

Investigating parenting factors, traumatic brain injury and antisocial behaviour in a sample of
Cape Town high school students in a low socioeconomic status setting

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Word Count:

Main Body: 7733

Abstract: 242

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Abstract

Background: South African (SA) males aged 12-22 years are leading perpetrators of crime in the country. Research suggests that traumatic brain injuries (TBIs), and certain parenting styles, can predispose one to engage in antisocial behaviours associated with criminal activity. Levels of TBI are high among SA youth; it is thus important to establish what effect parenting style has on children with TBI, in terms of antisocial behaviour outcomes.

Aim and methods: This study sought to investigate the relationship between these three variables in a sample of Cape Town high school boys ($N=54$), aged 13-21 years. We hypothesised that boys who reported that they had sustained a TBI and who had been exposed to poor parenting, would display increased levels of antisocial behaviour and that those with TBI who had experienced good parenting, would display lower levels of antisocial behaviour.

Results: Almost 41% (22/54) of participants reported sustaining a TBI. There was no significant difference in terms of exposure to good or poor parenting in the participants who reported sustaining TBIs, nor in the frequency of antisocial behaviours. However, poor parenting moderated antisocial behaviour in participants with TBI, while good parenting did not.

Conclusion: Our findings indicate that although adolescent boys with TBI are not exposed to significantly more good or poor parenting techniques than those without TBI, they are more susceptible to the effects of poor parenting but not good parenting than those without TBI, regarding increased levels of antisocial behaviour.

Keywords: Crime, antisocial behaviours, children with TBI, parenting.

South Africa has been a democratic state since 1994, but the effects of the previous apartheid regime still echo in the present day, with nationwide inequality having increased since 1994 (Statistics South Africa, 2018). The widespread inequality is shown within communities, as they are reflective of the socio-economic status (SES) of the majority of their inhabitants. This inequality influences how different communities are affected by crime in the country, where limited access to resources and opportunities, and a tangible socioeconomic gap, are associated with high levels of all types of crime (Kang, 2015). Crime rates in South Africa are high and have increased from 2016/17 to 2017/18 (Statistics South Africa, 2018), with the highest rates found in lower SES communities in the country (Gardner, Waller, Maughan, Cluver, & Boyes, 2015). Many youths aged 12-22 years in South Africa find themselves within such low SES settings, where they face high exposure to crime, violence and poverty, relative to the general population (Bhorat, Thornton, & Van der Zee, 2017; De Lannoy, Leibbrandt, & Frame, 2015; Gardner et al., 2015). However, youth are not only witnessing, and victims of crime but are also amongst the leading perpetrators thereof (du Plessis, Kaminer, Hardy, & Benjamin, 2015; Statistics South Africa, 2018). A well-established predictive factor of criminal involvement in individuals is the presence of antisocial behaviours. Given the magnitude of the problem of crime perpetrated by youth in the country, it is necessary to investigate factors that may predispose South African youth residing in low SES settings to engage in antisocial behaviours associated with criminal activity.

One such factor, which may be overrepresented in low SES communities is traumatic brain injury (TBI). South Africa has one of the highest rates of TBI in the world (Dewan et al., 2018; Rosema, Crowe, & Anderson, 2012). This is particularly pertinent considering the link between TBI and antisocial behaviours, and antisocial behaviours and crime, all of which are especially prevalent in the country. A further important predictive factor for antisocial behaviour is parenting style. Children who are exposed to poor parental support are at a greater risk of displaying antisocial behavioural outcomes (Ward, Gould, Kelly, & Mauff, 2015). Despite the prevalence of both TBIs and poor parental support in low SES settings within the country, there is a lack of research regarding the relationship between these two factors and antisocial behaviours.

Antisocial behaviours. Antisocial behaviour encompasses physically aggressive behaviours, rule-breaking behaviours, oppositional behaviours, and more severe behaviours associated with lack of empathy and guilt (Piotrowska, Stride, Croft, & Rowe, 2015). Antisocial behaviours are associated with high interpersonal and financial costs, within families and the

broader society. Numerous articles on predictors of, or pathways to, antisocial behaviours among youth have been put forward over the years (Henry, Moffit, Robins, Earls, & Silva, 1993; Low, Tan, Nainee, Viapude, & Kailsan, 2018; Park, Lee, Sun, Vazsonyi, & Bolland, 2010). Most published works in this area appear to divide predictors into one or more of the following areas of influence: individual, school, community, peer and family. Two factors seem to stand out in these studies: 1) in terms of individual factors, no mention is made of the possible role of TBIs in these studies, and 2) that parenting factors seem to be represented in all studies in some form regardless of the types of risk factors reported on and is even reported as the most significant predictor in some studies (this was the case for a sample of juvenile offenders in Malaysia; Low, et al., 2018). We review these two factors below.

Antisocial behaviour and traumatic brain injury. It is estimated that on a global scale, there are between 64 and 74 million cases of TBI annually (Dewan et al., 2018). Severe cases of TBI can often result in death and patients who sustain even mild TBIs report disabling symptoms across economic, societal and quality of life domains months after the incident. Individuals in low- to middle-income countries (LMICs), such as South Africa, are even more susceptible to this often-fatal injury. TBIs are estimated as nearly three times as prevalent in LMICs, although they tend to be better reported and documented in North America and Europe (Dewan et al., 2018). Further, statistics in South Africa show that the second leading cause of death in youth is "external causes and morbidities" such as violence and car accidents (Statistics South Africa, 2018), which are common mechanisms of injury in TBI (Naidoo, 2013).

TBIs are complex injuries resulting from trauma to the head, leading to adverse symptoms often associated with psychological distress. While impulse control, judgement of social appropriateness, inhibition, and self-control are not localized to one particular part of the brain, the components of the neural networks that are responsible for these functions are most susceptible to damage due to the mechanisms through which a TBI occurs and resultant pathophysiology (Rosema et al., 2012). These cognitive impairments can lead to social dysfunction. Instances of conduct behaviour problems, violent behaviours and suicidal thoughts are more commonly found in those who have sustained a TBI than those who have not (Ilie et al., 2014). One Polish study found that youth who had sustained a TBI were significantly more likely than controls to display antisocial behaviours including impulsivity, anger and aggression, but such a study has yet to be conducted in South Africa where unique social and cultural factors could influence the effects of a TBI on behaviour (Tomaszewski et al., 2014). TBI as a risk factor for antisocial behaviour must be further researched in the South African context, considering the high levels of crime in the country.

Antisocial behaviour and parenting. Style and methods of parenting have been found to have important and long-lasting effects on children's behaviour that continue into adolescent and young adult years (Ward et al., 2015). Children who received warmer, nurturing, parenting perform far fewer risky behaviours, and are less likely to be involved in violent and criminal behaviour than those who experience harsher parenting, or are deprived of parental support (Ward et al., 2015). Positive parenting has been found to minimise antisocial behaviours (e.g., aggression, delinquency, violence) in communities where violence is rife, and the absence thereof has been found to do the opposite (Kim-Ju, Goodman, & Her, 2018). Further, harsh discipline and high levels of maternal stress have been reported as strong predictors of antisocial behaviours in children as young as five years old, such as high levels of aggression (Leibbrandt et al., 2012). Parenting styles involving violence from parents towards children are associated with higher levels of antisocial behaviours in children (Ward et al., 2015).

Parenting and TBI. Parenting style has been found to moderate functional impairments in children with TBI across cognitive and social domains, where children parented with a permissive (negative) style of parenting are significantly more likely to display these impairments over time, in comparison to those who experience more positive parenting (Wade, Zhang, Yeates, Stancin, & Taylor, 2016). These differences in cognitive and social behavioural outcomes between children with TBI and controls become consistently more pronounced under extreme authoritarian and permissive parenting styles (Yeates, Taylor, Walz, Stancin, & Wade, 2010). Further, an authoritative (positive) parenting style is associated with better social and behavioural outcomes after TBI, compared to negative parenting (Schorr, Wade, Taylor, Stancin, & Yeates, 2019).

It is evident that parenting style can influence the types of behaviours children develop, and there is reason to believe it may influence the behavioural outcomes for children with TBI. However, there is a lack of research on parenting style as a predictor for antisocial and potentially criminal behaviour in the South African context (Ward, et al., 2015). There is a further lack of research regarding the role of parenting style in influencing the associated antisocial behavioural outcomes of children with TBI. Considering the high levels of both crime and TBI in low SES settings within the country, as well as the established link between TBIs and antisocial behavioural outcomes that may be moderated by certain parenting styles, there is a need to research the effects of parenting styles on behavioural outcomes in youth with TBIs (Piotrowska, et al., 2015).

Conclusion and rationale

South Africa has exceptionally high crime rates, and youth are the main perpetrators thereof (De Lannoy et al., 2015; Statistics South Africa, 2018). Youth who offend often display antisocial behaviours, which are associated with criminal behaviour (Gardner, et al., 2015). There are various factors that predict antisocial behaviours. There is an emerging body of evidence establishing links between TBI and antisocial behaviour (and consequent offending behaviour; Williams et al., 2018), as well as a large pool of research establishing links between parenting and antisocial behaviour, and some research suggesting that parenting style may moderate behavioural outcomes in youth with TBI; however there is a lack of this literature in the South African context (Ilie et al, 2014; Leibbrandt, Finn, & Woolard, 2012; Piotrowska, et al., 2015). Further, there is a lack of research investigating the interaction of parenting factors with TBI. Poor parenting may further predispose youth affected by TBI to engage in antisocial behaviours, providing the rationale for this research.

Aims and hypotheses.

The aim of the current study was to investigate whether parenting styles towards children with TBI moderated antisocial behavioural outcomes. Specifically, we investigated whether adolescents with TBI who have been exposed to more positive parenting styles, as measured by the Alabama Parenting Questionnaire, would report lower rates of antisocial behaviours than those with TBI who had been exposed to more negative parenting behaviours.

We hypothesised that:

- 1.) Children with TBI who had been exposed to more positive parenting behaviours would report lower levels of antisocial behaviours;
- 2.) Children with TBI who had been exposed to more negative parenting behaviours would report higher levels of antisocial behaviours.

Methods

Design and Setting

The study formed part of a larger study looking at the prevalence of TBIs among male young offenders and non-offenders and behavioural outcomes associated with TBIs within those groups. This study focused on the non-offender group of that larger study, specifically investigating antisocial traits in a typically developing youth sample, looking at TBI and parenting styles as predictors of said traits.

The study design was cross-sectional, as it looked at youth of different ages at the same point in time. The youth were from low SES high schools within Cape Town. We collected data for the larger project and the current one, through neuropsychological tests and self-report measures, as part of a team of honours and master's students and research assistants, on the respective school premises.

The independent variables in this study were TBI (yes/no) and the style of parenting to which participants had been exposed (poor/good). Antisocial traits, the dependent variable in our study, as measured by the Inventory of Callous Unemotional Traits. Two moderation analyses were run to determine whether the style of parenting (poor/good) moderated the effect of TBI regarding antisocial behavioural outcomes.

Participants

Participants in the study were recruited through purposive sampling, as only individuals possessing specific characteristics were recruited for the study. School principals were approached and those who expressed interest distributed consent forms to the pupils who met the sampling criteria. These schools were selected according to a low SES bracket and proximity to UCT as this facilitated data collection. As required by the larger study, participants included were English- or Afrikaans-speaking males from low-SES backgrounds, aged 13-21 and attended low-SES Cape Town high schools. Participants were excluded from the study if they did not meet the above criteria, as this study was particularly interested in South African youth residing in low-SES environments due to the literature indicating high rates of crime and TBI in low SES South Africa. The language exclusion criterion was a factor determined by the larger study, given limited access to translators for, and translations of, neuropsychological tools into other South African official languages.

Power Analysis. An a priori power analysis was performed and indicated that 50 participants would be needed for two moderation analyses to have a statistical power of .95 with a large effect size (Cohen's $f=0.35$). We were able to meet this requirement with a sample of $N=54$, and thus the study was adequately powered.

Measures

Screening Measures.

Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST). The ASSIST is a self-report questionnaire with eight items designed to assess levels of substance use in the three months preceding the test. The measure screens for a range of substances, including but not limited to alcohol, tobacco and cannabis. The World Health Organisation designed the ASSIST in 2010, with the goal of creating a standardised measure with which to assess levels of

substance abuse worldwide (Babor, 2002). It has high levels of reliability and validity ($a = .83$, $KMO = .77$; Simelane-Mnisi & Mji, 2017). Seeing as the measure was created with a global population in mind, and has been tested in an African population, it is suited to the South African context (World Health Organization [WHO], 2003).

Alcohol Use Disorders Identification Test (AUDIT). The AUDIT is a 10-item questionnaire that was developed by the WHO to measure alcohol consumption, dependence and associated complications (Peltzer, Davids, & Njuho, 2011). It is particularly aimed at healthcare practitioners, but it can and has been successfully self-administered or administered by non-health care professionals. The AUDIT has high internal consistency and reliability (Cronbach's $\alpha = 0.80$), and these properties have been tested and found to be retained in South African samples (Meneses-Gaya, Zurardi, Loureiro, & Crippa, 2010; Peltzer et al., 2011).

Beck Depression Inventory. The Beck Depression Inventory (BDI) is a widely utilised tool used to assess levels of depression. Both psychological and physical symptoms of depression are assessed. It is a self-report measure with 21 items using a 4-point Likert scale. Standard cut-off scores are as follows: scores between 0-9 indicate normal functioning, 10-19 indicate mild to moderate depression, and 20 and above indicate severe depression (Beck, Steer, & Brown, 1996). The test has good psychometric properties, including high validity (Cronbach's $\alpha = .96$) and test-retest reliability scores (Cronbach's $\alpha = 0.73 - 0.96$) (Beck et al., 1996; Wang & Gorenstein, 2013). Additionally, the BDI has been used successfully and widely in South Africa and was thus suited to the context (Khumalo & Plattner, 2019; Stellenberg & Abrahams, 2015).

Traumatic Brain Injury Measure.

Comprehensive Health Assessment Tool. The CHAT is a standardised measure used to screen for health complications. It was originally designed with a young offender population in mind. It includes four sections: physical health, mental health, substance misuse and neuro-disability. We used the CHAT to distinguish between adolescents who have sustained a TBI and those who have not. An advantage of this tool is that it measures the frequency and severity of each TBI (if there has been more than one). The CHAT has good psychometric properties when compared to other health assessment tools, and high reliability and validity when assessing the presence of TBI (Williams, Cordan, Mewse, Tonks, & Burgess, 2010). This measure has been used in SA in one unpublished study (Ockhuizen, 2014).

Demographic Questionnaire. This short questionnaire was used to assess individual participants' socio-economic environment. Questions pertaining to the participants' age, residential area, number of individuals residing within the household, number of rooms within

the household and the type of materials out of which the house was made were used to determine the SES of participants

Parenting Measure.

Alabama Parenting Measure. The Alabama Parenting Measure (APM) is a two-part self-report questionnaire whereby the participant in question is asked to rank his responses to 42 items on a 5-point Likert Scale. There are two separate questionnaires for youth and their parents. For the purposes of this study, only the high school boys were asked to complete this questionnaire, due to difficulty obtaining responses from parents. The questionnaire is used to assess parenting styles in five subcategories: involvement, positive parenting, monitoring/supervision, inconsistent discipline, and corporal punishment. High factorial validity has been found between these categories (Maguin, Nochajski, De Wit, & Safyer, 2016). Internal consistency is adequate and test-retest reliability is good ($r = 0.84-90$; Dadds, Maujean, & Fraser, 2003). The APM is a commonly used measure, with multiple translated versions in use. This measure has been successfully used to assess parenting in South African studies (Lachman, Cluver, Boyes, Kuo, & Casale, 2013). For the purposes of the current study, the five categories were grouped into two larger categories of Good and Poor parenting for better operationalization. Positive parenting and involvement were grouped as Good Parenting, while monitoring/supervision, inconsistent discipline, and corporal punishment were grouped under Poor parenting, allowing for two parenting scores.

Antisocial Behaviour Measure.

Inventory of Callous/Unemotional traits. The ICU is made up of 24 items that measure levels of aggression and antisocial behaviour across three subsections, including callousness, unemotionality, and uncaring tendencies. Each item is rated on a four-point Likert scale, and the participants are required to rank their responses to statements as such. Some items require reverse scoring. The ICU has been found to have good psychometric properties of validity even in cross-cultural settings (Cronbach's $\alpha = .77$) and reliable in detecting antisocial tendencies in adolescents (Kimonis et al., 2008; Mooney, 2010). Although this measure has only been used in an unpublished South African study, a study investigating cross-cultural properties of the ICU found it to retain its psychometric properties in varied cultural settings, and we, therefore, consider it appropriate for our context and purposes (Feilhauer, Cima, & Arntz, 2012; Ockhuizen, 2014).

Procedure

After we had received ethical clearance from the UCT Psychology Department's Research Ethics Committee – PSY2019-037 (see Appendix G) and permission to conduct

research in schools from the Western Cape Education Department – 20180308-249 (see Appendix D), we approached the principals of two low-SES high schools in Cape Town and invited their learners to participate in our study. All boys who met the inclusion criteria were invited to participate in the study, and we distributed parent consent forms (for the under 18s), participant consent forms (for the over 18s) to them. The schools informed us once the respective forms had been returned and signed appropriately, and we made a list of all the boys who agreed to participate in the study.

We, the research team involved in collecting the data (three Psychology Honours students, one Masters student and one research assistant with an Honours degree in Psychology and who worked on the larger project), administered the aforementioned measures individually to each participant along with the battery for the larger study, from 21 August to 20 September 2019. We arrived at the schools on the morning of the days that had been agreed upon with the school principals, and a designated teacher called the boys from class. We obtained assent (for those under 18 years) from the participants at the start of the sessions. The boys were interviewed individually in empty classrooms, where there was no risk of disruption or violation of confidentiality. Interview sessions for the screening and behavioural measures took approximately an hour and were often conducted with researchers in pairs, as a safety measure. The researchers asked the questions aloud and filled out the relevant answers on the questionnaires.

The researchers always recapped the participant's knowledge regarding the purpose of the study, and allowed them ample time before, during and after the interviews to ask any questions they had. As some of the questions were of a potentially distressing nature, and the interviews were fatiguing, the participants were made aware that they could take breaks at any time they wanted. They were also reminded of the voluntary nature of their participation and that they could withdraw their assent/consent to participate at any time even if their parents had consented (for the under 18s) to their participation and were made aware of counselling services available to them. At the end of the interview, the researchers provided each participant with a R50 Pick 'n Pay voucher. The participants were also provided with snacks which they were allowed to eat at any time during the interview when they felt the need for it.

Once the questionnaires had been completed, the research team stored the raw data in a locked office to which only the research team had access to ensure confidentiality.

Statistical Data Analysis

We analysed the data collected in this study using the Statistical Package for the Social Sciences (SPSS) version 25. The level of alpha was set at $p < 0.05$, in keeping with standard

practice. The data was cleaned, and assumptions for the various analyses checked before we ran the analyses. Then, descriptive statistics for, and the correlations between, age, the screening measures (BDI, AUDIT, ASSIST, age), the predictor variables (TBI and parenting style) and the outcome variable (antisocial behavioural traits) were calculated.

Hypothesis 1. To address this hypothesis and as illustrated in *Fig 1.*, we ran a hierarchical moderation analysis to determine whether boys with TBI (yes/no) who had been exposed to more positive parenting styles displayed fewer antisocial behaviour traits (ICU), thus indicating that parenting style moderates outcomes in youth with TBI. We controlled for our screening measures (BDI, AUDIT, ASSIST) as well as age in doing this.

Hypothesis 2. To address this hypothesis and also illustrated in *Fig 1.*, we performed an additional hierarchical moderation analysis to determine whether children with TBI who have been exposed to more negative parenting styles displayed more antisocial behaviour traits (ICU). Again, we controlled for our screening measures (BDI, AUDIT, ASSIST) and age in doing so.

For both moderations, all control variables and age were entered as a block, followed by TBI, and then by either poor or good parenting style, with the interaction term entered as the final block. Some studies have shown that substance use and depressive symptoms in adolescents may increase the likelihood of displaying antisocial behaviours (Hemphill, Heerde, Herrenkohl, & Farrington, 2015; Park et al, 2010). Additionally, age has a significant impact on antisocial behaviours in that the period of adolescence is associated with a significantly higher degree of antisocial behaviours compared to other phases in an individual's lifespan (Eme, 2016; Moffitt, 1993). Although all our participants were adolescents, the age range was quite large (13-21) and thus, it was necessary to control for age. It was, therefore, necessary to consider these potential confounding variables in the study.

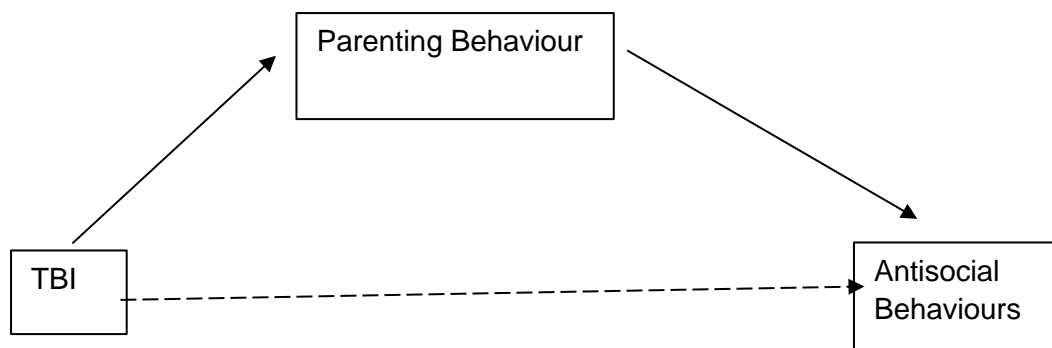


Fig 1. Hypothesised moderating role of parenting behaviours on antisocial behaviour outcomes

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee in the Psychology Department at the University of Cape Town. Permission to conduct the larger study, of which the proposed study formed part, had already been obtained from the Western Cape Education Department (see Appendix E).

Informed consent and assent process. Consent forms, found in appendix A, were given to all eligible boys in the schools to take to their parents to complete. These forms explained the rationale of the study and parents were asked to consent to their child participating. Both the consent and assent forms, which are found in appendix A and B, assured the participants of confidentiality and explained what that means exactly, as well as emphasized that their participation was entirely voluntary and that they could withdraw their consent and assent at any time. Participants over the age of 18 were able to sign their own consent forms. Before each interview commenced, the researcher reiterated the concept of voluntary consent and ensured that they understood that they could withdraw from the study at any time without being penalised.

Potential risks and benefits. There were no major risks to participants being part of the current study. The participants sometimes became tired during the testing but were provided with refreshments and allowed to take breaks if so desired. As some of the questions were of a personal nature, the participants were at risk of psychological distress during or after the interviews. All participants were made aware of counselling services available to them at their respective schools, but if any participants expressed particular distress, we referred them to the school counsellor. Any participants who scored 20 or higher on the BDI were immediately referred to the school counsellor. Each participant was compensated for their participation with a R50 Pick n Pay voucher, and given a snack pack (a fizzer, a packet of chips and a juice box).

Debriefing. After each session, the participants were debriefed and given a chance to ask any questions they had. They were also given have information on whom to contact should they have any concerns or questions should they have arisen at a later stage.

Confidentiality. Participants were informed that their identities and information would remain confidential and that only the research team would have access to the raw data. The data was kept in a secure, locked office, and names were replaced with numbers. Thus, when the data was entered into a password-protected laptop, there was no breach of confidentiality.

Results

Sample Characteristics

The sample size was $N=54$ and included high school boys in grades 8-12, aged 13-21 at the time of testing. There were 22 (40,7%) reported TBIs compared to 32 (59,3%) cases of no TBIs in the sample. Participants mainly resided in predominantly low-SES areas in Cape Town including Khayelitsha, Gugulethu, Langa and the Cape Flats.

Participants in the TBI and non-TBI groups were recruited from the same schools and therefore had similar SES statuses. Both schools were English medium schools, and therefore all participants could communicate in English fluently. Therefore, there were no significant between-group differences with regards to these variables.

Between Group Analysis

The results of comparisons between substance use, depression, parenting and age for the TBI and no-TBI groups are presented in Table 1. Results show that there were no significant differences in these variables. However, there were higher mean scores, at least descriptively, for TBI group for the measures of antisocial behaviour, alcohol use and poor parenting. Antisocial scores were in the normative range for both groups, falling between 20-26 on the ICU, where higher scores represent more severe antisocial traits (Aghajani, et al., 2017). Depression scores for both groups were in the mild depression range of 14-19 on the BDI-II and Alcohol consumption scores on the AUDIT were also below the cut off of 8

Correlations

Table 2 shows the correlations between the different study variables. TBI was not significantly correlated to any of the outcome or control variables; it did, however, show a weak positive correlation to poor parenting and weak negative correlation to good parenting, suggesting that the direction of the relationship is as anticipated. In other words, those who reported sustaining TBIs reported higher scores for poor parenting and those who reported that they had not sustained a TBI reported higher scores for good parenting.

Poor parenting was significantly correlated with age, substance use, alcohol consumption and depression scores, whilst good parenting was significantly correlated with depression, ICU scores and alcohol consumption. Poor parenting showed a weak positive correlation to age and substance use and a moderate positive correlation with alcohol consumption and depression scores. Positive parenting showed a weak negative correlation to alcohol consumption and antisocial levels (ICU scores) while showing a moderate negative relationship with depression scores. These findings suggest poorer parenting is significantly correlated to older age, higher

depression scores and greater alcohol consumption, whilst good parenting is significantly correlated with lower alcohol consumption, lower depression scores and lower antisocial levels.

Table 1

Descriptive Statistics and Between-Groups Analysis for TBI vs Non-TBI groups

| Variable | No-TBI | TBI | <i>F</i> | <i>p</i> |
|------------------------|------------------|------------------|----------|----------|
| | (<i>n</i> = 22) | (<i>n</i> = 32) | | |
| Age (years) | | | | |
| <i>M</i> (<i>SD</i>) | 15.56 (1.831) | 15.68 (2.056) | .050 | .824 |
| Range | 13 – 21 | 13 – 21 | | |
| ASSIST | | | | |
| <i>M</i> (<i>SD</i>) | .72 (.457) | .86 (.351) | 1.571 | .216 |
| AUDIT | | | | |
| <i>M</i> (<i>SD</i>) | 5.94 (6.334) | 6.27 (6.700) | .843 | .843 |
| ICU | | | | |
| <i>M</i> (<i>SD</i>) | 20.84 (5.280) | 21.59 (7.551) | .184 | .670 |
| BDI-II | | | | |
| <i>M</i> (<i>SD</i>) | 15.41 (9.821) | 15.86 (9.478) | .029 | .865 |
| Poor Parenting (%) | | | | |
| <i>M</i> (<i>SD</i>) | 49.05 (12.451) | 52.92 (10.647) | 1.415 | .240 |
| Good Parenting (%) | | | | |
| <i>M</i> (<i>SD</i>) | 61.97 (17.081) | 61.05 (16.571) | .040 | .843 |

Note. For the variables, means are presented with standard deviations in parentheses. ASSIST = Alcohol, Smoking and Substance Involvement Screening Test; AUDIT = Alcohol Use Disorders Identification Test, BDI-II = Beck Depression Inventory.

Table 2

Bivariate Correlations: TBI Group vs Non-TBI Group (N = 54)

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------|--------|--------|--------|--------|---------|-------|-------|---|
| 1. Age | - | | | | | | | |
| 2. ASSIST | .338** | - | | | | | | |
| 3. AUDIT | .463** | .432** | - | | | | | |
| 4. ICU | .165 | .150 | .114 | - | | | | |
| 5. BDI-II | .236* | .249* | .430** | .101 | - | | | |
| 6. TBI (y/n) | .031 | .171 | .028 | .024 | .024 | - | | |
| 7. Poor Parenting (%) | .313* | .253* | .467** | .029 | .422** | .163 | - | |
| 8. Good Parenting (%) | -.351 | -.209 | -.284* | -.263* | -.407** | -.028 | -.139 | - |

Note. *Correlation is significant at the 0.05 level (1-tailed). **Correlation is significant at the 0.01 level (1-tailed). ASSIST = Alcohol, Smoking and Substance Involvement Screening Test; AUDIT = Alcohol Use Disorders Identification Test, BDI-II = Beck Depression Inventor

Moderation analyses

Before running the analyses, assumptions were checked. Assumptions for normality, homoscedasticity, and linearity were upheld, as tested with histograms and plotted graphs (see Appendix J). In terms of multicollinearity, the VIF values were all close to 1 ($VIF_{max} = 1.8$), indicating that multicollinearity was not a problem in either of the models. The tolerance values further confirmed this (min = .56). The Durban-Watson statistics for poor parenting (2.05) and good parenting (1.9) confirmed the independence of residuals. Some Mahalanobis's distances exceeded the conventional cut-off of 15, with maximum scores of 16.9 for good parenting and 18.15 for poor parenting. However, the respective Cook's distances, with values well below 1, indicated that no data points were exerting unacceptable influence on the model and disturbing the normal distribution of residuals. Thus, we concluded that the model was suitable, and no data cleaning nor transformation was needed.

Moderation: Good parenting and TBI

We ran a hierarchical regression moderation analysis where depression, substance use and age were controlled for in the first block, TBI was added in the second, good parenting in the third, and the interaction term entered in the final block (see Table 3). Overall, the model was not statistically significant $F(7,46) = .62, p = .73$, and there was no moderation effect present, as shown in Table 3. The control variables (depression, substance use and age) did not significantly predict ICU scores and explained only 3.9% of the variance in the model $F(4,49) = .5, p = .73$. The addition of TBI only explained a further 0.01% of the variance and did not significantly predict ICU scores, $F(1,48) = .07, p = .78$. Good parenting was added to the regression and explained a further 4.3% of the variance but was not a significant predictor $F(1,47) = 2.2, p = .14$. In the final step, the interaction term was added, and this was not a significant predictor of antisocial behavioural outcomes either, $F(1,46) = .17, p = .68$. Good parenting ($\beta = -.06, p > .05$) and the interaction term ($\beta = -.03, p > .05$) had negative beta values while TBI had positive, ($\beta = .49, p > .05$) Thus, none of the included variables significantly predicted antisocial behavioural outcomes. Further, there was no moderation effect present, and thus good parenting did not moderate antisocial behavioural outcomes in children with or without TBI.

Table 3*Hierarchical Moderation Analysis: good parenting (N=54).*

| Variable | Predictor(s) | R^2 | R^2 change | F change | $df1$ | $df2$ | p | β |
|----------|-----------------------|-------|-----------------|---------------|-------|-------|-----|---------|
| ICU | ASSIST, | .039 | .039 | .501 | 4 | 49 | .73 | 1.46 |
| | AUDIT, | | | | | | | -.007 |
| | BDI, | | | | | | | .033 |
| | Age | | | | | | | .40 |
| | + TBI | .04 | .001 | .073 | 1 | 48 | .78 | .49 |
| | +Good parenting | .08 | .04 | 2.2 | 1 | 47 | .14 | -.06 |
| | + Interaction term | .08 | .003 | .17 | 1 | 46 | .68 | -.03 |

Note. The first row represents the model in which the controls were added. Each row after that represents each outcome variable in addition to the controls for the final model statistics.

Moderation analysis: Poor parenting and TBI

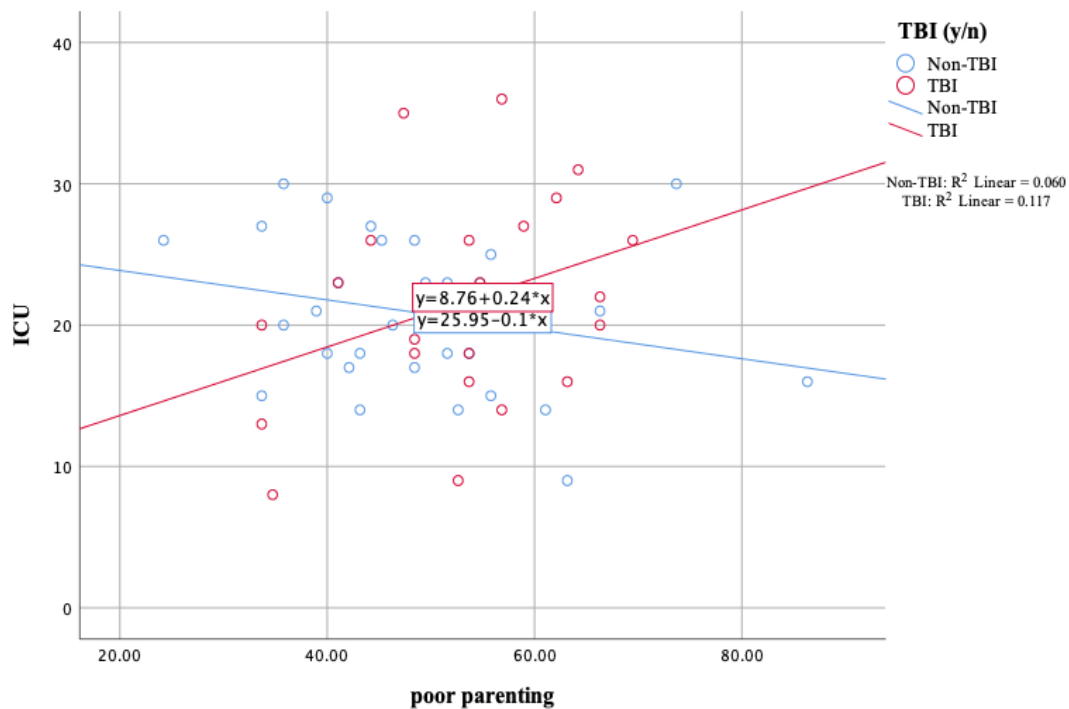
Overall, this model, identical to that above except for the exchange for parenting style, was not significant $F(7,46) = .102, p = .42$ and explained 13.5% of the variance. As shown in Table 4, none of the variables significantly predicted ICU scores by themselves - however, there was a moderation effect present as the interaction term significantly predicted ICU scores. In the first step, the controls did not significantly predict ICU outcomes, and explained 3.9% of the variance in the model $F(4,49) = .5, p = .73$. Thereafter, adding TBI did not predict ICU outcomes either $F(1,48) = .07, p = .78$ only explaining a further 0.1% of the variance in the model. The addition of poor parenting to the model was not a significant predictor of ICU scores, explaining only an additional 0.5% of the variance $F(1,46) = .23, p = .63$. In the final step, the interaction term explained an additional 9% of the variance which, although not very much, was significant $F(1,46) = 4.76, p = 0.03$. Therefore, as shown in Fig 1, there was a moderating effect present, and thus poor parenting moderated antisocial outcomes in children with TBI. For every one unit increase in poor parenting, ICU scores increased by .36 units ($\beta = .36, p < .05$).

Table 4*Hierarchical Moderation Analysis: poor parenting (N=54).*

| Variable | Significant predictor(s) | R ² | R ² change | F change | df1 | df2 | p | β |
|----------|--------------------------|----------------|-----------------------|----------|-----|-----|-------------|-------|
| ICU | ASSIST, | .039 | .039 | .501 | 4 | 49 | .73 | 1.46 |
| | AUDIT | | | | | | | -.007 |
| | BDI | | | | | | | .033 |
| | Age | | | | | | | .40 |
| | + TBI | .04 | .001 | .073 | 1 | 48 | .78 | .49 |
| | +Poor parenting | .04 | .005 | .23 | 1 | 47 | .63 | -.04 |
| | + Interaction term | .135 | .090 | 4.76 | 1 | 46 | .03* | .36 |

Note. The first row represents the model in which the controls were added. Each row after that represents each outcome variable in addition to the controls for the final model statistics. *p<0.05.

Fig 1. Scatter plot showing the interaction between poor parenting and ICU scores for youth who had sustained TBIs and controls



Discussion

Crime levels in South Africa, and especially within low-SES communities, are worryingly high (Statistics South Africa, 2018). Youth and particularly adolescent males within these communities are among the leading victims and perpetrators of criminal activity (du Plessis et al., 2015; Statistics South Africa, 2018). The presence of antisocial behaviours is associated with an increased likelihood of criminal activity (Moffitt, 2018). Two established predisposing factors towards antisocial behaviours associated with criminal activity are: 1) presence of a TBI, due to its associated neurological and subsequent behavioural pathologies (Ilie et al., 2014), and 2) harsh discipline and other techniques associated with poor parenting style (Ward et al., 2015). Furthermore, literature shows that parenting style moderates the associated cognitive and social outcomes in children with TBI, where poor parenting worsens, and better parenting improves, cognitive and social outcomes, respectively (Schorr et al., 2019; Wade et al., 2016). Considering the high levels of TBI among South African youth residing in low-SES communities, and the context of extreme crime levels in the country, it is important to establish whether certain parenting styles further predispose children with TBI to involvement in criminal activities (Naidoo, 2013; Statistics SA, 2018). Given a dearth of such research in the South African literature, this study, therefore, aimed to investigate whether:

1. Children with TBI who had been exposed to more reported positive parenting styles report lower levels of antisocial behaviours;
2. Children with TBI who had been exposed to more reported negative parenting styles reported higher levels of antisocial behaviours.

Between-Group analyses

Just over 40% of the sample reported having sustained a TBI, which is a worryingly high percentage, although consistent with other research on the prevalence of TBIs in South Africa, and other LMICs (Dewan et al., 2018; Naidoo, 2013). This also speaks to the high frequencies of car accidents and interpersonal violence, common mechanisms of TBI, in the country (Naidoo, 2013; Statistics South Africa, 2018). TBI and non-TBI groups were compared on different categories to determine if there was a link between TBI, parenting styles and antisocial behaviour, as well as controlling for variables of depression, alcohol and substance use, as these have also been linked to antisocial behaviour (Hemphill et al, 2015; Park et al, 2010). However, in both groups, scores for depression fell in the mild depression category, and ICU scores fell in the normative range. To make for easier comparison and analysis, parenting subcategories were split into two broader categories of Good or Poor parenting. Parenting scores between the groups

were similar to the TBI group being exposed to slightly more negative parenting represented by a higher poor parenting score, but this was not statistically significant.

Correlations

Interestingly there were no significant correlations between TBI and any of the outcome variables or control variables, which is in conflict with the literature indicating that TBIs are often associated with antisocial behavioural outcomes. Whilst the likelihood of obtaining a TBI was not correlated to any of the outcome or control variables, the directions of the albeit weak correlations were as anticipated, with poor parenting being weakly correlated to greater likelihood and good parenting being very weakly correlated with less likelihood, of having a TBI. Poor parenting weakly correlated to higher age and greater substance use while it was moderately correlated to higher depression scores and greater alcohol consumption. It appears that the older children are, the greater the effects of poor parenting are felt. Results suggest that monitoring and discipline may diminish with age, which may be linked to greater alcohol consumption, substance use and depression.

Good parenting was weakly correlated with lower alcohol consumption and lower antisocial levels, whilst it is moderately correlated with lower depression scores. Good parenting is characterized by greater parental involvement and positive parenting, which includes frequent affirmation and rewarding of children for good behaviour. The greater level of involvement and positive parenting appears to be linked to lower depression and lower alcohol use, which may be as a result of greater parent awareness. Good parenting being negatively correlated to antisocial levels may be as a result of greater family interactions and engagement with children.

TBI and good parenting

We had hypothesised that children with TBIs who had been exposed to good parenting, would have significantly fewer antisocial behaviours than those exposed to poor parenting. The between-groups analyses indicated no significant difference between TBIs and non-TBIs regarding antisocial behaviours as measured by ICU, nor differences in styles of parenting. There was a weak negative correlation between good parenting and ICU scores. Thus, we decided to run a hierarchical regression with a moderation analysis to determine whether any of the variables significantly predicted ICU scores and whether good parenting moderated ICU scores. In this analysis, we included the AUDIT, ASSIST, BDI and age of participants to control for the potential confounding effect of alcohol and substance use, depression levels and age, as the literature indicates that these variables can influence antisocial behavioural outcomes. However, the regression analysis indicated that this block did not significantly predict antisocial behavioural outcomes. It is interesting, and in conflict with the literature, that substance use did

not significantly predict antisocial behaviour outcomes. We postulate that as substance use and antisocial behaviour measures were administered in an interview setting, where each participant was asked to respond orally to a set of questions, they may not have responded as honestly as they would have, had their responses been completely anonymous. Further, the interviews took place in a school setting, which could also have affected honesty for fear that confidentiality might be violated, and answers given to respective teaching staff. This could mean that we did not get reliable data on the extent to which these participants use substances and engage in antisocial behaviours.

Further, neither TBI nor good parenting were significant predictors of antisocial behaviours, when entered individually into the regression. Good parenting explained the most variance in the model (4.3%), followed by the control variables (3.9%), but these percentages are relatively low. The moderation analysis indicated that good parenting did not moderate antisocial behaviour outcomes in children with TBI. We, therefore, cannot reject the null hypothesis that good parenting does not moderate antisocial behaviour outcomes in children with TBI. These findings are not consistent with the literature on parenting styles in children with TBI. Notably, most of the literature referenced in this regard did not come from South African research - it is, therefore, possible that the effects of good parenting on children with TBI differ from those found in HICs. Perhaps cultural differences impact the way positive parenting impacts children, considering the tendency of collectivistic cultures found in low-SES communities in LMICS including South Africa to rely on the support of neighbours, extended family and community (i.e., not solely immediate family). Further, there may be other influential factors at play which minimise the impact good parenting has on children with TBI, but are protective factors themselves (Eaton & Louw, 2000; Laher & Dockrat, 2019). Indeed, a collectivistic orientation has been identified as a protective factor against the development of undesirable behavioural outcomes in rural communities (Du, Li, Lin, & Tam, 2014). Seeing as our parenting style measure refers to specific parental figures, it could have failed to account for the influence of other forms of social support unique to the context of low-SES South Africa.

TBI and poor parenting

Our second hypothesis was that exposure to poor parenting would result in significantly more antisocial behaviours among children with TBI. Again, the initial analyses indicated no significant differences between ICU scores and exposure to poor parenting between children with and without TBIs. However, the correlation between poor parenting and ICU was trending ($p = 0.05$) and so we ran a hierarchical regression, with a moderation analysis, to investigate whether any variables significantly predicted ICU scores and whether there was a moderation

effect present in the model. We again included potential confounding variables as controls (AUDIT, ASSIST, BDI and age), and they did not significantly predict ICU scores. Again, neither TBI nor poor parenting significantly predicted ICU scores. The control variables explained most of the variance (3.9%) and TBI (0.1%) and poor parenting (0.5%) explained very little. However, there was a moderation effect present in this analysis. Poor parenting significantly moderated ICU scores in children with TBI and explained 9% of the variance in the model. We, therefore, reject the null hypothesis that poor parenting does not moderate antisocial behaviour outcomes in children with TBI.

These findings are consistent with the literature reviewed, indicating that poor parenting exacerbates the negative social effects of TBI and increases levels of antisocial behaviours. It is interesting that this, in contrast to the insignificant findings regarding the impact of good parenting on children with TBIs in terms of antisocial outcomes. This could suggest that South African children with TBIs are more susceptible to the effects of poor parenting including discipline, monitoring and supervision, and corporal punishment, necessarily delivered by parents, but not as susceptible to the effects of good parenting. This could potentially be due to wide networks of social support and thus less reliance on parents for positive social support than children in other settings. However, SA children with TBIs are still vulnerable to the effects of poor parenting.

The implications of these tentative findings could be that we need to target parents of children with TBI, with the intention of reducing the prevalence of behaviours associated with poor parenting, as these appear to increase the risk of children with TBI engaging in antisocial behaviours. Hospitals, where TBIs are often diagnosed and reported, could be a hotspot for identifying parents of children who have sustained TBIs and encouraging them to enrol in parenting workshops specific to their needs and situation. Further, parents of children who have sustained TBIs could have their parenting style assessed and be provided with support and education regarding the parenting of children who have sustained TBIs.

Limitations and recommendations for the future.

A limitation of this study was that the measures were administered in an interview setting where anonymity was not possible; participants may not have answered the questions truthfully due to social desirability bias. This could explain why the control variables (ASSIST, AUDIT, BDI and age) did not significantly predict ICU outcomes when the literature strongly correlates substance use with antisocial behaviours. Further, we were not able to administer the parent component of the APM and thus only had responses of the high school participants, where both would have provided a more reliable score, but we were limited by lack of resources. Furthermore, we did

not have access to medical records of the adolescents and thus had to rely on their recollection of having sustained a TBI, which may have been inaccurate.

Future research. Our results indicated that SA children with TBI might be more susceptible to the effects of poor parenting than good parenting in terms of antisocial behaviour outcomes. Future research should look to confirm these preliminary by including the parenting measure as answered by the parents, and not solely the adolescents, for increased reliability. Further, we suggested that SA children with TBIs may not be as susceptible to the effects of good parenting due to a wide network of social support available to them and thus are not entirely reliant on their parents to provide this. Future research could investigate to what extent community, neighbour, school and peer support as well as the presence of an adult role model influence antisocial behavioural outcomes in children with TBIs.

Conclusion

Given the association between antisocial behaviours and criminal activity and the high proportion of youth involved in criminal activity in South Africa, this study set out to study two factors associated with antisocial behaviours, parenting style and presence of a TBI. There is a lack of research into a possible link between parenting style, TBI and antisocial behaviour. This study found that children with a TBI are more susceptible to the effects of poor parenting, characterized by poor monitoring, poor support and corporal punishment and in terms of displaying more antisocial behaviours, but not to the effects of good parenting. Good parenting, which is characterized by parental involvement and positive parenting, is linked to lower antisocial levels but seems to have less of an impact on those who have sustained a TBI. This has important implications for the parenting of children with TBI. Parenting programmes should specifically target parents of children who have sustained TBIs to assist them in adjusting their parenting style in a way that will render their child less likely to display antisocial behaviours as a result of the associated impairments of their TBI.

Acknowledgements

We would like to thank the National Research Foundation for funding this study.

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Lastly, we would like to thank and express our gratitude to our supervisor Leigh Schrieff for her patience, guidance and supervision this year and without whom this thesis would not have been possible.

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Acknowledgements

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Appendix A



UCT Department of Psychology

Parent Consent Form

Your son is being invited to take part in a research study. This form provides you with information about the study and asks for your permission for your child to part take in the research study. Signing this will also give the researcher permission to access medical records of your child in order to confirm any head injuries. The Principal Investigator (the person in charge of this research) or a representative of the Principal Investigator will also describe this study to your son and answer all of your questions. Your child's participation is entirely voluntary.

Before you decide whether or not he may take part, please read the information below and feel free to contact the Principal researchers with any questions you may have. Your son will not be disadvantaged in any way by participating, or not participating in this research.

1. Title of Research Study

Investigating parenting factors, the prevalence of head injuries and associated problems in boys

2. Principal Investigators and Telephone Number(s)

Aimee Tredoux & Nathan Phillander

Honours in Psychology (student)

Department of Psychology

University of Cape Town

TRDAIM001@myuct.ac.za

PHLNAT003@myuct.ac.za

Dr Leigh Schrieff

Supervisor

Department of Psychology

University of Cape Town

021 650 3708

leigh.schrieff-elson@uct.ac.za

3. Source of Funding or Other Material Support

National Research Foundation

5. What is the purpose of this research study?

The purpose of this research is to investigate head injuries among young people in Cape Town and how these injuries and their family lives affect them. We will do this by asking your child to carry out some tasks with the investigators and to answer some questions.

6. What will happen if your son takes part in this research study?

Your son will be asked to complete some questionnaires about behaviour (such as how your son interacts with his friends and peers), emotions, family and your parenting. Additionally, your son will be asked to participate in activities which will assess his knowledge of words, how words relate and problem-solving skills.

7. If your son chooses to participate in this study, how long will he be expected to participate in the research?

Completing the questionnaires will take place during one session, which should not last longer than one hour. If at any time during the session your son wishes to stop his

participation, he is free to do so without penalty. Your son will not be treated differently at school if he or you decide to withdraw from the study. Withdrawal from the study will not appear on your son's school record or elsewhere.

Thereafter, your son will be invited back to a second session, where he will be asked to solve problems, such as figuring out a pattern or puzzle and explaining the meanings of some words.

8. How many people are expected to participate in the research?

50

9. What are the possible discomforts and risks?

There are no known risks associated with participation in this study. Should your child get tired during the study, he will be allowed to rest. If you wish to discuss the information above or any discomforts you may experience, you may ask questions now or call the Principal Investigators listed in #2 of this form.

10a. What are the possible benefits to you?

You or your child may or may not personally benefit from participating in this study. Should any problems be identified during the process of this study, you will be referred to the appropriate services, that is, the school counsellor or a Western Cape Education Department school clinic should there be no school counsellor available.

10b. What are the possible benefits to others?

The information gained from this research study will help improve our understanding of head injury and parenting styles in young people.

11. If you choose to take part in this research study, will it cost you anything?

Participating in this study will not cost you or your child anything.

12. Will you receive compensation for taking part in this research study?

No, but your son will receive a R50 Checkers / Pick 'n Pay shopping voucher.

13a. Can your child withdraw from this research study?

Your child is free to withdraw his consent and to stop participating in this research study at any time. If he does withdraw his consent, there will be no penalty.

If you have any questions regarding your rights in this research, you may contact Mrs Rosalind Adams at the Psychology Department offices at 021-650-3417 or

Rosalind.Adams@uct.ac.za.

13b. If you withdraw, can information about you still be used and/or collected?

Information already collected may be used, if you and your son give us permission to do so.

14. Once personal and performance information is collected; how will it be kept secret (confidential) in order to protect your son's privacy?

Only certain people have the right to review these research records. These people include the researchers for this study and certain University of Cape Town officials. Your research records will not be released without your permission unless required by law or court order.

All the information collected from your son will be strictly confidential, and his name won't appear in any report when it is used as data in a research report.

15. What information about your son may be collected, used and shared with others?

This information gathered from your son will be demographic information, information on your child's developmental history, and records of his responses to questionnaires regarding

Signature of Person Consenting and Authorizing

Date

Please indicate below if you would like to be notified of future research projects conducted by our research group:

_____ (initial) Yes, I would like to be added to your research participation pool and be notified of research projects in which I might participate in the future.

Method of contact:

Phone number: _____

E-mail address: _____

Mailing address: _____

Name of Participant ("Study Subject")

Appendix B
Participant Assent Form

ASSENT TO PARTICIPATE IN RESEARCH

We are inviting you to be in our research study. We would like to learn more about head injuries and how they affect young people. In order to do this, we are talking to young people who have had such an injury and also to those who have never had such an injury.

If you agree to be in this study, we will ask you to meet with us twice. During the first session, we will ask you to answer some questions about your life. These may be very personal questions about your behaviour. This session will last approximately 1 hour. During the second session, we will ask you to do some table-top tasks with us that will help us to understand your thinking and behaviour better. This session will be approximately 2 hours long.

Taking part in this study will not place you at risk in any way. These activities will not harm you, but some of them may be long, and you may feel tired at times. If you do, you can stop and rest at any time. There will be no penalty if you choose not to be part of this study or if you choose to stop being part of it. Other than receiving refreshments during the sessions and being compensated with a R50 Pick n Pay voucher at the end of the second session for your participation, there are no known benefits to taking part in this study. You will, however, be helping us to better understand the behaviours associated with having a head injury.

Your identity will not be revealed, and all the information you give will be strictly confidential.

This means that no one except us, the researchers, will know the answers you give to the

questions we ask you or your results on any of the tests. It will only be used for academic research purposes; such as in a research report.

If you sign this paper, it means that you would like to take part in this study. If you would not like to take part in this study, you do not have to sign this form. It is up to you. Before you say whether you want to be part of this study or not, I will answer any questions that you may have. If you have a question later that you didn't think of now, you can ask me next time.

I would like to take part in this study:

Signature of Participant _____ Date _____

Signature of Investigator _____ Date _____

Contact Details: Principal Investigators and Telephone Number(s)

| | |
|--|--|
| Aimee Tredoux & Nathan Phillander | Dr Leigh Schrieff |
| Honours in Psychology (student) | Supervisor |
| Department of Psychology | Department of Psychology |
| University of Cape Town | University of Cape Town |
| TRDAIM001@myuct.ac.za | leigh.schrieff@uct.ac.za |
| PHLNAT003@myuct.ac.za | 021 650 3708 |

Rosalind Adams
Postgraduate Administrator


Department of Psychology

University of Cape Town

Rosalind.adams@uct.ac.za

021

Appendix C
Ethics Application Form

| | |
|---|--|
| UNIVERSITY OF CAPE TOWN | |
|  | Department of Psychology Research Ethics Committee Rondebosch, 7701 Tel: 27 21 6503417 Fax: 27 21 6504104 |

APPLICATION TO CONDUCT PSYCHOLOGICAL RESEARCH

1. All applications must be submitted with the documentation outlined in the attached form.
2. All documents should be submitted electronically.
3. The University of Cape Town's Department of Psychology actively supports research as an essential academic function. It is essential that all applicants consult the UCT Code for Research involving Human Subjects (available from the UCT website).
4. In the case of research involving clinical populations, drug trials, neuroimaging, and recruitment from Groote Schuur Hospital or any affiliated medical institutions, approval must also be obtained from the Faculty of Health Sciences Research Ethics Committee (FHS REC).
5. Final responsibility for the ethical and effective conduct of the research lies with the principal investigator.

HONOURS STUDENTS:

Complete this application form and submit it to Rosalind Adams with the formal research proposal that forms part of your research methods module in the Honours programme.

MASTER'S AND DOCTORAL STUDENTS:

Complete this application form and submit it in electronic form to Rosalind Adams attached to the research proposal you will present to a departmental thesis committee.

DEPARTMENTAL STAFF, VISITING SCHOLARS AND POST-DOC STUDENTS:

Complete this application form and submit it in electronic form to Assoc. Prof. Lauren Wild (lauren.wild@uct.ac.za). The application must be accompanied by a detailed proposal (maximum length 25 1.5-spaced pages).



**UNIVERSITY OF CAPE TOWN
DEPARTMENT OF PSYCHOLOGY
APPLICATION FOR ETHICAL APPROVAL TO CONDUCT PSYCHOLOGICAL RESEARCH**

| | | |
|-----------|---------------------------------------|-----------------------------------|
| Section A | Proposal Identification Details | To be completed by all applicants |
| Section B | Study Information | To be completed for all studies |
| Section C | Financial and Contractual Information | To be completed by all applicants |
| Section D | Declaration on Conflict of Interest | To be completed by all applicants |
| Section E | Ethical and Legal Aspects | To be completed by all applicants |
| Section F | Checklist | To be completed by all applicants |

Section A: Proposal identification details.

| | | |
|--|---|-----------|
| <p>1. Title of the proposal/protocol: Investigating parenting factors, traumatic brain injury and antisocial behaviour in a sample of Cape Town high school students in a low socioeconomic status setting</p> | | |
| <p>2. Has this protocol been submitted to any other Ethical Review Committee? (The larger study, of which this study forms part, has been previously reviewed).</p> | <p>Yes x</p> | <p>No</p> |
| <p>2.1 If so, list which institutions and any reference numbers.</p> | <p>Department of Psychology REC: REF: 2017-052 – See appendix F</p> | |
| <p>2.2 What was/were the outcome/s of these applications?</p> | <p>It was approved.</p> | |

| | | | |
|--|----------|--|----|
| | | | |
| 3. Is this proposal being submitted for ethical approval for an amendment to a protocol previously approved by this committee? | Yes x | | No |
| 3.1 If so, what was the previous protocol's reference number? REF: 2017-052 – See appendix E | | | |

Investigator details

3.2 Principal Investigator (if a student project, the student is the principal investigator):

| Title | Initials & Last Name | Department and Institution | Phone | Email | Signature | Date |
|-------|----------------------|----------------------------|------------|--|-----------|------|
| Ms | A. Tredoux | UCT Psychology | 0729159665 | Trdai@myuct.ac.za | | |
| Mr | N. Phillander | UCT Psychology | 0647526146 | m001@myuct.ac.za | | |

3.2.1 (If different to 4.1 above) UCT Principal Investigator

| Title | Initials & Last Name | Department and Institution | Phone | Email | Signature | Date |
|-------|----------------------|----------------------------|-------|-------|-----------|------|
| | | | | | | |

3.3 Co-investigators: (if a student project, add the supervisor's name here)

| Title | Initials & Last Name | Department and Institution | Phone | Email |
|-------|----------------------|----------------------------|--------------|--|
| Prof | L.Schrieff | Psychology UCT | 021 650 3708 | leigh.schrieff@gmail.com |

| | | | | |
|------|--------------|----------------------|--|--|
| Ms | N. Steenkamp | Psychology UCT | | ninasteenkamp1@gmail.com |
| Prof | H. Williams | University of Exeter | | |

| | | | |
|---|----------|--|----|
| 4. Is the study being undertaken for a higher degree? | Yes X | | No |
| If yes: 4.1 What degree? Honours in Psychology | | | |
| 4.2 Student name: Aimee Tredoux & Nathan Phillander | | | |
| 4.3 Supervisor name: Leigh Schrieff | | | |
| 4.4 In what department is the degree? Psychology | | | |

Section B: Study Information (summarize the information contained in the proposal).

| | | |
|--|--|--|
| 5. Who will act as participants in the study? High School students | | |
| 6. Estimated number of participants: Aim is to obtain 50 participants | | |
| 7. Estimated duration of study: 6 months | | |
| 8. Location of study (e.g. UCT, school, hospital, etc., where you will gather data from the participants): High Schools | | |

1. Recruitment: Please describe how and from where the participants will be recruited. Attach a copy of any posters or advertisements to be used.

Schools that form part of the larger study have been included on the basis of proximity and being English-medium schools. Consent forms will be sent out to all parents of learners and only those returned will be able to participate in the study.

2. Vulnerable groups: Are there pre-existing vulnerabilities associated with the proposed participants, e.g., relating to pre-existing physiological or health conditions, cognitive or emotional factors, and socio-economic or legal status?

Yes x

No

If yes, explain briefly what vulnerability would entail in the study, and how you propose to safeguard participants' wellbeing.

The participants are children and thus, a vulnerable group. The parents/guardians of the children will be asked to consent on behalf of the children. The children further have to give their assent for participation.

3. Risks: Briefly describe the research risk associated with your study, i.e. the probability and magnitude of harms participants may experience. Minimal risk means that the probability and magnitude of harm due to participation in the research are no greater than those encountered by participants in their everyday lives.

Potential risks to participants are minor. As some of the questions are of a personal nature, the participants may experience psychological distress during or after the interviews. All participants will be made aware of counselling services available to them at their respective schools, but if any participants express particular distress, we will refer them to the school counsellor.

4. Costs: Give a brief description of any costs or economic considerations for participants.

No costs are associated with participation in the study.

5. Benefits: Discuss any potential direct benefits to the participants from their involvement in the project.

There are no direct benefits to participants in the study.

6. Compensation: If participants are to receive compensation for participation, please provide details.

Participants will receive a R50 Pick n Pay voucher.

7. Consent. Describe the process to be used to obtain informed consent. Where applicable, attach a copy of the information letter and consent form.

Consent forms will be sent out to all males at the high school for parents to complete, and only those returned will be allowed to participate in the study.

8. Confidentiality. Please describe the procedures to be used to protect the confidentiality of the data.

Data obtained from participants will be kept by researchers and the supervisor to avoid coming into contact with any third parties.

| | | |
|---|----------|----|
| | | |
| 9. Does the protocol comply with UCT's Intellectual Property Rights Policy (including ownership of the raw data)? | Yes X | No |

Section C: Financial and contractual information

| | | | |
|---|----------|--|---------|
| 10. Is the study being sponsored or funded? | Yes X | | No |
| If yes: 10.1 Who is the sponsor/funder of the study? National Research Foundation | | | |
| 10.2 Are there any restrictions or conditions attached to publication and/or presentation of the study results? | Yes | | No X |
| 10.3 Does the contract specifically recognize the independence of the researchers involved? | Yes X | | No |
| (Note that any such restrictions or conditions contained in funding contracts must be made available to the Committee along with the proposal.) | | | |
| 11. Will additional costs be incurred by the department? | Yes | | No X |
| 11.1 If yes, specify these costs: | | | |

Section D: Statement on Conflict of Interest

The researcher is expected to declare to the Committee the presence of any potential or existing conflict of interest that may potentially pose a threat to the scientific integrity and ethical conduct of any research in the Department. The committee will decide whether such conflicts are sufficient to warrant consideration of their impact on the ethical conduct of the study.

Disclosure of conflict of interest does not imply that a study will be deemed unethical, as the mere existence of a conflict of interest does not mean that a study cannot be conducted ethically. However, failure to declare to the Committee a conflict of interest known to the researcher at the outset of the study will be deemed to be unethical conduct.

Researchers are therefore expected to sign **either** one of the two declarations below.

- a) As the Principal Researcher in this study (name: Aimee Tredoux & Nathan Phillander), I hereby declare that I am **not aware** of any potential conflict of interest which may influence my ethical conduct of this study.

Signature: Aimee Tredoux and Nathan Philander Date: 10/05/2019

- b) As the Principal Researcher in this study (name: _____), I hereby declare that I am **aware** of potential conflicts of interest which should be considered by the Committee:

Signature: _____ Date: _____

Section E: Ethical and legal aspects

| | | | |
|--|----------|--|----|
| 12. Have you read the UCT Code for Research involving Human Subjects (available from the UCT website)? | Yes X | | No |
|--|----------|--|----|

Section F: Checklist**Tick**

| | | |
|--|-------------------|-----|
| Application form | 1 electronic copy | X |
| Covering letter and all other correspondence (e.g., ethics approval from other bodies, letters to parents, etc.) | 1 electronic copy | x |
| Detailed proposal, including a 200-word summary/abstract | 1 electronic copy | |
| Consent/Assent form/s | 1 electronic copy | X |
| Participant information sheet/Debriefing form (if separate from consent form) | 1 electronic copy | x |
| Other documents (e.g., advertising posters) | 1 electronic copy | n/a |

IMPORTANT NOTES:

- All applicable sections of this application form must be filled in OR justified why not.
- All applicable signatures must be sought
- All additional number of copies must be included with the application
- All incomplete applications will be returned to the applicant, leading to delays in the review.

Version February 2017

Appendix D



Directorate: Research

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

REFERENCE: 20180308-249

ENQUIRIES: Dr A T Wyngaard

Ms Nina Steenkamp
18 Vissershof Road
Bothasig
7441

Dear Ms Nina Steenkamp

RESEARCH PROPOSAL: THE PREVALENCE OF TRAUMATIC BRAIN INJURY AND AN INVESTIGATION OF BEHAVIOURAL, EMOTIONAL AND EXECUTIVE FUNCTIONING IN A SAMPLE OF MALE YOUNG OFFENDERS

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 **04 February 2019 till 27 September 2019**
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 2019

Lower Parliament Street, Cape Town, 8001
tel: +27 21 467 9272 fax: 0865902282
Safe Schools: 0800 45 46 47

Private Bag X9114, Cape Town, 8000
Employment and salary enquiries: 0861 92 33 22
www.westerncape.gov.za

Appendix E

UNIVERSITY OF CAPE TOWN



Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3417
Fax No. (021) 650 4104

15 November 2017

Nina Steenkamp
Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Nina

I am pleased to inform you that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *The prevalence of traumatic brain injury and an investigation of behavioural, emotional, and executive functioning in a sample of male young offenders*. The reference number is PSY 2017-052].

I wish you all the best for your study.

Yours sincerely

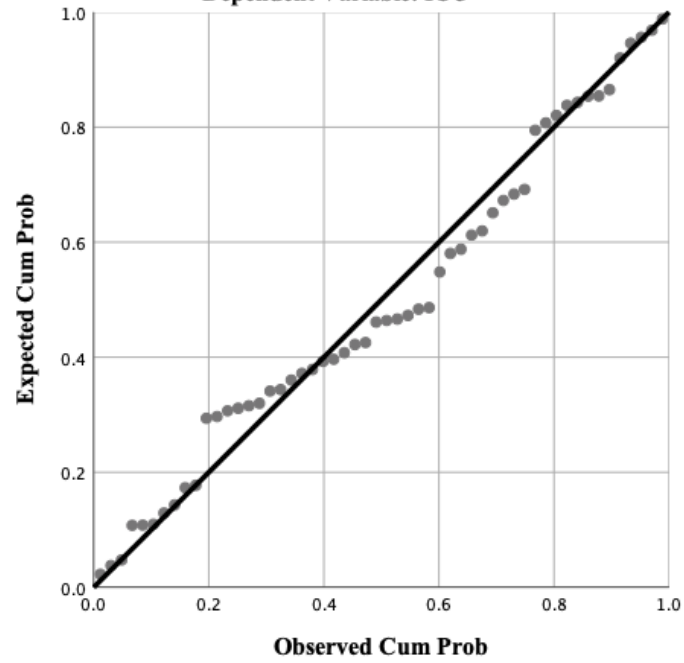
A handwritten signature in black ink, appearing to read 'Lauren Wild'.

Lauren Wild (PhD)
Associate Professor
Chair: Ethics Review Committee

Appendix F

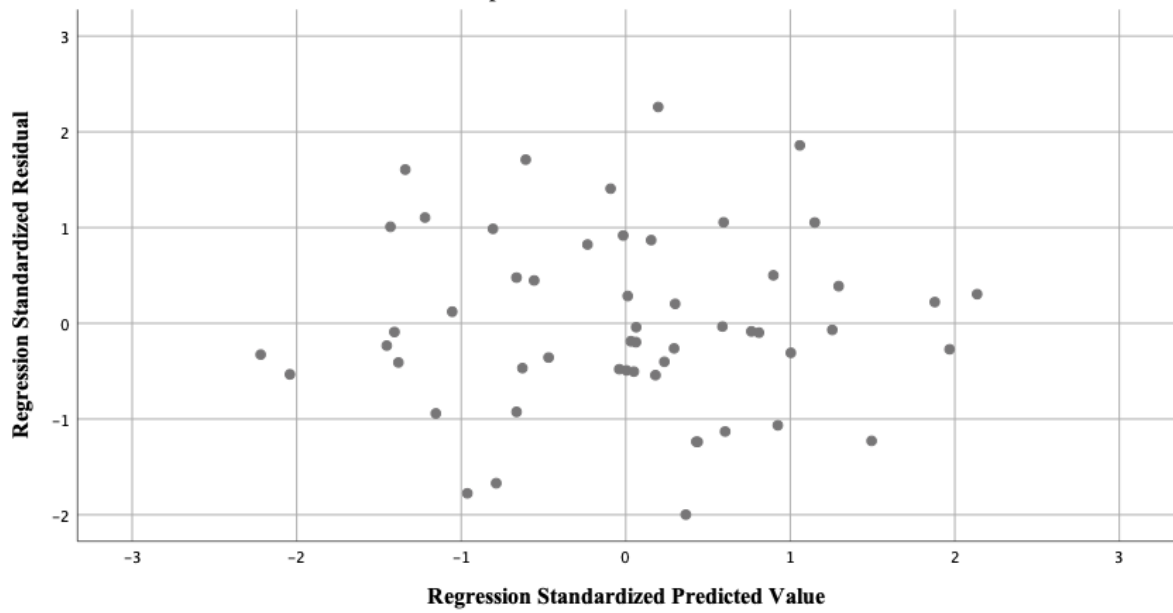
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: ICU



Scatterplot

Dependent Variable: ICU



Appendix G

UNIVERSITY OF CAPE TOWN



Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3417
Fax No. (021) 650 4104

15 July 2019

Aimee Tredoux and Nathan Phillander
Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Aimee and Nathan

I am pleased to inform you that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *Investigating parenting factors, traumatic brain injury and antisocial behaviour in a sample of Cape Town high school students in a low socioeconomic status setting*. The reference number is PSY2019-037.

I wish you all the best for your study.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Lauren Wild'.

Lauren Wild (PhD)
Associate Professor
Chair: Ethics Review Committee

University of Cape Town
PSYCHOLOGY DEPARTMENT
Upper Campus
Rondebosch