselves, such as greater responsiveness to social rewards that enhance social status versus those that are concerned with social affiliation (Allen et al., 2016; Foulkes et al., 2014) found in interview, questionnaire, and experimental studies translates into 'real-world' settings. This information would help us to better understand the association between social interaction and school-related outcomes for children with CU traits in the classroom.

8.5.2. Considering different stages of schooling

The current thesis has highlighted the importance of examining CU traits in the school context, showing distinct associations between CU traits and a broad range of school-related outcomes. However, the current research focuses on only two grades in South Korean primary school (aged 10 to 12 years old),

except for the last study (chapter 7) that focused on English secondary school children (aged 11 to 14 years). Given the different characteristics of schooling over the long period of schooling as a whole in OECD countries (i.e., around 12 years), the findings of the current thesis may not be applicable to children at other stages of schooling. In particular, the malleability of CU traits as well as individual level school-related outcomes, such as school engagement and academic achievement, may differ across development. In addition, the quality and quantity of social interaction with teachers and peers is likely to vary across different periods of schooling. For example, while preschool or primary school teachers teach most subjects, they also take on more of a caring role, with children provided with more support in learning the subject matter, study skills and in their development of social-emotional skills. In contrast, secondary school teachers generally teach one subject and focus more on the teaching role, with students expected to show greater independence in their learning and conduct. These differences among different schooling stages in relation to both intra-individual characteristics and school-based interpersonal relationships are likely to affect the findings related to associations between CU traits and school-related factors. Therefore, future longitudinal studies on CU traits need to be conducted across different schooling stages to better inform the development of effective intervention strategies to improve school outcomes for antisocial children.

8.5.3. Cross-cultural research

Another important dimension that should be considered for developmental and educational psychology research is to understand the impact of different cultural contexts. The current thesis adds to increasing evidence of cultural differences in the presentation and correlates of CU traits, with CU traits showing no significant association with poor academic grades and lower levels of peer support. This was unexpected, given that these are consistent findings in Western samples (e.g., Bird et al., 2019; Haas et al., 2018). In addition, the validated measure of CU traits was not a good fit in the current sample of South Korean children, and needed revisions excluding some items, notably those that assessed narcissistic traits. Due to this revision, it is not possible to directly compare findings for the measure of CU traits in the

current thesis to that used in Western samples. Therefore, it remains uncertain whether the findings reflect real cultural differences or differences in measurement. Therefore, future research in Asian countries, especially in relation to psychometric assessment of CU traits, will provide better understanding of the similarities and differences in the presentation and correlates of CU traits in different cultural contexts. In particular, cross-cultural research is warranted to develop a theoretical framework that accommodates both individual and cultural variation (Van de Vijver & Matsumoto, 2011), contributing to a deeper knowledge of child behaviour and school functioning in relation to CU traits.

8.5.4. Consideration of both family and school contexts

The current thesis highlights the importance of considering the role of CU traits in relation to a wide range of school-related outcomes. Some of the findings mirrored those in the parenting literature, such as the significant effect of positive affiliation in reducing CU traits and reduced responsivity to teacher discipline strategies. However, some of the findings, such as no significant longitudinal effect of CU traits in increasing harsh discipline, were inconsistent with findings in the parenting literature. This highlights the importance of examining CU traits in both the school and family contexts given the different roles of parents and teachers and differences in the nature of these relationships, and therefore their links with antisocial behaviour and CU traits.

In addition, future research should consider both the school and family contexts together given the interplay between these two domains. For example, parental involvement has been known to positively influence child academic achievement, school engagement, and behaviour at school (Desforges & Abouchaar, 2003; Epstein et al., 2018). In particular, congruence between teacher and parent views on children is known to be an important factor influencing child behavioural problem and social skills (Garbacz, Sheridan, Koziol, Kwon, & Holmes, 2015; Minke, Sheridan, Kim, Ryoo, & Koziol, 2014). Family and school can form cooperative communities that support child development, thus examining CU traits in both contexts may help to inform effective intervention for at-risk children. In fact, there have been successful attempts to reduce child behaviour problems by addressing both home and

school risk factors within an intervention (e.g., The Incredible Years; Webster-Stratton, 2001). However, little is known about the success of targeting both teacher-child interactions and parenting to reduce CU traits and antisocial behaviour. Therefore, future studies including both contexts will be crucial to gain further insight into the mechanisms of poor functioning in a wide range of domains for children with high levels of CU traits (De Los Reyes et al., 2019).

8.6. Conclusion

The current thesis has explored five different research questions to identify the associations of CU traits with both intra-individual and interpersonal school-related factors. CU traits were related to a more chronic pattern of poor school engagement over one academic year, elicited fewer rewards from teachers, and showed reduced sensitivity to harsh teacher discipline. However, a good quality of teacher-child relationship acted as a buffer against the development of CU traits, such that greater affiliation with teachers predicted less CU traits over time. In addition, this study was the first to examine a mechanism explaining the link between CU traits and low grades, with CU traits contributing to poor academic achievement via insensitivity to discipline. The current thesis also adds to increasing evidence on cultural differences in the measurement and correlates of CU traits. For example, a measure of CU traits with support for its reliability and validity in many previous studies conducted in Western nations (Hawes et al., 2019a; Pasalich et al., 2011), did not produce a good model fit in South Korean children. Moreover, well-established links between CU traits and poor academic achievement among children from Western countries was not supported in South Korean children. Similarly, peer acceptance also showed no significant associations with CU traits in contrast to previous studies conducted in Western countries (Miron et al., 2020; Waller et al., 2017a). These findings highlight the need for more research on CU traits in non-Western countries.

In conclusion, the current thesis highlights the importance of understanding CU traits in diverse contexts including both family and school as

well as different cultures. This was done through the diverse longitudinal designs, such as latent growth curve model, moderation, mediation, multiple group SEM, and cross-lagged model, and collecting data from South Korean primary schools, in which the study on CU traits was rarely conducted. The current thesis is the first to examine the longitudinal associations between CU traits and a wide range of school-related factors, therefore it offers great potential as a basis for future directions of the research on CU traits in relation to the provision of individualised school-based interventions for children at-risk.

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Appendix A: CHILD QUESTIONNAIR PROTOCAL

INFORMATION SHEET FOR STUDENTS

Institute of Education
UCL

Hello.

My name is Suhlim Hwang.

I am running a project to find out about what your thoughts and feelings about your teacher, friends and school.

If you decide to join in, I will visit your school to ask you to fill out some questionnaires during class time. I will visit your school three times this year, in March, July and December and ask you to fill out the same questionnaires each time. They include questions about your behaviour and feelings about school, your friends, and your teacher.

Teachers will be asked to fill out some questionnaires about your behaviour and feelings about school, peer relationships and about your teacher's behaviour as well. Your teachers will also give me your Maths and Korean test scores.

All the answers you give in the questionnaires and your test scores will be kept between you and me. Your name won't go on any papers.

It is OK if you don't want to take part. Talk to your parents, your teacher or other adults and then make a decision whether you want to take part or not.

If you do decide to take part, you will be given this information sheet to keep and asked to write your name on the next page which says that:

1. You understand what the project is about
2. You agree to take part in the project

If at any time you decide you don't want to join in anymore then please tell your parents, teacher or me and it will stop. Your parents have my telephone number, so if there are things you want to ask they can call me.

CONSENT FORM – STUDENTS

AGREEMENT FORM

I have understood about the project and decided that I want to join in.

Please circle: YES / NO

I understand that I can stop joining in with the project at any time. I know that I don't have to give a reason if I don't want to join in.

Please circle: YES / NO

I understand that anything I answer in the questionnaires will be between me and Suhlim. No-one else will know my answers or my test scores and my name will not be written on any papers or lists.

Please circle: YES / NO

I understand that I can ask Suhlim anything I want to about the project and that my parents have her phone number and email address.

Please circle: YES / NO

Your Name: .....

Date: .....

Researcher:.....

BACKGROUND QUESTIONNAIRE

Confidential

ID number: _____

1. **Gender** ☐ Male ☐ Female

2. **What is your date of birth?** _____(DD/MM/YR) , I am _____ years old

3. **How would you describe your ethnicity?**

   ☐ Korean ☐ Other: _____

Below are some ways to describe your behaviour. For each item, please answer how true the statement has been for you over the past six months. Please answer all of the questions as best you can even if you are not absolutely certain or the item seems strange to you. For each item, tick the box that best applies to you.

	About Me...	Not True	Somewhat True	Certainly True
1	I try to be nice to other people. I care about their feelings	☐	☐	☐
2	I am restless, I cannot stay still for long	☐	☐	☐
3	I usually share with others, for example CDs, games, food	☐	☐	☐
4	I usually do as I am told	☐	☐	☐
5	I am helpful if someone is hurt, upset or feeling ill	☐	☐	☐
6	I am constantly fidgeting or squirming	☐	☐	☐
7	I fight a lot. I can make other people do what I want	☐	☐	☐
8	I am easily distracted, I find it difficult to concentrate	☐	☐	☐
9	I am kind to younger children	☐	☐	☐
10	I am often accused of lying or cheating	☐	☐	☐
11	I often volunteer to help others (parents, teachers, children)	☐	☐	☐
12	I think before I do things	☐	☐	☐
13	I take things that are not mine from home, school or elsewhere	☐	☐	☐
14	I finish the work I'm doing. My attention is good	☐	☐	☐
15	I blame others for my mistakes	☐	☐	☐
16	I engage in illegal activities	☐	☐	☐
17	I care about how well you do at schoolwork or work	☐	☐	☐
18	I act without thinking of consequences	☐	☐	☐
19	My emotions are shallow and fake	☐	☐	☐
20	I lie easily and skillfully	☐	☐	☐
21	I am good at keeping promises	☐	☐	☐
22	I brag a lot about your abilities, accomplishments, or possessions	☐	☐	☐
23	I get bored easily	☐	☐	☐
24	You use or "con" other people to get what you want.	☐	☐	☐
25	You teases or make fun of other people.	☐	☐	☐
26	I feel bad or guilty when you do something wrong	☐	☐	☐
27	You can act charming and nice to get what you want.	☐	☐	☐
28	You think you are better or more important than other people.	☐	☐	☐
29	I do not plan ahead or leave things until the "last minute"	☐	☐	☐
30	I am concerned about the feelings of others	☐	☐	☐

Motivation (ESMS)

Below are some ways to describe you. For each item, please answer how well the statement describes you. Please answer all of the questions as best you can.

For each item, circle the number that best applies to you.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. I like reading	1	2	3	4	5
2. Reading interests me a lot	1	2	3	4	5
3. I read even when I don't have to	1	2	3	4	5
4. I can learn many useful things by reading	1	2	3	4	5
5. I choose to read to learn many things	1	2	3	4	5
6. In life, it's important to learn how to read	1	2	3	4	5
7. I read to get a nice reward	1	2	3	4	5
8. I read to please my parents or my teacher	1	2	3	4	5
9. I read to show others how good I am	1	2	3	4	5
10. I like writing	1	2	3	4	5
11. Writing interests me a lot	1	2	3	4	5
12. I write even when I don't have to	1	2	3	4	5
13. I can learn many useful things by writing	1	2	3	4	5
14. I choose to write to learn many things	1	2	3	4	5
15. In life, it's important to learn how to write	1	2	3	4	5
16. I write to get a nice reward	1	2	3	4	5
17. I write to please my parents or my teacher	1	2	3	4	5
18. I write to show others how good I am	1	2	3	4	5
19. I like maths	1	2	3	4	5
20. Maths interests me a lot	1	2	3	4	5
21. I do maths even when I don't have to	1	2	3	4	5
22. I can learn many useful things by doing maths	1	2	3	4	5

23. I choose to do maths to learn many things	1	2	3	4	5
24. In life, it's important to learn how to do maths	1	2	3	4	5
25. I do maths to get a nice reward	1	2	3	4	5
26. I do maths to please my parents or my teacher	1	2	3	4	5
27. I do maths to show others how good I am	1	2	3	4	5

School engagement (SES)

Below are some ways to describe your school life. For each item, please answer how well the statement describes you and your school. Please answer all of the questions as best you can. For each item, circle the number that best applies to you.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. I follow the rules at school.	1	2	3	4	5
2. I get in trouble at school.	1	2	3	4	5
3. When I am in class, I just act as if I am working.	1	2	3	4	5
4. I pay attention in class.	1	2	3	4	5
5. I complete my work on time.	1	2	3	4	5
6. I like being at school.	1	2	3	4	5
7. I feel excited by my work at school	1	2	3	4	5
8. My classroom is a fun place to be.	1	2	3	4	5
9. I am interested in the work at school.	1	2	3	4	5
10. I feel happy in school.	1	2	3	4	5
11. I feel bored in school.	1	2	3	4	5
12. I check my schoolwork for mistakes.	1	2	3	4	5
13. I study at home even when I don't have a test.	1	2	3	4	5
14. I try to watch TV shows about things we do in school.	1	2	3	4	5
15. When I read a book, I ask myself questions to make sure I understand what it is about.	1	2	3	4	5

16. I read extra books to learn more about things we do in school.	1	2	3	4	5
17. If I don't know what a word means when I am reading, I do something to figure it out.	1	2	3	4	5
18. If I don't understand what I read, I go back and read it over again.	1	2	3	4	5
19. I talk with people outside of school about what I am learning in class.	1	2	3	4	5

About your teacher... (rewards and discipline)

For each item, please answer how often your teacher act as described in the statement when try to deal with misbehavior.	Never	Hardly ever	Some of time	Often	Always
1. Imposes consequences on students who misbehave (e.g. move their seats and detention)	1	2	3	4	5
2. Increases the level of consequence if students will not do as they are told (e.g. move seats and detention)	1	2	3	4	5
3. Increases the level of consequence if a misbehaving student argues	1	2	3	4	5
4. Increases the level of consequence if a misbehaving student stops when told, but then does it again	1	2	3	4	5
5. Let us students know that the way they are behaving is not how the class expects them to	1	2	3	4	5
6. Discusses students' behaviour with them to allow them to figure out a better way to behave in the future	1	2	3	4	5
7. Describes what students are doing wrong, and expects them to stop	1	2	3	4	5
8. Reminds misbehaving students about the class rules	1	2	3	4	5
9. Rewards individual students who behave properly	1	2	3	4	5
10. Praises the class for good behaviour	1	2	3	4	5
11. Praises individual students for good behaviour	1	2	3	4	5
12. Rewards the class when students behave well	1	2	3	4	5
13. Organises the class to work out the rules for good behaviour	1	2	3	4	5

14. Makes students leave the room until they decide to behave properly	1	2	3	4	5
15. Yells angrily at students who misbehave	1	2	3	4	5
16. Deliberately embarrasses students who misbehave	1	2	3	4	5
17. Keeps the class in because some students misbehave	1	2	3	4	5
18. Makes sarcastic comments to students who misbehave	1	2	3	4	5

(Quality of the Student-Teacher Relationship Scale)

For each item, please answer how well the statement describes you and your teacher. Please answer all of the questions as best you can.	**Never**	**Hardly ever**	**Some of time**	**Often**	**Always**
1. I want to be more like my teacher.	1	2	3	4	5
2. When I am alone or sad, I go to my teacher.	1	2	3	4	5
3. My teacher has too much control over me.	1	2	3	4	5
4. My teacher understands me	1	2	3	4	5
5. I try to model myself after my teacher	1	2	3	4	5
6. I often wish I had a different teacher	1	2	3	4	5
7. When I grow up, I'll probably be a lot like my teacher	1	2	3	4	5
8. When I am upset or scared about something, I go to my teacher	1	2	3	4	5
9. I trust my teacher	1	2	3	4	5
10. When I feel bad about myself and need a boost, I go to my teacher.	1	2	3	4	5
11. I often feel angry with my teacher	1	2	3	4	5
12. When I feel happy, or have good news, I go to my teacher	1	2	3	4	5

13. I like my teacher	1	2	3	4	5
14. I would feel good if someone said that I am a lot like my teacher.	1	2	3	4	5
15. I can count on my teacher when I have problems at school.	1	2	3	4	5

(Peer)

Please read following questions carefully and give the best estimate you can of your peer relations.	Very few	Some	About half	Most around	Almost all
1. How many of friends behaved in school?	1	2	3	4	5
2. How many of friends misbehaved or broke rules?	1	2	3	4	5

From this item, please nominate your peer's name.
Please answer all of the questions as best you can.

3. The names of classmates you most like spending time with during breaks _____
4. These kids are best at schoolwork. They almost always get good grades and teachers often use their work as examples for the rest of the class _____
5. These kids are best in math. They almost always get good grades in math and the teacher calls on them to work hard math problems _____
6. These kids are best in reading. They usually get good grades in reading, and the teacher calls on them to read aloud or read hard words _____

Teacher is going to give you a category and ask you to name all the different examples that you can think of from that category in one minute. For instance, if teacher said flowers, you might write rose, daisy, etc.

Teacher is going to give you a letter and ask you to name as many different words as you can think of that start with that letter in one minute. For instance, if teacher said '다', you might write 다람쥐, 다리, etc.

Appendix B: TEACHER QUESTIONNAIR PROTOCAL

INFORMATION SHEET FOR TEACHERS

Institute of Education UCL

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Study of School Environment and Academic Achievement

You are invited to participate in a research project, conducted by Suhlim Hwang, a MPhil/PhD student from the Department of Psychology and Human Development at the UCL Institute of Education, under the supervision of Dr Jennifer Allen. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what your participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask the researcher if there is anything that is not clear or if you would like more information.

What is the purpose of the study & What will happen if I take part?
The aim of this current study is to increase an understanding of the influence of pupil's pro-social behaviour on their academic achievement. Specifically, we are looking at the influence of teacher-student interaction and its impact on pupils' motivation, behaviour in school and academic performance. This research may help to identify key aspects of school life that may impact student's academic outcomes. The information obtained in this study and may help to develop school programmes aimed at promoting student prosocial behavior and their academic performance. In this research project, you will be required to fill out questionnaires for four students nominated by you on the basis of their behavior at three separate time-points: in March, July and December 2018. These include a background sociodemographic questions, the child's behavior and feelings about school, their test scores (Maths and Korean) and about your relationship with the student and approach to classroom management.

Do I have to take part?
No. We are pleased that you are interested in taking part, but you should only participate if you want to. If you decide to take part you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not disadvantage you in any way. You may also withdraw any data/information you have already provided up until its inclusion in the final report. If you do decide to take part you will be given this information sheet to keep and asked to sign a consent form.

What are the possible benefits of taking part?
The information you and your pupils provide could help to further the knowledge field of teacher-student interaction and the development of pro-social behaviour. This information could benefit children, teachers and professionals working in the area of child emotional and behavioural health. Moreover, this could help build upon research to introduce interventions in the future that may improve the teacher-student relationship and inform how teachers can best support students in the classroom.

Will the information I provide be kept confidential?
All information we collect from you will be kept strictly confidential at all times. Any identifying information about you will be kept separately from the other information you provide. In this way, all information collected will remain anonymous. All information will be stored according to the requirements of the Data Protection Act (1998). Access to the information will be strictly restricted to authorised staff. Information will only be shared beyond the study team if there are concerns of harm to the child or others, as required by law.

What will happen to the results of the research?
Once we have collected information from all participants we will write a report on the study findings. You will have the option to request a copy of the report. Neither you, your school, nor the child and their family will be identified in any publications or presentations. This project has been reviewed by the UCL IOE Ethics Committee and has been given a favourable ethical opinion for conduct.
If you have any concerns about this study or require further advice or information, please contact Suhlim Hwang, telephone: (+82) 10 4909 1684, email: suhlim.hwang.17@ucl.ac.uk.

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CONSENT FORM – TEACHERS

Please complete this form after you have read the Information Sheet and heard an explanation about the research.

Title of Study: Study of the School Environment and Academic Achievement

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

Please tick or initial

- I understand that if I decide at any time during the research that I no longer wish to participate in this project, I can notify the researcher involved and withdraw from it immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my data up until submission (October 2020). ☐
- I consent to the processing of the data I have provided for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the Data Protection Act 1998. Information will be shared only if there are concerns of harm to the child or others, as required by law. ☐
- The information you have provided may be published in academic journals and presented at conferences aimed at practitioners and researchers in child mental health. Please note that confidentiality and anonymity will be maintained and it will not be possible to identify you from any publications. ☐
- I agree that the research team may use the data I have provided for future research and understand that any such use of identifiable data would be reviewed and approved by a research ethics committee. (In such cases, as with this project, data would not be identifiable in any report). ☐

Participant's Statement:

I _____ , agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed Date

BACKGROUND QUESTIONNAIRE

Confidential

ID number: _____

1. **Gender** ☐ Male ☐ Female
2. **What is your age?** _____ **(years old)**
3. **How long have you been teaching?** _____ **(years)** _____ **(months)**
4. **What is your position as a teacher?** ☐ Regular teacher ☐ Leader teacher

(Child 1)

From this please answer for each student.
For each item, please answer how true this is for **Child 1**. Base your answers on their behaviour over the past six months. Please answer ALL of the items as best you can even if you are not absolutely certain; use your best judgement.

		Not True	Somewhat True	Certainly True
1	Considerate of other people's feelings	☐	☐	☐
2	Restless, overactive, cannot stay still for long	☐	☐	☐
3	Shares readily with other children, for example toys, treats, pencils	☐	☐	☐
4	Generally well behaved, usually does what adults request	☐	☐	☐
5	Helpful if someone is hurt, upset or feeling ill	☐	☐	☐
6	Constantly fidgeting or squirming	☐	☐	☐
7	Often fights with other children or bullies them	☐	☐	☐
8	Easily distracted, concentration wanders	☐	☐	☐
9	Kind to younger children	☐	☐	☐
10	Often lies or cheats	☐	☐	☐
11	Often volunteers to help others (parents, teachers, children)	☐	☐	☐
12	Thinks things out before acting	☐	☐	☐
13	Steals from home, school or elsewhere	☐	☐	☐

14	Good attention span, sees chores or homework through to the end	☐	☐	☐
15	Blame others for his/her mistakes	☐	☐	☐
16	Engages in illegal activities	☐	☐	☐
17	Cares about schoolwork	☐	☐	☐
18	Acts without thinking of consequences	☐	☐	☐
19	Emotions are shallow and fake	☐	☐	☐
20	Lies easily and skillfully	☐	☐	☐
21	Good at keeping promises	☐	☐	☐
22	Brags about abilities, accomplishments, or possessions	☐	☐	☐
23	Gets bored easily	☐	☐	☐
24	Feel bad or guilty when do something wrong	☐	☐	☐
25	Does not plan ahead or leave things until the "last minute"	☐	☐	☐
26	Concerned about others' feelings	☐	☐	☐
	Office use only, code:	*[0]*	*[1]*	*[2]*

(Child 2)

For each item, please answer how true this is for **Child 2**. Base your answers on their behaviour over the past six months. Please answer ALL of the items as best you can even if you are not absolutely certain; use your best judgement.

		Not True	Somewhat True	Certainly True
1	Considerate of other people's feelings	☐	☐	☐
2	Restless, overactive, cannot stay still for long	☐	☐	☐
3	Shares readily with other children, for example toys, treats, pencils	☐	☐	☐
4	Generally well behaved, usually does what adults request	☐	☐	☐
5	Helpful if someone is hurt, upset or feeling ill	☐	☐	☐
6	Constantly fidgeting or squirming	☐	☐	☐
7	Often fights with other children or bullies them	☐	☐	☐
8	Easily distracted, concentration wanders	☐	☐	☐
9	Kind to younger children	☐	☐	☐
10	Often lies or cheats	☐	☐	☐
11	Often volunteers to help others (parents, teachers, children)	☐	☐	☐

12	Thinks things out before acting	☐	☐	☐
13	Steals from home, school or elsewhere	☐	☐	☐
14	Good attention span, sees chores or homework through to the end	☐	☐	☐
15	Blame others for his/her mistakes	☐	☐	☐
16	Engages in illegal activities	☐	☐	☐
17	Cares about schoolwork	☐	☐	☐
18	Acts without thinking of consequences	☐	☐	☐
19	Emotions are shallow and fake	☐	☐	☐
20	Lies easily and skillfully	☐	☐	☐
21	Good at keeping promises	☐	☐	☐
22	Brags about abilities, accomplishments, or possessions	☐	☐	☐
23	Gets bored easily	☐	☐	☐
24	Feel bad or guilty when do something wrong	☐	☐	☐
25	Does not plan ahead or leave things until the "last minute"	☐	☐	☐
26	Concerned about others' feelings	☐	☐	☐
	Office use only, code:	*[0]*	*[1]*	*[2]*

(Child 3)

For each item, please answer how true this is for **Child 3**. Base your answers on their behaviour over the past six months. Please answer ALL of the items as best you can even if you are not absolutely certain; use your best judgement.

		Not True	**Somewhat True**	**Certainly True**
1	Considerate of other people's feelings	☐	☐	☐
2	Restless, overactive, cannot stay still for long	☐	☐	☐
3	Shares readily with other children, for example toys, treats, pencils	☐	☐	☐
4	Generally well behaved, usually does what adults request	☐	☐	☐
5	Helpful if someone is hurt, upset or feeling ill	☐	☐	☐
6	Constantly fidgeting or squirming	☐	☐	☐
7	Often fights with other children or bullies them	☐	☐	☐
8	Easily distracted, concentration wanders	☐	☐	☐
9	Kind to younger children	☐	☐	☐

10	Often lies or cheats	☐	☐	☐
11	Often volunteers to help others (parents, teachers, children)	☐	☐	☐
12	Thinks things out before acting	☐	☐	☐
13	Steals from home, school or elsewhere	☐	☐	☐
14	Good attention span, sees chores or homework through to the end	☐	☐	☐
15	Blame others for his/her mistakes	☐	☐	☐
16	Engages in illegal activities	☐	☐	☐
17	Cares about schoolwork	☐	☐	☐
18	Acts without thinking of consequences	☐	☐	☐
19	Emotions are shallow and fake	☐	☐	☐
20	Lies easily and skillfully	☐	☐	☐
21	Good at keeping promises	☐	☐	☐
22	Brags about abilities, accomplishments, or possessions	☐	☐	☐
23	Gets bored easily	☐	☐	☐
24	Feel bad or guilty when do something wrong	☐	☐	☐
25	Does not plan ahead or leave things until the "last minute"	☐	☐	☐
26	Concerned about others' feelings	☐	☐	☐
	Office use only, code:	*[0]*	*[1]*	*[2]*

(Child 4)

For each item, please answer how true this is for **Child 4**. Base your answers on their behaviour over the past six months. Please answer ALL of the items as best you can even if you are not absolutely certain; use your best judgement.

		Not True	**Somewhat True**	**Certainly True**
1	Considerate of other people's feelings	☐	☐	☐
2	Restless, overactive, cannot stay still for long	☐	☐	☐
3	Shares readily with other children, for example toys, treats, pencils	☐	☐	☐
4	Generally, well behaved, usually does what adults request	☐	☐	☐
5	Helpful if someone is hurt, upset or feeling ill	☐	☐	☐
6	Constantly fidgeting or squirming	☐	☐	☐
7	Often fights with other children or bullies them	☐	☐	☐
8	Easily distracted, concentration wanders	☐	☐	☐

9	Kind to younger children	☐	☐	☐
10	Often lies or cheats	☐	☐	☐
11	Often volunteers to help others (parents, teachers, children)	☐	☐	☐
12	Thinks things out before acting	☐	☐	☐
13	Steals from home, school or elsewhere	☐	☐	☐
14	Good attention span, sees chores or homework through to the end	☐	☐	☐
15	Blame others for his/her mistakes	☐	☐	☐
16	Engages in illegal activities	☐	☐	☐
17	Cares about schoolwork	☐	☐	☐
18	Acts without thinking of consequences	☐	☐	☐
19	Emotions are shallow and fake	☐	☐	☐
20	Lies easily and skillfully	☐	☐	☐
21	Good at keeping promises	☐	☐	☐
22	Brags about abilities, accomplishments, or possessions	☐	☐	☐
23	Gets bored easily	☐	☐	☐
24	Feel bad or guilty when do something wrong	☐	☐	☐
25	Does not plan ahead or leave things until the "last minute"	☐	☐	☐
26	Concerned about others' feelings	☐	☐	☐
	Office use only, code:	*[0]*	*[1]*	*[2]*

Child background

Confidential

Classroom ID number: _____

Student ID	Math grade	Korean grade	Reception of free school milk	Single parent family

Appendix C: SCHOOL LETTER

INFORMATION SHEET FOR SCHOOL

Institute of Education
UCL

Study of the School Environment and Academic Achievement

Start Date: Start of First Term 2018
Anticipated End Date: End of Second Term 2018

Would you like to help with my research?

I am an MPhil/PhD student from the Department of Psychology and Human Development at the UCL Institute of Education, under the supervision of Dr Jennifer Allen. Over the next 10 months I will be undertaking a research project as part of my doctoral thesis. Please take time to read the following information carefully and discuss it with others if you wish. Ask the researcher if there is anything that is not clear, or if you would like more information.

What is the purpose of the study?
The aim of this current study is to increase an understanding of the influence of pupil's behaviour on their academic achievement. Specifically, we are looking at the influence of teacher-student interaction and its impact on pupils' motivation in school and on their academic performance. This research may help to identify key aspects of school life that may impact student's academic outcomes. The information obtained in this study may help to inform school programmes aimed at promoting positive teacher-student relationships, student prosocial behavior, and improved academic performance.

What are the possible benefits of taking part?
The information your school provides could help to further our knowledge of the student-teacher relationship and teacher classroom management relates to students' academic performance. This may inform school programmes aimed at encouraging children's prosocial behaviour and improved academic performance by promoting positive student-teacher relationships and effective classroom management strategies.

Who will be in the project?
Children from 4, 5, 6th grades and their teachers. Children and teachers who provide written consent will be asked to fill out questionnaires on the basis of their behavior at three separate time-points: in March, July and December 2018. These include questions about sociodemographic information (e.g., age, gender), child behaviour, child feelings about school, peer relationships, the student-teacher relationships, teacher classroom management strategies, and children's test scores (Maths and Korean). We have information sheets and opt-out consent forms that we would like to request that you send to parents prior to the study commencing. Any children whose parents return the opt-out consent form will not be asked to participate.

Will the information school provide be kept confidential?
All information we collect from students and teachers will be kept strictly confidential at all times. Any identifying information about them will be kept separately from the other information they provide using personal ID codes. In this way, all information collected will remain anonymous. All information will be stored according to the requirements of the Data Protection Act (1998). Access to the information will be strictly restricted to authorised staff. Information will only be shared beyond the study team if there are concerns of harm to the child or others, as required by law.

What will happen to the results of the research?
Once we have collected information from all participants I will write a brief report on the study findings and provide this to your school. I will also write up the group findings for my dissertation and may present this information at academic conferences and in journals. No individual student, teacher or school will be identified in any reports. Teacher and student participants can withdraw from the project at any time without providing a reason. This project has been reviewed by the UCL IOE Ethics Committee and has been given a favourable ethical opinion for conduct.

The parent, student and teacher information sheets and consent forms, and the teacher and student questionnaires are attached for review by your school. Thank you for taking the time to read through this information sheet. If you have any concerns about this study or require further advice or information, please contact Suhlim Hwang, telephone: (+82) 10 4909 1684, email: suhlim.hwang.17@ucl.ac.uk.

Appendix D: PARENT LETTER

INFORMATION SHEET FOR PARENTS

Institute of Education
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YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Study of the School Environment and Academic Achievement

We are inviting your child to take part in a research project, conducted by Suhlim Hwang, a MPhil/PhD student from the Department of Psychology and Human Development at the UCL Institute of Education, under the supervision of Dr Jennifer Allen.

What is the purpose of the study?
The aim of this current study is to increase an understanding of the influence of pupil's pro-social behaviour on their academic achievement. Specifically, we are looking at the influence of teacher-student interaction and its impact on pupils' behaviour and feelings about school and academic performance. This research could help to identify key aspects of school life, which can have an impact on a student's academic outcomes, and may help to develop school programmes aimed at promoting student prosocial behavior and their academic performance.

Who can take part?
We are looking for children aged 10-12 years. They will be asked to complete a set of questionnaires during their normal day at school (more information provided below).

Does my child have to take part?
No. If your child does decide to take part, they will be free to withdraw at any time and without giving a reason. If you would prefer your child not to take part, please return the slip at the end of this letter to your child's form teacher.

What will happen if my child does take part?
Your child will be asked to complete some questionnaires to obtain background information, information on their behaviour and feelings about school, their classmates and teachers. These should take about 30 minutes and will be completed during a form period. Again, if your child wishes to stop at any point they are free to do so without giving a reason, and with no consequence – they can simply hand in an uncompleted form. Teachers will also be asked to complete some questionnaires about your child's behaviour and feelings about school, how they support your child's learning and behaviour at school. Teachers will also be asked to provide your child's Maths and Korean test scores.

What are the possible benefits of taking part?
The information your child provides could help to further our knowledge of the student-teacher relationship and teacher classroom management relates to students' academic performance. This may inform school programmes aimed at encouraging children's prosocial behaviour and improved academic performance by promoting positive student-teacher relationships and effective classroom management strategies.

Will the information I provide be kept confidential?
All information we collect from your child and their teacher will be kept strictly confidential at all times. Participants are identified by a code number only and all information and results are kept on a secure computer and locked filing cabinet at the UCL Institute of Education. All information will be stored according to the requirements of the Data Protection Act (1998). Access to the information will be strictly restricted to authorised staff. Information will only be shared beyond the study team if there are concerns of harm to the child or others, as required by law. We will talk to you about this first.

What will happen to the results of the research?
Once we have collected information from all participants we will write a report on the study findings. You will have the option to request a copy of the report. This project has been reviewed by the IOE Ethics Committee and has been given a favourable ethical opinion for conduct. If you have any concerns about this study or require further advice or information, please contact Suhlim Hwang, telephone: (+82) 10 4909 1684, email: suhlim.hwang.17@ucl.ac.uk.

If you do not with for your child to participate in this project, please return the below form to your child's form teacher:

I refuse permission for my child (name)_____ to participate in this study.

Signed _____ date

Appendix E: ETHICS

Section 8 Ethical issues

Please state clearly the ethical issues which may arise in the course of this research and how will they be addressed.

All issues that may apply should be addressed. Some examples are given below, further information can be found in the guidelines. *Minimum 150 words required.*

- Methods
- Sampling
- Recruitment
- Gatekeepers
- Informed consent
- Potentially vulnerable participants
- Safeguarding/child protection
- Sensitive topics
- International research
- Risks to participants and/or researchers
- Confidentiality/Anonymity
- Disclosures/limits to confidentiality
- Data storage and security both during and after the research (including transfer, sharing, encryption, protection)
- Reporting
- Dissemination and use of findings

The following items are identified as, possibly, giving rise to concern:

<u>Potentially vulnerable participants/safeguarding and child protection:</u>
Participants will be children under the age of 16. This could raise issues of a lack of understanding of the subjects towards the research aims and purpose. Prior to data collection, the school will act as a gatekeeper, and they will be given an information sheet outlining the details of the study. Children and their parents will initially be informed of the research aims and procedures in an information sheet with the opt-out consent form which will be sent by the school to the children's parents prior to data collection Parents can return opt-out consent forms to their child's form teacher. In South Korea, information letters about any school-based issues are typically distributed by the form teachers. Opt-out consent helps to avoid low response rates and biased samples that are not representative of the community of interest, leading to incomplete, misleading findings. This research aims to examine antisocial behaviour and academic outcomes in children, so an opt-in sample is likely to have skewed towards students with fewer children who have higher levels of antisocial behaviour, sociodemographically disadvantage and poor academic performance; the very behaviours and characteristics needed to adequately investigate the stated hypotheses. To date, all research on the teacher-child relationship and teaching practices with children high in CU traits has only gathered teacher views; not children's. As such, their voices are missing from this important area of research. Research such as the proposed study is needed to inform education policy and teaching practices to better support children who are at-risk for poor school outcomes. The research does not involve video- or audio-recording, intervention, physical testing or any invasive procedures and is unlikely to cause distress. Following this initial approach, consent itself will be sought by written opt-in consent form. Children will be informed of the aims of the research and what their participation would entail before data collection by an information sheet and consent form. They will also have the opportunity to have any questions or concerns about the study answered before providing written informed consent. In addition, all child and teacher participants will

be informed that their participation is entirely confidential, and that the privacy of all respondents will be respected with no individual child, teacher, or the school identified in any reports. Only group findings will be reported. This study does not involve video- or audio-recording, psychological intervention, physical testing or any invasive procedures and is unlikely to cause distress. However, if any discomfort, distress or embarrassment may arise from completing questionnaires, participants have the option of not completing items or the questionnaire as a whole by simply handing back uncompleted forms. Parents, teachers and children will be informed that they can withdraw at any time without giving a reason and with no adverse consequences for themselves or the respective student.

Sensitive topics:
As the research aim includes studying antisocial behaviour, callous unemotional traits and student-teacher and peer interaction, there is the risk that some subjects may become upset by some of the items in the questionnaires. The questionnaires are designed to assess their feelings about themselves and situations that some subjects may find difficult to answer. Therefore, participants will be informed that they have the right to not answer any questions that they do not want to. They can simply hand in an uncompleted questionnaire pack if they prefer. They will also be informed that they do not need to give a reason when refusing to answer, they may also withdraw themselves from the research process at any point prior to data analysis (September 2018).

International research:
Data collection will be conducted in South Korea. Foreign and Commonwealth office advise that although the level of tension on the Korean peninsula remains high due to a series of nuclear and missile tests by the North Korea, heightened tensions haven't affected daily life. Around 140,000 British nationals visit South Korea every year and most visits are trouble-free. Following the Institute's International Travel Policy & Procedures, UCL's travel insurance form have been completed and submitted to the named contact in UCL Finance.

Confidentiality/Anonymity:
Given the sensitive nature of some questions relating to students' behaviour problems, learning ability and peers, teachers and students are reassured that all answers are confidential and names will not be associated with any responses, nor will any other person be viewing data other than the researchers involved in the project (myself and my supervisors, Drs Jennifer Allen, David Hawes and Rebecca Waller). Subjects will be given an ID number which will be used to link grades and questionnaire data, and no names of students or teachers will be written down on any of the results. The ID number will be used throughout the data collection and analysis to link data, and only group findings will be reported in the dissertation, and in any presentations or resulting publications. No individual student, teacher or school will be identified in any reports or presentations.

Data storage and security both during and after research:
Data will be collected on paper questionnaires and these will be kept in a locked filing cabinet in a locked office in the Institute of Education. The data sheets with the corresponding name-ID information will be stored in a separate locked location to the data sheets containing the questionnaire with ID numbers on them. During data analysis, data sets will be saved on an encrypted USB device, and the password will only be known to the researcher alone. A summary of group outcomes would be made available to the school, and to any parent or pupil who requests this. Also they will be given a chance to ask any questions regarding the study and the findings.