Investigating Developmental Sex Differences in Empathy as Predictors of Aggression in
Western Cape Children

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Abstract

In the South African context aggressive behavior poses a serious threat to the wellbeing of individuals yet there has remained a dearth of South African research regarding known predictors of aggressive behavior, namely the role of certain empathic profiles. Recent international research (e.g. Dadds et al., 2008; Dadds et al., 2009) suggests that different components of empathy have different developmental trajectories across age and also appear to be dependent on sex. Consequently, the aim of the current study was to examine the effects of age and sex on cognitive and affective components of empathy to see if certain empathy profiles were predictive of heightened levels of aggression within the context of the Western Cape, South Africa.

Parent/legal guardian reports were collected to compare empathy profiles (scored using the QCAE) and levels of aggression (scored using the externalizing subscale of the CBCL) of N=80 neurotypical children. Data were collected at the participating children's schools where parents were asked to come in to complete the QCAE and the CBCL with the help of a researcher. Our sample was divided into four groups of 20 individuals split according to sex (boys versus girls) and age group (6-7 year olds versus 12-13 year olds). Participants were selected using purposive stratified sampling and were systematically varied and matched across groups to account for differences in SES, home language and ethnicity.

Results suggested that cognitive and affective empathy scores differed significantly across sex, with girls scoring higher on each empathy measure. It was also found that cognitive empathy significantly increased with age across both sexes, whereas affective empathy did not. Moreover, a regression model constructed from the data showed that both cognitive and affective empathy were significant predictors of aggression. Thus, these results appear to support international findings and shed new light on several factors that are predictive of aggression within a South African context.

Keywords: child development, empathy development, empathy profiles, cognitive empathy, affective empathy, parent report, QCAE, aggression, sex differences.

Sex differences are a contentious area of research due to the fact that in delineating difference researchers run the risk of perpetuating stereotypes (Basow, 1992; Locke, 2002). However, without research regarding sex differences stereotypes cannot be disentangled from substantiated evidence of actual difference. The contested nature of sex differences is particularly visible in social emotions research, where although a vast body of investigations indicates the presence of sex differences in empathy there remains little consensus among the research findings (Jaffee, & Hyde, 2000; Lennon & Eisenberg, 1987).

There are two pivotal problems underlying the incommensurability of studies that explore sex differences in empathy: (1) difficulties with the conceptualization of empathy and (2) a lack of a developmental model of empathy. Empathy is an abstract phenomenon and therefore difficult to conceptualize: thus individual studies generally conceptualize, operationalize and measure empathy in different ways (Bateson, 2001). This has rendered the research findings of various studies examining sex differences in empathy largely incomparable. Furthermore, the lack of consensus in the research findings and the large focus on *adult* populations has prevented the construction of an adequate developmental model of empathy (Lennon & Eisenberg, 1987).

This lack of a developmental model of empathy, across both age and sex, is of significant concern as certain empathy profiles have been found to be associated with antisocial and aggressive behaviours (Cohen & Strayer, 1996; de Wied, Goudena, & Matthys, 2005; Silverthorn & Frick, 1999; Spinella, 2005; Viding, Blair, Moffitt, & Plomin, 2005). Notably, these early aggressive behaviours have been shown to be predictive of greater probabilities of delinquency, criminality and lifetime aggression (Baldry & Farrington, 2000; Moffit, 1990). These findings have particular importance within the South African context which has one of the highest rates of violent crime in the world, with over 1.8 million serious crimes being committed between 2011 and 2013 (South African Police Service, 2013).

A recent study by Dadds and colleagues (2008) provided preliminary evidence for sex as a mediating factor in the development of empathy across childhood, however these results have yet to be replicated in South Africa or elsewhere. Thus, the current study aimed to investigate whether specific empathy profiles (i.e. differing levels of *cognitive* and *affective* empathy across *age* and *sex*) in a South African context echoed the empathy profiles that Dadds and colleagues (2008) found to be predictive of aggression. Replication of these results hopes to provide further evidence for the potential risk factors associated with aggression, to help inform future interventions. Moreover, this research should bring us one step closer to a more comprehensive model of empathy development.

Background

Sex Differences on Our Minds

A recent article published on the website *scientificamerican.com* proclaimed that "sex differences in the brain are sexy," they fascinate the broader public and researchers alike, but they can easily become a point of contention (Elliot, 2009, "Girl Brain, Boy Brain?" para. 1). Controversy surrounds research on sex differences as researchers tread a fine line in their efforts to disentangle gender stereotypes, which have a socialized quality in terms of perceived gender roles, from evidence of significant differences across biological sex. This has proven to be a difficult task, which has not been aided by the general lack of agreement between the results of individual studies examining sex differences (Basow, 1992; Lennon & Eisenberg, 1987). This controversy is particularly evident in the research concerning sex differences in social cognition and more specifically in studies examining sex differences in empathy (Klein & Hodges, 2001).

Sex Differences in Empathy: Stereotype or Fact?

Several studies have investigated whether gender stereotypes regarding empathy are supported by research findings (Fischer, 1993; Hyde, 1984; Rueckert, 1987). Studies adopting an evolutionary perspective argue that since women acted as primary caregivers and males as primary providers, females should have more highly developed socio-cognitive abilities, whereas males should be more protective and therefore more violent and less empathic (Greary & Flinn, 2002). However, there remains a lack of consensus in results regarding sex differences in empathy (Basow, 1992; Feingold, 1994; Jaffee & Hyde, 2000). The need to disentangle stereotype from fact seems more pressing than ever as recent research findings have shown particular empathy profiles are associated with increased externalizing and aggressive behaviours in children: a relationship which has been found to be mediated by sex (Dadds et al., 2008, Dadds et al., 2009).

Evidence for Sex Differences in the Neural Mechanisms Associated with Empathy

Although there is a lack of consensus in research regarding how males and females differ empathically, neuroimaging studies have demonstrated that females and males recruit different parts of the brain when asked to perform empathic tasks (Decety, 2011; Decety & Jackson, 2004; Hofer et al., 2006; Schilte-Ruther, et al., 2008). Moreover, studies examining the effects of hormone exposure in the womb have shown that different levels of exposure to testosterone are mirrored by sex differences in brain structures associated with empathic functioning (Arnold, 1996; de Vries et al., 2002; Fitch & Denneberg, 1998).

However, although this research provides evidence for the existence of biological differences across the sexes, there is still little understanding of what impact these differences have on empathic behaviour (Decety & Michalaska, 2010; Eslinger; 1998). As Dadds and colleagues (2009) note, despite a growing neuroscience of empathy, little is known about how factors such as age and sex mediate the development of cognitive versus affective empathy across childhood. Overall, we lack a developmental model of empathy which takes into consideration both biological differences and environmental influences (Brody, 1985).

Absence of a Developmental Model of Empathy

One explanation for the lack of consensus in research regarding sex differences in empathy may be due to the notable dearth of literature pertaining to the development of empathy in boys and girls across childhood (Lennon & Eisenberg, 1987; Ruekert, 1987). Although empathy is understood to develop within the individual from childhood through to adulthood as an interaction between biology and socialization, there is little understanding of the course of empathy development (Zahn-Waxler, Robinson, & Emde, 1992). A lack of research has prohibited the construction of an adequate developmental model of empathy that takes both biological and social factors into consideration (Zahn-Waxler, Radke-Yarrow, & Wagner, 1992).

This poses significant problems to the study of empathy as without a developmental model of empathy there is no basis upon which to construct theory. There is a need to study sex differences in empathy across childhood because until recently the majority of the research has focused on *adult* sex differences in empathy (Eisenberg & Strayer, 1987). Sex differences in empathy need to be interpreted in light of developmental findings since empathy is understood to change and develop over time (Decety & Michalscka, 2010). In essence, we cannot know the meaning or significance of sex differences in empathy if we do not understand how empathy develops.

Problems with Conceptualizing and Operationalizing Empathy

The lack of a developmental model of empathy is but one explanation for the general lack of consensus in findings across studies of sex differences in empathy. A second fundamental difficulty concerns the pivotal problem of conceptualizing empathy (Bateson, 2001; Eisenberg & Strayer, 1987; Gerdes, Segal & Lietz, 2010). Although researchers agree that empathy is important, there is little agreement regarding how to conceptualize empathy, which has in turn led to problems with operationalization (Hoffman, 1982). Disagreement about how empathy can be understood as a construct has led to an array of conceptualizations and operational measures of empathy (Bateson, 2001).

Having multiple operationalizations of empathy has become increasingly problematic as research has shown that the type of measure used in the examination of empathy affects the magnitude of the sex difference found (Lennon & Eisenberg, 1987). For example, self-report measures have been found to produce larger sex differences in findings, which may reflect social desirability bias (Lennon & Eisenberg, 1987). Moreover, studies that conceptualize empathy differently generally have incomparable results. In order to address this problem there needs to be more agreement about what is meant by the concept of empathy and how the construct can be appropriately measured in relation to its conceptualization.

Measuring Cognitive and Affective Components of Empathy

Clarification of the construct of empathy is beyond the scope of this study. However, in order to examine sex differences in empathy this study needs to clarify what is meant when the term empathy is used. A growing body of evidence has led researchers to suggest that overall dispositional empathy can be understood as having separable cognitive and affective components (Dadds et al., 2008; Dadds et al., 2009; Decety, & Jackson, 2004; Decety & Michalscka, 2010). *Cognitive empathy* is the term used to describe a person's ability to understand or know what someone else is feeling whereas *affective empathy* is the term used to describe the degree to which a person feels what another feels (Eisenberg & Strayer, 1987; Eslinger, 1998; Preston & de Waal, 2002). This conceptualization of empathy has made the study of empathic differences across sex more straightforward in that now males and females can be compared in relation to their cognitive and affective empathy scores.

Why Study Empathic Gender Differences Across Childhood Using the QCAE?

Recently Dadds and colleagues (2008) piloted a measure of cognitive and affective empathy called The Griffith Empathy Measure (GEM), which was found to reliably measure cognitive versus affective empathy in an Australian sample of children. The validated GEM was then used to examine sex differences in empathy across childhood. Findings pointed to developmentally different empathy profiles in boys versus girls: specifically it was found that levels of cognitive versus affective empathy significantly differed across age and sex (Dadds et al., 2008). Moreover, results of a second study by Dadds and colleagues (2009) pointed to certain concurrent levels of cognitive and affective empathy (i.e. particular empathy profiles) as being predictive of heightened levels of aggression. Specifically, Dadds and colleagues (2009) found that girls who exhibited low cognitive empathy but high affective empathy showed increased externalizing aggressive behaviour, whereas boys with higher cognitive empathy and lower affective empathy conversely showed increased externalizing aggressive behaviour.

These results have yet to be replicated in South Africa or elsewhere. More importantly, recent research has shown that the GEM is not a reliable measure within the South African context (Woolley, 2012). This indicates a need to pilot other potentially more reliable measures of cognitive and affective empathy in South Africa, such as the *Questionnaire of Cognitive and Affective Empathy* (QCAE), to ascertain if Dadds and colleagues' (2009) results are supported. In South Africa, where there are particularly high rates of violent crime and criminality, the benefits of investigating whether certain empathy profiles can predict aggressive behaviours is evident (South African Police Service, 2013).

Rationale, Aims and Hypotheses

As argued above, examining the development of empathy and its connection to aggression is critical as it takes a step towards understanding what underpins violent and aggressive behaviours, bringing us closer to being able to address and prevent such behaviours from occurring. A better understanding of the factors that impact on empathy is needed in order to reduce aggression. International research has shown that sex is a significantly affects the relationship between empathy and aggression. There remains, however, little consensus across research findings (Dadds et al., 2009; Lennon & Eisenberg, 1987).

Moreover, most of the research that has been conducted has focused on *adult* populations. This means that there is still a lack of data regarding how sex impacts on the relationship between empathy and aggression across childhood. Consequently, the aim of this study was to examine how sex impacts the relationship between empathy and aggression across different stages of childhood development in a South African context.

Hypotheses

Prior research has shown that girls and boys show developmentally different empathy profiles that predict externalizing and aggressive behaviors (Dadds et al., 2008). Based on the literature and prior research the following hypotheses were formulated:

1. *Sex effect:* It was predicted that girls would display significantly higher overall dispositional, cognitive and affective empathy scores than boys.
2. *Age effect:* It was predicted that there would be a significant age effect for total dispositional empathy and cognitive empathy (i.e., scores increase with age) but no age effect for affective empathy.

3. It was predicted that when modeled the variables *sex* and *age group* would act as significant predictors of aggression and when added to the model and would account for a significant amount of variance in aggression scores.

4. It was predicted that when modeled the empathy variables (*cognitive* and *affective* empathy) would account for a significant amount of variance in aggression scores.

5. It was predicted that *affective empathy* would have a positive relationship with aggression (i.e. higher level of affective empathy would be associated with higher levels of aggression), and that *cognitive empathy* would have a negative relationship with aggression (i.e. lower cognitive empathy scores were expected to be predictive of higher levels of aggression).

Method

Research Design and Setting

This study took the form of a quasi-experimental, cross sectional comparison. Participants were specifically assigned to one of four groups based on their *sex* and *age* rather than being randomly assigned. The four groups were compared based on parent report of child behavior using the QCAE as a measure of overall dispositional empathy and it's cognitive and affective subcomponents and the externalizing subscale of the *Child Behaviour Check List* (CBCL) as a measure of aggressive behavior. Total dispositional, as well as cognitive and affective empathy profiles were compared. Parent report data was collected during scheduled times where researchers met with parents on school premises. This study formed part of a larger research protocol.

Participants

For this specific sub-study parent/legal guardian reports were used to assess the dispositional empathy profiles of neurotypical children ($N = 80$). Both children and parents/legal guardians participated in the broader study, but only parent/legal guardian report data was used for this specific sub-study. This study recruited participants from both mainstream private and public schools in the Western Cape region.

In order to ensure that participants were systematically varied and matched across groups purposive stratified sampling was used to account for socioeconomic status, sex, and age. Students being taught in English first language in Grade 1 (ages 6-7) and Grade 7 (ages 12-13) were eligible for participation. Moreover, it was noted when home language differed from language of instruction and participants were matched across groups. *Table 1* below presents the basic demographic characteristics of the included participants.

Table 1. *Sample Characteristics of the Pilot Study Sample*

Characteristic	Group			
	6-7 year old boys	6-7 year old girls	12-13 year old boys	12-13 year old girls
	(*n* = 20)	(*n* = 20)	(*n* = 20)	(*n* = 20)
Age range (Months)	74 - 89	73 - 88	138 - 161	144 - 166
Age (years)				
M (*SD*)	6.40 (0.50)	6.30 (0.47)	12.40 (0.50)	12.20 (.69)
Home language				
English: Afrikaans & English: Afrikaans: isiXhosa: isiXhosa & English	18:1:0:1:0	17:1:1:1:0	19:0:0:0:1	19:0:0:1:0
Ethnicity				
Coloured: Black	19:1	18:2	19:1	19:1
SES Range[a, b]				
Composite Std. Score	(-2.55) – (5.02)	(-2.70) – (3.62)	(-2.63) – (5.28)	(-3.62) – (4.84)
Working Memory [c]				
M (*SD*)	9.4 (3.54)	10.55 (3.10)	15.00 (3.75)	14.65 (2.02)

[a] SES = z (income) + [z (mother's education + father's education) /2] + z (assest index score).
[b] The range of SES scores does not differ across each of the groups, and all group show a wide range of SES.
[c] Working Memory does not significantly differ across sex for each age group.

Exclusion and inclusion criteria. Children with a documented history of infantile meningitis, traumatic head injury with a loss of consciousness and/or a diagnosed neurological condition/s (such as epilepsy) were not included in this study. Children with a history or diagnosis of a pervasive developmental disorder were also excluded. However, children diagnosed with behavioral, affective, or conduct disorders were included, and these diagnoses were documented.

Measures

The sub-study used parent/legal guardian report measures of child behaviour to measure the dispositional empathy scores and the levels of aggression of the children participating. All measures were administered in English. The QCAE was used to measure the cognitive and affective components of overall dispositional empathy. The externalizing subscale of the CBCL was employed as a measure of child aggression. General measures used to determine whether participants could be included in this sub-study will be discussed first, followed by a more in-depth description of the QCAE and CBCL.

General measures. *Basic demographic information.* In order to distinguish between those who could participate in this study versus those who could not parents/legal guardians were asked to fill out a demographic questionnaire. This questionnaire was used to ascertain if the participants met any of the exclusion criteria by asking specific questions about medical history. Moreover, this questionnaire posed a set of questions regarding home language, schooling language and participant age which was also used to determine if participants met inclusion criteria (Appendix C).

Socioeconomic status (SES). Participants' SES was estimated by using a questionnaire which acquired information regarding (1) parent/legal guardian education, (2) household financial and material resources and (3) total annual income (Appendix C). These three areas provided indices of SES that were used together to calculate a composite score of participant SES. Measuring SES via several indicators, rather than simply looking at a singular monetary indicator, allows for variation in SES to be depicted more adequately, especially in low and middle income countries such as South Africa (Barnes, Wright, Noble, & Dawes, 2007; Booysen, 2001; Cooper, Lund, & Kakuma, 2012; Myer et al., 2008).

Measure of dispositional empathy: QCAE. The original QCAE is a self-report questionnaire that was used in this study without modification as a parent-report measure of total dispositional empathy and its affective and cognitive subcomponents. The measure is comprised of 31 statements to which participants are asked to respond by selecting one of four Likert scale response options to indicate level of agreement: (1) *strongly agree,* (2) *slightly agree,* (3) *slightly disagree* and (4) *strongly disagree* (see Appendix D).

The QCAE measures levels of agreement with statements pertaining to either cognitive empathy such as, "My child is good at predicting how someone will feel," or affective empathy such as, "My child often gets upset when they see someone cry" (Reniers, Corcoran, Drake, Shryane, & Völlm, 2011, p. 89). To score the measure the items are summed, therefore for overall dispositional empathy all of the items would be added together to obtain a total empathy score. Similarly, the cognitive and affective empathy subscales are scored by adding together all items pertaining each individual subscale.

The current study employed the QCAE as opposed to the GEM (used in Dadds and colleagues 2008 study) as a measure of cognitive, affective and overall dispositional empathy as a previous plot study performed by Woolley (2012) found that the GEM was an unreliable measure of empathy and its subcomponents for a South African sample. Based on their research Reniers and colleagues (2011) found that the QCAE had reliable levels of cognitive (α

= .79) and affective empathy α =.73), whereas Woolley (2012) found unreliable levels of cognitive (α = .38) an affective (α = .67) empathy for the GEM. Thus, the QCAE was employed as the chosen measure of empathy because of its strong reliability and its simple response format.

Measures of aggressive behaviour: Externalizing subscale of the CBCL. The CBCL is a widely used and validated measure employed to identify children with a wide range of emotional and behavioral problems (Achenbach & Rescorla, 2001). This study examined children between the ages of 6-13 years, thus the school-age version of the CBCL (intended for children/adolescents between 6-18 years) was used. The CBCL consists of two subscales that measure either internalizing or externalizing behaviours.

In order to measure aggression/aggressive behaviour this sub-study utilized the parent report version of the CBCL's *externalizing* subscale. There are 36 statements that comprise this subscale to which participants respond using a Likert scale consisting of 3 options: (1) *not true,* (2) *somewhat sometimes true* or (3) *very true/often true*. This subscale includes questions that pertain to aggressive, antisocial and disobedient behaviours (Appendix E).

The CBCL has shown high reliability for American samples as well as internationally in both non-African and African countries (Achenbach & Rescorla, 2001; Ivanova, 2007; Roessner, Becker, Rothenberger, Rohde & Banaschewski, 2007). Moreover it has been used in a range of South African studies (e.g. Barbarin, Richter, & de Wet, 2001; Cluver, Gardner, & Operario, 2007; Palin et al., 2009) and its externalizing scale shows strong internal consistency in the South African context. A recent pilot study by Woolley (2012) found that the externalizing sub-scale also performs particularly well in the Western Cape (Cronbach's alpha = .87) which provides further support for this measure's use in the current study.

Procedure

General procedure. The study commenced once UCT ethical approval, Western Cape Education Department of (WCED) approval, school participation and principal permission were confirmed. Before data collection began information about the study together with parental consent forms and demographic questionnaires were sent home with children to their parents (Appendix B and C). Participants were selected based on the data provided by these forms, which were used to confirm if participants met the necessary inclusion criteria.

Collection of parent data. Researchers contacted parents to set up convenient times for them to meet on school premises to fill out several questionnaires. Researchers were present whilst parents filled out the forms so that there was someone to answer any questions that arose.

The full set of parent questionnaires (including those from the larger study) took about an hour to an hour and half to complete. Parents were compensated with R150 when they had completed all of the questionnaires, thanked for their participation, adequately debriefed and informed that they would be given feedback on results of the study towards the end of the year.

Ethical Considerations

This sub-study formed part of a larger study that had already attained approval from the ethics committee within the UCT Psychology department as well as the approval of the Western Cape Education Department (see Appendices F and G) to recruit participants from schools within the department's jurisdiction. After being approached several schools confirmed that they would be willing to participate in this study, and would allow for their premises to be used for data collection purposes.

Parental consent and child assent (Appendices B and A) were sought and confirmed prior to participation in the current study. Participants were told that participation in the study was entirely voluntary and that they could withdraw from the study at any point without any consequences. Furthermore, participants were informed that all information they provided would be kept strictly confidential and would used for research purposes alone.

Data Management and Statistical Analysis

SPSS Statistics 22.0 was employed for all statistical analyses. Before inferential analyses were carried out descriptive statistics were calculated to examine the distribution, central tendency and potential emergent patterns depicted within the data. Cronbach's alpha was calculated to assess the item-total correlations as well as the overall reliability of the measures employed, namely the QCAE and the externalizing subscale of the CBCL.

For the multiple regression analyses Pearson's correlations were calculated for each predictor included. One-tailed tests of significance were used as it was expected that all variables would have directional relationships with aggressive externalizing behavior. The alpha level was set as $\alpha = 0.05$ for all of the statistical analyses.

The first part of the main analysis aimed to investigate hypotheses 1 and 2. Three 2 x 2 factorial ANOVA's were employed to investigate how the independent variables of *age* and *sex* affected the dependent variables of *total dispositional empathy* (ANOVA 1), *cognitive empathy* (ANOVA 2) and *affective empathy* (ANOVA 3). All of the assumptions underlying each ANOVA were statistically examined and found to be upheld (Appendix H).

The second part of the main analyses aimed to investigate hypotheses 3, 4 and 5. A hierarchical regression was modeled to investigate whether certain levels of the empathy variables (i.e. certain empathy profiles) as well as sex and age group could significantly predict externalizing, aggressive behavior. Other potentially important predictors of aggression (including: working memory, socio-economic status, ethnicity, home language and school) were also included in the hierarchical model. All of the assumptions underlying multiple regression analysis were statistically examined and found to be upheld (Appendix I).

Results

Descriptive Statistics

Table 2 below exhibits several notable patterns. Comparing across sex it can be seen that females score higher on all empathy variables than males across age, with the highest discrepancies being between dispositional and cognitive empathy scores. Interestingly, the standard deviations show that there is generally less dispersion from the mean for females' empathy scores than for males'. Moreover, examination of the minimum and maximum values reveals that the range for males' empathy scores is generally larger than that of females'.

 Comparing across age group it can be seen that dispositional, cognitive and affective empathy scores increase with age across sex. However, the increases in dispositional and cognitive empathy scores are more evident than that of affective empathy, which by comparison appears marginal. Examining the minimum and maximum scores across the age groups it can be seen that the range of empathy scores narrows for cognitive and dispositional empathy as children age. However, for affective empathy the range of empathy scores does not appear to narrow with age.

Table 2. *Means and SDs for the QCAE's dispositional, cognitive and affective subscales split by sex and age*

		Sex of child							
		Male				Female			
		Mean	SD	Min	Max	Mean	SD	Min	Max
6-7 years	Dispositional	2.25	21.28	-39.00	48.00	17.15	18.27	-21.00	45.00
	Cognitive	-2.65	16.52	-34.00	28.00	10.00	14.65	-27.00	29.00
	Affective	4.90	7.36	-11.00	20.00	7.15	8.31	-8.00	17.00
12-13 years	Dispositional	15.00	21.77	-30.00	49.00	28.75	17.48	-11.00	49.00
	Cognitive	10.95	15.65	-26.00	38.00	20.10	12.67	-11.00	34.00
	Affective	4.05	7.93	-12.00	19.00	8.65	6.51	-7.00	17.00

Measuring the Reliability of the QCAE and CBCL

Cronbach's alpha was employed to calculate the internal consistency and overall reliability of the QCAE and externalizing subscale of the CBCL. According to Cortina (1993) internally consistent measures should have an alpha of at least $\alpha = .70$, with alpha values close to 1.0 indicating higher levels of internal consistency of the measure.

Cronbach's alpha for the externalizing subscale of the CBCL was calculated to be $\alpha = .89$, which according to George and Mallery (2003, p. 231) suggests an "excellent" level of internal consistency. Thus, a value of $\alpha = .89$ is indicative of a high level of internal consistency and reliability of the CBCL's externalizing scale for our sample.

Likewise, the QCAE was found to have a high level of internal consistency with Cronbach's alpha calculated to be $\alpha = .88$. Moreover, independent assessment of the QCAE's cognitive ($\alpha = .89$) and affective subscales ($\alpha = .86$) indicated that these subscales also have high levels of internal consistency. These results indicate that the QCAE was a reliable measure of overall dispositional empathy, and its subcomponents of cognitive and affective empathy.

Investigating the Effects of Age and Sex on Empathy Scores

Investigating the effects of age and sex on dispositional empathy scores. A 2 (age) by 2 (sex) factorial ANOVA was run to examine the effects of these variables on overall dispositional empathy. Both main effects were significant at the .05 level. The the interaction effect was not significant.

The main effect for sex, $F(1, 76) = 10.48$ $p = .002$, partial $\eta^2 = .121$, indicated that females ($M = 22.95$, $SD = 3.13$) exhibited significantly higher dispositional empathy scores than males ($M = 8.63$, $SD = 3.13$). The effect size for sex is considered within literature to be small, accounting for 12.1% of the variability in displayed in dispositional empathy scores (Cohen, 1988).

The main effect for age $F(1, 76) = 7.57$, $p = .007$, $\eta^2 = .091$, indicated that there was a significant difference in the dispositional empathy scores across age groups, with the 6-7 year olds ($M = 9.7$, $SD = 3.13$) having lower scores than the 12-13 year olds ($M = 21.88$, $SD = 3.129$). The effect size for age is considered within literature to be small, accounting for 9.1 % of the variability in displayed in dispositional empathy scores (Cohen, 1988).

Investigating the effects of age and sex on cognitive empathy scores. A 2 (age) by 2 (sex) factorial ANOVA was run to examine the effects of these variables on cognitive empathy. Once again both main effects were significant at the .05 level, and the interaction effect was non-significant.

The main effect for sex, $F(1, 76) = 10.642$ $p = .002$, partial $\eta^2 = .123$, indicated that females ($M = 15.05$, $SD = 2.36$) exhibited significantly higher cognitive empathy scores than males ($M = 4.15$, $SD = 2.36$). The effect size for sex is considered within literature to be small, with sex accounting for 12.3% of the variability in displayed in cognitive empathy scores (Cohen, 1988).

The main effect for age $F(1, 76) = 12.58$ $p = .001$, $\eta^2 = .142$, indicated that there was a significant difference in the cognitive empathy scores across age groups, with the 12-13 year olds ($M = 15.53$, $SD = 2.36$) having higher scores than the 6-7 year olds ($M = 3.68$, $SD = 2.36$). The effect size for age is considered within literature to be small, accounting for 14.2 % of the variability in displayed in cognitive empathy scores (Cohen, 1988).

Investigating the effects of age and sex on affective empathy scores. A 2 (age) by 2 (sex) factorial ANOVA was run to examine the effects of these variables on affective empathy. The results of this ANOVA showed that sex had a significant effect on affective empathy scores but age did not. The interaction was not significant.

The main effect for sex, was only just significant at the .05 level, $F(1, 76) = 4.107$ $p = .046$, $\eta^2 = .051$. This result indicated that females ($M = 7.90$, $SD = 1.195$) exhibited significantly higher affective empathy scores than males ($M = 4.475$, $SD = 1.195$). The effect size for sex is considered within literature to be small, with sex accounting for 5.1% of the variability in displayed in affective empathy scores (Cohen, 1988).

The main effect for age was non-significant, $F(1, 76) = .037$ $p = .848$, $\eta^2 = .000$, indicating no significant difference in affective empathy scores across the age groups.

Examining Intercorrelations for Potential Predictors of Aggression

Prior to the construction of a hierarchical regression model an intercorrelations matrix was constructed to investigate which factors were significantly correlated with the externalizing aggressive behaviours, as measured by the CBCL. The correlation matrix shows that only three of the ten variables included in the study were significantly correlated with aggression at the $\alpha = .05$ level of significance (see Table 3. below).

Working memory had the highest (negative) correlation with the outcome variable aggression, but although significant this correlation value ($r = -.252$) is still considered weak within the literature (Taylor, 1990). Age group had the second highest negative correlation with aggression ($r = -.198$) and sex the third highest ($r = -.190$), however these Pearson correlation values are generally considered to indicate a relatively weak relationship with the correlated variable (see Table 3).

Table 3. *Intercorrelations for all variables included*

Measures	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. CBCL	-										
2. Dispositional Empathy	-.047	-									
3. Cognitive Empathy	-.137	.952**	-								
4. Affective Empathy	.168	.738**	.495**	-							
5. Sex	-.190*	.334**	.327**	.226*	-						
6. Age group	-.198*	.284**	.356**	.021	.000	-					
7. Asset Index (SES)	-.155	-.203*	-.130	-.287**	-.184	.027	-				
8. Ethnicity	-.147	-.034	.019	-.136	.052	-.052	-.188*	-			
9. Home language	-.099	-.033	.007	-.107	-.028	-.083	-.183	.559**	-		
10. School	-.091	-.196*	-.210*	-.093	-.033	-.167	.039	.155	.018	-	
11. Working memory	-.252*	.149	.278**	-.190*	.095	.612**	.193*	.052	-.105	.088	-

Note: Age group was coded 1 for 6-7 year olds and 2 for 12-13 year olds, and sex was coded (1 males, 2 females)
  * Correlation is significant at the 0.05 level (1-tailed).
** Correlation is significant at the 0.01 level (1-tailed).

Modeling Factors that Influence Aggression

A hierarchical regression was modeled to investigate hypotheses 3, 4 and 5. Hypotheses 3 and 4 predicted that the sex, age group, cognitive and affective empathy variables would act as significant predictors of aggression and would account for a significant amount of variance in aggression scores. Moreover, hypothesis 5 anticipated that certain empathy profiles, namely lower levels of cognitive empathy and higher levels of affective empathy, would be predictive of higher levels of aggression. All assumptions underlying hierarchical multiple regression analysis were examined and found to be upheld before the hierarchical model was run (see Appendix I).

The initial hierarchy proposed consisted of four blocks that contained all of the variables included in the study grouped together by relatedness (as indicated by their intercorrelations) and association in the empathy research literature. Block one consisted of the empathy variables, block two only included the sex variable, block three included age and working memory, and block four grouped all the remaining demographic variables together.

After running this hierarchal analysis it was found that model 1, which included the empathy variables alone, was the only model that incurred a significant F-change, $p = .024$, meaning that the addition of the empathy variables to the model significantly increased its predictive capacity. However, the addition of each block of variables after block 1 did not incur any significant F-changes, indicating that the addition of these variables did not significantly increase the predictive power of the model (see Table 4 below).

Table 4. *Model Summary*

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.304[a]	.093	.069	6.384	.093	3.926	2	77	.024	
2	.351[b]	.123	.089	6.316	.031	2.669	1	76	.106	
3	.378[c]	.143	.085	6.328	.020	.856	2	74	.429	
4	.435[d]	.189	.085	6.329	.046	.991	4	70	.418	2.327

a. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy

b. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Sex

c. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Sex, Age_years, WM_Std.

d. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Sex, Age_years, WM_Std, Ethnicity, School, Asset Index, Home_language

A second simplified hierarchy consisting of three blocks (block 1: empathy variables, block 2: sex, block 3: age group) was drawn up to examine whether the variables of sex and age group acted as significant predictors of aggression and to see if they would add to the predictive power of the model. It was found that the sex and age variables were not significant predictors of aggression and that the addition of these variables did not significantly increase the predictive power of the model (see Table 5).

Table 5. *Model Summary*

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.304[a]	.093	.069	6.384	.093	3.926	2	77	.024	
2	.351[b]	.123	.089	6.316	.031	2.669	1	76	.106	
3	.375[c]	.141	.095	6.294	.017	1.513	1	75	.222	2.263

a. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy

b. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Sex

c. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Sex, Age_group

Model 1 (see Table 5 above) was retained as the final model due to the fact that both its predictors were significant (cognitive empathy, Beta = -.292, p = .022 and affective empathy, Beta = .313, p = .014). The significance of these two empathy variables' beta coefficients indicates that they were the only two variables that made significant contributions to the overall predictive power of the model. Moreover, model 1 was retained because it was the only model that incurred a significant F-change, meaning that it was the only model whose predictors together significantly increased the predictive power of the model.

Based on model 1 the regression equation would be: Aggression = 9.378 + 2.503 (affective empathy score) - .292 (cognitive empathy score) + U.i. (where 'U' represents the error term and the symbol 'i' represents any data point). The model seems to be appropriate and useful as it generally fits the data and appears to generalise relatively well beyond our sample (see Appendix I). The overall R^2 of model 1 = .093, indicates that this model accounts for 9.3 % of the variance in aggression, which although does not seem like much is still statistically significant, $F(2, 79) = 3.926$, $p < .05$.

Altogether, this regression model indicates that as hypothesis 4 predicted, empathy variables accounted for a significant amount of the variance in aggression. However, it was found that sex and age group were not significant predictors of aggression, contrary to the prediction of hypothesis 3. The positive beta value for affective empathy indicates that as affective empathy increases so does aggression and the negative beta value for cognitive empathy indicates that as cognitive empathy increases aggression decreases. This provides evidence for hypothesis 5's prediction that certain empathy profiles are more predictive of aggression than others.

Discussion

The results of the current study showed that cognitive and affective empathy scores differed significantly across sex in a sample of Western Cape children. It was also found for this sample that cognitive empathy significantly increased with age across both sexes, whereas affective empathy did not. Moreover, a regression model constructed from the data showed that sex and age group did not act as significant predictors of aggression, however cognitive and affective empathy variables did act as significant predicators and were also found to have differential effects on aggressive externalizing behaviour.

More specifically, the findings showed that in line with hypothesis 1's prediction, the independent variable sex had a significant impact on dispositional, cognitive and affective empathy scores. As expected, females were found to score significantly higher on all of the empathy subscales than males.

As predicted by hypothesis 2 the independent variable age had a significant affect on dispositional and cognitive empathy scores, with 6-7 year olds scoring significantly lower on these subscales than 12-13 year olds. However, it was found that affective empathy did not significantly increase with age but rather remained relatively constant.

Contrary to the prediction of hypothesis 3 neither age nor sex were found to be significant predictors of aggression. Moreover, when added to the hierarchical model these variables did not significantly increase the predictive power of the model. In other words, age and sex did not account for a significant amount of variance in aggression scores.

In keeping with hypothesis 4 it was found that when modeled, cognitive and affective empathy variables acted as significant predictors of aggression. Moreover, these empathy variables were also found to account for a significant amount of variance in aggression scores

As anticipated by hypothesis 5 affective empathy was found to have a positive relationship with aggression, indicating that as affective empathy increases so does aggression. Conversely, cognitive empathy was found to have a negative relationship with aggression, meaning that as levels of cognitive empathy increase levels of aggression decrease. This finding provides support for the prediction that certain empathic profiles (i.e. particular levels of cognitive versus affective empathy, specifically high levels of affective empathy and lower levels of cognitive empathy) better predict heightened levels of aggression than others.

Towards a Model of Empathy Development Across Age and Sex

Sex differences in empathy. The first hypothesis of the current study predicted that girls would display significantly higher overall dispositional, cognitive and affective empathy scores than boys. In other words, this hypothesis predicted that there would be a significant main effect for sex on each of the empathy variables. This hypothesis was informed by several research studies which all found that females displayed significantly higher empathy levels than males (Barnett, et al. 1980; Dadds et al., 2008; Eisenberg-Berg & Mussen 1978; Mills & Grusec 1989; Rueckert, & Naybar, 2008; Warden & Mackinnon, 2003).

In line with the findings of these past studies our results indicate that females scored significantly higher than males on dispositional, cognitive and affective emapthy variables, with the most marked differences being seen between males and females total dispositional and cognitive empathy scores. A potential explaination for these sex differences in empathy can be drawn from evolutionary theory. As Greary and Flinn (2002) argue, females are potentially more empathic than males due to the roles they have played throughout humans' evolutionary history. In other words, as primary caregivers it was probably more adaptive for females to be empathic and socio-cognitively in tune to meet the needs of their kin, whereas as primary providers and protectors it was probably more adaptive for males to be aggressive and less empathic.

However, evolutionary explanations for sex differences in empathy can be controversial as they frequently overlook the potential effects of gender stereotypes on empathic differences across the sexes (Archer, 2004). Gender stereotypes, forged through social and cultural norms, can influence the ways in which individuals act and can also affect the way individuals perceive the roles of males versus females (Lennon & Eisenberg, 1987). Thus, although our results show that females score significantly higher on each component of the QCAE than males this does not necessarily indicate that our results point to an underlying biologically forged adaptive proclivity for females to be more empathic than males. Rather our results could be explained by gender stereotyping, through which females are commonly understood to be more social and emotional and therefore more empathic (Basow, 1992; Locke, 2002).

This is a particularly notable point due to the fact that the current study employed parent-report measures, which have been shown to be susceptible to social desirability bias incurred by gender stereotyping (Lennon & Eisenberg, 1987). Thus, our finding that females scored significantly higher than males on all empathy variables may in fact be due to parents' gender stereotyped perceptions of empathy as being an innately female characteristic, rather than being evidence for biologically based sex differences in empathy. While parent report measures have been shown to be susceptible to gender stereotypes and social bias they still boast the most widespread use in the empathy literature, with the majority of studies regarding gender differences in empathy failing to comment on or acknowledge the effects of this potential bias (Basow, 1992; Locke, 2002). Thus, although mindful of these issues this study employed parent report measures in an effort to have similar operationalizations of empathy so that the results of this study could be comparable to the results of related studies.

Age differences in empathy. Although empathy is understood to develop within the individual from childhood through to adulthood as a product of both biology and socialization, little reseach has been done regarding the course of empathy development across childhood (Zahn-Waxler, Robinson, & Emde, 1992; Zahn-Waxler, Radke-Yarrow, & Wagner,1992). A lack of research regarding how levels of empathy (and its subcomponents) change as children age has hindered the construction of a developmental model of empathy, without which it is difficult to assess normal versus abnormal empathy development behaviours (Eisenberg & Strayer, 1987; Davis, Panksepp, & Normansell, 2003). Moreover, a lack of a developmental model of empathy also prevents the assessment of potential connections between abnormal empathy development and negative behavioural outcomes, such as aggression (Reniers et al., 2011).

Informed by this need, recent research by Dadds and colleagues (2008) endeavoured to measure levels of overall dispositional, cognitive and affective empathy scores at various stages of childhood development to see if empathy levels changed significantly as children aged. The results of Dadds and colleagues (2008) research informed the second hypothesis of the current study, which predicited that there would be a significant age effect for overall dispositional and cognitive empathy scores but not for affective empathy scores. Our results corroborated Dadds and colleagues (2008) findings, indicating that there were significant differences in dispositional and cognitive empathy scores across the age groups, with the 6-7 year old group scoring lower than 12-13 year old group on both of these empathy variables (see Table 5 above). However, as anticipated levels of affective empathy did not differ significantly across the age groups.

As Dadds and colleagues (2008) note these results suggest that as children age and their cognitive capacities develop with learning and socialization so does cognitive and overall dispositional empathy increase. On the other hand, the finding that affective empathy does not significantly increase or decrease with age, rather remaining seemingly constant, suggests that affective empathy may be an innate quality which is inborn rather than one which is primarily cultivated or socialized (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003; Hoffman, 1977). This potentially suggests that empathy is a product of both nature and nurture, with the cognitive subcomponent changing as children are socialized and the affective subcomponent being less impacted by environmental factors and potentially more dependent on biological ones (Preston & De Waal, 2002).

Potential Predictors of Aggression

Age group and sex as predictors of aggression. The third hypothesis of the current study predicted that when modeled the variables sex and age group would act as significant predictors of aggression, and these variables were further expected to account for a significant amount of the variance in aggression. However, our findings did not support this prediction, rather our results showed that neither age group nor sex acted as significant predictors of aggression. Moreover, the addition of these variables to the regression model did not significantly increase the model's ability to predict aggression scores (as measured by the externalizing scale of the CBCL, see Table 5). In other words, the inclusion of these variables did not create an improved model that could account for a significant amount of the variance in aggression.

This is a noteworthy finding as it goes against the current study's initial expectations as well as past research findings, which have suggested that aggression and antisocial behaviours significantly vary across sex and age (Dadds et al., 2009; Hyde, 1984). This is an unexpected result as this study's previous findings showed that dispositional and cognitive empathy significantly differed across age and sex and affective empathy differed across sex. Moreover, as cognitive and affective empathy were found to be significant predictors of aggression it would be fitting that sex and age group would also act as significant predictors of aggression.

What these results currently show is that age and sex impact significantly on levels of cognitive and affective empathy, which in turn act as significant predictors of aggression. This potentially suggests an indirect effect of age and sex on aggression, whereby these variables mediate the relationship between empathy and aggression. However, upon further investigation it was found that there were no simple mediation effects for age and sex on the relationship between cognitive empathy and aggression and affective empathy and aggression respectively (See Appendix J). Rather, it appeared that age and sex mediated the relationship between the combination of cognitive and affective empathy and aggression. However this connection is not clear and will require further research to be clarified.

A possible reason for the lack of a significant association between the predictors of sex and age group and aggression may be due to the use of a small sample size ($N = 80$) for this study. Studies that recruit small samples commonly reflect higher levels of type two error: rejecting the null hypothesis when it is in fact true (Cozby, 2009). In other words, when small sample sizes are employed there are higher chances that significant results may go undetected. Thus, it is advisable that this study be replicated with a larger sample size to either corroborate or dispute this this non-significant result.

Cognitive and affective empathy as predictors of aggression. The fourth hypothesis of the current study predicted that when modeled cognitive and affective components of empathy would act as significant predictors of aggressive behaviour (as measured by the externalizing scale of the CBCL) and would further account for a significant amount of variance in aggression scores. The results of the current study supported this prediction and found that both cognitive and affective empathy acted as significant predictors of aggression, with affective empathy being a marginally stronger predictor of aggression than cognitive empathy. Moreover, together these two empathy predictors were found to account for a significant amount of variance in aggression.

Past research regarding the factors that impact on aggression has mainly focused on the role of *parenting practices* (e.g. Barnett, King, Howard & Dino, 1980; Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Stormshak, Bierman, McMahon & Lengua, 2000), *exposure to violence* (e.g. Barbarin, Richter, & de Wet, 2001; Huesmann, Moise-Titus, Podolski & Eron, 2003, *socioeconomic Status* (e.g. Bradley, & Corwyn, 2002; Dodge, Pettit, & Bates, 1994), and *negative peer relations* (e.g. Price & Dodge, 1989; Rys & Bear, 1997). However, the influence of empathy on aggression has remained largely unexamined, with only a few dated research studies directly addressing the relationship between empathy and aggression (e.g. Feshbach & Feshbach, 1969; Miller, & Eisenberg, 1988). Thus, these results provide preliminary evidence for the significant impact of both cognitive and affective subcomponents of empathy on levels of aggression: a finding that requires further investigation.

Furthermore, the little research that has been done regarding the relationship between empathy and aggression has mainly focused on uncovering which sub-component of empathy has the largest impact on aggression. Whereas some studies have found affective empathy to be better predictor of aggression others have found cognitive empathy to be a stronger predictor of aggression (Ang & Goh, 2010; Dadds et al., 2008; Miller & Eisenberg, 1988). Thus, there remains little consensus in the literature regarding which component of empathy has the most profound impact on aggression. However, the results of the current study potentially indicate that both cognitive and affective components of empathy act as significant predictors of empathy, although they appear to do so in different ways that will now be examined.

Differential effects of cognitive and affective empathy on aggression. The fifth and final hypothesis of the current study predicted that affective empathy would have a positive relationship with aggression (i.e. higher levels of affective empathy would be predictive of heightened levels of aggression) and that cognitive empathy would have a negative relationship with aggression (i.e. lower levels of cognitive empathy were expected to be predictive of higher levels of aggression). In essence, this hypothesis predicted that certain empathy profiles (i.e. particular concurrent levels of cognitive and affective empathy), namely higher levels of affective empathy and lower levels of cognitive empathy, would predict higher levels of aggression. This prediction was based on the findings of Dadds and colleagues (2009) study, which showed that lower levels of cognitive empathy and higher levels of affective empathy were predictive of increased aggressive and anti-social behaviours. Our research findings provided support for this hypothesis and showed that higher levels of affective empathy and lower levels of cognitive empathy were indeed predictive of heightened levels of aggression.

Few studies have examined how concurrent levels of cognitive and affective empathy (i.e. certain empathic profiles) affect levels of aggression (Dadds et al, 2009). Thus this study, which examined concurrent levels of cognitive and affective empathy, provides further evidence for certain empathy profiles being predictive of aggression. Contrary to past research, the findings of the current research study suggest that it is not only deficits in cognitive *or* affective empathy which are predictive of aggression, but rather particular levels of both of these components of empathy which predict heightened levels of aggression.

Moreover these results also show that rather than deficiencies in affective empathy being predictive of aggression, heightened levels of affective empathy appear to be more predictive of higher levels of aggression. A possible explanation for this according to Dadds and colleagues (2009) could be that higher levels of affective empathy may relate to a poor capacity for emotional regulation, which could result in externalizing aggressive and antisocial behaviours. This is a noteworthy finding as it suggests that exhibiting higher levels of empathy is not always associated with positive behavioural outcomes. Furthermore, the finding that lower levels of cognitive empathy coupled with higher levels of affective empathy predict aggression may suggest that a combination between an individuals' poor ability to regulate their own emotions and a poor understanding of other's emotional states may lead to aggressive behaviours (Bandura et al., 2003; Dadds et al., 2009).

Limitations of the Current Study and Directions for Further Research

As a quasi-experimental, cross sectional comparison this study was subject to multiple limitations that require acknowledgement. Firstly, as this study took the form of a quasi-experimental design it is possible that the findings may have been contaminated by extraneous variables that were not measured and therefore could not be controlled for, such as parents' potential social bias regarding gender roles and parent temperament, which may have affected the parent report data collected. Furthermore, the fact that quasi-experimental designs specifically recruit and assign participants to experimental groups rather than using random assignment makes it harder to rule out alternative explanations and therefore poses a threat to the internal reliability of the study (Cozby, 2009).

A potential direction for future research would be to recruit a larger sample of individuals from which participants could be assigned to each of the experimental groups. However, this was not possible for the current study due to time constraints as well as limited access to child participants. Furthermore, as the study specifically recruited participants based on certain demographic characteristics (the majority of participants were coloured, see Table 1) within a particular locality (Cape Town, Western Cape, South Africa) the results of the study cannot be generalized to other populations beyond this sample and therefore have limited external validity.

Moreover, as this study was cross sectional in nature it was limited in its ability to assess the stability of empathy and its relation to aggression over time. A possible future direction would be to follow a set of individuals as they age in a longitudinal manner to assess more accurately how empathy and its cognitive and affective subcomponents change over time, and to see whether changes in empathy are predictive of aggression as individuals age (Eisenberg & Strayer, 1987; Eisenberg, Lennon, & Roth, 1983). As several authors have noted, this kind of study is necessary as there has been little research specifically regarding the development of empathy across the human life span, and the relationship between the development of empathy and aggression (Eisenberg & Strayer, 1987; Lennon & Eisenberg, 1987; Lovett & Sheffield, 1996; Miller & Eisenberg, 1988).

Another problematic aspect of this study is that a directional causal relationship between empathy and aggression cannot be assumed as this study was correlational in nature. Therefore, it is possible that instead of changes in empathy across age and gender being responsible for changes in aggression, the reverse may be true. Aggression may be responsible for the difference seen in cognitive and affective empathy. As noted by Cohen and Strayer (1996), being aggressive may diminish an individual's capacity to be empathic. A reverse causal relationship may suggest that violent environments or aggressive socio-cultural norms may hamper empathy development or prevent individuals from overtly displaying empathic behaviours.

The use of parent report measures is also a noteworthy limitation of this study as these measures have been shown to be susceptible to social bias which may have resulted in parents answering the questionnaires in a way that reflected their socially influenced perceptions of their child's behaviours, rather than reflecting on their child's actual behaviours (Lennon & Eisenberg, 1987). Furthermore, as Lennon & Eisenberg (1987) note, parent and self-report measures tend to produce larger sex differences in findings, which is most probably due to gender stereotyping. Therefore, an important direction for future research in the study of gender differences would be to use measures that are less susceptible to social bias such as coded observations or behaviour based tasks to measure levels of empathy and aggression (Lennon & Eisenberg, 1987).

Summary and Conclusions

Overall, the results of this research showed that overall dispositional, cognitive and affective empathy all differed across sex, with females scoring significantly higher than males across all empathy measures. However, it was found that only overall dispositional and cognitive empathy levels significantly increased with age, whereas affective empathy did not.

This result provides corroborating evidence for studies such as Dadds and colleagues (2008) that similarly found females to exhibit higher levels of empathy than males. Moreover, these results indicate that cognitive and affective empathy have different developmental trajectories. On one hand, cognitive empathy appears to increase as children age and their cognitive capacities develop through learning and socialization, whereas on the other hand affective empathy appears to remain constant, potentially suggesting that it has an inborn biological quality (Preston & de Waal, 2002).

Furthermore, the results of this study showed that as predicted cognitive and affective empathy acted as significant predictors of aggression. It was found that certain concurrent levels of cognitive and affective empathy, namely high levels of affective and low levels of cognitive empathy, were predictive of heightened levels of aggression. This finding provides evidence for the prediction that certain empathy profiles (i.e. particular levels of cognitive and affective empathy) better predict heightened levels of aggression than others. However, the finding that age group and sex were not significant predictors of empathy was unexpected, as these variables were found to significantly impact on levels of cognitive and affective empathy. These unexpected results may point to an indirect relationship whereby age and sex impact on empathy, which in turn impacts on levels of aggression. Nonetheless, this indirect connection is only speculative and would require further research to be substantiated.

Altogether the findings of the current study provide some insight into the development of overall dispositional, cognitive and affective empathy across age and sex in a sample of Western Cape children. Although these results cannot be generalized to other populations, they may help inform further studies regarding the development of empathy across childhood. Moreover, these research findings shed light on how certain levels of cognitive and affective empathy act as significant predictors of aggression. These preliminary findings provide further evidence for the potential risk factors associated with aggression, namely high levels of affective empathy and low levels of cognitive empathy in a South African Context. Overall, the results of this study provide evidence for the connection between empathy and aggression that can be used to inform future prevention and intervention programs aimed at combating levels of aggression in children, which has be shown to result in negative long term outcomes (Baldry & Farrington, 2000; Moffit, 1990).

References

Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA school-age forms and profiles.* Burlington, VT: University of Vermont.

Ang, R. P., & Goh, D. H. (2010). Cyberbullying among adolescents: The role of affective and cognitive empathy, and gender. *Child Psychiatry and Human Development*, *41*, 387-397.

Archer, J. (2004). Sex differences in aggression in real-world settings: A meta-analytic review. *Review of General Psychology*, *8*, 291.

Arnold, A. (1996). Genetically triggered sexual differentiation of brain and behaviour. *Hormones and Behavior, 30,* 495-505.

Baldry, A. C., & Farrington, D. P. (2000). Bullies and delinquents: Personal characteristics and parental styles. *Journal of Community and Applied Social Psychology, 10*, 17-31.

Bandura, A., Caprara, G. V., Barbaranelli, C., Gerbino, M., & Pastorelli, C. (2003). Role of affective self-regulatory efficacy in diverse spheres of psychosocial functioning. *Child Development*, *74*, 769-782.

Barbarin, O. A., Richter, L., & de Wet, T. (2001). Exposure to violence, coping resources, and psychological adjustment of South African children. *American Journal of Orthopsychiatry, 71*, 16-25.

Barnett, M. A., King, L. M., Howard, J. A., & Dino, G. A. (1980). Empathy in young children: Relation to parents' empathy, affection, and emphasis on the feelings of others. *Developmental Psychology*, *16*, 243.

Barnes, H., Wright, G., Noble, M., & Dawes, A. (2007). *The South African index of multiple deprivation for children: census 2001*. HSRC Press, Cape Town.

Basow, S.A. (1992). *Stereotypes and roles.* California: Cole Publishing Co.

Bateson, D. (2001). These things called empathy: Eight related but distinct phenomena. In J. Decety, & W. Ickes (Eds.), *The Social Neuroscience of Empathy* (pp. 3-15). Massachusetts: MIT Press.

Booysen, F. (2001). The measurement of poverty. In D. Bradshaw & K. Steyn (Eds.), *Poverty and chronic diseases in South Africa: Technical report* (pp. 15-38). South Africa: Medical Research Council and World Health Organization.

Brody, L. R. (1985). Gender differences in emotional development: A review of theories and research. *Journal of Personality, 53,* 102-149.

Cluver, L., Gardner, F., & Operario, D. (2007). Psychological distress amongst AIDS-orphaned children in urban South Africa. *Journal of Child Psychology and Psychiatry, 48*, 755-763.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.).* Hillsdale, NJ: Erlbaum.

Cohen, D., & Strayer, J. (1996). Empathy in conduct-disordered and comparison youth. *Developmental Psychology, 32*, 988-998.

Cooper, S., Lund, C., & Kakuma, R. (2012). The measurement of poverty in psychiatric epidemiology in LMICs: critical review and recommendations. *Social Psychiatry and Psychiatric Epidemiology, 47,* 1499-1516.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology, 78,* 98-104.

Cozby, P.C. (2009). *Methods in behavioural research (10th ed.).* New York, McGraw-Hill,

Dadds, M. R., Hunter, K., Hawes, D. J., Frost, A. D. J., Vassallo, S., Bunn, P., Merz, S., ... El Masry, Y. (2008). A measure of cognitive and affective empathy in children using parent ratings. *Child Psychiatry and Human Development, 39,* 111-122.

Dadds, M.R., Hawes, D.J, Frost A.D.J., Vassallo, S., Bunn, P., Hunter, K., & Merz, S. (2009). Learning to 'talk the talk': the relationship of psychopathic traits to deficits in empathy across childhood. *Journal of Child Psychology and Psychiatry, 50,* 599-606.

Davis, K. L., Panksepp, J., & Normansell, L. (2003). The affective neuroscience personality scales: normative data and implications. *Neuro-Psychoanalysis, 5,* 57-69.

Decety, J. (2011). Dissecting the neural mechanisms mediating empathy. *Emotion Review, 3,* 92-108.

Decety, J., & Howard, L. H. (2013). The role of affect in the neurodevelopment of morality. *Child Development Perspectives*, *7*, 49-54.

Decety, J., & Jackson, P. L. (2004). A social-neuroscience perspective on empathy. *Current Directions in Psychological Science, 15,* 54-58.

Decety, J., & Michalaska, K.J. (2010). Neurodevelopmental changes in the circuits underlying empathy and sympathy from childhood to adulthood. *Developmental Science, 13,* 886-899.

de Vries, G. J., Rissman, E. F., Simerly, R. B., Yang, L. Y., Scordalakes, E. M., Auger, C. J., ... & Arnold, A. P. (2002). A model system for study of sex chromosome effects on sexually dimorphic neural and behavioral traits. *The Journal of Neuroscience*, *22*, 9005-9014.

de Wied, M., Goudena, P. P., & Matthys, W. (2005). Empathy in boys with disruptive behavior disorders. *Journal of Child Psychology and Psychiatry, 46*, 867-880

Elliot, L.E. (2009, September, 8). Girl brain, boy brain? Retrieved March 18, 2014 from http://www.scientificamerican.com/article/girl-brain-boy-brain/

Eisenberg-Berg, N., & Mussen, P. (1978). Empathy and moral development in adolescence. *Developmental Psychology*, *14*, 185.

Eisenberg, N., Lennon, R., & Roth, K. (1983). Prosocial development: A longitudinal study. *Developmental Psychology*, *19*, 846.

Eisenberg, N., & Strayer, J. (1987). *Empathy and its development*. New York: Cambridge University Press.

Eslinger, P.J. (1998). Neurological and neuropsychological bases of empathy. *European Neurology, 1988,* 193-199.

Feingold, A. (1994). Gender differences in personality: A meta-analysis. *Psychological Bulletin, 116,* 429-456.

Fischer, A. H. (1993). Sex differences in emotionality: Fact or stereotype? *Feminism & Psychology, 3,* 303-318.

Fitch, R., & Denneberg, V. (1998). A role for ovarian hormones in sexual differentiation of the brain. *Behavioral and Brain Sciences, 21,* 311-352.

Frick, P. J. & Viding, E. (2009). Antisocial behaviour from a developmental psychopathology perspective. *Development and Psychopathology, 21*, 1111-1131.

George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston: Allyn & Bacon.

Gerdes, K. E., Segal, E. A., & Lietz, C. A. (2010). Conceptualising and measuring empathy. *British Journal of Social Work, 40*, 2326-2343.

Greary, D. C., & Flinn, M. (2002). Evolution of human parental behaviour and the human family. *Parenting: Science and Practice, 1*, 5-61.

Griffin, K. W., Botvin, G. J., Scheier, L. M., Diaz, T., & Miller, N. L. (2000). Parenting practices as predictors of substance use, delinquency, and aggression among urban minority youth: Moderating effects of family structure and gender. *Psychology of Addictive Behaviors*, *14*, 174.

Hofer, A., Siedentopf, C. M., Ischebeck, A., Rettenbacher, M. A., Verius, M., Felber, S., ... Fleischhacker, W. W. (2006). Gender differences in regional cerebral activity during the perception of emotion: a functional MRI study. *NeuroImage, 32,* 854–862.

Hoffman, M. L. (1982). The measurement of empathy. In C. E. Izard (Ed.), *Measuring emotions in infants and children* (pp. 279-296). Cambridge: Cambridge University Press.

Hyde, J. L. (1984). How large are gender differences in aggression? A developmental meta-analysis. *Developmental Psychology, 20,* 722-736.

Ivanova, M. Y., Achenbach, T. M., Dumenci, L., Rescorla, L. A., Almqvist, F., Weintraub, S., …Verhulst, F. C. (2007). Testing the 8-syndrome structure of the Child Behavior Checklist in 30 societies. *Journal of Clinical Child and Adolescent Psychology, 36*, 405-417.

Jaffee, S., & Hyde, J.S., (2000). Gender differences in moral orientation: A meta-analysis. *Psychological Bulletin, 126,* 703-726.

Jolliffe, D., & Farrington, D. P. (2006). Development and validation of the Basic Empathy Scale. *Journal of Adolescence, 29,* 589–611.

Klein, K. J. K., & Hodges, S. D. (2001). Gender differences, motivation, and empathic accuracy: When it pays to understand. *Personality and Social Psychology Bulletin, 27,* 720-730.

Locke, A. (2002). Gendered emotion: Personal, cultural or discursive. *Feminism and Psychology, 12,* 97-104.

Lennon, R., & Eisenberg, N. (1987). Gender and age differences in empathy and sympathy. In N. Eisenberg & J. Strayer (Eds.), *Empathy and its development* (pp. 195-217). New York: Cambridge University Press.

Mills, R. S., & Grusec, J. E. (1989). Cognitive, affective, and behavioral consequences of praising altruism. *Merrill-Palmer Quarterly (1982)*, 299-326.

Moffitt, T. E. (1990). Juvenile delinquency and attention deficit disorder: Boys' developmental trajectories from age 3 to age 5. *Child Development, 61*, 893-910.

Myer, L., Stein, D. J., Grimsrud, A., Seedat, S., & Williams, D. R. (2008). Social determinants of psychological distress in a nationally-representative sample of South African adults. *Social Science and Medicine, 66,* 1828-1840.

Palin, F. L., Armistead, L., Clayton, A., Ketchen, B., Linder, G., Kokot-Louw, P., & Pauw, A. (2009). Disclosure of maternal HIV-infection in South Africa: Description and relationship to child functioning. *AIDS and Behaviour, 13*, 1241-1252.

Preston, S.D., & de Waal, F.B. M. (2002). Empathy: its ultimate and proximate bases. *Behavioural and Brain Sciences, 25,* 1-72.

Reniers, R. L., Corcoran, R., Drake, R., Shryane, N. M., & Völlm, B. A. (2011). The QCAE: A questionnaire of cognitive and affective empathy. *Journal of Personality Assessment*, *93*, 84-95.

Roessner, V., Becker, A., Rothenberger, A., Rohde, L. A., & Banaschewski, T. (2007). A cross-cultural comparison between samples of Brazilian and German children with ADHD/HD using the Child Behavior Checklist. *European Archives of Psychiatry and Clinical Neuroscience, 257,* 352-359.

Ruekert, L. (1987). Gender differences in empaty, In D.J. Scapaletti (Ed.), *Psychology of Empathy* (pp. 221-234). Chicago: Nova Science Publishers, Inc.

Rueckert, L., & Naybar, N. (2008). Gender differences in empathy: The role of the right hemisphere. *Brain and Cognition, 67*, 162-167.

Schilte-Rüther, M., Markowitsch, N., Shah, J., Fink, G.R., & Piefka, M. (2008). Gender differences in brain networks supporting empathy. *NeuroImage, 42,* 393-403.

Silverthorn, P., & Frick, P. J. (1999). Developmental pathways to antisocial behavior: The delayed-onset pathway in girls. *Development and Psychopathology, 11*, 101-126.

South African Police Service. (2013). Crime report 2010/2011. Retrieved from http://www.saps.gov.za/statistics/reports/crimestats/2013/downloads/crime_statistics_presentation.pdf

Spinella, M. (2005). Prefrontal substrates of empathy: Psychometric evidence in a community sample. *Biological Psychology, 70,* 175–181.

Taylor, R. (1990). Interpretation of the correlation coefficient: a basic review. *Journal of Diagnostic Medical Sonography*, *6*, 35-39.

Viding, E., Blair, R. J. R., Moffitt, T. E., & Plomin, R. (2005). Evidence for substantial genetic risk for psychopathy in 7-year-olds. *Journal of Child Psychology and Psychiatry, 46*, 592-597.

Warden, D., & Mackinnon, S. (2003). Prosocial children, bullies and victims: An investigation of their sociometric status, empathy and social problem-solving strategies. *British Journal of Developmental Psychology, 21*, 367-385.

Woolley, D. (2012). *Deficiencies in empathy as a predictor of aggression in young children* (Unpublished Honour's thesis). UCT, Cape Town.

Zahn-Waxler, C., Robinson, J.L., & Emde, R.N. (1992). The development of empathy in twins. *Developmental Psychology, 28,* 1038-1047.

Zahn-Waxler, C., Radke-Yarrow, M., & Wagner, E. (1992). Development of concern for others. *Developmental Psychology, 28,* 126-136.

Appendix A

UNIVERSITY OF CAPE TOWN

DEPARTMENT OF PSYCHOLOGY

The Development of Empathy

Assent Form

Hello! We want to tell you about a research study we are doing. A research study is a way to learn more about something. We would like to find out more about how people understand what other people are feeling and thinking.

If you agree to join this study, you will be shown some pictures on the computer and we will ask you how you feel about them. You will also be asked to do some other tasks, like tell us the meaning of some words, play a game of cards, and we will also ask you to answer questions about short stories we will read to you.

Together these tasks will take about 90 minutes. We will take a break after you've done some of the tasks, and complete the rest of the tasks on a different day. We can take other short breaks too if you get tired.

You do not have to join this study. It is up to you. No one will be angry with you if you don't want to be in the study or if you join the study and change your mind later and stop.

Do you have any questions about the study? If you think you can do it and you don't have any more questions about it, will you sign this paper? If you sign your name below, it means that you agree to take part in this study.

Child's Signature: _____   Date: _____

Researcher's Signature: _____   Date: _____

Appendix B

Study Description and Consent Form

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

The Development of Empathy

Dear Parent/Legal guardian,

You and your child are invited to participate in a research study investigating the development of empathy in children. This study focuses on how children of different ages share what other people are feeling and understand what others feel and think.

Principal Researchers:

Dr Susan Malcolm-Smith	Lea-Ann Pileggi
Senior Lecturer	Doctoral candidate
Department of Psychology	Department of Psychology
University of Cape Town	University of Cape Town

What is involved in this study?

Approximately 240 Grade 1 and Grade 7 children will participate in this study. If your child participates, a researcher will guide her/him through several tasks. For example, in one task, children will be asked to view pictures of hands or feet in neutral situations (e.g. a hand opening a door) or in situations that could be painful (e.g. a hand getting stuck in a door). After viewing these pictures, children will be asked how sorry they feel for the person, and how much pain they think that person might be feeling. All pictures are appropriate for children as young as 3 years of age and have been taken from situations children readily observe in every-day life.

Additionally, children will complete a number of pencil and paper tasks. In one such task, your child will answer questions about short stories. These questions will look at their ability to take another person's point of view. Children will also play a game of cards and will be asked how they felt during that game when they won and when they lost. Altogether this study will take about 90 minutes of your child's time. Two sessions (45 minutes each) will

take place during the school day. We will take a break after completing some of the tasks, and take additional short breaks if your child gets tired.

We also have a number of questionnaires (aside from the Demographics questionnaire) that will ask you questions about your own views and questions about your child's views. Your completion of these documents is completely voluntary. Should you agree to completing these additional questionnaires, we will contact you to arrange a time to meet at your child's school, for you to complete them.

Are there any benefits to taking part in the study?

Your child will receive some sweets for her/his participation, as well as some stickers of her/his choice, and you will receive R150 if you complete all questionnaires. More importantly, should we identify any behavioural or learning difficulties that are likely to affect your child's capacity to learn, we will provide you with written feedback, and referrals to appropriate service providers where necessary. Furthermore, the results of this research could provide essential information about how children process emotional information and this may be helpful in planning effective educational programs for children with social difficulties.

What are the risks of the study?

There are no risks to you or your child through participating in this research. However, if any child does become at all upset, or tired, she or he may stop participating at any point. We would like to emphasise that participation in this study is entirely voluntary, and will not affect your child's education. All results will be securely stored, and kept strictly confidential.

If you would like your child to participate in the study, please complete the consent form, as well as the demographics survey, and return to your child's school. Please answer all the questions as accurately and truthfully as possible. We understand that some of this information may be sensitive, but be assured that all information will be kept strictly confidential.

Should you have any questions or queries about the research or your participation, please do not hesitate to contact Lea-Ann Pileggi: (email) leapileggi@gmail.com, or Susan Malcolm-Smith: (phone) 021 650 4605, (email) Susan.Malcolm-Smith@uct.ac.za.

Thank you for your participation.

CONSENT FORM

The research project and the procedures associated with it have been explained to me. I hereby give my permission for my child to participate in the above-described research project.

Child's name: _____   Parent/guardian's name: _____

Date: _____   Signature of parent/guardian: _____

Please provide a contact number below should you be willing to complete the additional questionnaires (for which you will be compensated with R150 upon completion), and indicate which time/s would be most convenient to receive a phonecall to arrange a time for you to meet with the researcher to complete the questionnaires.

Phone: _____ Time/s: _____

Appendix C

DEMOGRAPHICS QUESTIONNAIRE

International research guidelines suggest that researchers report some attributes of all research participants (e.g., children's gender, parents' educational background, etc.). To help us collect this information, we are asking you to complete this brief questionnaire. All your answers are kept private, and won't be used in a way that identifies you or your child. If you are uncomfortable answering any of the items, feel free to ignore them.

Today's Date: _____

Who is completing this questionnaire? (Please √)

☐ Biological parent   ☐ Grandparent   ☐ Nanny

☐ Foster parent   ☐ Aunt/Uncle   ☐ Friend

☐ Stepparent   ☐ Sibling   ☐ Other: _____

Are you the child's primary caregiver? (Circle one) Y / N

Your gender: M / F

Child's Information

Child's date of birth (including the year): _____

Child's gender: M / F

Child birth order: Child number _____ out of _____ children.

Ages of siblings: Boy / Girl Age: _____

                         Boy / Girl Age: _____

                         Boy / Girl Age: _____

Child's height (in cm):_____ Child's weight (in kg): _____

Child's home language: _____

Child's race (Please √):

☐ Black South African   ☐ Coloured   ☐ Indian

☐ Black African (Other)   ☐ White/Caucasian   ☐ Other: _____

(Please specify)

Please list any serious health problems this child has had:

_____

_____

____

Was this child born more than two weeks early?   Y / N

Please list any medications this child is taking for behaviour issues, attention difficulties, or issues related to moods and feelings:

_____

—

_____

—

Does this child currently attend (Please √):

☐ Daycare/Crèche   ☐ Grade R

☐ Preschool   ☐ Primary school (Grade: _____)

Household Information

Who does this child currently live with? (Please √ **all** that apply)

☐ Biological parent   ☐ Grandparent   ☐ Nanny

☐ Foster parent   ☐ Aunt/Uncle   ☐ Friend

☐ Stepparent   ☐ Sibling   ☐ Other: _____

Who is this child's primary caregiver?

☐ Biological parent   ☐ Grandparent   ☐ Nanny

☐ Foster parent   ☐ Aunt/Uncle   ☐ Friend

☐ Stepparent   ☐ Sibling   ☐ Other: _____

Languages currently spoken at home:

        Home language:_____

Other: _____

Religion(s) practiced in the home: _____

<u>Primary Caregiver Information</u>

Current age: _____

Marital Status:

☐ Married	☐ Divorced	☐ Widow/Widower
☐ Single	☐ Remarried	☐ Separated

Current job title:

Mother: _____

Father: _____

Primary caregiver: _____

Appendix D

QCAE (Child)

	People differ in the way they feel in different situations. Below you are presented with a number of characteristics that *may or may not apply to your child*. Read each characteristic and indicate how much you agree or disagree with the item by selecting the appropriate box. Answer quickly and honestly.	Strongly agree	Slightly agree	Slightly disagree	Strongly disagree
1.	My child sometimes finds it difficult to see things from another's point of view.				
2.	My child is usually objective when he/she watches a film or play, and doesn't often get completely caught up in it.				
3.	My child tries to look at everybody's side of a disagreement before he/she makes a decision.				
4.	My child sometimes tries to understand his/her friends better by imagining how things look from their perspective.				
5.	When my child is upset at someone, he/she will usually try to "put him/herself in the person's shoes" for a while.				
6.	Before criticizing somebody, my child tries to imagine how he/she would feel in their place.				
7.	My child often gets emotionally involved in his/her friends' problems.				
8.	My child is inclined to get nervous when others around him/her seem nervous.				
9.	People my child is with have a strong influence on his/her mood.				
10.	It affects my child very much when one of his/her friends seems upset.				
11.	My child often gets deeply involved with the feelings of a character in a film, play, or novel.				
12.	My child gets very upset when he/she sees someone cry.				
13.	My child is happy when he/she is with a cheerful group and sad when others are glum.				
14.	It worries my child when others are worrying and panicky.				
15.	My child can easily tell if someone else wants to enter into a conversation.				
16.	My child can quickly pick up if someone says one thing but means another.				
17.	It is hard for my child to see why some things upset people so much.				
18.	My child finds it easy to put him/herself in somebody else's shoes.				
19.	My child is good at predicting how someone will feel.				
20.	My child is quick to spot when someone in a group is feeling awkward or uncomfortable.				
21.	Other people tell my child he/she is good at understanding what others are feeling and what others are thinking.				
22.	My child can easily tell if someone else is interested or bored with what he/she is saying.				
23.	Friends talk to my child about their problems as they say that my child is very understanding.				
24.	My child can sense if he/she is intruding, even if the other person does not tell him/her.				
25.	My child can easily work out what another person might want to talk about.				
26.	My child can tell if someone is masking their true emotion.				
27.	My child is good at predicting what someone will do.				
28.	My child can usually appreciate the other person's viewpoint, even if he/she does not agree with it.				
29.	My child usually stays emotionally detached when watching a film.				
30.	My child always tries to consider the other person's feelings before he/she does something.				
31.	Before my child does something, he/she tries to consider how his/her friends will react to it.				

Appendix E

CBCL

1. About how many close friends does your child have? (Do *not* include brothers & sisters)

☐ None ☐ 1 ☐ 2 or 3 ☐ 4 or more

2. About how many times a week does your child do things with any friends outside of regular school hours? (Do *not* include brothers & sisters)

☐ Less than 1 ☐ 1 or 2 ☐ 3 or more

3. Does your child receive special education or remedial services or attend a special class or special school?

☐ No ☐ Yes - **kind of services, class, or school:** _____

_____

_____

4. Has your child ever had a serious head injury?

☐ No ☐ Yes – please describe: _____

_____

Below is a list of items that describe children and youths. For each item that describes your child *now or within the past 6 months*, please mark the *2* if the item is *very true or often true* of your child. Mark the *1* if the item is *somewhat or sometimes true* of your child. If the item is **not true** of your child, mark the **0**. Please answer all items as well as you can, even if some do not seem to apply to your child.

0 = Not True (as far as you know)   1 = Somewhat or Sometimes True   2 = Very True or Often True

☐ 0   ☐ 1   ☐ 2   2. Drinks alcohol without parents' approval (describe):

_____

_____

_____

☐ 0   ☐ 1   ☐ 2   3. Argues a lot

☐ 0   ☐ 1   ☐ 2   16. Cruelty, bullying, or meanness to others

☐ 0   ☐ 1   ☐ 2   19. Demands a lot of Attention

☐ 0   ☐ 1   ☐ 2   20. Destroys his/her own things

☐ 0   ☐ 1   ☐ 2   21. Destroys things belonging to his/her family or others

☐ 0   ☐ 1   ☐ 2   22. Disobedient at home

☐ 0   ☐ 1   ☐ 2   23. Disobedient at school

☐ 0   ☐ 1   ☐ 2   26. Doesn't seem to feel guilty after misbehaving

☐ 0   ☐ 1   ☐ 2   28. Breaks rules at home, school, or elsewhere

☐ 0   ☐ 1   ☐ 2   37. Gets in many fights

☐ 0   ☐ 1   ☐ 2   38. Gets teased a lot

☐ 0   ☐ 1   ☐ 2   39. Hangs around with others who get in trouble

☐ 0   ☐ 1   ☐ 2   43. Lying or cheating

☐ 0   ☐ 1   ☐ 2   57. Physically attacks people

☐ 0   ☐ 1   ☐ 2   63. Prefers being with older kids

☐ 0   ☐ 1   ☐ 2   67. Runs away from home

☐ 0   ☐ 1   ☐ 2   68. Screams a lot

☐ 0   ☐ 1   ☐ 2   72. Sets fires

☐ 0   ☐ 1   ☐ 2   73. Sexual problems (describe):

_____

_____

_____

☐ 0   ☐ 1   ☐ 2   81. Steals at home

☐ 0   ☐ 1   ☐ 2   82. Steals outside the home

☐ 0   ☐ 1   ☐ 2   86. Stubborn, sullen, or irritable

☐ 0   ☐ 1   ☐ 2   87. Sudden changes in mood or feelings

☐ 0   ☐ 1   ☐ 2   88. Sulks a lot

☐ 0   ☐ 1   ☐ 2   89. Suspicious

☐ 0   ☐ 1   ☐ 2   90. Swearing or obscene language

☐ 0   ☐ 1   ☐ 2   94. Teases a lot

Below is a list of items that describe children and youths. For each item that describes your child *now or within the past 6 months*, please mark the *2* if the item is *very true or often true* of your child. Mark the *1* if the item is *somewhat or sometimes true* of your child. If the item is **not true** of your child, mark the **0**. Please answer all items as well as you can, even if some do not seem to apply to your child.

0 = Not True (as far as you know)   1 = Somewhat or Sometimes True   2 = Very True or Often True

☐ 0   ☐ 1   ☐ 2   95. Temper tantrums or hot temper

☐ 0   ☐ 1   ☐ 2   96. Thinks about sex too much

☐ 0   ☐ 1   ☐ 2   97. Threatens people

☐ 0   ☐ 1   ☐ 2   99. Smokes, chews, or sniffs tobacco

☐ 0   ☐ 1   ☐ 2   101. Truancy, skips school

☐ 0   ☐ 1   ☐ 2   104. Unusually loud

☐ 0   ☐ 1   ☐ 2   105. Uses drugs for nonmedical

purposes (***don't*** include alcohol or tobacco) (describe):

_____

_____

_____

☐ 0   ☐ 1   ☐ 2   106. Vandalism

Appendix F

UCT Ethics Approval

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3414
Fax No. (021) 650 4104

5 March 2013

Dr. Susan Malcolm-Smith
Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Dr Malcolm-Smith,

I am pleased to inform you that ethical clearance has been given by an Ethics
Review Committee of the Faculty of Humanities for your project:

The development of moral reasoning

Please use the reference PSY2013-001 if required. I wish you all the best for your
study.

Yours sincerely,

Johann Louw PhD
Professor
Chair: Ethics Review Committee

Appendix G

WCED Approval

Western Cape Government

Education

Directorate: Research

Audrey.wyngaard2@pgwc.gov.za
tel: +27 021 467 9272
Fax: 0865902282
Private Bag x9114, Cape Town, 8000
wced.wcape.gov.za

REFERENCE: 20130315-8009

ENQUIRIES: Dr A T Wyngaard

Dr Susan Malcolm-Smith
Department of Psychology
UCT
Rondebosch

Dear Dr Susan Malcolm-Smith

RESEARCH PROPOSAL: THE DEVELOPMENT OF MORAL REASONING

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **29 January 2014 till 30 September 2014**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

    > **The Director: Research Services**
    > **Western Cape Education Department**
    > **Private Bag X9114**
    > **CAPE TOWN**
    > **8000**

We wish you success in your research.
Kind regards.
Signed: Dr Audrey T Wyngaard
Directorate: Research
DATE: 30 January 2014

Appendix H

Factorial ANOVA Results

First Factorial ANOVA

This Anova was carried out in order to see if there were any significant differences in dispositional empathy score due to difference in gender (IV_1) or difference in age group (IV_2).

Variables

IV_1 = Gender (*Male / Female*)

IV_2 = Age Group (*Group 1*- [6-7 year olds] / *Group 2* - [12-13 year olds])

DV = Dispositional Empathy Score (QCAE)

Hypotheses

Null:

H_0 = there is no main effect for gender

H_0 = there is no main effect for age group

H_0 = there is no interaction effect between these two factors

Alternate:

H_1 = there is a main effect for gender – based on the literature we would predict that

H_1 = there is a main effect for age group

H_1 = there is an interaction effect between these two factors

Check Assumptions

Normal distribution: In order to check that our data was normally distributed for this 2x2 factorial design we examined a box plot of the data (see right). Since our sample size for each group is only *N* = 20 it is hard to assess normal distribution from so few participants, however looking at the box plot we can see that generally speaking the data looks normally distributed, with only 3 visible outliers in the 6-7 year old boy group. Both boy groups seems slightly negatively skewed as well however, since ANOVA is a robust test and we have equal cell means we can continue with our analysis regardless of a potentially not normally distributed data set.
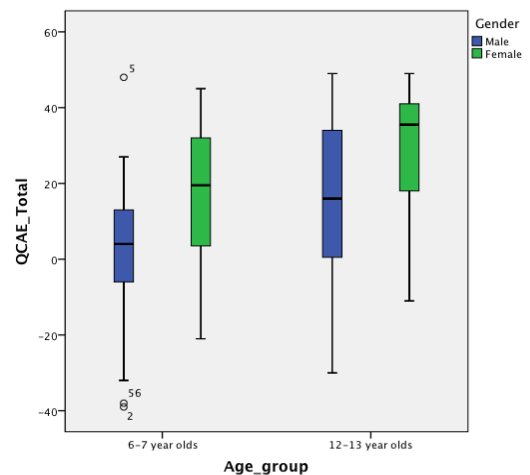
Independence of observations: is assumed

Homogeneity if variance: We found that Levene's test for the homogeneity of variance was not significant, *p* = .867, which means that the variance between our groups is not significant and therefore the assumption of homogeneity of variance has been upheld

Levene's Test of Equality of Error Variances[a]

Dependent Variable: QCAE_Total

F	df1	df2	Sig.
.242	3	76	.867

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Gender + Age_group + Gender * Age_group

Results

A two-factor study was carried out to determine the relationship between dispositional empathy score and two independent variables: (1) Gender of participant (*Male, Female,*); and (2) Age Group (*6-7 year olds* and *12-13 year olds).* All main effects were significant at the .05 level, but the interaction effect was not significant.

From the results of the factorial ANOVA we found that first independent variable, Gender, had a main effect F (1, 76) = 10.48 p = .002, partial eta squared = .121, indicating that females (*M* = 22.95, *SD* = 3.13) exhibited significantly higher dispositional empathy scores than males (*M* = 8.63, *SD* = 3.13) .

The second independent variable, Age Group, was also found to have a main effect F(1, 76) = 7.57, p = .007, partial eta squared = .091, indicating that there was a significant difference in the dispositional empathy scores across age groups with the 6-7 year olds (*M* = 9.7, *SD* = 3.13) having lower scores than the 12-13 year olds (*M* = 21.88, *SD* = 3.129).

There was no significant interaction effect between the two factors as can be seen in the profile plots below (Graph 1 and 2). The almost perfectly parallel lines further show that there is no interaction between these variables, i.e. displaying an ordinal relationship.

Since each of our variables only had two levels post-hoc analyses were not necessary or applicable.

Overall the results show that children of different ages and genders exhibit significantly different overall dispositional empathy scores. 6-7 year old boys exhibited the lowest overall dispositional empathy scores (*M* = 2.25, *SD* = 4.43) and 12-13 year old girls exhibited the highest overall empathy scores (*M*= 28.750, *SD* =4.43) as predicted. Looking at both profile plots we can visibly see that both independent variables have a significant effect on the DV (overall QCAE score).

Tests of Between-Subjects Effects
Dependent Variable: QCAE_Total

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	7075.338ª	3	2358.446	6.023	.001	.192
Intercept	19939.612	1	19939.612	50.921	.000	.401
Gender	4104.113	1	4104.113	10.481	.002	.121
Age_group	2964.613	1	2964.613	7.571	.007	.091
Gender * Age_group	6.613	1	6.613	.017	.897	.000
Error	29760.050	76	391.580			
Total	56775.000	80				
Corrected Total	36835.388	79				

a. R Squared = .192 (Adjusted R Squared = .160)

1. Gender
Dependent Variable: QCAE_Total

Gender	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	8.625	3.129	2.393	14.857
Female	22.950	3.129	16.718	29.182

2. Age_group
Dependent Variable: QCAE_Total

Age_group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
6-7 year olds	9.700	3.129	3.468	15.932
12-13 year olds	21.875	3.129	15.643	28.107

*3. Gender * Age_group*
Dependent Variable: QCAE_Total

Gender	Age_group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Male	6-7 year olds	2.250	4.425	-6.563	11.063
	12-13 year olds	15.000	4.425	6.187	23.813
Female	6-7 year olds	17.150	4.425	8.337	25.963
	12-13 year olds	28.750	4.425	19.937	37.563
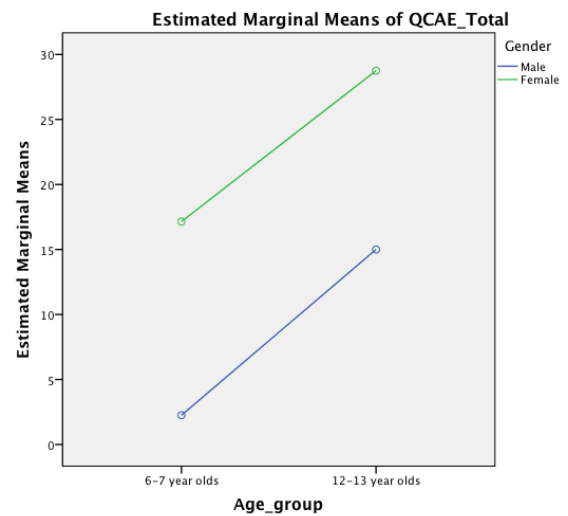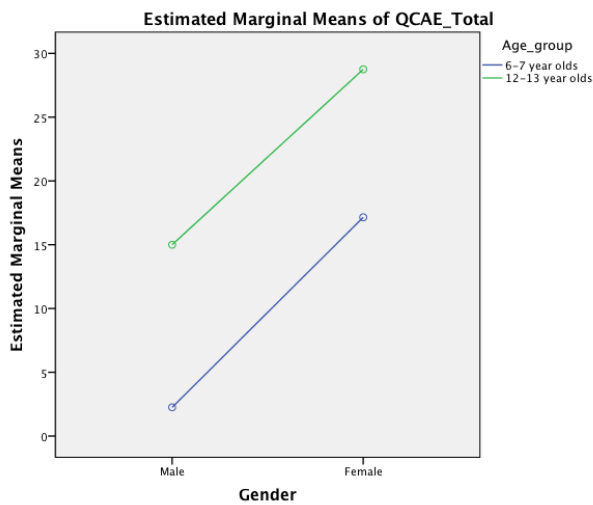
Second Factorial ANOVA

This Anova was carried out in order to see if there were any significant differences in cognitive empathy score due to difference in gender (IV_1) or difference in age group (IV_2).

Variables

IV_1 = Gender (*Male / Female*)
IV_2 = Age Group (*Group 1*- [6-7 year olds] / *Group 2* - [12-13 year olds])
DV = Cognitive Empathy Score (QCAE)

Hypotheses

Null:

H_0 = there is no main effect for gender

H_0 = there is no main effect for age group

H_0 = there is no interaction effect between these two factors

Alternate:

H_1 = there is a main effect for gender – based on the literature we would predict that

H_1 = there is a main effect for age group

H_1 = there is an interaction effect between these two factors

Check Assumptions:

Normal distribution: In order to check that our data was normally distributed for this 2x2 factorial design we examined a box plot of the data (see right). Since our sample size for each group is only *N* = 20 it is hard to assess normal distribution from so few participants, however looking at the box plot we can see that generally speaking the data looks normally distributed, with only 2 visible outliers: one in the 6-7 year old female group and one in the 12-13 year old male group. Both girl groups seems slightly negatively skewed as well, however since ANOVA is a robust test and we have equal cell means we can continue with our analysis regardless of a potentially not normally distributed data set.
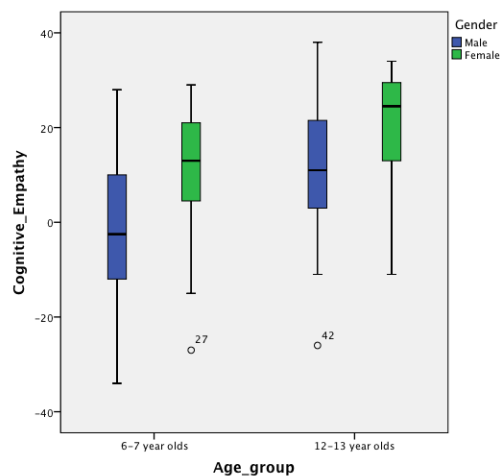
Independence of observations: is assumed

Homogeneity if variance: We found that Levene's test for the homogeneity of variance was not significant, *p* = .738, which means that the variance between our groups is not significant and therefore the assumption of homogeneity of variance has been upheld

Levene's Test of Equality of Error Variances [a]

Dependent Variable: Dispostional cognti

F	df1	df2	Sig.
.421	3	76	.738

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Gender + Age_group + Gender * Age_group

Results

A two-factor study was carried out to determine the relationship between cognitive empathy score and two independent variables: (1) **Gender** of participant (*Male, Female,*); and (2) **Age Group** (*6-7 year olds* and *12-13 year olds).* All main effects were significant at the .05 level, but the interaction effect was not significant.

From the results of the factorial ANOVA we found that first independent variable, **Gender**, had a significant main effect *F* (1, 76) = 10.642 *p* = .002, partial eta squared = .123, indicating that females (*M* = 15.05, *SD* = 2.36) exhibited significantly higher cognitive empathy scores than males (*M* = 4.15, *SD* = 2.36) .

The second independent variable, **Age Group**, was also found to have a main effect *F*(1, 76) = 12.58 *p* = .001, partial eta squared = .142, indicating that there was a significant difference in the cognitive empathy scores across age groups with the 6-7 year olds (*M* = 3.68, *SD* = 2.36) having lower scores than the 12-13 year olds (*M* = 15.53, *SD* = 2.36).

There was no significant interaction effect between the two factors as can be seen in the profile plots below (Graph 1 and 2). The almost parallel lines further show that there is no interaction between these variables, i.e. displaying an ordinal relationship.

Since each of our variables only had two levels post-hoc analyses were not necessary or applicable.

Overall the results show that children of different ages and genders exhibit significantly different overall cognitive empathy scores. 6-7 year old boys exhibited the lowest overall dispositional empathy scores (*M* = -2.650, *SD* = 3.34) and 12-13 year old girls exhibited the highest overall empathy scores (*M*= 20.10, *SD* =3.34) as predicted. Looking at both profile plots we can visibly see that both independent variables have a significant effect on the DV (overall QCAE score).

Also interestingly, what the graphs also show is that the slope of the boys line in the first graph is steeper than the girls, this indicates that boys cognitive empathy increases more drastically than that of girls as boys age.

Tests of Between-Subjects Effects
Dependent Variable: Dispostional cognitive

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5245.900[a]	3	1748.633	7.832	.000	.236
Intercept	7372.800	1	7372.800	33.020	.000	.303
Gender	2376.200	1	2376.200	10.642	.002	.123
Age_group	2808.450	1	2808.450	12.578	.001	.142
Gender * Age_group	61.250	1	61.250	.274	.602	.004
Error	16969.300	76	223.280			
Total	29588.000	80				
Corrected Total	22215.200	79				

a. R Squared = .236 (Adjusted R Squared = .206)

1. Gender
Dependent Variable: Dispostional cogntive

Gender	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Male	4.150	2.363	-.556	8.856
Female	15.050	2.363	10.344	19.756

2. Age_group
Dependent Variable: Dispostional cogntive

Age_group	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
6-7 year olds	3.675	2.363	-1.031	8.381
12-13 year olds	15.525	2.363	10.819	20.231

*3. Gender * Age_group*
Dependent Variable: Dispostional cogntive

Gender	Age_group	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Male	6-7 year olds	-2.650	3.341	-9.305	4.005
	12-13 year olds	10.950	3.341	4.295	17.605
Female	6-7 year olds	10.000	3.341	3.345	16.655
	12-13 year olds	20.100	3.341	13.445	26.755
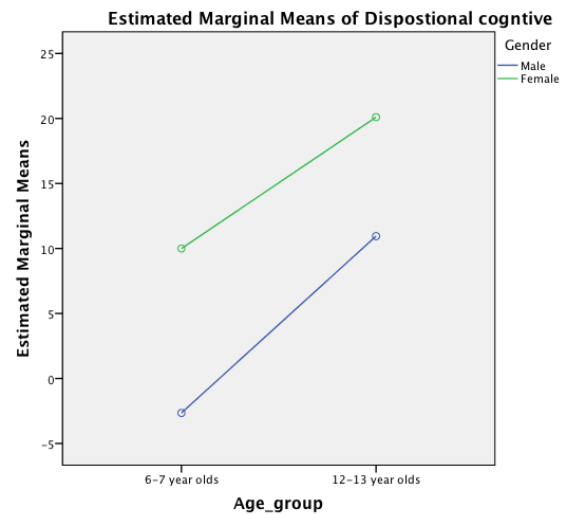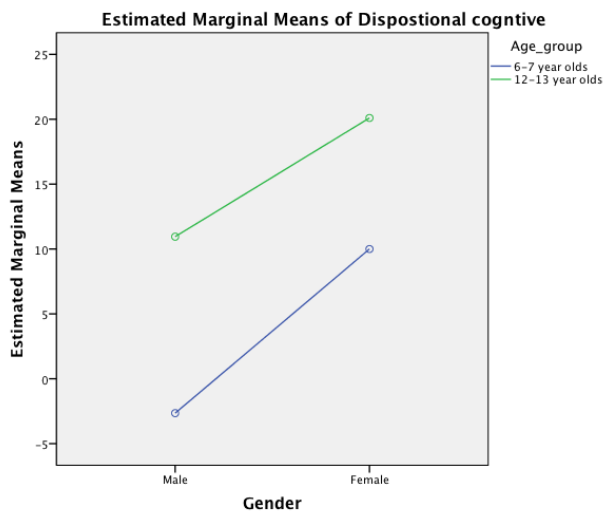
Third Factorial ANOVA

This Anova was carried out in order to see if there were any significant differences in affective empathy score due to difference in gender (IV_1) or difference in age group (IV_2).

Variables

IV_1 = Gender (*Male / Female*)
IV_2 = Age Group (*Group 1*- [6-7 year olds] / *Group 2* - [12-13 year olds])
DV = Affective Empathy Score (QCAE)

Hypotheses

Null:

H_0 = there is no main effect for gender
H_0 = there is no main effect for age group
H_0 = there is no interaction effect between these two factors

Alternate:

$H_{1=}$= there is a main effect for gender – based on the literature we would predict that
H_1 = there is a main effect for age group
H_1 = there is an interaction effect between these two factors

Check Assumptions

Normal distribution: In order to check that our data was normally distributed for this 2x2 factorial design we examined a box plot of the data (see right). Since our sample size for each group is only N = 20 it is hard to assess normal distribution from so few participants, however looking at the box plot we can see that generally speaking the data looks normally distributed, with only 1 visible outlier: in the 6-7 year old male group. Both girl groups seem negatively skewed as well however, since ANOVA is a robust test and we have equal cell means we can continue with our analysis regardless of a potentially not normally distributed data set.
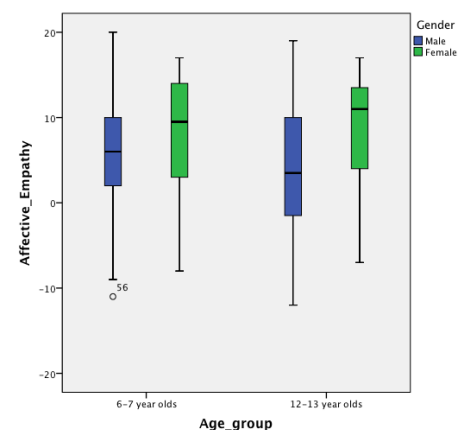
Independence of observations: is assumed

Homogeneity if variance: We found that Levene's test for the homogeneity of variance was not significant, $p = .730$, which means that the variance between our groups is not significant and therefore the assumption of homogeneity of variance has been upheld

Levene's Test of Equality of Error Variances^a

Dependent Variable: Affective_Empathy

F	df1	df2	Sig.
.433	3	76	.730

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Age_group + Gender + Age_group * Gender

Results

A two-factor study was carried out to determine the relationship between affective empathy score and two independent variables: (1) **Gender** of participant (*Male, Female,*); and (2) **Age Group** (*6-7 year olds* and *12-13 year olds*). Only one of the main effects (gender main effect) was significant at the .05 level, and the interaction effect was found not to be significant.

From the results of the factorial ANOVA we found that first independent variable, **Gender**, only just had a significant main effect $F (1, 76) = 4.107$ $p = .046$, partial eta squared = .051, indicating that females (*M* = 7.90, *SD* = 1.195) exhibited significantly higher affective empathy scores than males (*M* = 4.475, *SD* = 1.195) .

The second independent variable, **Age Group**, did not have a significant main effect $F(1, 76) = .037$ $p = .848$, partial eta squared = .000, indicating that there was no significant difference in the affective empathy scores across age groups with the 6-7 year olds (*M* = 6.025, *SD* = 1.195) having very similar scores to the 12-13 year olds (*M* = 6.350, *SD* = 1.195).

There was an interaction but this interaction was found to be insignificant , $F(1, 76) = .483$ $p = .489$ (see the profile plots below). The crossing over of the two lines (representing age group) in the second graph on the right exhibits a disordinal interaction (Disordinal interactions indicate that a factor has one kind of an effect in one condition and a different kind of effect in another condition). What this indicates for our results is affective empathy dependent on the gender 'condition', i.e. females show high affective empathy and males show low affective empathy.

Another interesting finding which can be seen by looking at the graph on the left is that males affective empathy appears to decrease with age whereas females affective empathy appears to increase with age.

Tests of Between-Subjects Effects

Dependent Variable: Affective_Empathy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	264.338^a	3	88.113	1.542	.210	.057
Intercept	3062.813	1	3062.813	53.612	.000	.414
Age_group	2.113	1	2.113	.037	.848	.000
Gender	234.613	1	234.613	4.107	.046	.051
Age_group * Gender	27.613	1	27.613	.483	.489	.006
Error	4341.850	76	57.130			
Total	7669.000	80				
Corrected Total	4606.188	79				

a. R Squared = .057 (Adjusted R Squared = .020)

1. Age_group

Dependent Variable: Affective_Empathy

Age_group	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
6-7 year olds	6.025	1.195	3.645	8.405
12-13 year olds	6.350	1.195	3.970	8.730

2. Gender

Dependent Variable: Affective_Empathy

Gender	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	4.475	1.195	2.095	6.855
Female	7.900	1.195	5.520	10.280

*3. Age_group * Gender*

Dependent Variable: Affective_Empathy

Age_group	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
6-7 year olds	Male	4.900	1.690	1.534	8.266
	Female	7.150	1.690	3.784	10.516
12-13 year olds	Male	4.050	1.690	.684	7.416
	Female	8.650	1.690	5.284	12.016

Estimated Marginal Means of Affective_Empathy

Estimated Marginal Means of Affective_Empathy
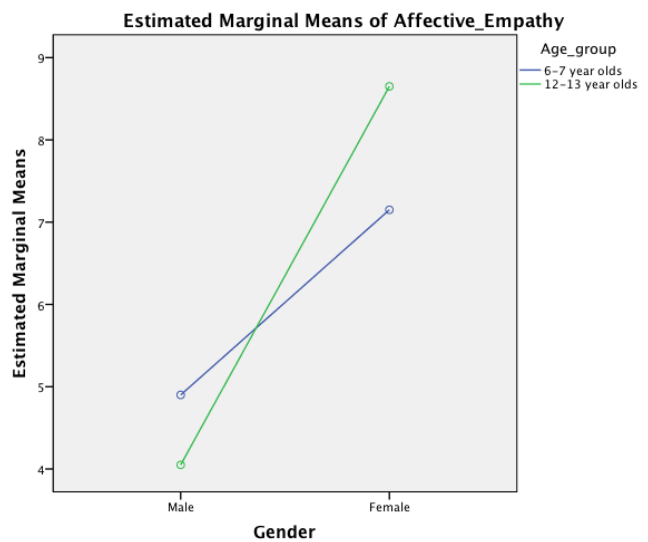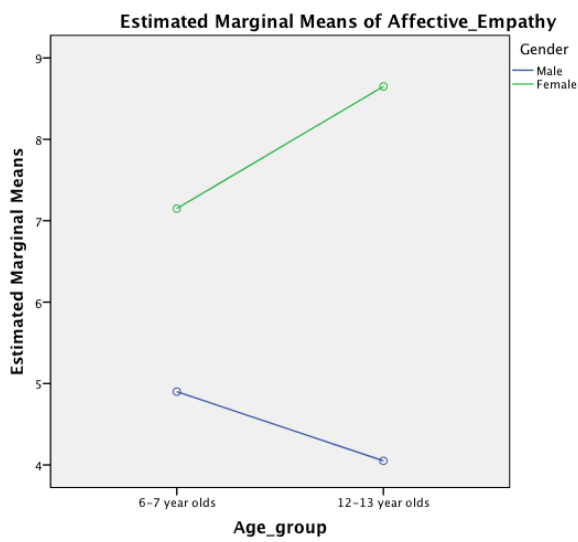
Appendix I

Multiple Regression Analysis Assumptions

ASSUMPTIONS

Non-Zero Variance

- From the descriptives below we can see that all the standard deviations differ from 0, i.e. there is non-zero variance

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
CBCL_total	80	0	28	9.95	6.616	43.770	.728	.269	.129	.532
QCAE_Total	80	-39	49	15.79	21.593	466.271	-.502	.269	-.254	.532
Affective_Empathy	80	-12	20	6.19	7.636	58.306	-.555	.269	-.430	.532
Cognitive_Empathy	80	-34	38	9.60	16.769	281.205	-.628	.269	-.152	.532
Gender	80	1.00	2.00	1.5000	.50315	.253	.000	.269	-2.052	.532
Age_group	80	1.00	2.00	1.5000	.50315	.253	.000	.269	-2.052	.532
Age_years	80	6	13	9.33	3.043	9.260	.022	.269	-1.927	.532
Ethnicity	80	1.00	2.00	1.0625	.24359	.059	3.684	.269	11.870	.532
Home_language	80	1.00	6.00	1.2500	.90707	.823	3.966	.269	15.711	.532
Asset Index	80	-4	5	.19	2.049	4.197	.513	.269	-.287	.532
WM_Standardized	80	3.00	23.00	12.4000	3.98923	15.914	-.015	.269	.329	.532
School	80	1.00	3.00	1.7500	.75473	.570	.453	.269	-1.105	.532
Valid N (listwise)	80									

Multicollinearity

Correlations

		CBCL_total	QCAE_Total	Affective_Empathy	Cognitive_Empathy	Gender	Age_group
Pearson Correlation	CBCL_total	1.000	-.047	.168	-.137	-.190	-.198
	QCAE_Total	-.047	1.000	.738	.952	.334	.284
	Affective_Empathy	.168	.738	1.000	.495	.226	.021
	Cognitive_Empathy	-.137	.952	.495	1.000	.327	.356
	Gender	-.190	.334	.226	.327	1.000	.000
	Age_group	-.198	.284	.021	.356	.000	1.000
Sig. (1-tailed)	CBCL_total	.	.340	.068	.113	.046	.039
	QCAE_Total	.340	.	.000	.000	.001	.005
	Affective_Empathy	.068	.000	.	.000	.022	.425
	Cognitive_Empathy	.113	.000	.000	.	.002	.001
	Gender	.046	.001	.022	.002	.	.500
	Age_group	.039	.005	.425	.001	.500	.

Coefficients[a]

|	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	9.378	.932		10.065	.000	7.523	11.234					
Affective_Empathy	.271	.108	**.313**	2.503	.014	.055	.486	.168	.274	.272	**.755**	**1.325**
Cognitive_Empathy	-.115	.049	**-.292**	-2.334	.022	-.213	-.017	-.137	-.257	-.253	**.755**	**1.325**
2 (Constant)	12.766	2.269		5.626	.000	8.246	17.286					
Affective_Empathy	.285	.107	.328	2.649	.010	.071	.498	.168	.291	.284	.750	1.333
Cognitive_Empathy	-.094	.050	-.239	-1.866	.066	-.195	.006	-.137	-.209	-.200	.706	1.416
Gender	-2.449	1.499	-.186	-1.634	.106	-5.434	.536	-.190	-.184	-.175	.888	1.127
3 (Constant)	15.831	3.365		4.705	.000	9.128	22.535					
Affective_Empathy	.260	.109	.300	2.389	.019	.043	.477	.168	.266	.256	.726	1.378
Cognitive_Empathy	-.066	.055	-.168	-1.199	.234	-.176	.044	-.137	-.137	-.128	.586	1.706
Gender	-2.670	1.505	-.203	-1.774	.080	-5.667	.327	-.190	-.201	-.190	.875	1.143
Age_group	-1.901	1.545	-.145	-1.230	.222	-4.978	1.177	-.198	-.141	-.132	.830	1.205

a. Dependent Variable: CBCL_total

- The correlation matrix displayed above shows that there is no perfect multicollinearity as the pearson coeffiecents are all below 1 (see correlation matrix above).
- Usingthe coeffiecents table (underneath the correlations table) we can take a closer look at multicollinearity .
  - Both predictors for **Model 1** have High **Tolerance** values, the lowest being . 755, which is well above .1, (.1 or below indicates a serious problem with tolerance).
  - The **VIF** values are not close to 10 (which is otherwise a cause for concern) and the average VIF value is 1.325 which is not substantially greater than one which indicates that the regression is not biased.
  -

Normality of Residuals

- The histogram below shows that the residuals have a slight negative skew. The pp-plot confirms that the residuals are not entirely normally distributed. This may warrant some form of transformation, but transforming data can incur problems of its own so this will not be done here.
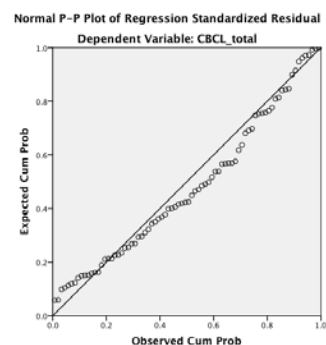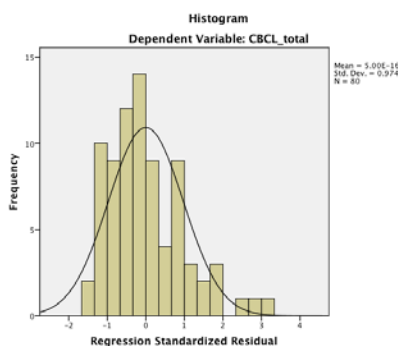
Independence of Residuals
- The Durban-Watson test statistic is 2.263 which is a slightly above the ideal value of 2, but it is well within the limits of 1 and 3. Thus it can be concluded that the residuals are independent.

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.304[a]	.093	.069	6.384	.093	3.926	2	77	.024	
2	.351[b]	.123	.089	6.316	.031	2.669	1	76	.106	
3	.375[c]	.141	.095	6.294	.017	1.513	1	75	.222	2.263

a. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy

b. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Gender

c. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Gender, Age_group

d. Dependent Variable: CBCL_total

Homoscedacity and linearity
- The standardised residual plot (far left) appears to show homscededacity and linearity with a couple of outliers (beyond 2 st devs) visible. The partial plots generally seem to exhibit homoscedacity as well.
- NB note – if this assumption is not met then a transformation could be performed on the data but as noted before this can have problems of its own and is also not necessary in this case as the assumption of homosced. Seems to have been met.
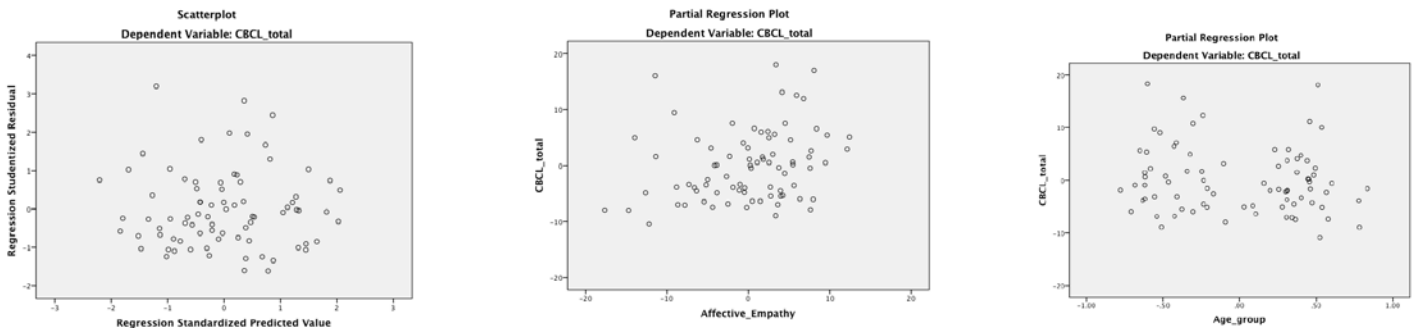
MODEL FIT

Finally in order to test whether the model generalises to other populations we need to cross validate it.One way of doing this is by looking at the adjusted R^2 value – this estimates how much variance in the outcome variable could be accounted for if the model had been derived from the population which our sample was taken from. For this model to generalise well the adjusted R^2 Value should be close or the same as the R^2 value. The adjusted R^2 value for this model was = .093and the R^2 value is .069 which is more or less relatively close so we can say our model generalises. Another way to cross validate this model would be to take subsamples of the original data and see how well the model works for these sub samples – even better would be to take another sample form the population and compare. However due to time constraints on our ability to conllect data these options will not be explored.

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
					Change Statistics					
1	.304[a]	.093	.069	6.384	.093	3.926	2	77	**.024**	
2	.351[b]	.123	.089	6.316	.031	2.669	1	76	.106	
3	.375[c]	.141	.095	6.294	.017	1.513	1	75	.222	2.263

a. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy

b. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Gender

c. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Gender, Age_group

d. Dependent Variable: CBCL_total

CONCLUSION

A hierarchical regression was eventually run to predict Aggression (measured by the CBCL externalising scale) using the predictors of Cognitve and Affective empathy scores (both measured by the QCAE). The model seems to be appropriate and useful since it generally fits the data and appears to generalise relatively well beyond our sample. The overall R^2 of the model = .092 (i.e. this model accounts for 9.2 % of the varianence in aggression). Moreover, the overall model is statistically significant, $F(2, 79) = 3.926$, $p <.05$.

Furthermore, by examining the Beta coefficients (Cognitive Empathy [Beta =.271, p = .014] , Affective_Empathy [Beta = -.115, p = .022]) we can see that Affective empathy is the strongest significant predictor of Aggression. Notably, an interesting finding was that affective empathy has a positive relationship with aggression (meaning that as affective empathy increases so does aggression) whereas cognitive empathy has a megative relationship with aggression (as cognitive empathy increases aggression deceases). *Regression equation*: Agression = 9.378+ .271 (Affective_Empathy) - .115(Cognitive_Empathy) + U.i.

*ANOVA[a]*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	320.004	2	160.002	3.926	.024[b]
	Residual	3137.796	77	40.751		
	Total	3457.800	79			
2	Regression	426.467	3	142.156	3.564	.018[c]
	Residual	3031.333	76	39.886		
	Total	3457.800	79			
3	Regression	486.428	4	121.607	3.069	.021[d]
	Residual	2971.372	75	39.618		
	Total	3457.800	79			

a. Dependent Variable: CBCL_total

b. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy

c. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Gender

d. Predictors: (Constant), Cognitive_Empathy, Affective_Empathy, Gender, Age_group

Appendix J

Initial Mediation Checks

Mediation Analysis 1
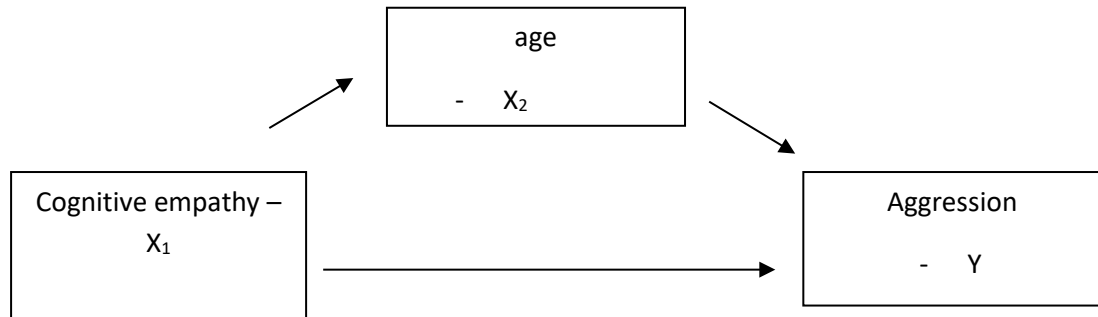
- Regression on X1 → Y. Significant - proceed, else stop.
  - o No not significant (stop).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	.137[a]	.019	.006	6.595	.019	1.489	1	78	.226

a. Predictors: (Constant), Cognitive_Empathy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.777	1	64.777	1.489	.226[b]
	Residual	3393.023	78	43.500		
	Total	3457.800	79			

a. Dependent Variable: CBCL_total

b. Predictors: (Constant), Cognitive_Empathy

Mediation Analysis 2

- Regression on X1 → Y. Significant - proceed, else stop.
  - o No not significant (stop)
-

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.137[a]	.019	.006	6.595	.019	1.489	1	78	**.226**

a. Predictors: (Constant), Cognitive_Empathy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.777	1	64.777	1.489	.226[b]
	Residual	3393.023	78	43.500		
	Total	3457.800	79			

a. Dependent Variable: CBCL_total

b. Predictors: (Constant), Cognitive_Empathy

Mediation Analysis 3

- Regression on X1 → Y. Significant - proceed, else stop.
  - o No not significant (stop)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.168[a]	.028	.016	6.563	.028	2.274	1	78	.136

a. Predictors: (Constant), Affective_Empathy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	97.966	1	97.966	2.274	.136[b]
	Residual	3359.834	78	43.075		
	Total	3457.800	79			

a. Dependent Variable: CBCL_total

b. Predictors: (Constant), Affective_Empathy

Mediation Analysis 4

- Regression on X1 → Y. Significant - proceed, else stop.
  - No not significant (stop)

Model Summary

				Std. Error	Change Statistics				
Model	R	R Square	Adjusted R Square	of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.168[a]	.028	.016	6.563	.028	2.274	1	78	.136

a. Predictors: (Constant), Affective_Empathy

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	97.966	1	97.966	2.274	.136[b]
	Residual	3359.834	78	43.075		
	Total	3457.800	79			

a. Dependent Variable: CBCL_total

b. Predictors: (Constant), Affective_Empathy

Mediation Analysis 5

Model Summary[b]

				Std. Error	Change Statistics					
Model	R	R Square	Adjusted R Square	of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.304[a]	.093	.069	6.384	.093	3.926	2	77	.024*	2.188

a. Predictors: (Constant), Affective_Empathy, Cognitive_Empathy

b. Dependent Variable: CBCL_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	320.004	2	160.002	3.926	.024[b]
	Residual	3137.796	77	40.751		
	Total	3457.800	79			

a. Dependent Variable: CBCL_total

b. Predictors: (Constant), Affective_Empathy, Cognitive_Empathy