# The predictive value of callous-unemotional traits and empathy on the stability of conduct problems in 6 and 7 year old children with ADHD and/or ODD.

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## Abstract

*There is increasing evidence that within the wide range of factors that influence the persistence of antisocial behaviour in youth, CU traits are particularly relevant. However, limited research has been done on examining the predictive value of CU traits in young children. Therefore the present longitudinal study aimed to investigate the role of CU traits and empathy in the persistence of severe conduct problems in a clinically referred sample of 41 initially 6-7 year old children with diagnoses of ADHD and/or ODD. Parents and teachers rated the child's CU traits and empathy at the initial assessment (T1), as well as the amount of conduct problems at both the initial and 1–year follow-up assessment (T2). As expected, there was a high stability of conduct problems over a 1-year period. Although CU traits and empathy were expected to contribute to the prediction of persistent conduct problems, no incremental value was found for these variables. In parent reports, T1 conduct problems and male gender significantly predicted T2 conduct problems. In teacher reports, T1 conduct problems significantly predicted T2 conduct problems. In a more clearly defined measure of aggressive behaviour, T1 aggression significantly predicted T2 aggressive behaviour, in both parent and teacher reports. The findings are consistent with prior research on aggression, but contrary to prior research on CU traits and empathy. In young children there seems to be no predictive value of CU traits and empathy for conduct problems over one year. Several limitations of the study are discussed and directions for further research are proposed, such as examining the influence of CU traits at young age in context of other domains of functioning.*

*Keywords: callous-unemotional traits, empathy, attention-deficit/hyperactivity disorder, oppositional defiant disorder, children, conduct problems*

## Introduction

In different cultures across the world, children display aggression as a part of their socialization process (Carr, 2006; Chen & French, 2008). Learning social skills to adjust to social requirements often includes facing conflicts (Prinzie, 2004), which can lead to frustration being expressed in an aggressive manner. This aggressive behaviour starts in infancy and increases in frequency and intensity during toddlerhood and early childhood (Carr, 2006; Prinzie, 2004). Starting from a few months to 42 months after birth, physical aggression strongly increases (Tremblay, 2004). There seems to be a decreasing trend in frequency of aggression beyond this age. Physical aggression decreases from the age of 4, because at that age children learn to use alternative strategies, such as negotiation, to accomplish their goals (Verhulst, 2008).

In research on child and adolescent (physical) aggression, proactive and reactive aggression are often distinguished as two functions of aggression (Card & Little, 2006). Proactive aggression (also called 'cold-blooded' aggression) is offensive and refers to deliberate behaviour in anticipation of self-serving outcomes. By contrast, reactive aggression (also called 'hot-blooded' aggression) is described as an angry, often emotionally dysregulated, defensive response to perceived offenses or frustrations. Results of a large meta-analysis on relations of proactive and reactive aggression with psychosocial adjustment indicate that reactive aggression (independent of aspects of proactive aggression) is related to many aspects of psychosocial maladjustment (e.g. internalising problems, delinquency, low social preference or victimization). By contrast, proactive aggression (independent of aspects of reactive aggression) seems only related to greater delinquency, peer rejection and even lower levels of victimization.

In the past decades the term 'aggressive behaviour' has been defined in numerous ways. Aggressive and antisocial behavior are often combined in one definition, because research towards the development of aggression so far, mainly concentrated on behaviours that are socially undesirable (Tremblay, 2000). Commonly used scales to assess aggressive behaviour, such as the ASEBA scales (Achenbach & Rescorla, 2001), contain mixed behaviours varying from physical aggression to disobedience and demanding attention. The 'aggressive' behaviours measured by popular rating scales often are perceived as annoying to other people, but do not only cover physical aggression. Children diagnosed with a disruptive behaviour disorder (oppositional defiant disorder; ODD, or conduct disorder; CD) frequently experience diverse conduct problems (Carr, 2006; Wicks-Nelson & Israel, 2009). Their disruptive behaviour is extreme and persistent; it causes a degree of disturbance and destruction for the child's environment way beyond the common 'normal' aggressive behaviour would do (Wicks-Nelson & Israel, 2009).

Children who show conduct problems before the age of 12 are at risk to continue showing problem behaviours into (early) adulthood (Mannuzza, Klein, Abikoff & Moulton, 2004; Nagin & Tremblay, 1999; Pardini & Fite, 2010) and to become disturbed in their social and psychological development (Prinzie, 2004; Santrock, 2008). Furthermore, these 'early-starters' are at high risk of becoming serious persistent offenders (Domburgh van, Loeber, Bezemer, Stallings & Stouthamer-Loeber, 2009), which makes their behaviour highly costly to society (e.g. costs of arrest charges; Carr, 2006; Frick & Loney, 1999). In order to create appropriate prevention and intervention programs, it is important to identify which factors contribute to the persistence of conduct problems. But for this, the challenge is to describe patterns of (dis)continuity of conduct problems.

Individual differences in antisocial and aggressive tendencies are relatively stable across development (Maughan & Rutter, 2001). A large study by the Early Child Care Research Network indicated that children's physical aggression seemed to have a high level of stability between the ages of 2 and 8 years, except for a small group of children who showed a major decline (Arsenio, 2004). In the larger group of children with a high level of stability in physical aggression, two types were described: two stable but low level trajectories (including 70% of the sample) and two smaller groups (18% of the sample) with stable but high level trajectories. Loeber (1982) reviewed several studies on the stability of antisocial and delinquent behaviour. He found that children who initially showed high rates of antisocial behaviour were more likely to persist in this behaviour, than children who initially showed lower rates of antisocial behaviour.

A review of studies that have provided estimates of the stability of conduct problems in children from 4 through 18 years old, who have been clinically diagnosed with ODD or CD, indicates that severe conduct problems are reasonably persistent over time (Frick & Loney, 1999). In studies using follow-up periods from 8 months to 5 years, the majority of the correlations for conduct problems between the first and latest measure were in the range of .42 and .64. Studies with a longer follow-up interval (from 6 up to 30 years) have somewhat lower stability estimates than studies with relatively short follow-up intervals. The correlation coefficients for these studies generally were in the range of .20 and .40. However, it is indicated that conduct problems in children aged 4 through 18 are substantially stable for a short period of time, but after more than 5 years this behaviour seems to change. These studies have not clearly identified variables that influence the persistent course of conduct problems in the short term intervals.

The maintenance of conduct problems involves a complex interplay of influences, such as family, peer, cognitive-emotional and biological influences (Wicks-Nelson & Israel, 2009). Several risk factors for persistence of conduct problems are low intelligence, low socio-economic status and male gender. Results from a review of 27 studies indicate that children with ODD or CD (who very often suffer from co-morbid

attention-deficit/hyperactivity disorder: ADHD) often have lower IQ's and problems with developing age-appropriate social knowledge (Hogan, 1999). These (social-)cognitive difficulties contribute to ongoing social adjustment problems. Furthermore, the cognitive limitations often are part of a wide range of other risk factors. Hence, low intelligence might be a predictor of persistence of conduct problems in children, under certain conditions. These effects may be best understood in the context of other variables, such as low socio-economic status (SES; Frick & Loney, 1999).

It has been demonstrated among several ethnic groups that low family SES and other disadvantages reflect a process in which adverse individual, family and environmental factors combine to increase a young person's chance of developing and maintaining conduct problems (Carr, 2006; Maughan & Rutter, 2001; Wicks-Nelson & Israel, 2009). Low SES can put parents in a position where they have few resources for providing in the family's needs (Carr, 2006). For children, material discomfort can result in stress, which may find experience in conduct problems.

In addition, gender is also related to conduct problems. Conduct disorders and ADHD are more commonly diagnosed in boys than in girls, with typically cited ratios between 3:1 and 4:1 (Wicks-Nelson & Israel, 2009). The prevalence may be affected by the fact that the diagnostic criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; American Psychiatric Association, 2000) definitions emphasise behaviours typically observed in boys, such as 'male' expressions of aggression in diagnoses of disruptive behaviour disorders, running and climbing in ADHD. In clinical samples, gender differences in ADHD probably reflect a referral bias due to boys' greater expression of aggression. Moreover, boys are often found to have less empathic skills when compared to girls (Lennon & Eisenberg, 1987; Strayer & Roberts, 2004).

Empathic deficits in children are related to disruptive behaviour (Wied de, Goudena & Matthys, 2005; Wied de, Gispen-de Wied & Boxtel van, 2010; Hogan, 1999; Strayer & Roberts, 2004). Empathic skills develop in the first year of life and become more complex as the child grows older (Schaffer, 2005). Dadds and colleagues (2008) define empathy as the ability to understand the emotions of others. Empathy can be measured through questionnaires in which empathy is seen as a stable trait of an individual, or through procedures in which a (situational) affective empathic response is being provoked (Eisenberg & Miller, 1987; Lovett & Sheffield, 2007). Children with empathic deficits often behave more antisocially because they have less cognitive understanding of others and therefore are less aware of the impact of their behaviour on other people's feelings (Strayer & Roberts, 2004). Empathic deficits have also been found in children aged 8-12 years with ADHD, even when the role of intelligence and oppositional and conduct problems were taken into account (Marton, Wiener, Rogers, Moore & Tannock, 2009). These children used lower levels of social perspective taking

and identification of feelings than children without ADHD.

Attention problems can also be related to unawareness of other people's feelings and disruptive behaviour in general. For instance, poor attainment may lead to frustration and disenchantment with academic work, which finds expression in conduct problems (Carr, 2006). Children with attention and hyperactivity or impulsivity problems are often characterised by over-activity, oppositional and aggressive behaviours. Research shows that childhood ADHD without co-morbid ODD or CD may also be a developmental precursor of a later antisocial disorder (Mannuzza et al., 2004). Children with ADHD symptoms are more likely to develop ODD symptoms (Frick & Loney, 1999) and ODD symptoms in turn are related to a later increase of conduct problems (Pardini & Fite, 2010). Therefore, in preparation for the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) the issue has emerged whether ADHD and ODD symptoms are unique predictors to various forms of (persistent) psychosocial impairment in youth (Pardini & Fite, 2010).

Recently, the DSM-V Childhood Disorders and the ADHD and Disruptive Behavior Disorders Work Groups proposed to include a specifier for the diagnosis of conduct disorder in the DSM-V, based on the presence of callous-unemotional traits (CU traits; Frick & Moffit, 2010). There is increasing evidence that within the wide range of factors that influence the persistence of disruptive behaviour, this affective dimension of psychopathic features is particularly relevant (Frick & White, 2008; Loeber, Burke & Pardini, 2009). Children with CU traits are described as having lack of remorse or guilt, having callous-lack of empathy, being unconcerned about performance, or displaying shallow or deficient affect. According to the conceptualization of CU traits, low levels of empathy play a significant role in this psychopathic feature (Frick & White, 2008; Pardini, Lochman & Powell, 2007). This is evidenced by the fact that measures of CU traits often include items assessing empathy, which are reverse scored (e.g. 'is concerned about the feelings of others', Frick & Hare, 2001; Pardini et al., 2007). It has been found that youths who score high on CU traits have deficits in the processing of negative emotional stimuli, namely deficits in response to signs of fear and distress in others (e.g. Marsh et al., 2008).

Various studies (e.g. Frick, Stickle, Dandreaux, Farrell & Kimonis, 2005; Pardini et al., 2007) have indicated that CU traits predict a stable or increased trajectory of antisocial behaviour over time in children who show conduct problems. A recent study showed that CU traits provide unique prognostic information about persistent delinquent behaviour (Pardini & Fite, 2010). CU traits predicted moderate to serious violence and delinquency across a 2-year follow-up in a large sample of 1st, 4th, and 7th graders. Also with respect to multiple antisocial outcomes, CU traits (measured in youth in 7th grade) were predictive in antisocial outcomes (McMahon, Witkiewitz & Kotler, 2010). In a follow-

up study over a longer period of time, CU traits in clinic-referred boys (aged 7 to 12) predicted measures of psychopathy at ages 18 to 19, even when controlling for other risk factors such as IQ, SES and the child's level of conduct problems (Burke, Loeber & Lahey, 2007). Specifically, CU traits have been uniquely related to proactive, but not reactive, aggression in children who score high on CU traits and conduct problems at a one-year follow-up in a community sample (Frick, Cornell, Barry, Bodin & Dane, 2003).

Results from a large research review show that CU traits do seem to be the most important psychopathological feature to designate a specific subgroup within antisocial youth (Frick & White, 2008). Differences have been found between antisocial youths with and without CU traits. Besides differences in severity of conduct problems, differences have also been found in stability of antisocial behaviour and in a number of cognitive, emotional and personality characteristics. For example, youths with CU traits show abnormalities in responsiveness to punishment cues and show less trait anxiety when controlling for the level of antisocial behaviour. Scheepers, Buitelaar and Matthys (2011) note that the CU traits specifier in the DSM-V could help making distinctions in severity of conduct problems that cannot be made in the DSM-IV-TR. In the DSM-IV-TR the severity is based on the extent of conduct problems that are predominantly described as externalising behaviour symptoms in relation to others, whereas more covert conduct behaviour, or conduct behaviour that is shown outside the social context could in the DSM-V be described by the CU traits of the specific patient.

There are sufficient longitudinal data that suggests that CU traits in antisocial or aggressive youth are relatively stable from childhood to adolescence (Fontaine, Rijsdijk, McCrory & Viding, 2010; Frick & White, 2008; Pardini & Loeber, 2007). The relatively high stability of CU traits from childhood to adulthood seems to be especially true for parenting ratings (Frick & White, 2008). In a community sample of 4 to 9 year old Australian children, it was found that over one year parent-reported CU traits estimates are also moderately stable (correlation coefficient .55; Dadds, Frazer, Frost & Hawes, 2005). In another study it was found that CU traits were relatively stable across a 1-year period in moderate to highly aggressive children from 9 to 12 year old (Pardini et al., 2007). Although the stability of CU traits is found in studies among older children and adults, this does not imply that these traits are unchangeable (Frick & White, 2008; Pardini & Loeber, 2007).

To summarise, both CU traits and empathy seem to be stable factors in childhood and they appear to be correlated to conduct problems. Regarding these results, it seems important to consider CU traits as a risk factor for serious and persistent forms of conduct problems and criminal behaviour in the DSM-V. Therefore it is important to study psychopathic and emphatic features in young children to understand the (in)stability of these features at a young age. Previous research barely combined the constructs of

empathy and CU traits in prediction to developmental outcomes of aggressive behaviour in young children. The few studies that focused on the link between CU traits and empathic skills included youth or adults, and not young children (Frick & White, 2008). When young children were studied, it often concerned a community sample (e.g. Dadds et al., 2005). Moreover, research in the areas of CU traits and empathy has often been limited by the use of cross-sectional data.

The present longitudinal study aimed to investigate the role of CU traits and empathy in the persistence of severe conduct problems in clinically referred 6 and 7 year old children with ADHD and/or ODD.

## Method

### Participants

Data were collected one year after the first assessment that was part of a larger study on empathy among young children at the University Medical Center Utrecht (UMCU). Participants were recruited from outpatient clinical units of the Department of Child and Adolescent Psychiatry of the UMCU. During the first assessment, the Dutch parent version of the Diagnostic Interview Schedule for Children (DISC-IV; Ferdinand & van der Ende, 2002) was conducted to classify behaviour problems. All parents were interviewed by trained students to collect DISC-IV data. Exclusion criteria were an estimated intelligence lower than 70 (n=3) and a non-matching DISC-IV diagnosis corresponding to the psychiatric diagnosis (n=14). In order to observe unaffected behaviour responses of children, most of the children have not taken their medication prior to the assessments. There was one missing teacher report in the second measure, because of non-response of the teacher.

The final sample consisted of 41 initially 6 or 7 year old children (mean age 7.0, SD 0.6) who had been clinically diagnosed based on extensive psychiatric assessment in the UMCU and met the DISC-V criteria for ADHD only (29.3%), ODD only (4.9%), or co-morbid ADHD and ODD (65.9%). Among them, there were 8 girls (19.5%) and 33 boys (80.5%). Two children of the sample had a non-Dutch ethnic background. The mean estimated intelligence for the total sample was IQ=105.1 (SD=19.9). In 51,2% of the sample, the parent with the highest education had a degree in middle-level applied education ('*Middelbaar Beroeps Onderwijs*') or lower. There were 3 parents (7,3%) with higher general continued education ('*Hoger Algemeen Voorbereidend Onderwijs*') as their highest level of education. In the major group of the sample (36,6%), the parent with the highest education had a degree in higher professional education ('*Hoger Beroeps*

*Onderwijs'*). There were 2 parents in the sample (4,9% of the children) that had an academic degree ('*Wetenschappelijk Onderwijs'*).

**Procedure**

All procedures were approved by the Medical Ethics Committee of the UMCU. Primary caregivers of the children were approached by phone to participate in the study. Prior to the primary data collection the parents gave written informed consent. Data were collected through three sources: parent/caregiver, teacher and child. Parents received several questionnaires, namely Dutch versions of the Child Behaviour Checklist (CBCL; Achenbach & Rescorla, 2001), the Instrument for Reactive and Proactive Aggression (IRPA; Polman, Orobio de Castro, Thomaes & van Aken, 2009), the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) and the Griffith Empathy Measure (GEM; Dadds et al., 2008). They also received the teacher versions of the same questionnaires to pass on to the classroom teacher. The questionnaires were returned during the DISC-IV interview or during the child assessment at school. The primary caregivers were interviewed in the participants' homes by trained graduate students to collect DISC-IV data. The children were tested in approximately 1.5 hour, also by trained graduate students, during school time in separate rooms in their school. The students were trained and able to use written protocols detailing the regular procedure and verbal instructions. The child assessment consisted of administration of two subtests of the WISC-III-[NL] and diverse tasks about empathy for the larger study on empathy of the UMCU.

Roughly one year after the initial assessment, the primary caregivers were approached by post to participate in the follow-up study. The primary caregivers again received questionnaires by post, namely a short version of the CBCL and Teacher's Report Form (TRF; Achenbach & Rescorla, 2001) and a parent and teacher version of the IRPA (Polman et al., 2009). Both primary caregivers and classroom teachers filled out these questionnaires and sent the packages back to the UMCU using a reply envelope.

**Measures**

***First assessment (T1)***

*Demographic information*

Demographic information, such as the participants' age, gender and academic history of the parents, was collected using single questions about these topics. The academic history of the parents was assessed by scores that were ascribed to the highest level of education of each parent. These scores vary between 1 (no degree) and 9 (university degree). The highest of both scores was used as an estimation of SES.

*WISC-III-$^{NL}$*

To estimate the children's intelligence, two subtests of the Wechsler Intelligence Scale for Children-III (Dutch editing WISC-III-$^{NL}$ by Kort et al., 2005) were administered at school. The WISC-III-$^{NL}$ consists of 13 subtests, which are divided into verbal tasks and performance tasks. To estimate the intelligence the norm scores of one verbal task (Vocabulary) and one performance task (Block Design) were averaged. These subtests were found to have good correlations with the total IQ (Sattler, 1992).

*Child Behavior Checklist and Teachers Report Form*

Parents and teachers completed questionnaires on the child's behaviour. Parents completed the CBCL for ages 6-18 and teachers completed the TRF for ages 6-18 (Achenbach & Rescorla, 2001). The Dutch translations of the questions were based on translations of the CBCL and TRF for ages 4-18 versions from 1991 (Verhulst, van der Ende & Koot, 1996, 1997). The CBCL and TRF contain different subscales that are used to assess problem areas in children aged 6 through 18. Every item is scored either 0 (definitely not true), 1 (sometimes true), or 2 (definitely true). In this study only the total raw scores on the subscales 'Attention problems' and 'Aggressive Behavior' were taken into account to assess attention problems and aggressive behaviour.

*Instrument for Reactive and Proactive Aggression*

The parent and teacher version of the Instrument for Reactive and Proactive Aggression (IRPA; Polman et al., 2009) was filled out by the parents and teachers. This questionnaire was originally developed for teachers, to differentiate between form and frequency of aggressive behaviour on one hand and the function of this behaviour on the other hand. For the present study, the questionnaire was translated into Dutch and adjusted for parent ratings by changing 'the child' into 'your child'. Items can be scored on a 5-point Likert scale (0= never, 1= occasionally, 2= weekly, 3= several times a week and 4= daily). When a form of aggression is present in the child, more questions about the (proactive or reactive) function of this behaviour follow. There are four proactive function-items and three reactive function-items, which are also scored on the 5-point Likert scale. At the first assessment the proactive, reactive and total scores are used to assess aggressive behaviour in children. Proactive and reactive aggression often seem to be highly correlated, but they can be well differentiated when assessed by the IRPA. According to Polman and colleagues (2009), the IRPA is a valid measure that has demonstrated good discriminant and satisfactory convergent validity.

*Antisocial Process Screening Device*

The APSD (Frick & Hare, 2001) was filled out by primary caregivers and teachers. The 6 items of the CU traits scale ('Is concerned about schoolwork', 'Keeps promises', 'Feels bad or guilty when he has done something wrong', 'Concerned about the feelings of others', 'Does not show emotions' and 'Keeps the same friends') were used to assess CU traits in children. The items can be scored either 0 (definitely not true), 1 (sometimes true), or 2 (definitely true), so a total score for the CU traits scale was computed. The scores were also used categorically, to assign either a high or low score on CU traits. Previous research with the CU traits subscale of the APSD among 6-13 year old clinic-referred children, have used cut-off scores of 7 (Barry, Frick, DeShazo, McCoy, Ellis, & Loney, 2000), and 5 out of the possible 12 points (Enebrink, Andershed & Langström, 2005). Since the present study only includes children aged 6 or 7, a cut-off score of 6 or higher on the CU traits scale was used to define a high CU traits score. Scores 5 or lower were considered low scores. Internal consistency in both parent and teacher reports was low (Cronbach's alpha in parent report = .29 Cronbach's alpha in teacher report = .52).

*Griffith Empathy Measure*

Empathy was assessed by the Griffith Empathy Measure (GEM; Dadds et al., 2008). The GEM is a 23-item behaviour rating scale that, in this study, was completed by each child's primary caregiver and teacher. In the teacher version 5 items were deleted, because they reflect on the child's behaviour in situations unrelated to the school situation (e.g. 'The child treats dogs and cats as if they have human feelings'). This questionnaire was adapted from Bryant's Index of Empathy for Children and Adolescents and adjusted for the present study. Questions were reworded in third person format and answers can be scored on a 9-point Likert scale from -4 (totally disagree) to +4 (totally agree). It can measure cognitive and affective components of empathic behaviour in children and adolescents, but in the present study the total score was taken into account. The GEM demonstrates good reliability and validity (Dadds et al., 2008). In this study the internal consistency for both parent and ratings is good (Cronbach's alpha in parent ratings =.84, Cronbach's alpha in teacher ratings =.86). The alpha in teacher ratings is calculated out of 37 cases, because the teacher report of one child is missing and in three other teacher reports one item of the GEM was not filled out.

**Follow up assessment (T2)**

*Child Behavior Checklist and Teachers Report Form*

During the second time of measurement, short versions of the Dutch translations of the CBCL and TRF (Achenbach & Rescorla, 2001) were filled out by primary caregivers and

teachers. As with the first assessment, the follow-up assessment contained the subscale 'Aggressive Behaviour' to assess aggressive behaviour.

*Instrument for Reactive and Proactive Aggression*
During the second measurement the same Dutch translations of the parent and teacher version of the IRPA (Polman et al., 2009) as with the first assessment were filled out by the primary caregivers and teachers. Only the total scores from the parent and teacher versions were used at the follow-up assessment, to assess a clearly defined, but comprehensive concept of aggressive behaviour.

**Data-analysis**

Data was analyzed using multiple linear regression models in SPSS version 18.0. Multiple linear regression was chosen because it allowed exploration of the relationship between different predictors and outcome variables. To determine which (combination of) variables best predicted the persistence of conduct problems after one year, analyses were done in a stepwise method. Variables have not been converted to z-scores before conducting all analyses, because the distribution of the variables was approximately normal (except for the IRPA scores in both parent and teacher reports). Other assumptions have been met. Predictive models were created for each different parent and teacher reported outcome variable, namely the amount of conduct problems (based on the CBCL or TRF aggressive behaviour scales) or aggressive behaviour (based on the parent and teacher reported IRPA total scale scores) at the follow-up assessment (T2). The models included the primary study predictors reported by parents or teachers at the first assessment (T1), namely the aggressive behaviour scales of the CBCL/TRF or the IRPA scores, as well as CU traits and empathy. The primary study variables were not controlled for attention problems, estimated intelligence, gender and SES, so these variables were also included as predictors.

# Results

## Correlations

Relations between the primary study variables were computed by Spearman's correlation, because the SES data are ordinal and neither the parent rated, nor the teacher rated IRPA-scores were normally distributed. Descriptive statistics and correlations among the primary study variables obtained by parents are listed in table 1.

As expected, the aggressive behaviour scales of both the CBCL and IRPA exhibited moderate to high levels of temporal stability from T1 to T2 (CBCL aggressive behaviour scale: $\rho$=.78, IRPA total scale: $\rho$=.53). In addition, the scales of these questionnaires correlated significantly within T1 as well. The IRPA T2 total score did not significantly correlate with the IRPA proactive scale T1. Higher levels of CU traits were significantly correlated with T1 aggressive behaviour measured with the CBCL and IRPA total and proactive scale, but not with the IRPA reactive scale. As expected, higher levels of CU traits were significantly correlated with lower empathy scores measured with the GEM total scale. The GEM scores correlated significantly with estimated intelligence as well, but not with any other parent reported variable. Lower levels of empathy were related to higher estimated intelligence. CBCL attention problems and SES were not significantly correlated with any other parent reported variable.

Table 1. *Descriptive statistics and correlations among primary study variables in parent report*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. CBCL agg.beh. T2 | | .78*** | .78*** | .39* | .61*** | .60*** | .12 | -.01 | .14 | .06 | .09 |
| 2. IRPA total T2 | | | .69*** | .28 | .58*** | .53*** | -.04 | .04 | .28 | .01 | .14 |
| 3. CBCL agg.beh. T1 | | | | .47** | .83*** | .73*** | .38* | -.12 | .19 | .11 | -.03 |
| 4. IRPA proactive T1 | | | | | .46** | .60*** | .36* | -.15 | .15 | -.15 | -.09 |
| 5. IRPA reactive T1 | | | | | | .73*** | .26 | -.10 | .23 | -.07 | -.03 |
| 6. IRPA total T1 | | | | | | | .32* | -.15 | .17 | -.11 | -.13 |
| 7. APSD CU traits T1 | | | | | | | | -.59*** | .14 | .22 | -.26 |
| 8. GEM total T1 | | | | | | | | | -.02 | -.37* | .13 |
| 9. CBCL atten.pr. T1 | | | | | | | | | | -.01 | .12 |
| 10. Estimated IQ | | | | | | | | | | | .23 |
| 11. SES | | | | | | | | | | | |
| *M* | 15.20 | 8.63 | 15.75 | 15.12 | 26.34 | 9.24 | 4.71 | 4.24 | 11.03 | 105 | - |
| *SD* | 7.26 | 5.33 | 6.88 | 13.37 | 21.41 | 6.36 | 1.79 | 24.25 | 3.05 | 19.92 | - |

*Note:* T2 = time 2 assessment; T1 = time 1 assessment
*p* <.05 (2-tailed); **p* <.01 (2-tailed); ***p* < .001 (2-tailed)

Descriptive statistics and correlations among the primary study variables obtained by teachers are listed in table 2. As well as in parent reports, in teacher reports the aggressive behaviour scales exhibited moderate levels of temporal stability from T1 to T2 (TRF aggressive behaviour scale: $\rho$=.56, IRPA total scale: $\rho$=.50). The scales of these questionnaires also correlated within T1. The T1 IRPA proactive and reactive scales did not significantly correlate with the T2 TRF aggressive behaviour scale. Higher levels of CU traits significantly correlated with all the T1 measures of aggressive behaviour, except for the T1 IRPA reactive scale. Higher levels of CU traits did not correlate with the T2 measures of aggressive behaviour. Higher levels of CU traits were significantly correlated with lower levels of empathy (GEM total scores). Lower levels of GEM scores were also significantly correlated with higher levels of T1 TRF aggressive behaviour and with a higher SES. In contrast to the parent reports, the teacher reported attention problems

significantly correlated with CU traits and with the amount of aggressive behaviour on both the T1 TRF and T1 IRPA scales (except for the IRPA reactive scale). Attention problems also significantly correlated with T2 TRF aggressive behaviour. Estimated intelligence did not significantly correlate with any other teacher reported variable. Higher SES scores correlated significantly with higher amounts of T2 TRF aggressive behaviour. The mean amounts of aggressive behaviour reported by teachers are lower than those reported by parents. Teachers also reported less empathy on the GEM and almost twice as much attention problems in children, as parents did.

Table 2. *Descriptive statistics and correlations among primary study variables in teacher report*

|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. TRF agg.beh. T2 |  | .67*** | .56*** | .24 | .29 | .32* | .13 | -.06 | .51** | .14 | .33* |
| 2. IRPA total T2 |  |  | .40* | .37* | .42** | .50** | .11 | -.07 | .30 | -.05 | .17 |
| *3. TRF agg.beh. T1* |  |  |  | .62*** | .50** | .71*** | .46** | -.33* | .65*** | .24 | -.01 |
| 4. IRPA proactive T1 |  |  |  |  | .69*** | .82*** | .40* | -.31 | .51** | .07 | -.20 |
| 5. IRPA reactiveT1 |  |  |  |  |  | .71*** | .06 | .05 | .29 | -.09 | -.15 |
| 6. IRPA total T1 |  |  |  |  |  |  | .41** | -.30 | .54*** | .04 | -.14 |
| 7. APSD CU traits T1 |  |  |  |  |  |  |  | -.49** | .33* | .15 | .04 |
| 8. GEM total T1 |  |  |  |  |  |  |  |  | -.23 | -.29 | -.41** |
| 9. TRF atten.pr. T1 |  |  |  |  |  |  |  |  |  | .14 | .11 |
| 10. Estimated IQ |  |  |  |  |  |  |  |  |  |  | .23 |
| 11. SES |  |  |  |  |  |  |  |  |  |  |  |
| *M* | 10.26 | 4.51 | 12.63 | 11.40 | 19.43 | 7.03 | 5.23 | -9.82 | 21.20 | 105 | - |
| *SD* | 7.83 | 2.93 | 9.71 | 12.88 | 14.33 | 5.51 | 2.19 | 19.17 | 10.39 | 19.92 | - |

*Note:* T2 = time 2 assessment; T1 = time 1 assessment
*p <.05 (2-tailed); **p <.01 (2-tailed); ***p < .001 (2-tailed)

**Regression analyses**

Several separate stepwise regressions were used containing either parent reported T2 and T1 variables, or teacher reported T2 and T1 variables. T2 aggressive behaviour measured with CBCL/TRF or IRPA scales were regressed onto the T1 CBCL/TRF or IRPA scales and each of the other T1 predictors in separate regressions. Identical procedures were conducted using the categorical CU traits variable instead of the interval CU traits variable at T1 as predictor. Next, it was examined whether the influence of CU traits would be different when it was used categorically (clinical vs. nonclinical score of CU traits). The predictive models for both parent and teacher reported T2 aggressive behaviours with the categorical CU traits variable had exactly the same predictive values as the models with the interval CU traits variable (see table 3-6).

In the first analysis (see table 3), the T1 CBCL aggressive behaviour scale ($\beta$=.76, $p$=.001) and male gender ($\beta$=.22, $p$=.05) significantly predicted CBCL aggressive behaviour scores at T2 ($R^2$=.62). Thus, the T1 amount of parent reported CU traits, empathy (GEM total) or CBCL attention problems, as well as the estimated intelligence

and SES score did not significantly contribute to the prediction of parent reported T2 aggressive behaviour on the CBCL. The T1 CBCL aggressive behaviour scale and being male together explained 62% of the variance in T2 parent reported CBCL aggressive behaviour. Only the T1 IRPA total score ($\beta$=.59, $p$=.001) significantly predicted T2 IRPA total aggressive behaviour ($R^2$=.35) reported by parents (see table 4).

Table 3. *Predictive model of T1 variables predicting parent reported aggressive beh. (CBCL) T2*

| | | CBCL aggressive behaviour scale T2 | | |
|---|---|---|---|---|
| | | B | SE B | β |
| Step 1 | Constant | 2.84 | 1.90 | |
| | CBCL aggr. beh. T1 | .80 | .11 | .76*** |
| Step 2 | Constant | -.531 | 2.41 | |
| | CBCL aggr. beh. T1 | .80 | .11 | .76*** |
| | Gender (being male) | 4.05 | 1.90 | .22* |

*Note:* Excluded variables: APSD CU traits, GEM total, CBCL attention problems, estimated IQ, SES
$R^2$ =.58 for step 1; $R^2$ = .62 for step 2 ($p$ <.001) *$p$ < .05, ***$p$ <.001

Table 4. *Predictive model of T1 variables predicting parent reported aggressive beh. (IRPA total) T2*

| | | Parent reported IRPA total aggressive behaviour T2 | | |
|---|---|---|---|---|
| | | B | SE B | β |
| Step 1 | Constant | 4.07 | 1.24 | |
| | IRPA total T1 | .49 | .11 | .59*** |

*Note:* Excluded variables: IRPA proactive, IRPA reactive, APSD CU traits, GEM total, CBCL attention problems, estimated IQ, gender, SES
$R^2$ =.35 ($p$ <.001) ***$p$ <.001

In the teacher report (see table 5), the T1 TRF aggressive behaviour scale ($\beta$=.56, $p$=.001) significantly predicted T2 TRF aggressive behaviour scores ($R^2$=.31). However, contrary to the T2 parent report of aggressive behaviour on the CBCL, being male was not of significant influence. The T1 TRF aggressive behaviour scores explained 31% of the variance in the T2 TRF aggressive behaviour scores. Teacher reported T2 IRPA total aggressive behaviour scores were predicted by the T1 teacher reported IRPA total aggressive behaviour scores ($\beta$=.45, $p$=.01, $R^2$=.20, see table 6). Therefore, the T1 amount of teacher reported reactive or proactive aggressive behaviours, CU traits, empathy (GEM total) and TRF attention problems, as well as the estimated intelligence and SES score did not significantly contribute to the prediction of teacher reported T2 IRPA total aggressive behaviour.

Table 5. *Predictive model of T1 variables predicting teacher reported aggressive beh. (TRF) T2*

| | | TRF aggressive behaviour scale T2 | | |
|---|---|---|---|---|
| | | B | SE B | β |
| Step 1 | Constant | 4.68 | 1.76 | |
| | TRF aggr. beh. T1 | .46 | .11 | .56*** |

*Note:* Excluded variables: APSD CU traits, GEM total, TRF attention problems, estimated IQ, gender, SES
$R^2$ =.31 ($p$ <.001) ***$p$ <.001

Table 6. *Predictive model of T1 variables predicting teacher reported aggressive beh. (IRPA total) T2*

| | | Teacher reported IRPA total aggressive behaviour T2 | | |
|---|---|---|---|---|
| | | B | SE B | β |
| Step 1 | Constant | 2.91 | .70 | |
| | IRPA total T1 | .25 | .08 | .45** |

*Note:* Excluded variables: IRPA proactive, APSD CU traits, GEM total, TRF attention problems, estimated IQ, gender, SES
$R^2$ =.20 ($p$ <.01) **$p$ <.01

## Discussion

The primary goal of the current study was to examine the predictive value of CU traits and empathy on the stability of conduct problems in clinically referred 6-7 year old children with ADHD and/or ODD. Consistent with prior research (e.g. Frick & Loney, 1999; Pardini & Fite, 2010; Tremblay, 2000), there was a high stability of conduct problems over a one year period. Contrary to expectations based on prior research (e.g. Frick et al, 2003; Frick et al., 2005; Pardini et al., 2007), CU traits and empathic deficits did not have incremental value in predicting conduct problems.

In parent reports, the persistence of aggressive behaviour (based on the CBCL aggressive behaviour scores) over one year was best predicted by the amount of aggressive behaviour reported at the first assessment and the gender of the child. As mentioned in the introduction, the CBCL and TRF not only cover aggressive behaviour, but a broader concept of conduct problems. This indicates that a higher level of parent reported conduct problems was predicted by the amount of conduct problems the child showed the previous year and the fact that the child is a boy, perhaps because the diagnostic criteria of the DSM-IV definitions emphasise behaviours typically observed in boys (Wicks-Nelson & Israel, 2009). When looking at more clearly defined aggressive behaviour (based on the IRPA scores), only the total amount of aggressive behaviour predicted the total amount of aggressive behaviour the next year. These findings are in line with previous research that has indicated that the conduct problems in children diagnosed with ODD or CD are reasonably persistent over time (Frick & Loney, 1999). Differentiating between proactive and reactive aggression did not make any difference in predicting the aggressive behaviour at the follow-up assessment of the present study. In teacher reports only conduct problems (based on the TRF) at the first assessment predicted conduct problems the next year. In addition, as in parent ratings, more clearly defined aggressive behaviour in teacher reports could only be predicted by the total amount of aggressive behaviour at the first assessment.

Attention problems were clearly present in the current study, as 95% of the sample received an ADHD diagnosis. Contrary to expectations, the attention problems did not contribute to the prediction of aggressive behaviour outcomes, although they were correlated in teacher reports. ADHD symptoms are often found to be related to conduct problems (Carr, 2006; Wicks-Nelson & Israel, 2009). Attention problems may be more evident in a school setting than at home, but teachers could also have rated the 'annoying behaviour' as attention deficit, whereas parents might refer to this behaviour as conduct problems. This could be explained by the fact that the TRF attention problem scale contains more behaviours that can be perceived as annoying, compared to the

CBCL attention problem scale (Achenbach & Rescorla, 2001). For example, annoying behaviours measured by the TRF, but not by the CBCL, are 'talks too much', 'shows off to stand out', 'behaves irresponsible' and 'whines'.

It has been proposed to include CU traits in the DSM-V as a specifier in conduct disorder, because these traits are thought to provide useful prognostic information above and beyond the current DSM-IV criteria for conduct disorder (Frick & Moffit, 2010). Although there are several studies supporting the predictive utility of CU traits for persistence of conduct problems, most have used large community samples, including children of (pre-)adolescent age, or long follow-up periods (e.g. Frick et al., 2003, Frick et al., 2005; Pardini et al., 2007; Pardini & Fite, 2010). However, as well as in the present study, the effects found in prior research could be largely explained by differences in the initial level of conduct problems. In the study (n=98) of Frick and colleagues (2003) for example, the predictive value of CU traits on aggression at the 1-year follow-up assessment was no longer significant when controlled for severity of conduct problems at the initial assessment. In a 1-year follow-up in 9-12 year old children (n=120), the predictive value of CU traits on antisocial behaviour was small ($\beta$=.18; Pardini et al., 2007). In a large 2-year follow-up study (n=1517) on boys (mean age 10.7 years), it was found that CU traits predicted moderate/serious violence and receiving criminal charges, but not ODD and CD symptoms based on the TRF and CBCL (Pardini & Fite, 2010).

In the current study, CU traits and empathy did not provide additional prognostic information about the persistence of conduct problems or aggressive behaviour over one year in a relatively small sample of initially 6 and 7 year old children with ADHD and/or ODD. Perhaps in young children, the effects of CU traits on conduct problems only become apparent after more than one year. Although in a community sample of 7-year old twins different developmental trajectories of CU traits were found, the high level CU traits trajectories indeed were related to higher level of conduct problems, only from the age of 12 year on (Fontaine et al., 2010).

Furthermore, the conduct problems and aggressive behaviour measures in this study highly correlated over time in both parent and teacher ratings; the problem behaviour at the first assessment explained a large proportion of the problem behaviour one year later. In order to provide useful information on top of this already explained variance, CU traits or empathy probably needed to have strong influence on conduct problems at the follow-up assessment. In previous research this problem sometimes seemed to be solved by ascribing higher scores to the CU traits in children: some studies combined parent and teacher ratings by taking the higher of the two informants' ratings for each item on the questionnaires (e.g. Pardini et al., 2007). Therefore it is possible that the relations between CU traits and the antisocial outcomes were higher, compared

to the outcomes of present study. However, using the CU traits in a categorical way (either ascribing a low or high score on CU traits) did not change the predictive utility on the amount of conduct problems one year later in the present study. Furthermore, although the CU traits scale of the APSD has proved to be a valid measure of CU traits (Frick & Hare, 2001), in the present study the Cronbach's alpha for the CU traits scale in both parent and teacher reports was low. If a more comprehensive CU measure had been used in this study, CU traits probably related more clearly with the aggressive outcomes assessed one year later.

CU traits and empathy have not been found to contribute to the persistence of conduct problems and there was only a very small correlation between CU traits and the aggressive outcomes the next year. Perhaps CU traits and empathy could be predictive for maladjustment in other domains of functioning, such as in the social development or the academic achievement. In a study on antisocial youth, it was found that children with both conduct problems and CU traits showed higher levels of affiliation with deviant peers, when compared to children with conduct problems but without CU traits (Kimonis, Frick & Barry, 2004).

Although this study is characterised by a number of strengths, including the sample of clinically referred young children with diagnoses of ADHD and/or ODD and the differentiation between parents and teachers as informants, it is important to highlight several limitations. Firstly, although this study is one of few that examined the relation between CU traits, empathy and conduct problems in a one-year follow-up in young children, studies covering a longer follow-up period are needed to examine the extent to which CU traits predict the stability of conduct problems. Secondly, only 41 participants were recruited from outpatient clinical units of the Department of Child and Adolescent Psychiatry of the UMCU. Replications are needed with a larger study population, consisting of children with comparable behaviour. Performing a replication of this study, using a larger study population, might support prior findings. Thereby, some of the predictor and outcome variables deviated from a normal distribution. This can be explained by the small study population, who are expected to show similar behaviour according to their clinically similar diagnoses. Thirdly, the assessment of the variables (including CU traits, empathy and conduct problems) was conducted using parent and teacher information separately. This enables differentiation of behaviours observed by these two informers. However, combining parent and teacher ratings probably provides more comprehensive measures and thus provide better inside into the relations between reported information. Fourthly, the CU traits scale of the PSD showed low internal consistency in both parent and teacher reports. Therefore the scores on the CU traits scale had to be interpreted carefully. Fifthly, the intelligence scores had a considerable range, probably because it was only based on two subtests of the WISC-III-NL (Kort et

al., 2005). A more accurate estimation, based on more subtests, might result in another predictive utility of intelligence on the amount of conduct problems. Finally, it is suggested to include other important outcome variables, such as academic achievement and quality of peer relations, when examining the predictive utility of CU traits and/or empathy in young children.

### *Conclusion*

Consistent with prior research, aggressive behaviour predicted persistence of aggressive behaviour over one year in a clinical referred sample of initially 6 and 7 year old children with ADHD and/or ODD. Although CU traits and empathy were also expected to contribute to the prediction of persistently aggressive behaviour, these relationships have not been found. When considering including CU traits as a specifier for disruptive behaviour disorders in the DSM-V, it is suggested to consider also the age of children. In young children, the presence of CU traits does not seem to contribute to the prediction of persistent aggressive behaviour. The influence of CU traits at young age, probably should be analysed in context of other domains of functioning.

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