Establishing prevalence of head injury and associated disability in individuals being assessed by a pre-sentencing Criminal Justice Social Work Report

& Clinical Research Portfolio

Holly de Mora

Submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical Psychology (DClinPsy)

Institute of Health and Wellbeing

College of Medical, Veterinary and Life Sciences

University of Glasgow

Table of Contents

Acknowledgements

Firstly, I would like to thank all the individuals who took part in this study for their time. Also thank you to the West Dunbartonshire Criminal Justice Social Work Team who made me welcome. With particular thanks to Connie Sellars, the support with recruitment was invaluable.

A special thanks to my supervisor, Tom McMillan. Your guidance, knowledge and patience have got me through to this stage. Further, to Jean McFarlane who stepped in midway through to provide calm and thoughtful field supervision. Both helped me to get through the many challenges and successes of this project.

I would like to dedicate this thesis to my three wonderful boys. You have been infinitely patient and understanding throughout the process. You have been superstars in tolerating a distracted mum and stepping up to get things done. You have helped me to laugh and smile in my most stressful moments and given me the motivation to be the best I can be. You make me proud every day and I hope this is evidence that you can achieve whatever you want, no matter the challenges thrown at you. After all, now we know that anything is possible!

Chapter One: Systematic Review

Cognition in the criminal courts: A PRISMA systematic review

Chapter word count (including abstract and references): 6759

Submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical Psychology. Written in accordance with the guidelines for submission to the Journal of Psychology, Public Policy, and Law (Appendix 1.1/1.2).

1.0 Abstract

Objective: This systematic review (SR) investigates relationships between cognitive function and fitness to stand trial (FST) in order to improve understanding around need and service provision within the criminal courts. It updates the review by White et al (2014), incorporating new research in this field and analysis of methodological risk of bias.

Methods: Electronic databases were searched for relevant research (PsychArticles; PsychInfo; Pubmed; Proquest; Scopus; Medline) on March 29th, 2019. Reference lists of included papers, meta-analyses, policy reports and systematic reviews in this area were scrutinised. Papers included were assessed for risk of bias and outcomes were extracted.

Results: Four studies published since the White et al SR were included, alongside the original 10. The quality of the studies was mixed. Unfit defendants performed significantly worse in memory, attention, and executive functioning than their fit peers. Causes of impairments were not reported. IQ was found to be modestly predictive of FST.

Conclusion: This SR supports previous findings that individuals unfit to stand trial perform significantly worse across specific cognitive domains. However, samples were not evidenced to be representative of the wider FST population. Future research must address the limitations highlighted here in order to expand the current evidence base.

Keywords: cognitive impairment, criminal court, offending, criminal conviction

2.0 Introduction

Fitness to stand trial (FST) is a fundamental legal concept in criminal courts throughout the world. Legal criteria differ internationally (Criminal Code of Canada, 1993; Criminal Procedures (Scotland) Act, 1995; Dusky v. United States, 1960; Presser, 1958; R v. Pritchard, 1836; Appendix 1.3) however, the aim is to ensure a fair trial for all accused whilst maintaining the integrity of the criminal justice system (Rogers, Blackwood, Farnham, Pickup, & Watts, 2008). Individuals standing trial are afforded five minimum rights to ensure they can understand and contribute to the process (Talbot, 2012). In Scotland individuals must have: capacity to understand the charge against them and their plea; be able to comprehend and follow proceedings; know that a juror can be challenged; be able to question the evidence; and ability to instruct and assist counsel (Bradley, 2009). Courts recognise the role of reasonable adjustments and special measures to ensure defendants are considered fit to stand trial however, these are often not implemented (The Law Commission, 2010). Individuals with questionable capacity are usually referred to mental health specialists for formal assessment but the final decision on FST remains with the Court (Buchwald-Mackintosh, Williams, & Sakdalan, 2018).

FST evaluations are a major financial expense within the criminal justice system. Numbers within the UK are not well reported but a study by Rodgers et al (2009) reported that the numbers of defendants found to be unfit were "startingly low". However, in the United States it is estimated that over 60,000 evaluations are conducted each year (Bonnie & Grisso, 2000; Winick, 1996), with approximately 20-30% found unfit (Roesch, Zapf, Golding, & Skeem, 1999). The discrepancy between the UK and USA could be due to the legal standards and the lack of standardised assessment and screening procedures in the UK. A wealth of research has focused on the development of screening measures and assessment tools to identify competent defendants quickly to save time and reduce costs (Pirelli, Gottdiener, & Zapf, 2011). However, no measure is considered the gold standard and no standardised procedure is used in the United Kingdom (The Law Commission, 2010). Specific criteria within legal standards are often neglected in assessment, with most reports overlooking several criteria (Kearns & Mackay, 2000). Another weakness with FST assessments

is the omission of standardised effort testing, despite estimated prevalence rates of malingering between 10-29% in those assessed (Vitacco, Rogers, Gabel, 2009).

Defendants deemed fit and unfit are largely similar across variables related to offending characteristics and demographics: e.g., gender, arrest history and years of education (Robertson, Gupton, McCabe, & Bankier, 1997). A meta-analysis of relationships between cognitive function and fit/unfit defendants by Pirelli (2011) found that fit defendants scored around 6 Full Scale IQ points higher than unfit defendants. In the United Kingdom, FST is often determined by diagnosis of learning disability (The Law Commission, 2010). However, the presence of a lower intellectual ability does not automatically determine FST and may not occur despite there being specific cognitive impairments that can have bearing on FST caused by neurological conditions such as brain injury, foetal alcohol syndrome or autism (Shiroma, Ferguson, & Pickelsimer, 2010; Tussey, Marcopulos, & Caillouet, 2013). The Law Commission (2010) advised current FST procedures in the UK be reformed to a unitary assessment of functional and mental capacity, including a test on decision-making.

Although there is growing research interest in neurological impairment within prison and probation populations (Farrer & Hedges, 2011; Fazel, Xenitidis, & Powell, 2008), uncertainty exists around prevalence in defendants in the criminal courts. Individuals with cognitive impairment can have difficulties following the workings of a court (Bradley, 2009). Unfit defendants tend to have poorer memory capacity, slow processing speed and poor visuospatial abilities compared to fit defendants (White, 2014). However, the lack of standardised procedures to identify and support these defendants means that large numbers may be subjected to an unfair trial (The Law Commission, 2010). Further evidence is required to provide a more robust argument to the court system for the need for standardised assessments that include cognitive testing.

The current review will update that by White et al (2014). New methods for assessing risk of bias will add to White et al's review, moving away from descriptors of reporting and into exploring the research in its entirety (Garner et al, 2016). Through doing so the current review would hope to identify patterns in research and clinical practice for improvements. Further to this, White et al did

not include an assessment or evaluation of effort testing or the domain of attention. Both these areas are thought to be in important in the assessment of forensic populations (Vitacco et al, 2009).

2.1 Aim:

To update the systematic review by White et al (2014) and reconsider the quality of studies by rating risk of methodological bias. To determine the cognitive domains with deficits in defendants found unfit to stand trial and advise on the development of standardised screening and assessment procedures within the UK courts.

2.2 Review Questions:

1. How do the cognitive profiles of individuals found unfit differ from those found fit to stand trial?
2. Do studies on cognitive function and FST take account of effort?
3. Which cognitive assessment measures correctly categorise cognitive deficits in the FST population?

3.0 Method

The general procedure used across this review was guided by PRISMA protocol (Shamseer et al, 2015).

3.1 Inclusion Criteria

1. Participants were from a forensic/court population
2. Participants were adults (aged 18+)
3. Assessment of one or more cognitive domains other than, or in addition to, intelligence was included
4. The study related to FST

3.2 Exclusion Criteria

1. Single case studies
2. Conference abstracts
3. Book chapters
4. Commentaries or opinion articles
5. Articles not written in English
6. Population was restricted to learning disability

For each eligible study, data were extracted according to a fixed protocol devised by the author (appendix 1.5).

3.3 Search Strategy

Searches were conducted March 29th, 2019 using the following electronic databases: PsychArticles; PsychInfo; Pubmed; Proquest; Scopus; Medline. In addition, the reference lists of meta-analyses, policy reports and systematic reviews in this area were scrutinised (Bradley, 2009; Pirelli, et al, 2011; The Law Commission, 2010)

The search strategy was informed by the systematic review by White et al (2014). Initial scoping searches were conducted to identify relevant search terms which were finalised following discussion with a librarian (Appendix 1.4). To ensure the search captured all article types, parameters were not set for published dates or publication type.

A total of 2334 articles were identified from the searches and of these 224 duplicates were removed. Titles of the remaining 2110 articles were screened for relevance resulting in the exclusion of 1971 articles. These articles were excluded due to: being situated in civil courts; non forensic populations; not related to FST; or youth offenders/learning disability population only. The abstracts of 139 articles were read and a further 110 excluded. The remaining 29 articles were read in full and a further 15 were subsequently excluded. Fourteen studies finally met the inclusion criteria (Figure 1). Of these, 10/14 papers were included in the previous review by White et al (2014). Data were extracted from the included studies (appendix 1.5). The search, screening and data extraction were conducted by the author alone.

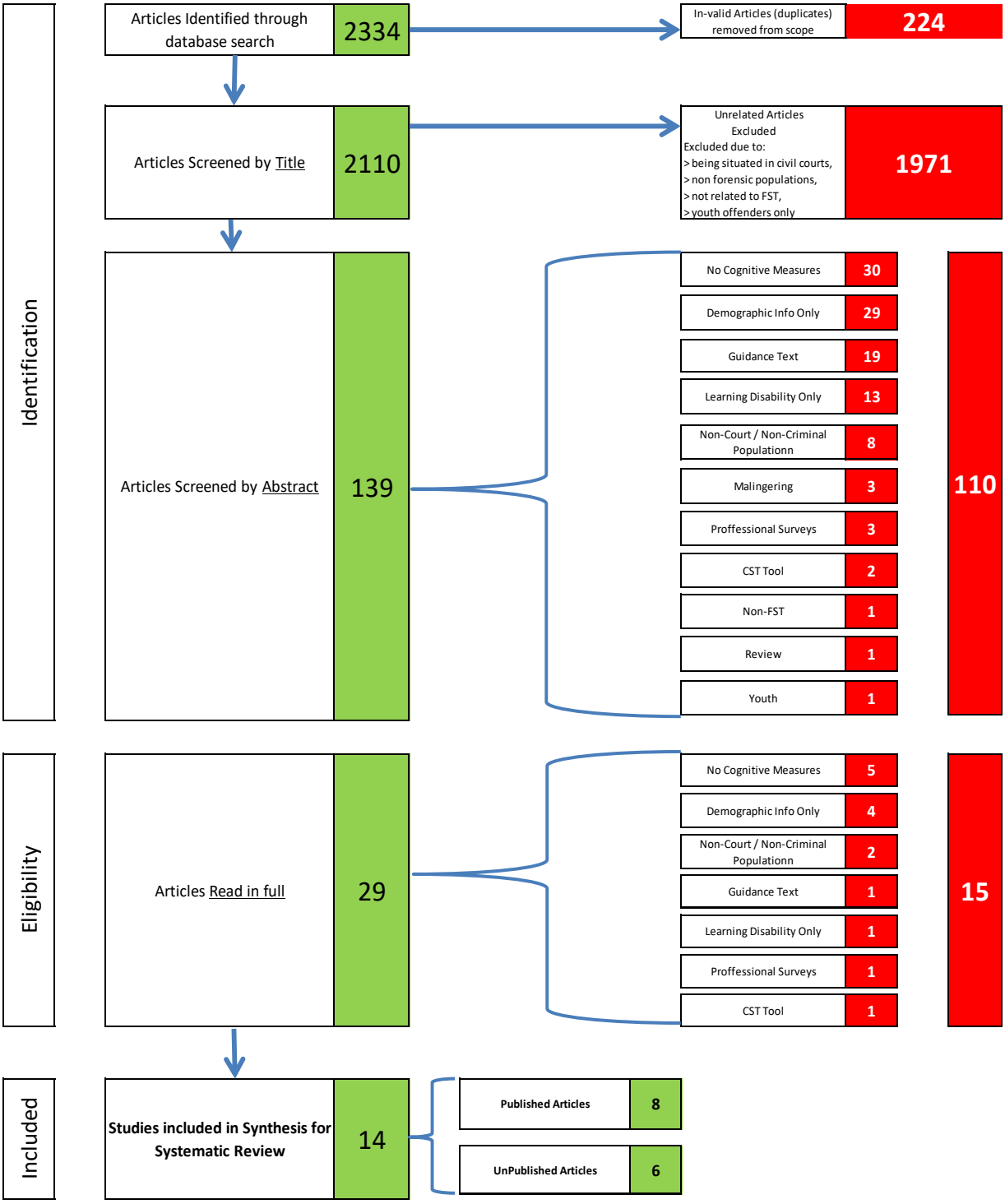


FIGURE 1: STUDY INCLUSION FLOW CHART

3.4 Quality Rating

Studies included in this review were assessed for methodological bias across six domains derived from the research questions (Table 1). These domains were based on risk of bias criteria developed by Sanderson, Tatt, & Higgins (2007) to evaluate the quality of observational epidemiological studies and modified for use in offending groups by Moynan and McMillan (2018). Each study was categorised as 'high' or 'low' risk of bias, 'Not Reported' if data were collected but not presented or 'Not Applicable' if data were not collected by that study. Studies rated as low in risk of bias had to meet the criteria in table 1.

Studies were independently rated by the author and a trainee clinical psychologist. There was inter-rater concordance for 80/84 ratings (95%, Appendix 1.7). The four exceptions were resolved by discussion.

3.5 Cognitive Assessment and Domains

Information was extracted from each study on neuropsychological tests used to assess and evaluate FST and was grouped based into specific cognitive domains (e.g., memory, attention and executive functioning).

TABLE 1: DOMAIN AND CRITERIA FOR ASSESSING RISK OF BIAS

Domain	Criteria
1. Methods for selecting participants	(a) Source population are individuals assessed for FST; (b) Inclusion and exclusion criteria are clear
2. Methods for assessing FST	(a) Use of a recognised assessment tool for FST and/or use of court decision on FST; (b) Use of a recognised definition of FST; (c) Use of an appropriately matched control group is desirable
3. Methods for assessing the presence of cognitive impairments	Use of internationally recognised tests for assessing cognitive functions; (b) Comparison of fit vs unfit groups
4. Methods to control for confounds	(a) Confounders specific to the study design that might affect the results are considered; (b) Statistical methods to control confounders
5. Methods for assessing the impact of cognitive impairment on FST	(a) Statistical methods are described; (b) Examination of subgroups and interactions are described; (c) Explains how missing data are addressed; (d) Appropriate use of statistics
6. Conflict of interest is reported	Any potential conflict of interest is declared

Notes: For further guidance see Appendix 1.6

4.0 Results

4.1 Demographics and Context of Studies

The fourteen studies provide data from 2159 defendants that was collected between 1984 and 2016. Overall there tended to be more fit (n=1243) than unfit (n=916) defendants. Two studies had overlapping samples (White et al, 2012; White et al, 2016). Whilst this can be useful for increasing validity, it may also reduce generalisability and increase risk of researcher confirmation bias. Most defendants were men (90%). Age ranged from 17-90 (mean 37). Demographic characteristics of participants are described in table 2.

Most studies were conducted in the USA (11/14), comprising 87% of the total sample of 2159 participants across all studies. Of the remainder, two were carried out in Australia (n=244 defendants) (White, Batchelor, Pulman, & Howard, 2012; White, Batchelor, Meares, Pulman, & Howard, 2016), and one in Canada (n=36 defendants) (Nussbaum, Mamak, Tremblay, Wright, & Callaghan, 1998). Studies in the USA used the Dusky legal standard (1960), in Australia the Presser criteria (1958) and in Canada the Criminal Code of Canada (1993). Eight studies used retrospective, archival data from forensic and psychiatric inpatient groups on remand, and six used prospective data.

4.2 Study Quality and Design

In relation to review questions, the risk of bias was low in two domains (1 and 2), high in one (4) and mixed in three (3, 5 and 6) (table 2). Demographic information was well reported.

All studies used a cross-sectional design. Tests of effort were used in 5/14 studies. Twelve studies were conducted on psychiatric inpatients, and as such, were not representative of the general FST population.

Risk of bias in assessments of cognitive function was mixed. All studies used valid and reliable tests. However, there was no uniformity in tests used or outcome measure selection. Two papers (Toofanian-Ross, 2015; Arredondo, 2017) used the RBANS which is a cognitive screening battery. A further 6 relied on a single battery (e.g., Wechsler tests).

All studies were low in risk of bias for assessing the occurrence of FST, utilising court determinations, expert opinions/reports and recognised FST assessment measures to categories those deemed fit and unfit.

All studies described appropriate statistical measures to assess the impact of cognitive impairment on FST. Eleven used multivariate analyses, and 3 ran group comparisons. Sample sizes varied and no studies reported a priori power analyses. Effect sizes were not well reported. Studies were poor at reporting missing data and if/how they controlled for confounds in analyses.

Conflict of interest was declared in all but two published studies (Simon, 1987; Toofanian-Ross, 2015). However, none of the unpublished dissertations referred to conflict of interest (Gannon, 1989; Lesser, 1989; Sachsenmaier, 1990; Grandjean, 2004; Shields, 2004; Klein, 2010).

TABLE 2: CHARACTERISTICS OF INCLUDED STUDIES

Reference	Design	Sample	Measure and Definition of FST	Outcome Measures
Simon (1987) (Arkansas, USA)	Cross-sectional | Prospective	Criminal defendants referred for psychological evaluation 36 cases (25 fit, 11 unfit)	Legal standard not reported Determined by court decision and expert opinion	**IQ:** Quick Test **EF:** The Proverbs Test
Gannon (1989) (California, USA)	Cross-sectional | Prospective	Psychiatric inpatients in Atascadero State Hospital 40 cases (23 fit, 17 unfit) | 100% male | Age range: 20-71 (mean=33.9, sd=10.11)	Dusky criteria Determined through use of CAI, expert opinion and court decision	**IQ:** WAIS-R **EF:** The Proverbs Test | Category Test | Color Form Sorting Test
Lesser (1989) (Florida, USA)	Cross-sectional | Retrospective 1984-1987	Psychiatric inpatients 135 cases (83 fit, 52 unfit) | 100% male | Mean age=31.3, sd=9.5	Dusky criteria | Determined by court decisions, forensic assessment and FST measure	**IQ:** WAIS-R (broken into subgroups PIQ, VIQ and individual subtests)
Sachsenmaier (1990) (Montana, USA)	Cross-sectional | Retrospective 1984-1989	Psychiatric inpatients in Montana State Hospital 445 cases (348 fit, 97 unfit) | 92% male | 10% diagnosed with 'brain damage'	Dusky criteria Determined through expert opinion and use of FST measure	**IQ:** WAIS-R (broken into subgroups PIQ, VIQ and individual subtests)
Nussbaum (1998) (Toronto, Canada)	Cross-sectional | Prospective	Inpatients in a brief assessment unit 36 cases (29 fit, 7 unfit)	Criminal Code of Canada Determined through FST measure	**A:** Verbal by WMS (Orientation and Mental Control subtests) **VS:** Rey-Osterreith Complex Figure Test **PS:** TMT(A) **L:** COWAT | Sentence Arrangement subtest of WAIS **EF:** Common Item Estimation Test **PM:** NART
Nestor (1999) (Bridgewater, USA)	Cross-sectional | Retrospective 1987-1995	Psychiatric inpatients referred for neuropsychological testing in Bridgewater State Hospital 181 cases (128 fit, 53 unfit) | 100% male | Age range: 17-80 (mean=32.7, sd=12.33	Dusky criteria Determined by court decision and expert opinion	**IQ:** WAIS-R **A:** WMS-R subtest **PS:** TMT **M:** WMS-R **EF:** WCST
Grandjean (2004) (Texas, USA)	Cross-sectional | Prospective	Psychiatric inpatient hospital	Dusky criteria	**IQ:** WAIS (including VIQ, PIQ) **M:** WMS, CPT-IP

		48 cases (18 fit, 30 unfit) | 81% male | Mean age=37.7, sd=12.9	Determined through expert opinion and FST measure	**EF:** TMT, COWAT, WCST **PM:** NART **E:** SIRS
Shields (2004) (Kentucky, USA)	Cross-sectional | Retrospective	Psychiatric inpatients 213 cases (183 fit, 30 unfit) | 85% male | Age range: 18-85 (mean=34.6)	Dusky criteria Determined by court decision and expert opinion	**IQ:** WAIS (including PIQ, VIQ)
Klein (2010) (Massachusetts, USA)	Cross-sectional | Retrospective 1995-2008	Psychiatric inpatients 371 cases (245 fit, 126 unfit) | 100% male | Mean age=30, sd=2.6	Dusky criteria Determined by court decision	**IQ:** WAIS-III **M:** WMS-III **E:** PAI
Ryba (2011) (Alabama, USA)	Cross-sectional | Prospective 2002-2003	Psychiatric inpatients 77 cases (40 fit, 37 unfit) | 100% male | Age range: 18-85 (mean=40.95, sd=13.13)	Dusky criteria Determined by court decision, expert opinion and FST tool	**WM:** WAIS-III subtests **PS:** WAIS-III subtests **A:** BTA **EF:** TMT(B)
White (2012) (New South Wales, Australia)	Cross-sectional | Retrospective 2005-2010	Cases heard in District or Supreme Courts referred for competency assessment 135 cases (all unfit) | 89.6% male | Age range: 18-90 (mean=39.52, sd=15.92)	Presser criteria Determined by court outcomes and reports	**IQ:** WAIS, K-BIT, WASI **M:** WMS **PS:** **EF:** TMT, TEA, WCST **E:** TOMM, FIT
Toofanian-Ross (2015) (Southern California, USA)	Cross-sectional | Retrospective 2000-2012	Psychiatric inpatients 288 cases (all unfit) | 72.2.7% male | Age range: 18-81 (mean=39.9, sd=12.4)	Dusky criteria Determined by court decision and treatment team	**M:** RBANS **A:** RBANS
White (2016) (New South Wales, Australia)	Cross-sectional | Retrospective 2005-2010	Cases heard in District or Supreme Courts referred for competency assessment 244 cases with crossover from 2012 study (91 fit, 153 unfit) |92.3% male (fit), 88.2% male (unfit) | Mean age 35.8, sd=12.7 (fit); 39.6, sd=16.0 (unfit) | TBI found in 35.2% cases	Presser criteria Determined by court outcomes and reports	**IQ:** WAIS, K-BIT, WASI **M:** WMS **PS:** SDMT **EF:** TMT, TEA, WCST **E:** TOMM, FIT
Arredondo (2017) (Southeastern USA)	Cross-sectional | Prospective 2001-2016	Psychiatric inpatients referred for neuropsychological testing 45 cases (30 fit, 15 unfit) | 66.7% male | Age range: 18-62 (mean=40.82, sd=12.42)	Dusky criteria Determined by professional reports. Some court decisions but limited access	**IQ:** WAIS **E:** TOMM **M:** RBANS **A:** RBANS

Note: See Appendix 1.7 for names of measures

TABLE 3: RISK OF BIAS RATINGS

Reference	Methods for selecting participants (1)	Methods for assessing FST (2)	Methods for assessing cognitive function (3)	Methods to control for confounds (4)	Methods for assessing the impact of cognitive impairment on FST (5)	Conflict of interests (6)
Simon (1987)	Low	Not Reported	High	High	High	Not Reported
Gannon (1989)	Low	Low	Low	Low	High	Not Reported
Lesser (1989)	Low	Low	High	High	Low	Not Reported
Sachsenmaier (1990)	Low	Low	High	High	Low	Not Reported
Nussbaum (1998)	Low	Low	Low	Low	High	Not Reported
Nestor (1999)	Low	Low	Low	High	Low	Low
Grandjean (2004)	Low	Low	Low	High	High	Not Reported
Shields (2004)	Low	Low	High	High	Low	Not Reported
Klein (2010)	Low	Low	High	High	Low	Not Reported
Ryba (2011)	Low	Low	Low	High	Low	Low
White (2012)	Low	Low	High	High	Low	Low
Toofanian-Ross (2015)	Low	Low	High	High	Low	Not Reported
White (2016)	Low	Low	High	High	Low	Low
Arredondo (2017)	Low	Low	Low	High	High	Low

4.3 How do the cognitive profiles of individuals found unfit differ from those found fit to stand trial and which cognitive assessment measures are used?

A wide variety of tests were administered across studies (table 1.3). However, most studies measured the same outcomes and had used similar analysis procedures. Studies identified both psychiatrists and psychologists as compiling reports for the court to evaluate FST, with psychologists more likely to use neuropsychological assessment. White et al (2016) showed that a significantly higher percentage (80%) of defendants who underwent neuropsychological assessment were found unfit to stand trial than those who did not ($X^2(1) = 7.06$, p=.008). Studies by White et al (2012; 2016) reported intelligence as the most likely cognitive function to be assessed (92%; 89%). This was followed by attention (60%; 57%); processing speed (58%; 50%); verbal memory (57%; 53%); visual memory (55.4%; 49.1%); and executive functioning (49.2%; 40.6%). Most relied on large single instruments like the Wechsler tests to report on separate domains.

Intelligence

Intelligence and FST was examined by 13/14 studies, most reporting Wechsler Full-Scale Intelligence (FSIQ), Performance Intelligence (PIQ), and Verbal Intelligence (VIQ). Results for the VIQ index were particularly consistent. White et al (2016) found FSIQ to be higher in fit (M=72.52, sd=12.93) than unfit defendants (M=64.45, sd=16.46; p<0.5). Two studies found that RBANS predicted FST that was otherwise assessed by clinical reports provided to the court. Although not a measure of IQ the RBANS Total Scale Index Score (TSIS) is considered a good indicator of general cognitive functioning (King, Bailie, Kinney, & Nitch, 2012). The mean TSIS in the sample of Toofanian-Ross et al (2015) indicated extremely low performance, suggesting general cognitive impairment (M 67.1; sd 15.4) compared to healthy adults of the same age. Indeed, the TSIS was two standard deviations or more below the norm in 62% of participants. Regression analysis indicated FSIQ predicted FST decision in multiple studies (Gannon, 1989; Klein, 2010; Lesser, 1989; Ryba & Zapf, 2011; White, 2012).

Memory

Eight studies examined memory and FST. The Wechsler Memory Scale (WMS) was the most common assessment tool. Unfit defendants were found to have worse outcomes for composite measures of memory than fit defendants. Verbal and auditory memory were most strongly associated with FST and predicted a decision about FST made by clinical assessment/court decision (Arredondo, 2017; Grandjean, 2004; Nestor, 1999; Klein, 2010; Toofanian-Ross, 2015; White, 2016).

Nestor et al's (1999) sample of unfit defendants scored lower across all domains of the WMS-R, after controlling for intelligence; auditory ($p<.01$) and visual memory ($p<.05$) were significantly lower in unfit defendants. White et al (2016) found that unfit defendants performed more poorly on the Verbal Memory Index of the WMS than fit ($p<.001$). Grandjean (2004) and Klein (2010) found that unfit defendants were significantly worse on auditory memory tests than fit ($p<.01$). Arredondo et al (2017) found fit ($m=72.30$, $sd=18.81$) had higher scores than unfit defendants ($m=59.93$, $sd=18.22$) on immediate memory ($p<.05$). They also found unfit ($m=53.87$, $sd=15.68$) had significantly poorer performance on measures of delayed memory than fit ($m=69.73$, $sd=19.49$) defendants ($p<.01$). A receiver operating characteristic (ROC) curve analysis suggested that, as scores in delayed memory decreased, the likelihood ratio and post-test odds of being deemed incompetent increased.

In a single group of defendants, White and colleagues (2012) found poorer memory to be associated with a decision of failure on Presser Criterion 1 ($p<.05$) and a marginal non-significant effect for criterion 5 ($p=.069$). Toofanian-Ross et al (2015) found individuals had scores below population norms on immediate memory index ($m=66.6$, $sd=17.2$) and delayed memory index ($m=69.7$, $sd=20.3$) of the WMS. Indicating impairment in their group of defendants.

Processing Speed

Five studies found slower processing speed in defendants classified as unfit (Nestor et al, 1999; Nussbaum et al, 1998; Sachsenmaier, 1991; Shields, 2004; White, 2012). Three studies controlled for intelligence in their analysis, all finding large

effects (p<.001) (Nestor et al., 1999; Nussbaum et al., 1998; Sachsenmaier, 1991). White et al (2012) reported that processing speed was not significantly associated with FST decisions; it was significantly associated with failure on the Presser Criterion 5 (ability to understand the substantial effect of any evidence and be able to make a defence of answer to the charge, including the ability to instruct council) (p<.05).

Visuospatial/visuoperceptual function

Toofanian-Ross et al (2015) reported that scores on Visuospatial Constructional Index of the RBANS were in the extremely low range in unfit defendants. Sachsenmaier (1990) and Lesser (1989) reported that scores on the Visuospatial Index of the WAIS-R was lower in unfit defendants (p<.001). Both studies controlled for intelligence.

Attention

Eight studies examined attention and FST. No measure provided a consistent outcome. Toofanian-Ross et al (2015) reported a mean of 69.2 (sd=17.7) on the RBANS Attention Index, suggesting the sample was impaired overall in this domain. White et al (2012) found that attention was the only cognitive domain that was significantly associated with failure on Presser Criteria 2 and 3 (p<.01). Grandjean (2004) found unfit defendants had poorer attention than fit defendants, accounting for 19% of the variance in their model (r=.439, p=.005). Nestor et al (1999) and Nussbaum et al (1998) also found unfit defendants had poorer attention.

Executive Functioning (EF)

Eleven studies examined FST and executive functioning. White et al (2012, 2016) found no significant effect of EF for FST decision. Several studies report that scores on EF measures of social intelligence were poorer in unfit defendants (Sachsenmaier, 1990; Nestor et al, 1999; Klein, 2010). Grandjean (2004) found support for the role of impairment in multiple areas of EF in unfit defendants including reasoning, fluency and cognitive flexibility. Simon (1987) and Gannon

(1989) report higher rates of concrete thinking and less ability to think abstractly in unfit defendants ($p<.001$).

4.4 Is a regular test of effort included in cognitive assessments performed in FST assessments?

Five studies reported information on testing of effort. The Test of Memory Malingering was most commonly used and reported in three studies (White et al, 2012; White et al, 2016; Arredondo et al, 2017).

White et al (2012; 2016) report that approximately 40% of FST assessments included effort testing, with 9% of those tested, having a non-credible performance.

Arredondo et al (2017), Klein (2010) and Grandjean (2004) only included individuals who had passed effort testing. Arredondo found most individuals referred for neuropsychological testing were tested for effort (83%); 31% of defendants had results suggesting a non-credible performance. Grandjean found 17% of those tested gave a non-credible performance. Klein (2010) did not report how many individuals failed effort testing.

5.0 Discussion

5.1 Risk of bias

Risk of bias was high in studies across multiple areas. Use of the tool has highlighted patterns within the literature that future researchers can use to improve studies. Most studies obtained samples from psychiatric units and excluded those with learning disabilities. Further to this, 90% of defendants were male with few studies commenting on the representativeness of their sample. Missing data was often not accounted for and effect sizes were underreported. These factors appear common in FST literature, as highlighted in the SR by Pirelli et al (2011). Hence, the literature does not seem to represent the typical cases seen by CJSW for the Courts, who do not come from psychiatric units (The Law Commission, 2010). The cognitive data analysed was often obtained for clinical purposes away from FST research, consequently the types of tests and psychometric properties were varied. This reduced the ability to critically interpret results.

5.2 How do the cognitive profiles of individuals found unfit differ from those found fit to stand trial?

Deficits in multiple cognitive domains are common in published studies. Overall, from the included studies indicate that defendants who are unfit have poorer cognitive function than their fit counterparts.

However, the presence of a lower general intellect does not necessarily determine FST (Shiroma et al, 2010; Tussey et al, 2013; White et al, 2014). Although the general intelligence of unfit defendants is significantly lower than in fit defendants, it accounts for a small proportion of variance when predicting FST. The overall association is unsurprising given that intelligence affects functional ability and that FST is an assessment of ability to participate adequately in court. (Robertson et al, 1997; Roesch et al, 1999). However, the limited power of intellect to predict FST supports guidance from the Law Commission (2010) that the UK system move away from basing competency on intelligence alone.

The deficits in attention, memory and executive function are indicative of a classification of unfitness. Attention is significantly associated with failure of multiple criteria within the Presser standard and was significant in predicting FST

in over half of studies reporting on it, accounting for a large proportion of variance in judgements of FST across studies (range 19-51%).

Auditory memory also predicts FST and outcome for individual criteria within the legal standards. The ability to understand and recall complex, meaningful information presented verbally is fundamental to legal concepts of FST (Pirelli et al, 2011). Court proceedings largely rely on production and comprehension of verbal information, so adequate function in this area is essential to following court proceedings.

Impairment in EF was found in unfit defendants, and is common in offenders (Meijers et al, 2015). This was particularly relevant for reasoning, social cognition and cognitive flexibility. Executive functions support decision-making and reasoning and it is unsurprising that this domain differentiated fit and unfit defendants (White et al, 2014). This would further support the recommendations from the Law Commission (2010) to introduce a test of decision-making into FST assessment within the UK.

FST was not automatically determined by test scores or diagnoses but they did contribute to decision making. Unfit defendants have a lower general intelligence and impairments in auditory memory, attention and executive function. A functional screening and assessment procedure to identify unfit defendants, and those who would benefit from special measures, is supported by these findings.

5.2 Is a regular test of effort included in cognitive assessments performed in FST assessments?

This SR confirms that the omission of standardised effort testing is a weakness in FST assessments and published research (Vitacco et al, 2009). Less than half of the studies referred to performance validity testing. Studies that did, reported possible poor effort in 9%-31% of participants (Grandjean, 2004; Klein, 2010; White, 2012; White, 2016; Arredondo, 2017). These findings are in line with previous studies on effort testing in forensic samples, which showed rates between 10%-29% (Cornell & Hawk, 1989; Boccaccini, Murrie & Duncan, 2006). Assessments not using a test of effort should be interpreted with caution as they are vulnerable to artificial inflation of cognitive impairment, reducing the reliability and validity of information presented to the courts. The omission of such testing could result in an overestimation of the rates and significance of cognitive impairments found.

Given the prevalence of poor effort, effort testing should be routinely included as an essential part of FST assessments and research studies.

5.3 Which assessment measures used to assess cognitive impairment produce consistent results with the FST population?

The tests used to examine cognitive domains were not consistent within and across studies. There was no uniform coding of tests, associated cognitive domains or reporting of results. This made comparisons across studies challenging and comment on the usefulness of specific tests in relation to FST not possible.

Refinement of test measures and the reporting of results is required to improve research within this field (White et al, 2014). Research should attempt to identify consistent relationships between FST and specific cognitive tests. This will enable tests to be validated and contribute to more reliable FST assessments.

5.4 Strengths and Limitations of Review

This review utilised a systematic method of searching and screening the literature relevant to FST and cognition. The use of a risk of bias tool in assessing the methodological quality of included papers has identified weaknesses in the literature that can improve future research design. Including effort testing within the review has highlighted the need for improvements in its use to increase the validity of FST assessments. Further to this, the four new papers have suggested attention to be of particular importance when differentiating fit and unfit defendants, a domain neglected in the White et al (2014) review. Lastly, this review has demonstrated a need for cognitive domains to be related to the individual criteria within specific legal standards to improve FST assessments and research. However, searching was limited to studies written English and some eligible studies may not have been included. Of note, is that no studies published in other languages were cited in the included studies or review by White (2014). A paper prepared for the National Association of Mental Health Program Directors: Forensic Division Conference, Tampa, Fl., (Esquerre et al 1998) appeared relevant to this review but could not be obtained. Whilst findings have been discussed in

relation to specific legal standards in the UK, none of the included studies were conducted in the UK.

5.5 Future Research

Most studies in this review, and across FST literature, utilise a cross-sectional, retrospective case design. Future studies that use a prospective design are required. Inclusion of effort testing in studies with this population is essential and results without this need to be considered with caution. The literature would also be improved by use of the same battery of assessment across each sample. This would allow for improved analysis of the role of each domain on overall FST and the legal standards relevant to the setting. Studies should control for confounds more consistently in analysis to increase validity. Studies should comment on representativeness of samples, either within the country of origin or globally, to enable findings to be placed within a clear context. Research across a variety of countries and settings, covering a more diverse demographic would be hugely beneficial to this field. Finally, relating findings to individual criteria within the specific legal standard in question would provide a more detailed view of how specific cognitive domains relate to elements of FST criteria.

6.0 Conclusion

This SR highlights the need for improved standards of screening and assessment of FST, including routine examination of effort; use of comprehensive and consistent batteries of tests and explicit examination of each of the relevant legal criteria. The current review supports the role of cognitive testing in understanding and determining the FST population. It supports recommendations for the UK to review current practice and standards in line with research to avoid unfair trials. The four recent studies that were not in the earlier review by White (2014) are generally of better methodological quality however, more research that takes account of issues raised in this SR is required to enable a meaningful meta-analysis to be conducted.

7.0 References

Arredondo, B. C., Marcopulos, B. A., Brand, J. G., Campbell, K.T., & Kent, J. A. (2017). Cognitive functioning and adjudicative competence: defendants referred for neuropsychological evaluation in a psychiatric inpatient setting. *The Clinical Neuropsychologist, 31*(8), 1432-1448.

Boccaccini, M. T., Murrie, D. C., & Duncan, S. A. (2006). Screening for malingering in a criminal-forensic sample with the Personality Assessment Inventory. *Psychological Assessment, 18*, 415-423.

Bonnie, R. J., & Grisso, T. (2000). Adjudicative competence and youthful offenders. In *Youth on trial: A developmental perspective on juvenile justice*. (pp. 73-103). Chicago, IL: University of Chicago Press.

Bradley, Lord. (2009). *The Bradley Report*.

Buchwald-Mackintosh, K. V., Williams, M. W. M., & Sakdalan, J. A. E. (2019). Effects of the Presser and legislative criteria on classifying New Zealand's fitness to stand trial court outcomes. *Psychiatry, Psychology and Law, 0*(0), 1-13.

Cornell, D. G., & Hawk, G. L. (1989). Clinical presentation of malingerers diagnosed by experienced forensic psychologists. *Law and Human Behaviour, 13*, 367-383.

Criminal Code of Canada. (1993).

Criminal Procedure (Scotland) Act. (1995).

Dusky v. United States. (1960).

Farrer, T. J., & Hedges, D. W. (2011). Prevalence of traumatic brain injury in incarcerated groups compared to the general population: A meta-analysis. *Progress in Neuro-Psychopharmacology and Biological Psychiatry, 35*(2), 390-394.

Fazel, S., Xenitidis, K., & Powell, J. (2008). The prevalence of intellectual disabilities among 12 000 prisoners: A systematic review. *International Journal of Law and Psychiatry, 31*, 369-373.

Gannon, J. (1989). *Validation of the competency instrument and elements of competency to stand trial* (Unpublished doctoral dissertation). Available from Proquest Dissertations and Theses database.

Garner, P., Hopewell, S., Chandler, J., MacLehose, H., Akl, E.A., Beyene, J., Chang, S., Churchill, R., Darness, K., Guyatt, G., Lefebvre, C., Liles, B., Marshall, R., Martinez Garcia, L., Mavergames, C., Nasser, M., Qaseem, A, Sampson, M., Soares-Weiser, K., Takwoingi, Y., Thabane, L., Trivella, M., Tugwell, P., Welsh, E., Wilson, E., & Schunemann, H. (2016). When and how to update systematic reviews: consensus and checklist. *BMJ, 354*.

Grandjean, N. R. (2004). *Neuropsychological predictors of incompetency to stand trial in defendants referred for competency restoration* (Unpublished doctoral dissertation). Available from Proquest Dissertations and Thesis database.

Kearns, G., & Mackay, R. D. (2000). An upturn in unfitness to plead? Disability in relation to the trial under the 1991 Act. *Criminal Law Review*. 532-539.

King, L. C., Bailie, J. M., Kinney, D. I., & Nitch, S. R. (2012). Is the Repeatable Battery for the Assessment of Neuropsychological Status factor structure appropriate for inpatient psychiatry? An exploratory and higher-order analysis. *Archives of Clinical Neuropsychology, 27*, 756-765.

Klein, K. L. (2010). *Neuropsychological and personality predictors of competence to stand trial: A social cognitive perspective* (Unpublished doctoral dissertation). Available from Proquest Dissertations and Thesis database.

Lesser, F. I. (1990). *Formulating a prediction model for regaining competency to stand trial* (Unpublished doctoral dissertation). Available from Proquest Dissertations and Thesis database.

Meijers, J., Harte, J. M., Jonker, F. A., & Meynen, G. (2015). Prison brain? Executive dysfunction in prisoners. *Frontiers in Psychology, 6*, 43.

Moynan, C.R, & McMillan, T.M. (2017). Prevalence of head injury and associated disability in prison populations: A systematic review. *The Journal of Head Trauma Rehabilitation, 33*(4), 275-282.

Nestor, P. G., Daggett, D., Haycock, J., & Price, M. (1999). Competence to stand trial: a neuropsychological inquiry. *Law and Human Behaviour, 23*(4), 397-412.

Nussbaum, D., Mamak, M., Tremblay, H., Wright, P., & Callaghan, J. (1998). The Metfors Fitness Questionnaire (MFQ): A self-report measure for screening competency to stand trial. *American Journal of Forensic Psychology, 16*(3), 41-65.

Pirelli, G., Gottdiener, W. H., & Zapf, P. A. (2011). A meta-analytic review of competency to stand trial research. *Psychology, Public Policy, and Law, 17*(1), 1-53.

Pitman, I., Haddlesey, C., Ramos, S. D., Oddy, M., and Fortescue, D. (2014). The association between neuropsychological performance and self-reported traumatic brain injury in a sample of adult male prisoners in the UK. *Neuropsychological Rehabilitation, 10*, 1-17.

R v. Pritchard. (1836).

R v. Presser. (1958).

Robertson, R. G., Gupton, T., McCabe, S. B., & Bankier, R. G. (1997). Clinical and demographic variables related to "fitness to stand trial" assessments in Manitoba. *The Canadian Journal of Psychiatry/La Revue Canadienne de Psychiatrie, 42*(2), 191-195.

Rodgers, T. P., Blackwood, N. J., Farnham, F., Pickup, G. J., & Watts, M. J. (2008). Fitness to plead and competence to stand trial: A systematic review of the constructs and their application. *Journal of Forensic Psychiatry & Psychology, 19*(4), 576-596.

Rodgers, T. P., Blackwood, N., Farnham, F., Pickup, G., & Watts, M. (2009). Reformulating fitness to plead: A qualitative study. *Journal of Forensic Psychiatry & Psychology, 20*(6), 815-834.

Roesch, R., Zapf, P. A., Golding, S. L., & Skeen, J. L. (1999). Defining and assessing competency to stand trial. In A. K. Hess & I. B. Weiner (Eds.), *The handbook of forensic psychology., 2nd ed.* (pp. 327-349). Hoboken, NJ: John Wiley & Sons Inc.

Ryba, N. L., & Zapf, P. A. (2011). The influence of psychiatric symptoms and cognitive abilities on competence-related abilities. *International Journal of Forensic Mental Health, 10,* 29-40.

Sachsenmaier, S. J. (1991). *The relationship between traditional psychometric test scores and the determination of criminal responsibility and competency to stand trial* (Unpublished doctoral dissertation). Available from Proquest Dissertations and Thesis database.

Sanderson, S., Tatt, I. D., & Higgins, J. P. (2007). Tools for assessing quality and susceptibility to bias in observational studies in epidemiology: A systematic review and annotated bibliography. *International Journal Epidemiology, 36,* 666-676.

Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., & Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: Elaboration and explanation. *BMJ, 349.*

Shields, C. L. (2004). *Competence to stand trial: Cognitive related abilities and other factors* (Unpublished doctoral dissertation). Available from Proquest Dissertations and Thesis database.

Shiroma, E. J., Ferguson, P. L, & Elisabeth Pickelsimer, E. (2012). Prevalence of Traumatic Brain Injury in an Offender Population: A Meta-Analysis. *Journal of Head Trauma Rehabilitation, 27*(3), E1-E10.

Simon, M. J. (1987). Use of the proverbs test in the assessment of competency to stand trial. *Psychological Reports, 60*(3c), 1166-1166.

Talbot, J. (2012). *Fair Access to Justice? Support for Vulnerable Defendants in the Criminal Courts.* Prison Reform Trust, London.

The Law Commission. (2010). Unfitness to Plead.

Toofanian-Ross, P. T., Padula, C. B., Nitch, S. R., & Kinney, D. I. (2015). Cognition and competency restoration: Using the RBANS to predict length of stay for patients deemed incompetent to stand trial. *The Clinical Neuropsychologist, 29*(1), 150-165.

Tussey, C. M., Marcopulos,B. A., & Caillouet, B. A. (2013). Neuropsychological evaluation of competency in criminal forensic contexts. *Psychological Injury and Law, 6*(1), 31-40.

Vitacco, M. J., Rogers, R., & Gabel, J. (2009). An investigation of the ESCT-R in male pretrial patients: Evaluating the effects of feigning on competency evaluations. *Criminal Justice and Behaviour, 41*(3), 345-363.

White, A. J., Batchelor, J., Pulman, S., & Howard, D. (2012). The role of cognitive assessment in determining fitness to stand trial. *International Journal of Forensic Mental Health, 11*(2), 102-109.

White, A. J., Batchelor, J., Meares, S., Pulman, S., & Howard, D. (2016). Fitness to stand trial in one Australian jurisdiction: The role of cognitive abilities, neurological dysfunction and psychiatric disorders. *Psychiatry, Psychology and Law, 23*(4), 499-511.

White, A. J., Meares, S., & Batchelor, J. (2014). The role of cognition in fitness to stand trial: A systematic review. *Journal of Forensic Psychiatry & Psychology, 25*(1), 77-99.

Winick, B. J. (1996). The MacArthur treatment competence study: Legal and therapeutic implications. *Psychology, Public Policy and Law, 2*(1), 137-166.

Chapter Two: Major Research Project

Establishing prevalence of Head Injury and associated disability in individuals being assessed by a pre-sentencing Criminal Justice Social Work Report

Holly de Mora

Chapter word count (including abstract and references): 6855

Submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical Psychology. Written in accordance with the guidelines for submission the Journal of Psychology, Public Policy, and Law (Appendix 2.1).

1.0 Plain English Summary

Background: Head injury (HI) can result in serious deficits in how an individual can think, remember, behave, interact and manage their emotions. These deficits and changes can sometimes be serious enough to be considered a life-long disability. It is thought that more people within the offender population have experienced a HI in their lifetime and several studies have looked at prevalence rates within prisons. For this reason, The National Prisoner Healthcare Network were asked by the Scottish Government to investigate the level and impact of disability caused by HI in offender populations. A recommendation from the NPHN was to introduce and evaluate screening for HI in criminal justice social work. Identifying significant HI and disability at this stage may help to contribute towards developing suitable pathways and intervention for individuals.

Aim: This study looks to establish the prevalence of HI in offenders completing a criminal justice social work (CJSW) report. To establish how many individuals with HI have disability caused by the injury, what that disability looks like and how it differs from others within the offender population. It also looked at how aware (CJSW) are of HI. It is predicted that:

- Disability is more likely in those who have had a HI
- Cognitive impairment is more likely in those who have had a HI
- Those who have had a HI have higher rates of re-offending

Methods: Adult (over age of 18) males and females will be recruited from West Dunbartonshire Criminal Justice Social Work. All participants will be asked by a social worker if they would like to take part in a study about health in offenders. People will not be able to take part if they are not fluent in English, have a deteriorating cognitive condition, have serious mental health difficulties or pose a significant risk to the researchers. Participants will be asked to take part in an interview and various brief assessments taking about 60 minutes. The measures assess HI, cognitive function, mental health, disability and substance misuse. CJSW reports were reviewed for evidence of HI.

Findings: HI was common in participants. This study found that disability, poor mental health and substance use was more likely in participants with HI. They commit more violent offences and have higher numbers of convictions and prison sentences. However, HI is not considered or well documented in reports to the court.

Conclusions & Implications: Introduction of a screening tool within CJSW could help identify individuals with HI who might need support. From this study, around 28% of individuals being assessed by pre-sentencing report might require further assessment. This would require resource, training and development of links and pathways with other services (e.g., brain injury services). However, doing so could help CJSW develop and plan relevant interventions, both in the community and prison, in line with What Works guidelines.

2.0 Abstract

2.1 Background

The emotional, social, cognitive and behavioural impact of head injury (HI) can be significant and long lasting. Those with a forensic history are at higher risk of sustaining a HI. There is a growing evidence base on prevalence and linking the effects of HI with offending behaviour. The National Prisoner Healthcare Network (NPHN) recommends evaluation of screening for HI by social workers completing a pre-sentencing Criminal Justice Social Work (CJSW) report. This may help to better understand the role of HI on future offending and guide disposals or interventions.

2.2 Objectives

The study assessed how many participants undergoing a CJSW assessment would likely benefit from a screening assessment and onward referral following HI. It did this by identifying (a) the prevalence of HI in participants undergoing a CJSW assessment (b) the occurrence of persisting problems, including neuropsychological impairment, emotional difficulties, behavioural difficulties and social disability after HI and (c) whether CJSW reports already indicate HI. The study also investigated relationships between significant HI and re-offending.

2.3 Method

A cross sectional, between subjects design was utilised. A screening measure that is valid for forensic samples was used to assess severity of HI. Assessments of disability, mental health, cognitive function and effort were carried out on 46 adult participants undergoing assessment at West Dunbartonshire CJSW, Scotland. Participants were grouped by severity of HI (group 1=moderate-severe or multiple-mild, group 2=no or mild HI). CJSW reports were scrutinised to identify reference to HI and other impairments (e.g., mental/physical health and disability).

2.4 Results

HI was reported by 91% of 46 participants. Moderate-severe HI was found in 20% (n=9) and multiple-mild HI in 39% (n=18). HI predicted disability (p=.012) and psychological distress (p=.034) after adjusting for age, education and substance use. Groups performed similarly across cognitive domains. Participants with

moderate-severe/multiple-mild HI were more likely to have violent offending histories (p=.002); more convictions (p=.005); and have more prison sentences (p=.007). No CJSW reports identified HI.

2.5 Conclusions

Disability and psychological distress were more common in participants with more severe HI. Results indicate around 28% of participants would benefit from screening for HI. However, HI was not identified in CJSW reports. Introduction of a HI screening process within CJSW would require training and links with health professionals to be developed. However, this could help to plan and support more appropriate disposals and interventions. Findings are preliminary and further large-scale research is required.

3.0 Introduction

Head injury (HI) affects around 8.5% of the UK population in their lifetime (Williams, 2012). The effects of HI on behaviour, cognition, social interaction and emotional control have long been established (Wood, 1987). The implications for individuals experiencing these can be significant and life-long with reductions in their daily functioning and independence (Stuss & Levine, 2002).

The prevalence of HI is high in prisoners. For example, meta-analyses suggest that the prevalence is 50-60% in prisoners (Farrer & Hedges, 2011; Shiroma et al, 2012). Yet HI is often a hidden disability within forensic populations as chronic impairment is often not identified or assessed (NPHN, 2016). Alongside this, research has not explored the impact of HI in terms of disability within CJSW populations in Scotland (Moynan & McMillan, 2017).

A recent report by the Scottish Parliament's Health & Sports Committee highlighted many ongoing health inequalities, that disproportionately affect offender populations and included HI (Health & Sports Committee, 2017). Reducing these inequalities or providing support may improve individual wellbeing and help to reduce reoffending within the population (Williams, 2012). This is in line with The Mental Health Strategy for Scotland (2017), with key aims to improve prevention and early intervention and access to treatment and joined up services. HI can create deficits in attention, flexibility of thought, insight, concentration, memory and impulse control and increase irritability, aggression and disinhibition (Bennett et al, 2005; Hart et al, 2005; Bivona et al, 2008). The nature of these deficits may increase the likelihood of an individual having contact with the CJS (Pitman, Haddlesey, Ramos, Oddy & Fortescue, 2015). The Scottish Government tasked The National Prison Healthcare Network (NPHN) to report on HI and offending. The NPHN aim to support the health inequalities agenda and reduce re-offending by working with the health and justice services. In 2016 the NPHN produced a report with several recommendations, including to pilot screening for HI in the CJSW report.

Unlike the rest of the UK who rely on the National Probation Service, responsibility for supervision of offenders within the community in Scotland lies with local social

work departments. This began in the late 1960s and over time their involvement has evolved and now includes producing CJSW Reports, court services, probation and throughcare (service for prisoners during and after sentence). An aim is to help offenders to reduce offending behaviour and promote social responsibility through social integration and community resources (Mair, 2004). To achieve this, attention is paid to the Risk, Needs, Responsivity literature; this focuses on responsivity factors whereby preventing reoffending is seen as an individualised process (Andrews & Bionta, 2006; Sapouna, Bisset, Conlong & Matthews, 2015). Chronic effects of HI could be an individual responsivity factor, requiring adaptations and interventions.

Impairments and disability resulting from HI may affect the ability to successfully engage with CJSW, court and prison systems. For example, deficits in executive function and memory often make it difficult to keep appointments, to monitor, plan, reflect and problem solve. Cognitive impairments contribute to the likelihood of reoffending with potentially worse outcomes than for uninjured peers (Pitman et al, 2015; Williams, 2012). Identification and understanding of impairment in offenders could help to reduce reoffending and ongoing contact with the CJS by improving disposals from courts, engagement within prison systems and ongoing support to engage in CJSW (Williams, Mewse, Tonks, Mills, Burgess & Cordan, 2010). Improving understanding and tailoring interventions and rehabilitation could improve outcomes, reduce reoffending and ultimately reduce social and financial costs.

To support individuals who are disabled by HI there needs to be a way of identifying them. Previous unpublished research (Walker, 2017; McGinley, 2017) investigated the prevalence of disability from HI within males in prison and the validity and utility of screening tools to identify HI. However, there has been no research in CJSW. Given that the CJSW reports consider personal, health and social circumstances of individuals (and their relationship to sentencing options) it seems reasonable to consider whether there is a need for screening for HI in this process.

A CJSW report can be requested by the court prior to sentencing. It is written by a social worker, usually within four weeks. The report considers if there are issues

relevant to involvement in offending and any proposed intervention (Scottish Government, 2010). The CJSW report is written at the early stages of contact with the CJS, identifying HI at this point would provide opportunity for intervention and support.

This study addresses the NPHN recommendation that a two-step screening for HI is introduced and evaluated in the CJSW interview (NPHN, 2016), and could provide practitioners with opportunity to consider whether HI is relevant to the court process, including whether specialist brain injury assessment may help to guide planning for disposal, including recommendations for rehabilitation, care and support.

3.1 Aims and Hypotheses

This research estimates the prevalence of self-reported HI in individuals who are undergoing assessment by CJSW in order to provide a court report prior to sentencing. It considers the extent to which those who self-report HI have associated disability compared to those without HI. It assesses the awareness of HI and persisting disability through scrutiny of CJSW reports (linked to participants) for evidence of recommendations relating to HI. The following hypotheses are examined:

H1: Higher rates of ongoing disability, as measured by the Glasgow Outcome Scale-Extended (GOS-E), occur in individuals with significant HI than in those without

H2: Cognitive impairment is more common in individuals with significant HI than in those without

H3: Individuals with significant HI have higher rates of reoffending than those without

4.0 Methods

4.1 Ethical Approval

Ethical approval was obtained from the Ethics Committee for the MVLS College at the University of Glasgow (14/01/2019 | 200180023, Appendix 2.2).

4.2 Design

The study used a quantitative, cross-sectional design. Group comparisons were explored. Multivariate regression models then investigated any significant group differences.

4.3 Participants

Participants were recruited from West Dunbartonshire Criminal Justice Social Work (WD CJSW) Department. This locality was selected as it provides a service to a large geographical area in the West of Scotland, because it expressed interest in supporting the study, and had capacity by completing approximately 50 CJSW reports a month. Support was offered from the Acquired Brain Injury Service (West Dunbartonshire HSPC) to allow onward referral if deemed necessary. Interviews were conducted in a private room within the social work building.

4.4 Eligibility Criteria

Participants were included if: (a) currently being assessed by a CJSW for a pre-sentencing report; (b) aged over 18; (c) fluent in English; (d) had capacity to consent; (c) not currently experiencing symptoms of severe mental health difficulties; (f) able to communicate to a standard to enable completion of assessments; and (g) having no deteriorating neurological diagnosis (e.g., dementia). Participants not meeting the above criteria were excluded.

4.5 Demographic Data

A data capture form (Appendix 2.3) included: (a) age; (b) ethnicity; (c) education; (d) occupation; (c) offence history; (f) time spent in custody; (g) length of hospital stay and follow-up after HI. It also included data to be extracted from CJSW reports.

4.6 Measures

The following measures were selected because they are relevant to outcomes after HI, have good psychometric properties, and are brief to administer.

Table 4 shows measures used to assess cognitive function, mental health and substance use. Cognitive measures used are shown to be sensitive to the effects of HI and neurological disorder (Burgess et al, 1998; Strauss et al, 2006; Lezak, 2012).

Ohio State University Traumatic Brain Injury Identification Method (OSU TBI-ID)

A structured interview which uses self-report to establish the presence and severity of HI and any other source of central nervous system (CNS) compromise. It has five key indicators to identify whether individuals are 'likely' to have persisting effects. Bogner and Corrigan (2009) validated the OSU against cognitive, psychiatric and behavioural indices, finding large effect sizes ($r^2>0.36$). They also report good test-retest reliability ($r>0.6$). Large effect sizes were also found between disability and the OSU 'worst injury' rating ($r=0.41$, $p=0.01$) in an unpublished study on a Scottish male prison sample (McGinley, 2017). 'Worst injury' ratings in this study refer to internationally recognised definitions of HI severity (Carroll et al, 2004) and two or more HIs close together.

TABLE 4: COGNITIVE, MENTAL HEALTH, SUBSTANCE USE MEASURES

Type of Tool	Measure	Purpose and Process
Mental Health	Clinical Outcomes in Routine Evaluation System (CORE-10)[1]	Self-report screening for distress through commonly experienced symptoms of anxiety and depression. Participants rate their experience over the past 7 days.
Substance Misuse	Alcohol Use Disorders Identification Test (AUDIT)[2]	Self-report screening of alcohol consumption, drinking behaviour, and alcohol related problems. Total score reflects risk related to alcohol.
	Drug Abuse Screening Test (DAST-10)[3]	Self-report screening for risk in relation to drug use.
Effort Testing	Word Memory Test (WMT)[4]	Immediate and delayed recognition of 20-word pairs, with failure on either trial indicating poor effort. Paper version administered.
Dysexecutive Symptoms	Dysexecutive Questionnaire (DEX)[5]	Self-report questionnaire assessing cognition, behavior and emotions. Higher scores reflect greater problems with executive functioning. Only the self-report part of the DEX was completed due to a lack of access to a reliable informant.
Cognitive Test	List Learning subtest from Adult Memory Information Processing Battery (AMIPB)[6]	Assesses learning and working memory. Total score over 5 trials.
	Symbol Digits Modalities Test (SDMT)[7]	Measure of processing speed and attention, visual scanning and motor speed.
	Trail Making Test (TMT)[8]	Assessment of executive function (Part B: divided attention, mental flexibility and Part A motor speed. Total time taken for each part provides the score.
	Hayling Sentence Completion Test[9]	Executive function: initiation speed and response suppression.

References: [1]Connell & Barkham, 2007; [2]Babor et al, 2001; [3]Skinner, 1982; [4]Green, Lees-Haley & Allen, 2003; [5]Wilson et al, 1997; [6]Coughlan & Hollows, 1985; [7]Smith, 1982; [8]Armitage, 1946; [9]Burgess & Shallice, 1997

Glasgow Outcome Scale Extended (GOS-E) (Wilson, Pettigrew & Teasdale, 1998)

An assessment of disability outcome after HI conducted through semi-structured interview and used in community settings. It has good predictive validity and high inter-rater reliability (78%). It explores independence in activities of daily living, work ability, social and leisure activities, social relationships, and ongoing symptoms of HI (e.g., headaches, dizziness, memory and concentration difficulties). An overall rating in one of eight categories of disability ranging from 'death' to 'upper good recovery' is produced. Participants are asked whether these symptoms are associated with HI, another factor (e.g., physical health), or a combination of both. This produces either disability by HI or disability by any cause (HI, other factors and combined).

Further to these measures a brief semi-structured interview was used to capture demographic information. A data capture form (appendix 2.3) was used to guide this.

4.7 Recruitment and Study Procedures

Recruitment took place between February and July 2019; 46 individuals participated. CJSW provided individuals undergoing a CJSW report with an information sheet (Appendix 2.4). Individuals indicated interest verbally or through a sign-up sheet. Their name was then passed to the researcher (HdM) by individual social workers. Meetings with participants were arranged, the content of the information sheet was reviewed, and informed written consent obtained (Appendix 2.5).

A semi-structured interview was conducted and recorded on a data capture form. Assessment took place in the following order: WMT Immediate Recall (IR), TMT Part A&B, CORE-10, SDMT, AMIPB, DEX, AUDIT, DAST-10, WMT Delayed Recall (DR), OSU TBI-ID, GOSE. The OSU TBI-ID and GOSE were administered at the end of assessment to avoid priming participants to effects of HI and affect their responses during testing. Most interviews took less than 60 minutes to

complete. Participants were invited to ask questions or report any distress caused by participating. No participants reported distress. Data was also extracted from each participants court report. CJSW reports were reviewed and data extracted.

4.8 Participant Grouping

Participant groups were based on OSU TBI-ID categories: moderate-severe HI, multiple-mild HI and non-significant injury (Table 5). These were then combined into dichotomous groups labelled no/mild HI (NMHI) and multiple/moderate-severe HI (MMSHI). The OSU-TBI-ID defines moderate HI as any resulting in loss of consciousness (LoC) for 30 minutes-24 hours, and severe HI as LoC >24 hours.

TABLE 5: HI CATEGORIES

Category for Study	Type of HI	Defined by
No/Mild HI (NMHI)	No HI	No injury to the head or neck
	Mild HI	Injury with no, or <30 minutes LoC.
Multiple/Moderate-Severe HI (MMSHI)	Moderate HI	Injury with LoC between 30 minutes-24 hours
	Severe HI	Injury with LoC >24 hours
	Multiple HI	Repeated impacts (2 or more close together) to the head, even without apparent effect.

4.9 Justification of Sample Size

No studies have looked at HI and/or disability within CJSW. Walker (2017) reported a correlation of $r^2 = -.33$ between duration of loss of consciousness and cognitive test scores in male Scottish prisoners. To detect a medium effect, with 80% power and $\alpha = .05$, a sample size of n=67 would be required (Faul, Erdfelder, Lang &

Buchner, 2007). To detect larger effects (r^2=0.5) with the same analysis, 80% power and α=.05, n=26 are required. G*power calculation indicated n=85 are required to detect a medium effect (f^2=.15), with power of 80% and α=.05 using multiple linear regression with four predictor variables. To detect a large effect (f^2=.35) power 80%, α=.05, n=40 are required. Based on this the study aimed for a sample size of 67. Despite the study achieving a final *n* of 46, the data met assumptions for continuing with the statistical design as planned. Regression analysis were limited to four variables to allow for adequate precision and confidence intervals and standard errors are reported.

4.10 Data Analysis

Statistical analysis was undertaken using IBM SPSS v22 (IBM, 2013). Demographic data are presented as measures of central tendency (mean and standard deviation or percentages). For group comparisons HI was explored through dichotomous group (0=NM HI, 1=MSHI HI). Univariate analysis was used to establish group differences in outcome measures. Preliminary analysis was conducted to explore the parameters of the data. Where data did not meet required assumptions, non-parametric tests were used. Multivariate regression models then investigated significant univariate differences with control for (1) demographic variables (age, years of education) and (2) previous substance misuse (as indicated by AUDIT scores). Again, tests to ensure assumptions were met were conducted. All inferential tests were two tailed. Three cases could not be analysed because of missing data.

5.0 Results

5.1 Demographic Data

The study recruited 46 participants, with no-one excluded from the study. Demographic data are summarised in table 6 alongside Scottish National and local CJSW statistics for 2017/18.

TABLE 6: COMPARISONS MADE AGAINST 2017/18 CJSW STATISTICS (REPORTED FEBRUARY 2019)

Category	Attribute	Scotland	West Dun	Sample
Total Numbers		28403	618	46
Gender	**Male**	21383 (83%)	492 (80%)	41 (89%)
	Female	4290 (17%)	75 (12%)	4 (9%)
Ethnicity	**White**	22381 (97%)		44 (96%)
	Other	788 (3%)		2 (4%)
Age Range	**16-30**	11992 (47%)	246 (39%)	13 (28%)
	31+	13681 (53%)	321 (52%)	33 (72%)
Employment	**Employed**	5934 (24%)	70 (12%)	19 (41%)
	Unemployed	17098 (67%)	495 (80%)	27 (60%)
	Other/Unknown	2641 (10%)	2 (0.3%)	0

Note: 'Employed' includes students and training schemes

The mean age was 37.63 years (sd=12.42; range= 19-74). Most participants were white (96%) and male (89%). The mean years of education was 10.59 (sd=2.33; range 7-22). Over half (60%) reported attending a mainstream school, 20% received support or attended a base within a mainstream school, and 20% attended a specialist education provider. Only 41% reported being in current employment however, 76% reported previous employment. Physical health complaints were self-reported by 41%. Binomial tests were conducted to assess sample representativeness (Appendix 2.6). These indicated the proportions in categories of gender and ethnicity were as expected for both national and local statistics. The proportion of participants in the sample who were currently employed was higher than expected based from national (p=.01) and local (p=<.001) statistics. The sample was older than for national (p=.016) and local (.012) statistics.

5.2 Head Injury History

Most (91%) reported at least one HI and 63% more than one. The median number of HI reported was 2 (range 0-7). Of those reporting HI, 72% reported LoC (n=33), with 20% (n=9) of these LoC over 30 minutes and 4%, (n=2) for over 24 hours. Multiple-mild HI was reported by 39% (n=18) (Table 7). Categories of HI can be found above in table 5 (section 4.8).

TABLE 7: HI DESCRIPTIVE DATA

		(n, %)
Number of HI	0	4 (9)
	1-2	20 (44)
	3+	22 (48)
Number of LoC	0	13 (28)
	1-2	27 (59)
	3+	6 (13)
Age first HI (mean, sd)		14.59 (11.93)
CNS Factors		22 (48)
HI Category	None/Mild	19 (41)
	Multiple-Mild	18 (39)
	Moderate/Severe	9 (20)

The mean age at first HI was 14.59 (SD=11.93, range 0-54), with 28% reporting a HI before the age of 15. Almost half reported other CNS factors, including ADHD (n=10), Asperger's (n=1), epilepsy (n=2), learning difficulties (n=3), meningitis (n=1), chemotherapy treatment (n=1), oxygen deprivation (n=2) and stroke (n=2) (n=22, 48%).

5.3 Offence History

An overview is shown in table 8. Six (13%) had no previous convictions, 50% had 1-9 previous convictions, and the remaining 37% had 10 or more convictions (Mean=9.41, SD=11.64).

TABLE 8: OFFENCE DESCRIPTIVE DATA

	Total Sample (n=46)	NMHI (n=19)	MMSHI (n=27)	p
Age of first arrest (mean, sd)	22.22 (11.56)	26.53 (14.03)	19.19 (8.49)	.011* (r=.37)
Number of convictions (mean, sd)	9.41(11.64)	4.16 (4.41)	13.11(13.66)	.005* (r=.41)
Number of prison sentences (mean, sd)	1.91 (2.53)	.68 (1.06)	2.78 (2.90)	.007* (r-.40)
Violent Offences (n,%)	25 (60)	6 (32)	21 (78)	.002*
Sexual Offences (n, %)	6 (14)	4 (21)	3 (11)	.355
Property Offences (n, %)	13 (31)	5 (26)	9 (33)	.611
Other Offences (n, %)	36 (86)	16 (84)	22 (82)	.810

**=statistically significant result*

Participants reported convictions for violence (60%), sexual offences (14%), property (31%) and other offences (86%) including drugs and breach of the peace. The average age of first arrest was 22.22 years (sd=11.56; range=10-74), and 44% (n=20) had been arrested at least once before the age of 18. Almost half had never been in prison (n=21, 46%); 37% (n=17) had been imprisoned 1-3 times and 17% (n=8) 4 or more times. Of those who had been in prison, their longest sentences ranged from 1-63 months (median=3 months).

A chi-square test for association was conducted between HI status and offence types. All expected frequencies were greater than five. There was a statistically significant association between HI and violent offending. Participants in the MMSHI group were significantly more likely to have violent than non-violent offending histories than those in the NMHI group, $x^2(1)=9.818$, p=.002; large effect φ=0.462. There was no significant association between HI groups and the remaining offences.

Assumptions for parametric tests were violated and so Mann-Whitney U tests were run to determine if there were differences between HI groups in the number of convictions, number of prison sentences, and age of first arrest. Those

with MMSHI had significantly more convictions (U=381.5, z=2.801, p=.005); were significantly younger at first arrest (U=143, z=-2.536, p=.011); and had significantly more prison sentences (U=371.5, z=2.707, p=.007) than those with NMHI.

5.4 Mood and Substance Use:

Mental health difficulties were self-reported by n=30 (65%). This was consistent with CORE-10 scores where n=33 (72%) scored with mild distress or above (table 9).

TABLE 9: MOOD AND SUBSTANCE DESCRIPTIVE DATA

		NMHI (n=19, %)	MMSHI (n=27, %)	Total Sample (n=46, %)
CORE-10	Healthy	10 (53)	3 (11)	13 (28)
	Mild	2 (11)	2 (7)	4 (9)
	Moderate	1 (5)	6 (22)	7 (15)
	Mod/Severe	4 (21)	8 (30)	12 (26)
	Severe	2 (11)	8 (30)	10 (22)
DAST-10	No Problem	8 (47)	10 (40)	18 (43)
	Low	3 (18)	1 (4)	4 (10)
	Moderate	4 (24)	5 (20)	9 (21)
	Substantial	2 (12)	8 (32)	10 (24)
	Severe	0 (0)	1 (4)	1 (2)
AUDIT	Low Risk	7 (41)	5 (20)	12 (29)
	Increasing Risk	7 (41)	10 (40)	17 (41)
	Higher Risk	1 (6)	3 (12)	4 (10)
	Possible Dependence	2 (12)	7 (28)	9 (21)

The DAST-10 identified that 48% (n=22) would benefit from a more intensive assessment of their drug use and the AUDIT that 74% (n=34) were at increased health risk from their alcohol use.

There was homogeneity of variances for scores on all mood and substance use measures, as assessed by Levene's test for equality of variances. Therefore, T-tests were used to explore group differences. Participants with MMSHI had

significantly higher raw scores than those with NMHI on the CORE-10 (t(44)=3.021, p=.004, d=.89)) and AUDIT (t(44)=-3.132, p=.003, d=.95). No difference was found between groups on DAST-10 scores (t(44)=5.847, p=.184).

5.5 Cognitive Impairment

Impairment was defined as 1.5SD or more below the normative means (within the bottom 7% of the population), to detect mild cognitive impairment. Norms similar to the sample by age education and gender were used for comparison (appendix 2.6). Scores on the AMIPB and TMT-B were impaired. The percentage of the sample failing effort testing was comparable to population norms, with 33% of the sample having scores suggestive of poor effort (26% with NMHI and 37% MMSHI).

Mann-Whitney U tests determined there were no significant differences between HI groups on any cognitive tests, including effort (Appendix 2.7). Scores on the DEX approached significance (U=330.5, z=1.920, p=.055, r=.283).

5.6 Disability

Disability from any cause on the GOS-E was found in 70% (n=32) (table 10); 35% (n=16) were specifically disabled by HI. All 9 (100%) participants with moderate-severe HI were disabled (any cause) and 5 (56%) attributed this to HI. Participants with multiple-mild HI were rated as disabled in 15 cases (83%), and 8 (44%) attributed this to HI. There were no differences in rates of disability for groups with and without other CNS factors.

TABLE 10: DISABILITY DESCRIPTIVE DATA

	NMHI (n=19) (n,%)	MMSHI (n=27) (n,%)	Total sample (n=46) (n, %)
Disabled (Any cause)	8 (42)	24 (89)	32 (70)
Disabled (by HI)	1 (5)	13 (48)	14 (30)

A chi-square test for association found disability from any cause was significantly more frequent in participants with MMSHI than NMHI ($x^2(1)=11.529$, p=.001) with a large effect φ=.501.

5.7 CJSW Reports

Mental health difficulties were noted in 55% (n=23) of reports and physical health in 33% (n=14); 7% (n=3) mentioned possible cognitive impairment and 14% (n=6) 'disability' in general terms. No reports noted occurrence of HI.

5.8 Multivariate Analysis

Relationships between outcome variables (disability, number of convictions, age of first arrest, number of prison sentences, violent offences and CORE-10) and predictor variables (HI, age, years of education and alcohol use) were further explored. Post hoc regressions were conducted, and no model violated assumptions (table 11).

HI and disability: The logistic model was significant, $x^2(4)=14.658$, p<.005 and HI predicted 39% (Nagelkerke R^2) of the variance associated with disability. Of the four predictor variables (HI, age, years of education and alcohol use) only HI was significant (p=.012). Presence of MMSHI was associated with an increased likelihood of disability.

HI and mood: The linear model for the CORE-10 was significant, F=(4, 41)=4.543, p=.004, with HI, age, years of education and alcohol use explaining 31% of the variance in the sample. MMSHHI was the only predictor of elevated scores on the CORE-10 (p=.034).

HI and Offending:
Number of convictions was further explored through linear regression. The four predictors (HI, age, years of education and alcohol use) accounted for 23% of the variance, with an adjusted R^2 of 15.6%; F(4,41)=3.078, p=.026. HI severity had no

significant association with number of convictions, age of first arrest or number of prison sentences after controlling for confounding factors.

A logistic regression explored predictors of violent offending. The model was significant $x^2(4)=23.587$ $p<.0005$ and explained 54% (Nagelkerke R^2) of the variance. Of the four predictor variables, (HI, age, years of education and alcohol use) MMSHI ($p=.006$) and fewer years in education ($p=.016$) predicted likelihood of violent offending.

TABLE 11: SUMMARY OF REGRESSION ANALYSIS

Outcome	Predictors	OR	B	SE	p	CI, 95%	Adj^2	Pseduo R^2
Number of Convictions	HI	-	6.297	3.624	.090	-1.023, 13.616	.156	-
	Age	-	.007	.130	.957	-.255, .269		
	Years of education	-	-1.416	.714	.054	-2.859, .027		
	AUDIT Score	-	.278	.228	.230	-.183, .739		
CORE-10	HI	-	5.203	2.367	.034*	.423, 9.984	.239	-
	Age	-	.086	.085	.317	-.085, .257		
	Years of education	-	.698	.467	.142	-.244, 1.641		
	AUDIT Score	-	.279	.149	.068	-.022, .581		
Age of First Arrest	HI	-	-5.374	3.173	.098	-11.782, 1.034	.345	-
	Age	-	.413	.114	.001*	.184, .643		
	Years of education	-	1.814	.625	.006*	.551, 3.077		
	AUDIT Score	-	-.077	.200	.701	-.481, .326		
Prison Sentences	HI	-	1.569	.791	.054	-.027, 3.166	.149	-
	Age	-	.006	.028	.826	-.051, .064		
	Years of education	-	-.226	.156	.154	-.541, .088		
	AUDIT Score	-	.060	.050	.237	-.041, .160		
Violent Offending	HI	.076	-2.578	.944	.006*	.120, .483	-	.540
	Age	1.006	-.036	.036	.314	.899, 1.035		
	Years of education	.320	-1.140	.474	.016*	.126, .809		
	AUDIT Score	1.006	.006	.056	.909	.902, 1.123		
GOS-E	HI	.117	-2.146	.854	.012*	.022, .624	-	.386
	Age	1.041	.040	.032	.203	.978, 1.108		
	Years of education	.872	-.137	.175	.435	.619, 1.229		
	AUDIT Score	1.060	.058	.059	.327	.944, 1.191		

6.0 Discussion

6.1 Main Findings:

The prevalence of HI was high, with almost all participants reporting at least one mild HI, and over half more than one. Moderate-severe HI was less common, sustained by less than a third. If using OSU-TBI criteria for a 'likely' poor outcome, approximately two thirds of participants are likely to experience persisting effects of HI. However, less than a third reported chronic disability attributed to HI and all but one was in the MMSHI group. MMSHI was also strongly associated with persisting disability and more severe problems on CORE-10, independent of demographic factors and substance misuse. Given the large numbers with mild HI in the population and as findings suggest chronic disability in this group is rare, it would be more practical for CJSW to focus on those with those with MMSHI. On this basis about 28% of individuals being assessed would require further assessment and follow up (11% with moderate/severe HI and 17% multiple/mild). This would approximate to 180 individuals in West Dunbartonshire and 8237 individuals nationally per annum (Figure 2; Appendix 2.8 for breakdown of further categorisation). Although this is a large number, some may benefit from education about HI and its effects (and further work is needed to elucidate this (NPHN, 2016).

CJSW reports do not report HI, and rarely disability. Providing social workers with HI awareness training and introducing a screening process, as recommended by the NPHN (2016), may address this gap and encourage more informed disposal, care and support recommendations.

Disability from any cause (which might include HI) was present in over two thirds of the sample, suggesting possible co-morbidity with other common complaints such as psychological distress, substance misuse, and physical problems. There is considerable over-lap between symptoms of HI and these other factors making attribution of cause difficult (McMillan & Williams, 2017). Teasing this apart will help to better understand reoffending and provide targeted care and support to reduce it.

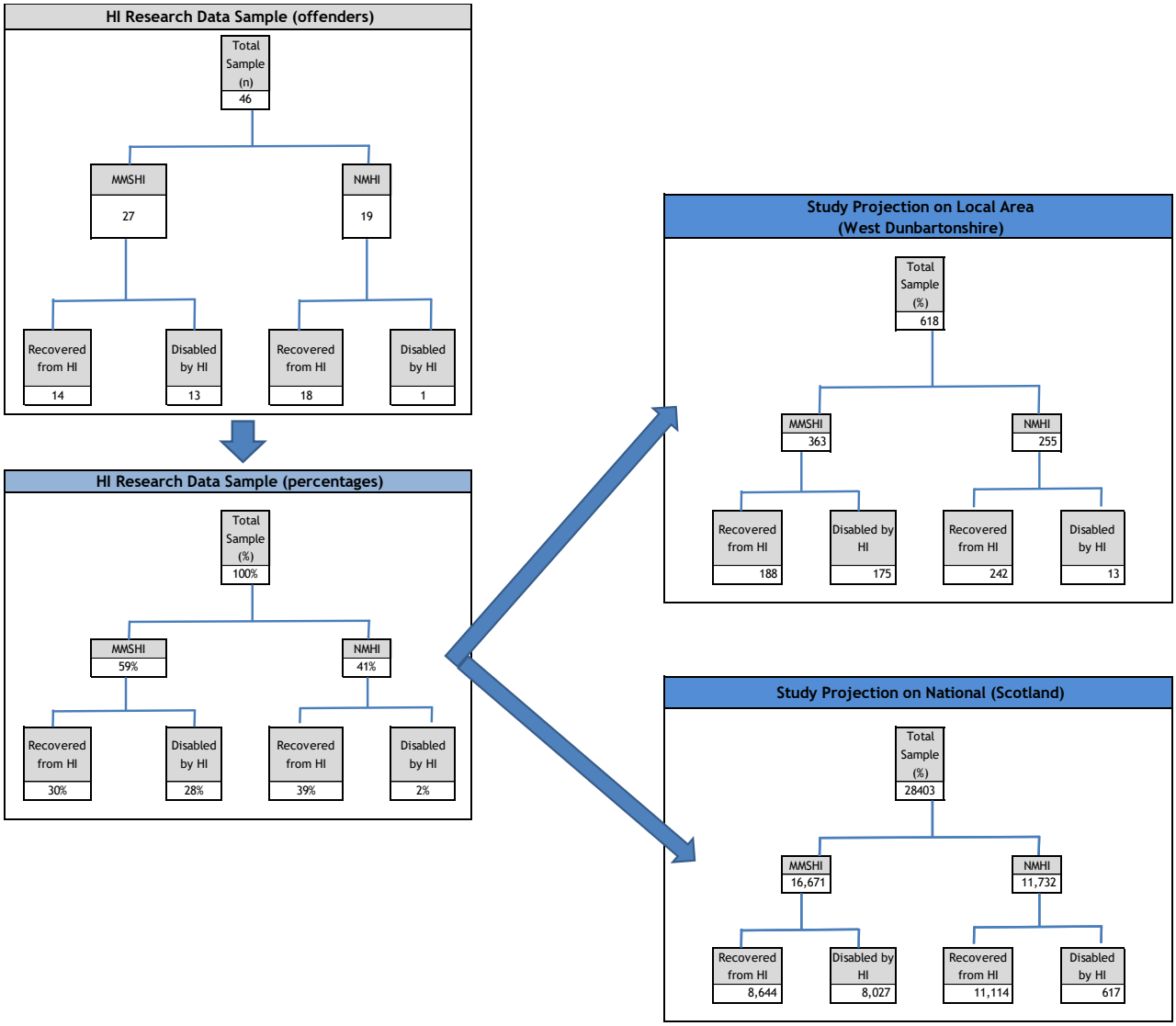


FIGURE 2: STUDY PROJECTION BASED ON LOCAL AND NATIONAL DATA

In terms of hypothesis three, participants within the MMSHI group tended to offend at a younger age, have more convictions, more prison sentences, and commit more violent offences. However, only partial support was provided for the hypothesis as MMSHI did not predict reoffending when age, years of education and alcohol use were controlled for. Small group sizes may have limited the ability to find predictive relationships.

6.2 The context of other research:

The study supports previous findings of a high prevalence of HI in offender populations (Farrer & Hedges, 2011; Shiroma et al, 2012). However, not all those with HI experience chronic disability. Rates of chronic disability in this study are consistent with previous unpublished research by Walker (2017), who found that 21% of male prisoners reported disability associated with HI. The contrast between prevalence of HI/disability and reporting rates in CJSW reports is unsurprising given that we know offenders experience health inequalities (Health & Sports Committee, 2017). However, it clearly identifies a need for increased awareness, screening and assessment of HI, enabling tailored adaptions and interventions to support engagement and reduce recidivism (Williams, 2012).

The study partially supports previous research suggesting that HI is associated with increased recidivism and a younger age of offending (Williams et al, 2010; Fazel et al, 2011; Stoddard & Zimmerman, 2011). However, HI was not predictive of offending characteristics when factors such as substance use, age and years of education were considered. This could be due to the high prevalence of multi-morbidity in participants with associated psychological distress and cognitive impairment, in line with previous research (Fazel & Seewald, 2012; Pitman et al, 2014; O'Connor & Morris, 2018). Trauma experiences were regularly documented in the CJSW reports reviewed within this study. However, trauma was not assessed in this study. Trauma is over-represented in individuals who have regular contact with the criminal justice system (Wolf & Shi, 2012). It has substantial implications for individuals and have been linked to developmental delays, psychological difficulties, problematic behaviour and substance misuse (Pettus-Davis, 2014; Wolf & Shi, 2012).

Although the second hypothesis, that participants with more severe HI would have greater cognitive impairment, was not supported in this study, memory and executive function were generally impaired in the sample overall and deficits in these domains are common in offender populations (Anderson et al, 2011; Meijers et al, 2015; Schumlich et al, 2018). It may be that specific effects for the HI group was masked by other conditions that impair cognition such as stress and substance abuse.

In summary, hypothesis one is supported in that ongoing disability is higher in individuals with more severe HI than those without. However, hypothesis two was not supported as cognitive impairment was similar across HI groups. Hypothesis three received partial support, as HI did not predict reoffending rates despite initial group differences showing higher rates of reoffending in those in the MMSHI group.

6.3 Limitations:

The sample was representative of national (Scotland) and local (West Dunbartonshire) CJSW populations in gender and ethnicity. However, the study sample was generally older and more likely to be in employment than these populations. Results should be interpreted with this potential bias in mind. Medium and large effect sizes were found in group comparisons (e.g., group differences between number of convictions, rates of disability) however, small group sizes within regression models may have limited the ability to find predictive relationships. Recruitment was more challenging than anticipated, likely due to the chaotic nature of the population and it may be that older age and employment resulted in more stable lifestyles, that facilitated participation. A further limitation is the omission of a trauma measure in this study. This would be important to assess in future research.

6.4 Future Research:

Future research might look to minimise sampling bias within a larger sample to enable further analysis to further explore the causal factors in the health inequalities and reoffending rates of participants. Future research should focus on

the impact of HI training and screening on the outcomes and support for participants with MMSHI.

7.0 Conclusions

HI was common in participants, with persisting disability affecting around a third. Introducing screening for HI at the point of CJSW report could generate around 3124 follow up assessments nationally (per annum). This has clear implications for CJSW departments in terms of resourcing and workload. Training on HI would be essential to raise awareness and knowledge of HI. Links would need to be established with local services to form pathways for assessment and follow up support. However, it has the potential to provide many practical benefits to individuals within CJSW with residual impairment and disability from HI. CJSW conduct some of the earliest assessments with individuals following arrest. Allowing equality of service for those receiving a community or custodial and earlier intervention, adaptation and support. This could provide the opportunity for CJSW to consider whether the HI had an impact on the offence, whether impairment would impact on the individual's ability to engage in rehabilitation programs and suitability of disposal. Also, to highlight adaptations for the individual to manage the environment within prison (self-care, engagement, adherence, behavioural control).

8.0 References

Anderson, V., Brown, S., Newitt, H., & Hoile, H. (2011). Long-term outcome from childhood traumatic brain injury: Intellectual ability, personality, and quality of life. *Neuropsychology, 25(*2), 176-189.

Andrews, D. A., & Bionta, J. (2006). *The Psychology of Criminal Conduct (4th ed.)*. Newark, NJ; LexisNexis.

Armitage, S. (1946). Analysis of certain psychological tests used for the evaluation of brain damage. *Psychological Monographs, 60*(1), 1–277.

Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The Alcohol Use Disorders Identification Test: Guidelines for use in primary care (2nd Edition)*. Department of Mental Health and Substance Dependence. World Health Organisation.

Bennett, P., Ong, B., & Ponsford, J. (2005). Measuring executive dysfunction in an acute rehabilitation setting: using the dysexecutive questionnaire (DEX). *Journal of the International Neuropsychological Society,11*, 376–385.

Bivona, U., Ciurli, P., Barba, C., Onder, G., Azicnuda, E., Silvestro, D., Mangano, R., Rigon, J., & Formisano, R. (2008). Executive function and metacognitive self-awareness after severe traumatic brain injury. *Journal of the International Neuropsychological Society, 14*, 862–868

Bogner, J., & Corrigan, J. D. (2009). Reliability and predictive validity of the Ohio State University TBI identification method with prisoners. *The Journal of Head Trauma Rehabilitation, 24*(4), 279-291.

Burgess, P.W., Alderman, N., Evans, J., Emslie, H., & Wilson, B.A. (1998). The ecological validity of tests of executive function. *Journal of the International Neuropsychological Society, 4*(06), 547-558.

Burgess, P. W., & Shallice, T. (1997). *The Hayling and Brixton Tests*. Thurston, Suffolk*:* Thames Valley Test Company.

Carroll, L.J., Cassidy, J.D., Holm, L., Kraus, J. & Coronado, V.G. (2004). Methodological issues and research recommendations for mild traumatic brain injury: The WHO

collaborating centre task force on mild traumatic brain injury. *Journal of Rehabilitative Medicine, 43*, 113-125.

Connell, J. & Barkham, M. (2007). *CORE-10 user manual, Version 1.1*. CORE System Trust & CORE Information Management Systems Ltd.

Coughlan, A., & Hollows, S. (1985). *The Adult Memory and Information Processing Battery (AMIPB): Test manual*. Leeds: St James' University Hospital.

Farrer, T. J., & Hedges, D. W. (2011). Prevalence of traumatic brain injury in incarcerated groups compared to the general population: A meta-analysis. *Progress in Neuro-Psychopharmacology & Biological Psychiatry, 35*(2), 390-394.

Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, 62ehavioural, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175-191.

Fazel, S., Lichtenstein, P., Grann, M., & Langstrom, N. (2011). Risk of violent crime in individuals with epilepsy and traumatic brain injury: a 35-year Swedish population study. *PloS Med, 8*(12), 100-150

Fazel, S., & Seewald, K. (2012). Severe mental illness in 33,588 prisoners worldwide: Systematic review and meta-regression analysis. *The British Journal of Psychiatry, 200*, 364–373.

Green, P., Lees-Haley, P. R., & Allen, L. M. (2003). The Word Memory Test and validity of neuropsychological test scores. *Journal of Forensic Neuropsychology, 2*, 97-124.

Hart, T., Whyte, J., Kim, J., & Vaccaro, M. (2005). Executive function and self-awareness of 'real-world' behaviour and attention deficits following traumatic brain injury. *Journal of Head Trauma Rehabilitation, 20*, 333–347.

Health and Sport Committee. (2017). *Healthcare in Prisons*. 5th Report (session 5).

Lezak, M. D. (2012). *Neuropsychological Assessment*. Oxford University Press, USA.

Mair, G. (2004). *What Matters in Probation*. Willan Publishing, Devon.

Meijers, J., Harte, J. M., Jonker, F. A., and Meynen, G. (2015). Prison brain? Executive dysfunction in prisoners. *Frontiers in Psychology, 6*, 43.

McGinley, A. (2017). Validating the Brain Injury Screening (BISI) and the Ohio State University Traumatic Brain Injury Identification Method (OSU TBI-ID) as screening

tools for head injury in a Scottish prison setting. (Unpublished doctoral dissertation).

Moynan, C. R., McMillan, T. M. (2017). Associated disability in prison populations: A systematic review. *Journal of Head Trauma Rehabilitation, 33*(4), 275-282.

National Prisoner Healthcare Network. (2016). *National Prisoner Healthcare Network: Brain Injury and Offending Report*. Edinburgh: NHPN.

O'Connor, G., & Morris, R. (2019). The CORE-10 in screening for current mental health problems and severe mental illness in prisoners. *Criminal Behaviour & Mental Health, 29*, 43–46.

Pettus-Davis, C. (2014). Social support among releasing men prisoners with lifetime trauma experiences. *International Journal of Law and Psychiatry, 37,* 512-523.

Pitman, I., Haddlesey, C., Ramos, S. D. S., Oddy, M., & Fortescue, D. (2014). The association between neuropsychological performance and self-reported traumatic brain injury in a sample of adult male prisoners in the UK. *Neuropsychological Rehabilitation*, *25*(5), 763–779.

Sapouna, M., Bisset, C., Conlong, A., & Matthews, B. (2015). *What works to reduce reoffending: A summary of the evidence*. Justice Analytical Services: Scottish Government.

Scottish Government. (2010). *National Outcomes and Standards for Social Work Services in the Criminal Justice System: Criminal Justice Social Work Reports and Court-Based Services Practice Guidelines*.

Schumlich, E. J., Reid, G. J., Hancock, M., & Hoaken, P. N. S. (2018): Executive Dysfunction in Criminal Populations: Comparing Forensic Psychiatric Patients and Correctional Offenders, *International Journal of Forensic Mental Health*.

Shiroma, E. J., Ferguson, P. L., & Pickelsimer, E. E. (2012). Prevalence of traumatic brain injury in an offender population: A meta-analysis. *Journal of Head Trauma Rehabilitation*, *27*(3), 1-10.

Skinner, H. A. (1982). The Drug Abuse Screening Test. *Addictive Behaviour, 7*(4), 363-371.

Smith, A. (1982). *Symbol Digit Modalities Test*. Los Angeles, CA: Western Psychological Services.

Stoddard, S. A., & Zimmerman, M. A. (2011). Association of interpersonal violence with self-reported history of head injury. *Pediatrics, 127*, 1074

Strauss, E., Sherman, E. M., and Spreen, O. (2006). *A compendium of neuropsychological tests: Administration, norms, and commentary*. Oxford University Press, USA.

Stuss, D. T., & Levine, B. (2002). "Adult clinical neuropsychology: lessons from studies of the frontal lobes." *Annual Review of Psychology*, 401.

The Scottish Government. (2017). *Mental Health Strategy: 2017-2027*. The Scottish Government.

Walker, V. (2017). The prevalence of cognitive impairment and disability associated with head injury in Scottish prisoners. (Unpublished doctoral dissertation).

Williams, H. (2012). *Repairing Shattered Lives: Brain injury and its implications for criminal justice*. Centre for Clinical Neuropsychology Research. University of Exeter. Commissioned by the Barrow Cadbury Trust.

Williams, W. H., Mewse, A. J., Tonks, J., Mills, S., Burgess, C. N. W., & Cordan, G. (2010). Traumatic brain injury in a prison population: Prevalence and risk for re-offending. *Brain Injury*, *24*(10), 1184–1188.

Wilson, B.A., Evans, J.J., Alderman, N., Burgess, P.W., & Emslie, H. (1997). Behavioural assessment of the dysexecutive syndrome. *Methodology of Frontal and Executive Function, 239*, 250.

Wilson, J. T., Pettigrew, L. E., & Teasdale, G. M. (1998). Structured interviews for the Glasgow outcome scale and the extended Glasgow outcome scale: guidelines for their use. *Journal of Neurotrauma, 15*, 573-585

Wolff, N., & Shi, J. (2012). Childhood and adult trauma experiences of incarcerated persons and their relationship to adult behavioural health problems and treatment. *International Journal of Environmental Research and Public Health, 9,* 1098-1926.

Wood, R. L. I. (1987). *Brain injury rehabilitation: A neurobehavioural approach*. Croom Helm.

Chapter One Appendices

Appendix 1.1 Journal Overview

Psychology, Public Policy, and Law provides a forum in which to critically evaluate the contributions of psychology and related disciplines (hereinafter psychology) to public policy and legal issues, and vice versa. It is read by legal scholars and professionals and public policy analysts as well as psychology researchers and practitioners working at the interface of the three fields.

The journal publishes theoretical and empirical articles that

- critically evaluate the contributions and potential contributions of psychology to public policy and legal issues;
- assess the desirability of different public policy and legal alternatives in light of the scientific knowledge base in psychology;
- articulate research needs that address public policy and legal issues for which there is currently insufficient theoretical and empirical knowledge;
- present empirical work that makes a significant contribution to the application of psychological knowledge to public policy or the law; and
- examine public policy and legal issues relating to the conduct of psychology and related disciplines (e.g., human subjects, protection policies; informed consent procedures).

This publication thus uniquely provides peer review, scientific and legal input, and editorial guidance from psychologists and lawyers. Through publication in a single forum, it focuses the attention of scholarly, public policy, and legal audiences on such work.

Psychology, Public Policy, and Law® is now using a software system to screen submitted content for similarity with other published content. The system compares each submitted manuscript against a database of 25+ million scholarly publications, as well as content appearing on the open web.

This allows APA to check submissions for potential overlap with material previously published in scholarly journals (e.g., lifted or republished material). A similarity report will be generated by the system and provided to the

Psychology, Public Policy, and Law Editorial office for review immediately upon submission.

The journal encourages authors to write comprehensive pieces, rather than submitting smaller pieces to multiple journals.

Psychology, Public Policy, and Law encourages the submission by scholars of empirical studies, as well as theoretical, conceptual, and critical reviews dealing with psychology and with relevant information derived from related disciplines, law, and policy studies.

Authors of accepted papers must obtain and provide to the editor on final acceptance all necessary permissions to reproduce in print and electronic form any copyrighted work, including test materials (or portions thereof), photographs, and other graphic images (including those used as stimuli in experiments).

On advice of counsel, APA may decline to publish any image whose copyright status is unknown.

Appendix 1.2 Author Guidelines

APA Style **JARS**
Journal Article Reporting Standards

JARS–**Quant** | Table 9
Information Recommended for Inclusion in Manuscripts Reporting Meta-Analyses

Title and Title Page

Title

- State the research question and type of research synthesis (e.g., narrative synthesis, meta-analysis).

Author Note

- List all sources of monetary and in-kind funding support; state the role of funders in conducting the synthesis and deciding to publish the results, if any.
- Describe possible conflicts of interest, including financial and other nonfinancial interests.
- Give the place where the synthesis is registered and its registry number, if registered.
- Provide name, affiliation, and e-mail address of corresponding author.

Abstract

Objectives

- State the research problems, questions, or hypotheses under investigation.

Eligibility Criteria

- Describe the characteristics for inclusion of studies, including independent variables (treatments, interventions), dependent variables (outcomes, criteria), and eligible study designs.

Methods of Synthesis

- Describe the methods for synthesizing study results, including
  - Statistical and other methods used to summarize and to compare studies
  - Specific methods used to integrate studies if a meta-analysis was conducted (e.g., efect-size metric, averaging method, the model used in homogeneity analysis)

Results

- State the results of the synthesis, including
  - Number of included studies and participants, and their important characteristics
  - Results for the primary outcome(s) and moderator analyses
  - Efect size(s) and confidence interval(s) associated with each analysis if a meta-analysis was conducted

Conclusions

- Describe strengths and limitations of the evidence, including evidence of inconsistency, imprecision, risk of bias in the included studies and risk of reporting biases.

Introduction

Problem

- State the question or relation(s) under investigation, including
  - Historical background, including previous syntheses and meta-analyses related to the topic
  - Theoretical, policy, and/or practical issues related to the question or relation(s) of interest
  - Populations and settings to which the question or relation(s) is relevant
  - Rationale for (a) choice of study designs, (b) the selection and coding of outcomes, and (c) the selection and coding of potential moderators or mediators of results
  - Psychometric characteristics of outcome measures and other variables

Objectives

- State the hypotheses examined, indicating which were prespecified, including
  - Question in terms of relevant participant characteristics (including animal populations), independent variables (experimental manipulations, treatments, or interventions), ruling out of possible confounding variables, dependent variables (outcomes, criterion), and other features of study designs
  - Method(s) of synthesis and if meta-analysis was used, the specific methods used to integrate studies (e.g., efect-size metric, averaging method, the model used in homogeneity analysis)

Protocol

- List where the full protocol can be found (e.g., a supplement), or state that there was no protocol. State that the full protocol was published (or archived in a public registry) or that it was not published before the review was conducted.

Method

Inclusion and Exclusion Criteria

- Describe the criteria for selecting studies, including
  - Independent variables (e.g., experimental manipulations, types of treatments or interventions or predictor variables)
  - Dependent variable (e.g., outcomes, in syntheses of clinical research including both potential benefits and potential adverse efects)
  - Eligible study designs (e.g., methods of sampling or treatment assignment)
  - Handling of multiple reports about the same study or sample, describing which are primary and handling of multiple measures using the same participants
  - Restrictions on study inclusion (e.g., by study age, language, location, or report type)

Inclusion and Exclusion Criteria (*continued*)

- Changes to the prespecified inclusion and exclusion criteria, and when these changes were made
- Handling of reports that did not contain sufcient information to judge eligibility (e.g., lacking information about study design) and reports that did not include sufcient information for analysis (e.g., did not report numerical data about those outcomes)

Information Sources

- Describe all information sources:
  - Search strategies of electronic searches, such that they could be repeated (e.g., include the search terms used, Boolean connectors, fields searched, explosion of terms)
  - Databases searched (e.g., PsycINFO, ClinicalTrials.gov), including dates of coverage (i.e., earliest and latest records included in the search), and software and search platforms used
  - Names of specific journals that were searched and the volumes checked
  - Explanation of rationale for choosing reference lists if examined (e.g., other relevant articles, previous research syntheses)
  - Documents for which forward (citation) searches were conducted, stating why these documents were chosen
  - Number of researchers contacted if study authors or individual researchers were contacted to find studies or to obtain more information about included studies, as well as criteria for making contact (e.g., previous relevant publications), and response rate
  - Dates of contact if other direct contact searches were conducted such as contacting corporate sponsors or mailings to distribution lists
  - Search strategies in addition to those above and the results of these searches

Study Selection

- Describe the process for deciding which studies would be included in the syntheses and/or included in the meta-analysis, including
  - Document elements (e.g., title, abstract, full text) used to make decisions about inclusion or exclusion from the synthesis at each step of the screening process
  - Qualifications (e.g., training, educational or professional status) of those who conducted each step in the study selection process, stating whether each step was conducted by a single person or in duplicate as well as an explanation of how reliability was assessed if one screener was used and how disagreements were resolved if multiple were used

Data Collection

- Describe methods of extracting data from reports, including
  - Variables for which data were sought and the variable categories
  - Qualifications of those who conducted each step in the data extraction process, stating whether each step was conducted by a single person or in duplicate and an explanation of how reliability was assessed if one screener was used and how disagreements were resolved if multiple screeners were used as well as whether data coding forms, instructions for completion, and the data (including metadata) are available, stating where they can be found (e.g., public registry, supplemental materials)

Methods for Assessing Risk to Internal Validity

- Describe any methods used to assess risk to internal validity in individual study results, including
  - Risks assessed and criteria for concluding risk exists or does not exist
  - Methods for including risk to internal validity in the decisions to synthesize the data and the interpretation of results

Summary Measures

- Describe the statistical methods for calculating efect sizes, including the metric(s) used (e.g., correlation coefcients, diferences in means, risk ratios) and formula(s) used to calculate efect sizes.

Methods of Synthesis

- Describe narrative and statistical methods used to compare studies. If meta-analysis was conducted, describe the methods used to combine efects across studies and the model used to estimate the heterogeneity of the efects sizes (e.g., a fixed-efect, random-efects model robust variance estimation), including
  - Rationale for the method of synthesis
  - Methods for weighting study results
  - Methods to estimate imprecision (e.g., confidence or credibility intervals) both within and between studies
  - Description of all transformations or corrections (e.g., to account for small samples or unequal group numbers) and adjustments (e.g., for clustering, missing data, measurement artifacts, or construct-level relationships) made to the data and justification for these
  - Additional analyses (e.g., subgroup analyses, meta-regression), including whether each analysis was prespecified or post hoc
  - Selection of prior distributions and assessment of model fit if Bayesian analyses were conducted
  - Name and version number of computer programs used for the analysis
  - Statistical code and where it can be found (e.g., a supplement)

Publication Bias and Selective Reporting

- Address the adequacy of methods used (e.g., contacting authors for unreported outcomes to identify unpublished studies and unreported data). Describe any statistical methods used to test for publication bias and selective reporting or address the potential limitations of the synthesis's results if no such methods were used.

Results

Study Selection

- Describe the selection of studies, ideally with a flowchart, including
  - Number of citations assessed for eligibility
  - Number of citations and number of unique studies included in the syntheses
  - Reasons for excluding studies at each stage of screening
  - Table with complete citations for studies that met many but not all inclusion criteria with reasons for exclusion (e.g., efect size was not calculable)

Study Characteristics

- Summarize the characteristics of included studies. Provide a table showing, for each included study, the principle variables for which data were sought, including
  - Characteristics of the independent and outcome or dependent variables and main moderator variables
  - Important characteristics of participants (e.g., age, sex, ethnicity)
  - Important contextual variables (e.g., setting, date)
  - Study design (e.g., methods of sampling or treatment assignment).
  - Report where the full data set is available (e.g., from the authors, supplemental materials, registry)

Results of Individual Studies

- Report the results for each study or comparison (e.g., the efect size with confidence intervals for each independent variable). If possible, present this information in a figure (e.g., forest plot).

Synthesis of Results

- Report a synthesis (e.g., meta-analysis) for each study result (e.g., weighted average efect sizes, confidence intervals, estimates of heterogeneity of results).

Assessment of Internal Validity of Individual Studies

- Describe risks of bias diferent design features might introduce into the synthesis results.

Publication and Reporting Bias

- Describe risk of bias across studies, including
  - Statement about whether (a) unpublished studies and unreported data, or (b) only published data were included in the synthesis and the rationale if only published data were used
  - Assessments of the impact of publication bias (e.g., modeling of data censoring, trim-and-fill analysis)
  - Results of any statistical analyses looking for selective reporting of results within studies

Adverse and Harmful Efects

- Report any adverse or harmful efects identified in individual studies.

Discussion

Summary of the Evidence

- Summarize the main findings, including
  - Main results of the synthesis, including all results of prespecified analyses
  - Overall quality of the evidence
  - Strengths and limitations (e.g., inconsistency, imprecision, risk of bias, and publication bias or selective outcome reporting) of findings
  - Alternative explanations for observed results (e.g., confounding, statistical power)
  - Similarities and diferences with previous syntheses

Generalizability

- Describe the generalizability (external validity) of conclusions, including
  - Implications for related populations, intervention variations, dependent (outcome) variables

Implications

- Interpret the results in light of previous evidence.
- Address the implications for further research, theory, policy, and/or practice.

Appendix 1.3 Legal Standards

Dusky Standard

Definition: Provides that a defendant has the right to a competency evaluation before his trial and that the standard for competency to stand trial is whether the defendant has "sufficient present ability to consult with his lawyer with a reasonable degree of rational understanding" and a "rational as well as factual understanding of the proceedings against him."

Test of defendant's competency to stand trial is whether he has sufficient present ability to consult with his lawyer with a reasonable degree of rational understanding and whether he has rational as well as factual understanding of the proceedings against him and it is not enough that he is oriented to time and place and has some recollection of events (Dusky v. United States, 1960, p. 788).

Presser Standard

In Victoria, the test for unfitness to stand trial derives from the judgment of Justice TW Smith in the case of *R v Presser* (Presser). Justice TW Smith expanding on the Pritchard criteria, identified seven criteria (the 'Presser criteria'), to determine unfitness to stand trial:

- ability to understand the charge
- ability to plead to the charge and to exercise the right to challenge jurors
- ability to understand generally the nature of the proceedings (that it is an inquiry as to whether the accused person did what they are charged with)
- ability to follow the course of the proceedings

- ability to understand the substantial effect of any evidence that may be given against them
- ability to make their defence or answer to the charge, or
- ability to give any necessary instructions to their legal counsel.

Criminal Code of Canada

In this Act, "unfit to stand trial" means unable on account of mental disorder to conduct a defence at any stage of the proceedings before a verdict is rendered or to instruct counsel to do so, and, in particular, unable on account of mental disorder to (a) understand the nature or object of the proceedings, (b) understand the possible consequences of the proceedings, or (c) communicate with counsel.

Pritchard

The importance of the case was the setting out of the following questions for the jury to answer in determining a defendant's sanity:

"There are three points to be enquired into:- first, whether the prisoner is mute of malice or not; secondly, whether he can plead to the indictment or not; thirdly, whether he is of sufficient intellect to comprehend the course of the proceedings in the trial so as to make a proper defence – to know that he might challenge any of you [the jury] to whom he may object – and to comprehend the details of the evidence, which in a case of this nature must constitute a minute investigation.

Criminal Procedures (Scotland) Act

Unfitness for trial

A person is unfit for trial if it is established on the balance of probabilities that the person is incapable, by reason of a mental or physical condition, of participating effectively in a trial.

In determining whether a person is unfit for trial the court is to have regard to the ability of the person to—

- understand the nature of the charge
- understand the requirement to tender a plea to the charge and the effect of such a plea
- understand the purpose of, and follow the course of, the trial
- understand the evidence that may be given against the person
- instruct and otherwise communicate with the person's legal representative
- and any other factor which the court considers relevant.

The court is not to find that a person is unfit for trial by reason only of the person being unable to recall whether the event which forms the basis of the charge occurred in the manner described in the charge.

In this section "the court" means

- as regards a person charged on indictment, the High Court or the sheriff court
- as regards a person charged summarily, the sheriff court.

Appendix 1.4 Search Strategy

Author title, abstract and keyword search terms (used across all 5 databases):	
FST Terms	(“Fit*” OR “competenc*” OR “capacity”) within two words of (“stand” OR “trial” or “plead”)
	(“Adjudicative” OR “criminal” OR “legal” OR “trial”) within two words of (“competenc*”)
Cognition Terms	“Cognit*”
	“Neuropsycholog*”
	“Psychometric*”
	(“Psycholog*” OR “assess*”) within two words of (“forensic”)
	“Forensic mental health assess*”

Separate databases were searched using the same terms, matched to the database thesaurus.

The separate searches within FST terms were then combined using the Boolean operator OR. The same applied for the separate cognitive terms. The final two searches (one combining FST terms, one combining cognitive terms) were then combined using the Boolean operator AND.

Appendix 1.5 Data Capture Form

Data Extraction Tool for Cognition in the Criminal Courts	
Paper Title	
Author(s)	
Date	

Domain	Required Information	Details
Sample	Country	
	Setting	
	Source Population	
	Year(s) of data collection	
	Inclusion/Exclusion Criteria	
	Total Sample	
	Total Fit	
	Total Unfit	
	Prevalence of unfit	
	Age (mean, range)	
	Gender	
	Ethnicity	
FST Ax	Legal Criteria used	
	How determination of FST made	
	Control group details (if present)	
Cog. Ax	Tools to ax IQ	
	Tools to ax memory	
	Tools to ax processing speed	
	Tools to ax visuospatial	
	Tools to ax attention	
	Tools to ax executive function	
	Tools to ax language	
	Tools to ax effort	
Confounds	Aim of study	
	Study design	
	Reference to representativeness	
	Confounds controlled for in design	
	Factors controlled for in analysis	
Analysis	Description of statistical measures	
	Missing data reported	
	Results IQ	
	Results memory	
	Results visuospatial	
	Results attention	
	Results executive function	
	Results language	
	Results effort	
	Analysis of subgroups	

Other	

Appendix 1.6 Risk of Bias Tool: Further Guidance

1. If inclusion and exclusion criteria are not stated, then study should be excluded from review process

2. FST trial can be assessed through various measures

a. Validated measures for FST include those recognised and accepted for use within the criminal courts. Study should state the tool and its validity for use

b. Definition for categorising FST would usually be through a legal criteria such as Dusky, Presser, Pritchard, Criminal Code of Canada.

c. Control group is not essential for achieving a low risk of bias but would be desirable

1. Cognitive assessment must be conducted using internationally recognised tools.

a. These tools should be clearly stated within the study.

b. If only selected subtests used these should be clearly identified

c. Tool should match the desired outcome (measuring what they say it is)

1. The study should clearly identify potential confounds that may affect the results, either through the study design or statistical analysis. For design this might include

a. Sample is demographically representative of the population from which it is taken

b. Sample is representative of larger FST population

c. Comparisons between participants and non-participants are made

For statistical analysis this might include controlling for

a. Current substance misuse

b. Current symptoms of mental illness

c. Learning disability or IQ

Appendix 1.7 References for Table 1.3/1.4

Study outcome measures

BG | Canter Bender Gestalt Test | Canter, A. (1976). The Canter Bender in practice: Manual for administration, scoring and interpretation. Nashville, TN: Counsellor Recordings and Tests

BTA | Brief Test of Attention | Schretlen, D. (1996). Brief test of attention. Odessa, FL: Psychological Assessment Resources

CFS | Weigl-Goldstein-Scheerer Color-Form Sorting Test | Lezak, M.D., Howieson, D.B., & Loring, D.W. (2004). Neuropsychological assessment. New York, NY: Oxford University Press

CIT | Common Item Test | Wright, P., & Stuss, D. (1992). The common item estimation task. Unpublished document. Baycrest Centre for Geriatric Care

COWAT | Controlled Oral Word Association Test | Strauss, E., Sherman, E., & Spreen, O. (2006). A compendium of neuropsychological tests: Administration, norms and commentary (3rd ed.). New York, NY: Oxford University Press

CPT | Continuous Performance Test | Cornblatt, B.A., Risch, N.J., Faris, G., Friedman, D., & Erlenmeyer-Kimling, L. (1995). New findings about sustained attention in normal families. Psychiatry Research, 26, 223–238

CT | Categories Test | Halstead, W.C. (1947). Brain and intelligence. Chicago, IL: University of Chicago Press

FIT | Rey Fifteen-Item Memory Test | Rey, A. (1964). L'examen clinique en psychologie. Paris: Universitaires de France

K-BIT | Kaufman Brief Intelligence Test | Kaufman, Alan S. (2009). *IQ Testing 101*. New York: Springer Publishing

PAI | Personality Assessment Inventory | Morey, Ph.D., L. (2007). Personality Assessment Inventory | SIGMA

PT | Proverbs Test | Gorham, D.R. (1956). Proverbs test. Missoula, MT: Psychological Test Specialists

QT | The Quick Test | Ammons, R.B., & Ammons, C.H. (1962). The quick test (QT): Provisional manual. Missoula, MT: Psychological Test Specialists

NART | National Adult Reading Test | Nelson, H.E., & Willison, J. (1991). The national adult reading test (NART): Test manual (2nd ed.). Windsor: NFER Nelson

RBANS | Repeatable Battery for the Assessment of Neuropsychological Status | Randolph C, Tierney MC, Mohr E, Chase TN (June 1998). "The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS): preliminary clinical validity". *J Clin Exp Neuropsychol*. **20** (3): 310–9

ROCF | Rey-Osterreith Complex Figure Test | Meyers, J.E., & Meyers, K.R. (1995). Rey complex figure test and recognition trial. Odessa, FL: Psychological Assessment Resources

SDMT | **Symbol Digit Modality Test** | Smith, A. (2007). Symbol Digits Modalities Test: Manual. Los Angeles: Western Psychological Services

SIRS | Structured Interview of Reported Symptoms | Rogers, R., Bagby, R. M., & Dickens, S. E. (1992). Structured Interview of Reported Symptoms (SIRS) and professional manual. Odessa, FL: Psychological Assessment Resources

SKQ | Social Knowledge Questionnaire | McEvoy, J.P., Hartman, M., Gottlieb, D., Godwin, S., Apperson, L.J., & Wilson, W. (1996). Common sense, insight, and neuropsychological test performance in schizophrenia patients. Schizophrenia Bulletin, 22, 635–640

TEA | Test of Everyday Attention | Robertson, I. H., Ward, T., Ridgeway, V., Nimmo-Smith, I. (1994). The test of everyday attention. Thames Valley Test Company

TOMM | Test of Memory Malingering | Tombaugh, T. N. (1996). The Test of Memory Malingering (TOMM). Toronto, ON, Canada: Multi-Health Systems

TMT | Trail Making Test (Parts A&B) | Reitan, R.M., & Wolfson, D. (1985). The Halstead-Reitan neuropsychological test battery. Tucson, AZ: Neuropsychology Press

WAIS-III | Weschler Adult Intelligence Scale-Version 3 (other versions reported) | Wechsler, D. (1997a). Wechsler adult intelligence scale (3rd ed.). San Antonio, TX: The Psychological Corporation

WASI | Weschler Abbreviated Scale of Intelligence | Wecshler, D. (1999). Wechsler abbreviated intelligence scale. San Antonio, TX: The Psychological Corporation

WCST | Wisconsin Card Sort Test | Heaton, R.K. (1981). Wisconsin card sorting testing manual. Odessa, TX: Psychological Assessment Resources

WMS | Weschler Memory Scales (other versions reported) | Wechsler, D. (1997b). Wechsler memory scale (3rd ed.). San Antonio, TX: The Psychological Corporation

WRAT-R | Wide Range Achievement Test-Revised | Jastak, S., & Wikinson, G.S. (1984). The wide range achievement test-revised: Administration manual. Wilmington, DE: Jastak Associates

Appendix 1.8 Risk of Bias (Second Rater Scoring)

Reference	Methods for selecting participants (1)	Methods for assessing FST (2)	Methods for assessing cognitive function (3)	Methods to control for confounds (4)	Methods for assessing the impact of cognitive impairment on FST (5)	Conflict of interests (6)
Simon (1987)	Low	Not Reported	High	**High**	High	Not Reported
Gannon (1989)	Low	Low	Low	Low	High	Not Reported
Lesser (1989)	Low	Low	High	High	Low	Not Reported
Sachsenmaier (1990)	Low	Low	High	High	Low	Not Reported
Nussbaum (1998)	Low	Low	Low	Low	**High**	Not Reported
Nestor (1999)	Low	Low	Low	High	Low	Low
Grandjean (2004)	Low	Low	Low	High	High	Not Reported
Shields (2004)	Low	Low	High	High	Low	Not Reported
Klein (2010)	Low	Low	**High**	High	Low	Not Reported
Ryba (2011)	Low	Low	Low	High	Low	Low
White (2012)	Low	Low	High	High	Low	Low
Toofanian-Ross (2015)	Low	Low	High	High	Low	Not Reported
White (2016)	Low	Low	High	High	Low	Low
Arredondo (2017)	Low	Low	Low	**High**	High	Low

Note: Any disagreements between raters are **bold**

Chapter Two Appendices

Appendix 2.1 Author Guidelines

APA Style JARS
Journal Article Reporting Standards

JARS–**Quant** | Table 1
Information Recommended for Inclusion in Manuscripts
That Report New Data Collections Regardless of Research Design

Title and Title Page

Title

- Identify main variables and theoretical issues under investigation, the relationships between them. Identify the populations studied.

Author Note

- Provide, in the author note, acknowledgment and explanation of any special circumstances, including
  - Registration information if the study has been registered
  - Use of data also appearing in previous publications
  - Prior reporting of the fundamental data in dissertations or conference papers
  - Sources of funding or other support
  - Relationships or affiliations that may be perceived as conflicts of interest
  - Previous (or current affiliation of authors) if diferent from location where study was conducted
  - Contact information for the corresponding author
  - Additional information of importance to the reader that may not be appropriately included in other sections of the paper

Abstract

Objectives

- State the problem under investigation.
  - Main hypotheses

Participants

- Describe subjects (animal research) or participants (human research), specifying their pertinent characteristics for this study; in animal research, include genus and species. Participants will be described in greater detail in the body of the paper.

Study Method

- Describe the study method, including
  - Research design (e.g., experiment, observational study)
  - Sample size
  - Materials used (e.g., instruments, apparatus)
  - Outcome measures
  - Data-gathering procedures, including a brief description of the source of any secondary data. If the study is a secondary data analysis, so indicate.

Findings

- Report findings, including efect sizes and confidence intervals or statistical significance levels.

Conclusions

- State conclusions, beyond just results, and report the implications or applications.

Introduction

Problem

- State the importance of the problem, including theoretical or practical implications.

Review of Relevant Scholarship

- Provide a succinct review of relevant scholarship, including
  - Relation to previous work
  - Diferences between the current report and earlier reports if some aspects of this study have been reported on previously

Hypothesis, Aims, and Objectives

- State specific hypotheses, aims, and objectives, including
  - Theories or other means used to derive hypotheses
  - Primary and secondary hypotheses; other planned analyses
- State how hypotheses and research design relate to one another.

Method

Inclusion and Exclusion

- Report inclusion and exclusion criteria, including any restrictions based on demographic characteristics.

Participant Characteristics

- Report major demographic characteristics (e.g., age, sex, ethnicity, socioeconomic status) as well as important topic-specific characteristics (e.g., achievement level in studies of educational interventions).
- In the case of animal research, report the genus, species, and strain number or other specific identification, such as the name and location of the supplier and the stock designation. Give the number of animals and the animals' sex, age, weight, physiological condition, genetic modification status, genotype, health–immune status; if known, drug- or test-naïve, and previous procedures to which the animal may have been subjected.

Sampling Procedures

- Describe procedures for selecting participants, including
  - Sampling method if a systematic sampling plan was implemented
  - Percentage of sample approached that actually participated
  - Whether self-selection into the study occurred (either by individuals or by units, such as schools or clinics)
- Settings and locations where data were collected as well as dates of data collection
- Agreements and payments made to participants
- Institutional Review Board agreements, ethical standards met, and safety monitoring

Sample Size, Power, and Precision

- Describe the sample size, power, and precision, including
  - Intended sample size
  - Achieved sample size, if diferent from intended sample size
  - Determination of sample size, including
    - › Power analysis, or methods used to determine precision of parameter estimates
    - › Explanation of any interim analyses and stopping rules employed

Measures and Covariates

- Define all primary and secondary measures and covariates, including measures collected but not included in this report.

Data Collection

- Describe methods used to collect data.

Quality of Measurements

- Describe methods used to enhance the quality of measurements, including
  - Training and reliability of data collectors
  - Use of multiple observations

Instrumentation

- Provide information on validated or ad hoc instruments created for individual studies, for example, psychometric and biometric properties.

Masking

- Report whether participants, those administering the experimental manipulations, and those assessing the outcomes were aware of condition assignments.
- If masking took place, provide statement regarding how it was accomplished and if and how the success of masking was evaluated.

Psychometrics

- Estimate and report values of reliability coefcients for the scores analyzed (i.e., the researcher's sample), if possible. Provide estimates of convergent and discriminant validity where relevant.
- Report estimates related to the reliability of measures, including
  - Interrater reliability for subjectively scored measures and ratings
  - Test–retest coefcients in longitudinal studies in which the retest interval corresponds to the measurement schedule used in the study
  - Internal consistency coefcients for composite scales in which these indices are appropriate for understanding the nature of the instruments being employed in the study
- Report the basic demographic characteristics of other samples if reporting reliability or validity coefcients from those sample(s), such as those described in test manuals or in the norming information about the instrument.

Conditions and Design

- State whether conditions were manipulated or naturally observed. Report the type of design as per the JARS–Quant tables:
  - Experimental manipulation with participants randomized
    - › Table 2 and Module A
  - Experimental manipulation without randomization
    - › Table 2 and Module B
  - Clinical trial with randomization
    - › Table 2 and Modules A and C
  - Clinical trial without randomization
    - › Table 2 and Modules B and C
  - Nonexperimental design (i.e., no experimental manipulation): observational design, epidemiological design, natural history, and so forth (single-group designs or multiple-group comparisons)
    - › Table 3
  - Longitudinal design
    - › Table 4
  - *N*-of-1 studies
    - › Table 5
  - Replications
    - › Table 6
  - Report the common name given to designs not currently covered in JARS–Quant.

Data Diagnostics

- Describe planned data diagnostics, including
  - Criteria for post-data-collection exclusion of participants, if any
  - Criteria for deciding when to infer missing data and methods used for imputation of missing data
  - Defining and processing of statistical outliers
  - Analyses of data distributions
  - Data transformations to be used, if any

Analytic Strategy

- Describe the analytic strategy for inferential statistics and protection against experiment-wise error for
  - Primary hypotheses
  - Secondary hypotheses
  - Exploratory hypotheses

Results

Participant Flow

- Report the flow of participants, including
  - Total number of participants in each group at each stage of the study
  - Flow of participants through each stage of the study (include figure depicting flow when possible; see Figure 2)

Recruitment

- Provide dates defining the periods of recruitment and repeated measures or follow-up.

Statistics and Data Analysis

- Provide information detailing the statistical and data-analytic methods employed, including
  - Missing data
    - › Frequency or percentages of missing data
    - › Empirical evidence and/or theoretical arguments for the causes of data that are missing, for example, missing completely at random (MCAR), missing at random (MAR), or missing not at random (MNAR)
    - › Methods actually employed for addressing missing data, if any
  - Descriptions of each primary and secondary outcome, including the total sample and each subgroup that includes the number of cases, cell means, standard deviations, and other measures that characterize the data employed.
  - Inferential statistics, including
    - › Results of all inferential tests conducted, including exact *p* values if null hypothesis statistical testing (NHST) methods were employed, including reporting the minimally sufcient set of statistics (e.g., *df*s, mean square [*MS*] efect, *MS* error) needed to construct the tests
    - › Efect-size estimates and confidence intervals on those estimates that correspond to each inferential test conducted, when possible
    - › Clear diferentiation between primary hypotheses and their tests–estimates, secondary hypotheses and their tests–estimates, and exploratory hypotheses and their test–estimates

Statistics and Data Analysis (*continued*)

  - Complex data analyses, for example, structural equation modeling analyses (see also Table 8), hierarchical linear models, factor analysis, and multivariate analyses, and so forth, including
    - › Details of the models estimated
    - › Associated variance–covariance (or correlation) matrix or matrices
    - › Identification of the statistical software used to run the analyses (e.g., SAS PROC GLM, or the particular R library program)
  - Estimation problems (e.g., failure to converge, bad solution spaces), regression diagnostics, or analytic anomalies that were detected and solutions to those problems.
  - Other data analyses performed, including adjusted analyses, if performed, indicating those that were planned and those that were not planned (though not necessarily in the level of detail of primary analyses).
- Report any problems with statistical assumptions and/or data distributions that could afect the validity of findings.

Discussion

Support of Original Hypotheses

- Provide a statement of support or nonsupport for all hypotheses whether primary or secondary, including
  - Distinction by primary and secondary hypotheses
  - Discussion of the implications of exploratory analyses in terms of both substantive findings and error rates that may be uncontrolled

Similarity of Results

- Discuss similarities and diferences between reported results and work of others.

Interpretation

- Provide an interpretation of the results, taking into account
  - Sources of potential bias and threats to internal and statistical validity
  - Imprecision of measurement protocols
  - Overall number of tests or overlap among tests
  - Adequacy of sample sizes and sampling validity

Generalizability

- Discuss generalizability (external validity) of the findings, taking into account
  - Target population (sampling validity)
  - Other contextual issues (setting, measurement, time; ecological validity)

Implications

- Discuss implications for future research, program, or policy.

Appendix 2.2 Ethical Approval

University of Glasgow

14/01/2019

MVLS College Ethics Committee

Project Title: The prevalence and impact of head injury on disability within a Criminal Justice Social Work population

Project No: 200180023

Dear Prof McMillan,

The College Ethics Committee has reviewed your application and has agreed that there is no objection on ethical grounds to the proposed study. It is happy therefore to approve the project.

- Project end date: End Decemeber 2019
- The data should be held securely for a period of ten years after the completion of the research project, or for longer if specified by the research funder or sponsor, in accordance with the University's Code of Good Practice in Research: (http://www.gla.ac.uk/media/media_227599_en.pdf)
- The research should be carried out only on the sites, and/or with the groups defined in the application.
- Any proposed changes in the protocol should be submitted for reassessment, except when it is necessary to change the protocol to eliminate hazard to the subjects or where the change involves only the administrative aspects of the project. The Ethics Committee should be informed of any such changes.
- You should submit a short end of study report to the Ethics Committee within 3 months of completion.

Yours sincerely,

Jesse Dawson
MD, BSc (Hons), FRCP, FESO
Professor of Stroke Medicine
Consultant Physician
Clinical Lead Scottish Stroke Research Network / NRS Stroke Research Champion
Chair MVLS Research Ethics Committee

Institute of Cardiovascular and Medical Sciences
College of Medical, Veterinary & Life Sciences
University of Glasgow
Room M0.05
Office Block
Queen Elizabeth University Hospital
Glasgow
G51 4TF

iesse.dawson@glasgow.ac.uk

Appendix 2.3 Data Capture Form

Data Capture Form

Demographic	ID Number	
	Age	
	Gender	
	Ethnicity	
	Location (Postcode/Area)	
	Community or Remand	
Education	Type of school	
	Age left school	
	Any qualifications	
Employment	Current occupation (if unemployed which benefits)	
	Previous occupation	
Forensic History	Offence going to court for	
	Age of first arrest	
	Number of convictions	
	Number of prison sentences	

	Longest prison sentence	
	Types of previous offences	
Mental Health	Do they have a diagnosed MH condition (if yes, what)	
	Do they see anyone for this	
Physical Health	Do they have a diagnosed PH condition (if yes, what)	
	Do they see anyone for this	
Other	Anything else that might impact on testing?	
Criminal Justice SW Report	Reason for report request	
	Does the report mention HI (If yes, provide descriptive)	
	Does the report mention PH (If yes, provide descriptive)	
	Does the report mention MH (If yes, provide descriptive)	

	Does the report mention disability (If yes, provide descriptive)	
	Does report make reference to support requirements (If yes, provide descriptive)	
	Other relevant report information	

Document any other relevant information not included in capture form:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Appendix 2.4 Information Sheet

Participant Information Sheet

The prevalence and impact of persisting health difficulties on disability within a Criminal Justice Social Work population

We would like you to help us in a research study on persisting difficulties with health and lifestyle factors. Before you decide if you would like to help, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. If anything is unclear, or you would like to ask questions about the study, please speak to your social worker who will notify us. Take time to decide whether you wish to take part.

What is the purpose of the study?

We are carrying out this study to consider the needs of those with persisting difficulties with health and lifestyle factors within the criminal justice system. We aim to understand the rates of those with such difficulties and any associated disability. This study will contribute towards the researcher's qualifications and will fulfil a component in their Doctorate in Clinical Psychology.

Why have I been chosen?

You have been chosen because you are currently undergoing assessment with social work for a Criminal Justice Social Work Report.

Do I have to take part?

It is up to you to decide whether or not to take part, and there will be no consequences for you either way except the time required to complete the study should you decide to take part. You will be given this information sheet to keep and if you wish to take part you will be asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?

You will be invited to attend for a single assessment lasting approximately 60 minutes. This will involve (1) a brief interview about your health and lifestyle (2) questionnaires about psychological well-being (3) tests of cognition such as memory and concentration (4) questionnaires about drug and alcohol use. Additionally, researchers will need to obtain details from your social worker of any previous convictions you have.

Where will the assessment take place?

The assessment will take place within the local social work centre.

What do I have to do?

You just have to attend for assessment lasting approximately 60 minutes.

What are the possible disadvantages and risks of taking part?

There are no particular disadvantages to taking part and your participation will have no impact on your social work assessment or court experience or sentence.

What are the possible benefits of taking part?

You will receive no direct benefit from taking part. The information collected in the study will give us a better understanding of health within the criminal justice system. It may allow us to make recommendations for service improvements.

Will my taking part in this study be kept confidential?

All information which is collected about you, or responses that you provide, during the course of the research will be kept strictly confidential. You will be identified by an ID number, and any information about you will have your name and address removed so that you cannot be recognised from it. Please note that assurances on confidentiality will be strictly adhered to unless evidence of serious harm, or risk of serious harm, is uncovered. In such cases, the University may be obliged to contact relevant statutory bodies/agencies.

Any data in paper form will be stored in locked cabinets in rooms with restricted access at the University of Glasgow. All data in electronic format will be stored on secure password protected computers. No one outside of the research team or appropriate governance staff will be able to find out your name, or any other information which could identify you.

What will happen to my data?

All study data will be collected, stored and processed in accordance with the General Data Protection Regulation (2018). We may be collecting and storing identifiable information from you in order to undertake this study. This means that the University is responsible for looking after your information and using it properly. We may keep identifiable information about you for 10 years after the study has finished and will not pass this information to a third party without your express permission. After this period, further retention may be agreed or your data will be securely destroyed in accordance with the relevant standard procedures.

Your rights to access, change or move the information we store may be limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. Your identifiable information might be shared with people who check that the study is

done properly and, if you agree, in coded form with other organisations or universities to carry out research to improve scientific understanding. Your data will form part of the study result that will be published in expert journals, presentations, student theses and on the internet for other researchers to use. Your name will not appear in any publication. To safeguard your rights, we will use the minimum personally identifiable information possible. You can find out more about how we use your information from Holly de Mora or Tom McMillan (contact details at end of form).

What will happen to the results of the research study?

When the project is completed, the findings will be submitted for publication in peer reviewed international journals. Further, the results may be used in conference presentations, and will be detailed within theses to fulfil the requirements of the Doctorate in Clinical Psychology.

Who is organising and funding the research?

The research is organised by the University of Glasgow. The research is funded by the University of Glasgow and partly by the National Prison Healthcare Network.

Who has reviewed the study?

The project has been reviewed by the University of Glasgow College of Medical Veterinary and Life Sciences.

Contact for Further Information

You can contact Holly de Mora or Professor Tom McMillan (0141 211 0354) who are organising the research.

Thank you for considering taking part in this research

Appendix 2.5 Participant Consent Form

University of Glasgow | College of Medical, Veterinary & Life Sciences

Centre Number : Project Number: Participant Number:

CONSENT FORM

The prevalence and impact of persisting health difficulties on disability within a Criminal Justice Social Work population.

Please take the time to read the statements below and initial all statements that you agree with.

Ref	Terms	Initials
1	I confirm I have read and understood the Participant Information Sheet (V2) Dated 10/05/2018	
2	I have had the opportunity to think about the information and ask questions and understand the answers that I have been given.	
3	I understand that my participation is voluntary, that it will have no effect on my social work report or sentence and that I am free to withdraw at any time, without giving any reason and without my legal rights being affected.	
4	I confirm that I agree to the way my data will be collected and processed and that data will be stored for up to 10 years in the University archiving facilities in accordance with relevant Data Protection polices and regulations.	
5	I understand that if I withdraw from the study, my data collected up to that point will be retained and used for the remainder of the study.	
6	I agree that if the researchers believe that I or another person is at risk of harm, they will pass this information to relevant organisations (such as social work/police).	
7	I agree that if the researchers find evidence that I have a significant health difficulty/disability they will inform social work of this so that they can consider this in terms of my care.	
8	I consent to researchers accessing information from Social Work regarding any previous offences I have been convicted of.	
9	I understand that the researcher is collecting data in the form of interview, questionnaires and cognitive assessment for use in an academic research project at the University of Glasgow.	
10	I agree that my name, contact details and data described in the information sheet will be kept for the purposes of this research project.	
11	I understand that all data and information I provide will be kept confidential and will be seen only by study researchers and regulators whose job it is to check the work of researchers.	
12	The material may be used in future publications, both print and online.	
13	I consent to taking part in this study.	

Name of person giving consent (Block Capitals please)	
Signature of person giving consent	Date

Thank you for taking the time to complete this form. Should you have any further questions please get in touch with the details below:

Contact Details

Academic Researcher: Holly de Mora, h.de-mora.1@research.gla.ac.uk

Academic Supervisor: Thomas McMillan, Thomas.mcmillan@glasgow.gla.ac.uk

Department address:

Institute of Health and Wellbeing, 1st Floor Admin Building, Gartnavel Royal Hospital, Glasgow, G12 0XH

Consent Form HI-HDM-01 v2.0

V2 | 05/10/2018

Appendix 2.6 Sample Representativeness (Against National and Local)

Table shows results of binomial tests to assess sample representativeness.

Categories	Attributes	Scotland	West Dunbartonshire
Gender	**Male**	.362	.172
	Female	.644	.192
Ethnicity	**White**	.918	Not Reported
	Other	.918	Not Reported
Age Range	**16-30**	.016	.18
	31+	.016	.012
Employment	**Employed**	.01	<.001
	Unemployed	.298	<.001

*indicates the proportion of participants in the sample was higher or lower than expected

Appendix 2.7 Cognitive Measures Outcomes

Cognitive measures descriptive data

Measure	N	Total Sample mean/median	HI mean/median	No HI mean/median	Normed mean/median	Difference
SDMT[a]	45	41.69 (42)	41.71 (42.5)	41.59 (41)	49.6 (10.8)	U=261 Z=.322 P=.747
AMIPB[b]	46	34.26 (34)	33.96 (34)	34.53 (34)	52 (9.6)	U=243.5 Z=-.291 P=.771
TMTA[c] (median, range)	46	32 (66)	35 (45)	30 (59)	24.4 (8.7)	U=292 Z=.793 P=.428
TMTB[c] (median, range)	46	70 (149)	74 (109)	69 (139)	50.7 (12.4)	U=283 Z=.591 P=.554
Hayling[d]	46	5.02 (6)	5.04 (5.5)	4.94 (6)	6.1 (1.6)	U=261 Z=.106 P=.916
WMT Fail[e] (%, n)	46	32.6 (15)	37 (10)	26.3 (5)	32 (166)	x=.583 P=.445
DEX[f]	45	25.02 (26)	26.21 (27)	18.61 (19)	22.1 (8.9)	U=330.5 Z=1.92 P=.055

a= Kiely, K., Butterworth, P., Watson, N., & Wooden, M. (2014). The symbol digit modalities test: Normative data from a large nationally representative sample of Australians. Archives of Clinical Neuropsychology, 29(8), 767-775

b= Coughlan, A., & Hollows, S. (1985). The Adult Memory and Information Processing Battery (AMIPB): Test manual. Leeds: St James' University Hospital.

c=Tombaugh, T. (2004). Trail making test A and B: Normative data stratified by age and education. Archives of Clinical Neuropsychology, 19(2), 203-214.

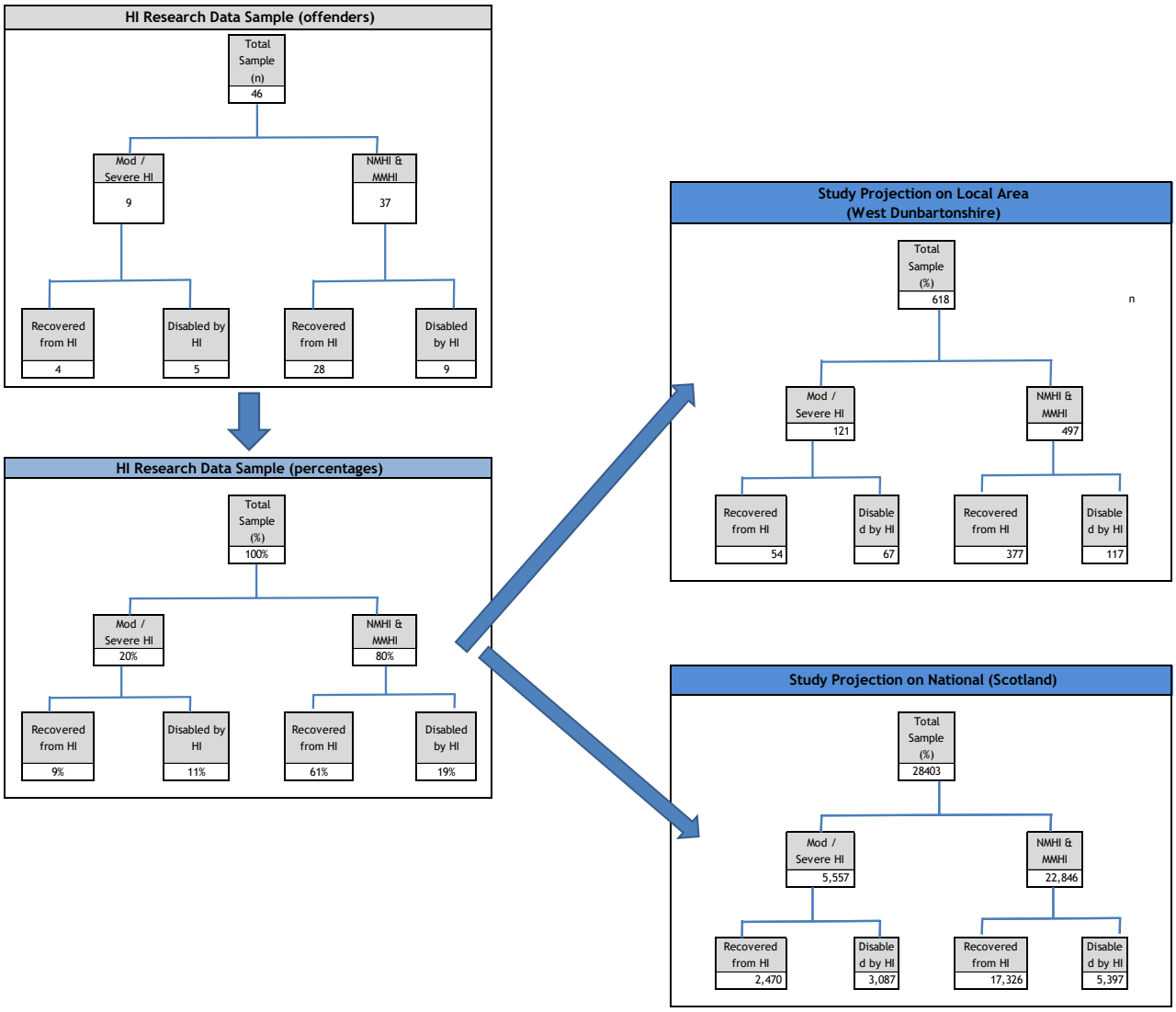
d= Burgess, P. & Shallice, T. (1997). The Hayling and Brixton Tests. Thurston, Suffolk: Thames Valley Test Company

e=: Boone, K. B. (2007). *Assessment of Feigned Cognitive Impairment : A Neuropsychological Perspective*, edited by Kyle Brauer Boone, Guilford Publications.

f=Chan, R. C. (2001). Dysexecutive symptoms among a non-clinical sample: A study with the use of the dysexecutive questionnaire. British Journal of Psychology, 92(3), 5515

Appendix 2.8 Assessment Projection on Local & National

Figure shows projection to local and national CJSW reports based on statistics and results from sample (moderate/severe HI only).



Appendix 2.9 Research Proposal

Abstract

A) Background:

The emotional, social, cognitive and behavioural impact of head injury (HI) can be significant and long lasting. Those with a forensic history are considered to be at higher risk of experiencing head injury. There has been a growing evidence base available for analysis that can be used to understand the prevalence, link and impact of HI on offending behaviour. A recommendation from the National Prisoner Healthcare Network (NPHN) is to introduce and evaluate routine screening for HI by social workers completing a pre-sentencing Criminal Justice Social Work Report (CJSWR). This may help to better understand the role of HI on future offending and guide any proposed disposals or interventions.

B) Aims:

The aims of this study are to measure the prevalence of persisting effects of significant HI (which include neuropsychological impairment, emotional difficulties, behavioural difficulties and social disability) in individuals undergoing a CJSWR assessment. From these measurements/analysis, the study also establishes the relationship between significant HI and re-offending rates.

C) Methods:

Approximately 100 individuals across one of more CJSW services will be recruited. A cross sectional design will compare emotional, neuropsychological and disability outcomes of participants with and without HI. The same design will be used to compare the number of previous offences.

The OSU TBI-ID screening tool will be used to determine the presence and severity of HI.

D) Applications:

Establishing the prevalence of disability (resulting from significant HI) in this population may help to guide individuals into more appropriate disposals. It may also support a need for the development of suitable pathways for interventions and development of appropriate services.

1.0 Introduction

Head injury (HI) affects around 8.5% of the UK population in their lifetime (Williams, 2012). The effects of HI on behavior, cognition, social interaction and emotional control have long been established. The implications for individuals experiencing these can be massive, creating significant and long-term changes in their functioning and independence (Stuss & Levine, 2002).

It is also known that the prevalence rates of HI are much higher in certain populations, such as those in prison and involved in the criminal justice system (CJS) where it is thought to be as much as 60% (Farrer & Hedges, 2011 and Shiroma et al, 2012). Yet HI frequently remains a hidden disability within forensic populations (NPHN, 2016) as residual impairment is often not identified or assessed. Alongside this, relatively little research has explored the extent and impact of HI on impairment and disability within this population.

There continues to be an increase in awareness and motivation to meet the physical and mental health needs of individuals within the CJS. However, a recent report produced by Scottish Parliament's Health & Sports Committee highlighted many ongoing health inequalities, including HI, that disproportionately affect offender populations (Health & Sports Committee, 2017). Reducing these inequalities may improve individual wellbeing but could also help to reduce reoffending rates within the population (Williams, 2012). HI can create potential deficits in attention, flexibility of thought, insight, concentration, memory and impulse control along with increases in irritability, aggression and disinhibition. The nature of these deficits may increase the likelihood an individual will have contact with the Criminal Justice System (Pitman, Haddlesey, Ramos, Oddy & Fortescue, 2015). The Scottish Government asked the NPHN to produce a report on HI and offending. In 2016 the NPHN produced a report with several resulting recommendations. One of these included determining the prevalence of HI and its associated disability within Criminal Justice Social Work (CJSW).

Unlike the rest of the UK who rely on the National Probation Service, responsibility for the supervision of offenders within the community in Scotland it lies with local social work departments. This began in the late 1960s and over time their involvement has evolved and now includes producing Criminal Justice Social Work Reports (CJSWR), court services, probation and throughcare (service for prisoners during and after sentence). One of their aims is to help offenders to tackle and reduce offending behaviour and promote social responsibility through social integration and community resources (Mair, 2004). In order to achieve this, they pay particular attention to the 'What Works' literature. "What Works" has a focus on responsivity issues for individuals due to the understanding that preventing reoffending is an individualised process rather than a one size fits all (Sapouna, Bisset, Conlong & Matthews, 2015). Potential impairments and disability from HI should be

considered an individual responsivity factor and so appropriate adaptations and interventions should be identified based upon this.

Impairments and disability resulting from HI may affect an individual's ability to successfully engage with CJSW, court and prison services and systems. Executive functioning deficits may make it difficult for them to keep appointments, reflect and problem solve. They may also experience impaired empathy skills and have deficits in memory and concentration. This could mean they are more likely to reoffend and so have poorer outcomes than their non-disabled peers (Pitman et al, 2015). Therefore, identification and understanding of impairment within this population could help to reduce re-offending and ongoing contact with Criminal Justice services by providing more appropriate disposals from courts, improved engagement within prison systems and rehabilitation programs, and ongoing support to engage in CJSW (Williams, Mewse, Tonks, Mills, Burgess & Cordan, 2010). By improving understanding, tailoring interventions and rehabilitation could lead to improvements in outcomes, reductions in reoffending and ultimately cost savings.

To assess and act to support individuals who are disabled by HI there needs to be a way of identifying them. Previous research (Walker, 2017 and McGinley, 2017) has investigated the prevalence of disability from HI within males in prison and then the validity and utility of screening tools to identify them. However, there has been no research or formal screening procedures within Scottish CJSW to identify individuals disabled by HI. Given that the CJSWR already considers the personal, health and social circumstances of individuals (and their relationship to sentencing options) it would seem reasonable to introduce screening and consideration for HI into the CJSWR process.

The CJSWR can be requested by the court prior to sentencing an individual. It is written by a social worker, usually within four weeks. The report enables enquiry into the individual and their circumstances to consider if there are any issues relevant to both the involvement in offending and to any proposed intervention (Scottish Government, 2010). This can then assist the sentencing process by helping determine the most suitable way of dealing with the case (Scottish Government, 2010). This CJSWR is written at the early stages of contact within the CJS and so identifying individuals at this point would provide opportunity for earlier intervention and support.

This study will address the NPHN recommendation that a two-step screening for HI be introduced and evaluated in the CJSW interview which can offer a more detailed assessment if required (NPHN, 2016). This could provide practitioners the opportunity to consider whether the HI had an impact on offending and so if it is relevant to the court process; whether further specialist assessment would be helpful; and the most appropriate planning for the disposal, care and support recommendations both within and on release from prison.

2.0 Aims and hypotheses

This research will examine the prevalence of self-reported HI in individuals being assessed by a CJSWR prior to sentencing. It will also look at the extent to which those with self-reported significant HI experience ongoing disability compared to those without significant HI. The following hypotheses will be examined:

H1: Disability is more common in individuals with significant HI than those without.

H2: Those with significant HI have higher rates of re-offending.

3.0 Plan of Investigation

The dataset will be collected by three researchers. In addition to the author, another DClinpsy trainee will be conducting a parallel study looking at offenders leaving custody and beginning community supervision across the same CJSW board. A research worker experienced in working with forensic participants with HI will support the study in reaching its desired sample by carrying out assessments on some participants.

3.1 Participants:

Males and females aged 18 and over will be recruited from CJSW services.

3.2 Recruitment Sites:

West Dunbartonshire CJ Partnership have expressed an interest in supporting the study. Other localities may be approached if required.

3.3 Inclusion/Exclusion Criteria:

All participants must be undertaking a pre-sentencing CJSW report. No criminal offences will be excluded. Participants must be fluent in English and able to consent. Individuals within this population would be considered vulnerable and so informed consent is particularly important to ensure their dignity is fully respected and they fully able to opt out of the study without penalty. Individuals with current severe mental health difficulties, severe communication difficulties or a deteriorating neurological condition will be excluded. Individuals who pose risk of violence to the researchers or who lack the capacity to consent will be excluded. Researchers will assess for suitability on receipt of referral from social work.

3.4 Recruitment Procedures:

Individuals will be approached by social workers completing a pre-sentencing social enquiry report. They will be informed about the study by CJSW and given an information sheet. This will detail brief information about the study which will state it is about health within offender populations. It will not mention HI so not to influence the social worker and their report or the desired recruitment of participants with no HI. Information will then be passed to researchers who will make contact to begin consent process and assessment.

3.5 Measures:

The following measures will be completed with each participant in a time appropriate for them (approximately 60-90 minutes). See appendix 1 for justification of suitability and validity of measures.

Type of Measure	Name of Measure
Head Injury Screening Tool	Ohio State University Traumatic Brain Injury Identification Method (OSU TBI-ID)
Measure of Disability	Extended Glasgow Outcome Scale (GOSE)
Mental Health Screen	Hospital Anxiety and Depression Scale (HADS)
Cognitive Tests	List Learning from The Adult Memory Information Processing Battery (AMIPB) The Symbol Digit Modalities Test Trail Making Test (TMT) Dysexecutive Questionnaire (DEX)
Test of Effort	Word Memory Test (WMT)
Screening for Substance Use	Alcohol Use Disorders Identification Test (AUDIT) Drug Abuse Screening Test (DAST-10)
Background Information, Demographics	Semi Structured Interview
Forensic History Summary	Criminal Justice Social Work Report

During assessment demographic information will be obtained in relation to: age; gender; ethnicity; socioeconomic background; learning disability; language; current offence; education; previous prison sentences; and number and types of offences. A form used in previous studies on HI within forensic samples will be used for this. The OSU TBI-ID and GOSE will be administered at the end of assessment to avoid priming participants to HI and so minimising any impact on their behavior and interpretation of testing.

3.6 Design/Research Procedures:

Participants will be grouped into two categories based on OSU TBI-ID results:- significant head injury and non-significant injury (this group will include those with no head injury). The OSU-TBI-ID identifies significant HI as any resulting in loss of consciousness for 30 minutes or more. The study will be a quantitative, between subjects, cross-sectional design.

A short pilot study will be carried out to consider procedural/practical issues which could arise during administration of assessment. This would involve two or three participants completing all attributes and data would be included in the final dataset. All researchers would be present for the pilot to increase consistency in administering and scoring.

3.7 Data Analysis:

Descriptive statistics will be used to describe demographic data obtained. Tests of normality will be used to determine if continuous data meets parametric assumptions. Potential confounding factors may include level of effort, level of education, current and previous substance misuse, gender and age.

The hypothesis will be assessed using the following criteria:

H1: *Disability is more common in individuals with significant HI than those without.* A regression framework will be used to analyse data obtained. Initial unadjusted regressions will be completed for each outcome to understand any relationships between outcome measures and HI status. Adjusted regressions will then be completed to examine the relevant contribution and predictive value of outcome variables.

H2: *Those with significant HI have higher rates of re-offending*. The same method of data analysis will be used as for H1 above.

3.8 Sample Size Estimation:

There have been no studies looking at HI and level of disability within Criminal Justice Social Work. However, Walker (2017) reported a correlation of 0.33 between duration of loss of consciousness and cognitive test scores in prisoners. With power of 0.80, probability of 0.05, a two-tailed test and a medium effect size of 0.03 a sample size of 69 would be required (Faul, Erdfelder, Lang & Buchner, 2007). A

reported correlation of 0.292 between loss of consciousness and measures of mood was found within the same study. With the same parameters as above a sample size of 89 would be required. Using A Priori power analysis for multivariable regression (power 0.8, probability 0.05) a sample size of 68 would be required.

Given these power analysis's, this study will aim for a sample size of approximately 100 participants.

4.0 Health, Safety, Wellbeing and Ethics

4.1 Health, Safety & Wellbeing

Given that researchers will be working within a high-risk population, they will adhere to CJSW policy to ensure safety during data collection. Assessments will take place in either social work buildings to ensure adequate response to distress. Researchers will speak to CJSW staff prior to interview regarding any risk issues for each participant.

Whilst no safety issues are anticipated for participants, some may be highly vulnerable. This is considered below in 4.2

4.2 Ethical Issues

Care will be taken to ensure that the interview is as non-intrusive as possible and data will be anonymised at the point of collection to ensure that no personal information is compromised. To ensure data security once collected, data will be stored in a locked filing cabinet at all times or on a secure and protected electronic system. Data will be kept for 10 years in accordance with NHS and University of Glasgow policy before it is destroyed. Informed consent will be taken from participants using a written consent form. This consent will include seeking consent to inform CJSW staff of any HI identified to inform care and management. Participants will be informed that their participation is voluntary and will not have any impact on upon the CJSW process or court outcome.

Submissions will be made to both the CJSW and Scottish Prison Service Ethics Committee.

The process of recruitment will need to be sensitive to the fact individuals will be awaiting sentencing and in a vulnerable situation. Participants need to be made aware that participating will have neither have a positive or negative impact on the

outcome within court. The information sheet will not identify HI so as not to influence participants during assessment.

It is also of note that consideration of the lack of current pathways and support within the offender population for those with HI. Individuals may be identified as having a HI worthy of further consideration and assessment. However, service provision is not easily accessed to support this at present. Should significant head injury or disability be identified in individuals within the study, appropriate information will be provided to them in relation to this. Information regarding this may also be passed to individuals involved in their ongoing care (e.g., social worker). Links have been established with local brain injury services (through Angela Sprott and Jean McFarlane) where referral could be made to provide more thorough assessment and support if required.

5.0 Proposed Study Schedule

A schedule has been created with study milestones identified below.

Milestone ID	Milestone Activity	Target Date
1	Submit MRP proposal	February 2018
2	Finalise MRP proposal	June 2018
3	Obtain ethics and other approvals	June 2108 - August 2018
4	Data collection	September 2018- April 2019
5	Data analysis and write up	May 2018 - July 2019
6	Submit portfolio	July 2019 - August 2019

6.0 Practical Applications

This study has the potential to provide many practical benefits to those individuals within CJSW with residual impairment and disability from HI. CJSW conduct some of the earliest assessments with individuals following arrest. Allowing equality of service for those receiving a community sentence over custodial and earlier intervention, adaptation and support. This could provide the opportunity for CJSW to consider whether the HI had an

impact on the offence, whether impairment would impact on the individual's ability to engage in rehabilitation programs and suitability of disposal. Also, to highlight adaptations for the individual to manage the environment within prison (self-care, engagement, adherence, behavioural control). It also has the potential to reduce re-offending and inform future care and management on exit of CJSW. Findings from this study will be disseminated through a thesis submitted to the University of Glasgow and to CJSW Leads.

End of Proposal

References

Burgess, P.W., Alderman, N., Evans, J., Emslie, H., and Wilson, B.A (1998). The ecological validity of tests of executive function. *Journal of the International Neuropsychological Society*, 4(06), pp 547-558.

Burgess, P. W., and Shallice, T (1997). The Hayling and Brixton Tests. *Thurston, Suffolk:* Thames Valley Test Company.

Farrer, T. J., & Hedges, D. W (2011). Prevalence of traumatic brain injury in incarcerated groups compared to the general population: A meta-analysis. *Progress in Neuro-Psychopharmacology & Biological Psychiatry,* 35(2), pp.390-394.

Faul, F., Erdfelder, E., Lang, A., & Buchner, A (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175-191.

Green, P., Lees-Haley, P.R, and Allen, L.M (2003). The Word Memory Test and validity of neuropsychological test scores. *Journal of Forensic Neuropsychology,* 2, pp97-124.

Health and Sport Committee (2017). Healthcare in Prisons. 5th Report (session 5).

Mair, G (2004). What Matters in Probation. *Willan Publishing*, Devon.

McGinley, A (2017). Validating the Brain Injury Screening (BISI) and the Ohio State University Traumatic Brain Injury Identification Method (OSU TBI-ID) as screening tools for head injury in a Scottish prison setting. *D Clin Psy Thesis, University of Glasgow*.

McIsaac, K. E., Moser, A., Moineddin, R., Keown, L. A., Wilton, G., Stewart, L. A., et al (2016). Association between traumatic brain injury and incarceration: a population-based cohort study. *CMAJ open*, 4(4), E746-E753.

National Prisoner Healthcare Network (2016). National Prisoner Healthcare Network: Brain Injury and Offending Report.

Pitman, I., Haddlesey, C., Ramos, S. D. S., Oddy, M., & Fortescue, D (2015). The association between neuropsychological performance and self-reported traumatic brain injury in a sample of adult male prisoners in the UK. *Neuropsychological Rehabilitation*, 25(5), 763–779.

Sapouna, M., Bisset, C., Conlong, A., Matthews, B (2015). What works to reduce reoffending: A summary of the evidence. Justice Analytical Services: Scottish Government.

Scottish Government (2010). National Outcomes and Standards for Social Work Services in the Criminal Justice System: Criminal Justice Social Work Reports and Court-Based Services Practice Guidelines.

Shiroma, E. J., Ferguson, P. L., and Pickelsimer, E. E (2012). Prevalence of traumatic brain injury in an offender population: A meta-analysis. *Journal of Head Trauma Rehabilitation*, 27(3), E1-E10.

Stuss, D. T., and Levine, B (2002). "Adult clinical neuropsychology: lessons from studies of the frontal lobes." *Annual Review of Psychology*, pp. 401

Walker, Vicky (2017). The prevalence of cognitive impairment and disability associated with head injury in Scottish prisoners. *D Clin Psy Thesis, University of Glasgow*.

Whitnall, L., McMillan, T. M., Murray, G. D., & Teasdale, G. M (2006). Disability in young people and adults after head injury: 5–7 year follow up of a prospective cohort study. *Journal of Neurology, Neurosurgery & Psychiatry*,77(5), pp.640-645

Whelan-Goodison, R., Ponsford, J., and Schonberger, M (2009b). Validity of the Hospital Anxiety and Depression Scale to assess depression and anxiety following traumatic brain injury as compared with the structured clinical interview for DSM-IV. *Journal of Affective Disorders,* 114, pp94-102.

Williams, H (2012). Repairing Shattered Lives: Brain injury and its implications for criminal justice. Centre for Clinical Neuropsychology Research. University of Exeter. Commissioned by the Barrow Cadbury Trust.

Williams, W. H., Mewse, A. J., Tonks, J., Mills, S., Burgess, C. N. W., & Cordan, G (2010). Traumatic brain injury in a prison population: Prevalence and risk for re-offending. *Brain Injury*, 24(10), 1184–1188.

Wilson, J.T., Pettigrew, L.E., and Teasdale, G.M (1998). Structured interviews for the Glasgow outcome scale and the extended Glasgow outcome scale: guidelines for their use. *Journal of Neurotruama,* 15, pp573-585.

Appendix 1

Justification of Suitability and Validity of Assessment Measures

Head Injury Screening Tool:

Ohio State University Traumatic Brain Injury Identification Method Short Version

This tool uses self-report and is completed through structured interview. It has 5 questions to identify if an individual is 'likely' or 'not likely' to have ongoing problems because of HI. In a study using a Scottish prison sample (McGinley, 2017) large effect sizes were found between the measure and disability (r=-0.41, n=41, p=0.01), cognitive functioning (r=-0.44, n=39, p-0.01), anxiety (r=0.43, n=41, p=0.01) and depression (r=0.55, n=41, p-=0.01).

Measure of Disability:

Glasgow Outcome Scale – Extended

This tool uses self-report and is completed through structured interview. It assesses disability outcome after HI within community settings with 8 outcome categories. It has been found to have various effect sizes, from small (r=0.22) to large (r=0.72), across several health and disability measures.

Mental Health Screen:

Hospital Anxiety and Depression Scale

This tool uses self-report and is completed through structured interview. It has 14 questions to assess anxiety and depression. It has been found to have good reliability and validity for people with HI (Whelan-Goodson, Ponsford & Schonberger, 2009).

Cognitive Tests:

Adult Memory and Information Processing Battery (List Learning Subtest)

This tool asks participants to recall 15 unrelated words (which are read to them) over 5 learning trials. It assesses memory and information processing. Interference is created through a second list prior to recall. Those with HI have been found to perform below norms and with large effect sizes (Lezak, 2012).

Symbol Digit Modalities Test

This tool asks participants to identify and write the correct number (1-9) that corresponds with the symbol above it. They are allowed 90 seconds to complete as many as possible. It assesses information processing, attention, visual scanning and motor speed. It has been shown to be sensitive to the effects of HI The Symbol Digit Modalities Test (SDMT, Smith 1982) assesses information processing, attention, visual scanning and motor speed. It requires participants to identify nine different symbols which correspond with numbers 1-9. They are given ninety seconds to write the correct number under the symbol. It has been shown to have high test-retest reliability and is sensitive to the effects of Head Injury (Strauss et al, 2006) and has high test-retest reliability.

Trail Making Test

This tool is completed in 2 parts and scored by the time taken to complete each part and correct mistakes. Part 1 asks participants to connect circled numbers by drawing a continuous line, part 2 asks them to connect both circled numbers and letters. This tool

assesses executive functioning. Good sensitivity for neurological disorders has been found (Burgess et al, 1998).

Dysexecutive Questionnaire (part of Behavioural Assessment of Dysexecutive Syndrome)

This tool is a 20 item questionnaire that can be self-report or completed by someone who knows the participant well. It assesses cognitive, behavioural and emotional changes in everyday life following HI. Reliability is shown to be improved when completed by someone other than the participant (Wilson et al, 1996).

Test of Effort:

Word Memory Test

This tool asks participants to learn and then immediately recall 20 word pairs. This is followed by a recognition task after 30 minutes and a paired associated task. It assesses effort and verbal memory. Sensitivity has been found to be excellent and it is well validated in forensic samples (Green et al, 2002).

Appendix 2

Plain English Summary

Title:

Establishing prevalence of head injury and associated disability in individuals being assessed by a pre-sentencing Criminal Justice Social Work Report.

Introduction:

Head injury (HI) can result in serious deficits in how an individual can think, remember, behave, interact and manage their emotions. These deficits and changes can sometimes be serious enough to be considered a life-long disability. It is thought that a disproportionate number of people within the offender population have experienced a HI in their lifetime and several studies have looked at prevalence rates within prisons. For this reason, The National Prisoner Healthcare Network were asked by the Scottish Government to investigate the level and impact of disability caused by HI in offender populations. A recommendation from the NPHN was to introduce and evaluate screening for HI in criminal justice social work, in particular when Social Workers are asked to compile a criminal justice social work report to the court. Identifying significant HI and disability at this stage may help to contribute towards developing suitable pathways and intervention for individuals.

Aims and Hypothesis:

This study looks to establish the prevalence of significant HI within offenders completing a criminal justice social work report. It also looks to establish how many individuals with significant HI have disability

caused by the injury, what that disability looks like and how it differs from others within the offender population. It is predicted that:

- Disability is more likely in those who have experienced a significant HI
- Those who have experienced HI have higher rates of re-offending
- Those who have experienced HI are more likely to have higher rates of substance misuse

Methods:

Adult (over age of 18) males and females will be asked to take part in the study. They will be recruited from at least one Criminal Justice Social Work board. All participants will be asked by a social worker if they would like to take part in a study about health in offenders. People will not be able to take part if they are not fluent in English, have a deteriorating cognitive condition, have serious mental health difficulties or pose a significant risk to the researchers.

Measurements:

Participants will be asked to take part in an interview and various brief assessments with one of three researchers (including the author, another DClinPsy trainee and a research assistant). It is anticipated this should take between 60-90 minutes however, may vary depending on individual need.

The Ohio State University Traumatic Brain Injury Identification Method (OSU TBI-ID) will be used to identify those who have experienced a significant HI (defined as loss of consciousness of 30 minutes or more). This will put participants into two groups (significant HI and non-significant/no HI) for comparison across disability measures.

Ethics:

Relevant ethical approval will be sought from the social work department and Scottish Prison Service. Confidentiality limits will be discussed with all participants and data protection procedures will be adhered to. All participants will be provided with an information sheet about the study and complete a consent form. The vulnerable nature of potential participants is noted, and attention will be paid to obtaining fully informed consent to respect their dignity and avoid feelings of obligation to participate (participation will have no impact, positive or negative, on the report compiled by social work or outcome in court).

Applications:

This study will help to understand if those who have experienced a significant HI differ in terms of type and severity of disability to those who have not. This information can then be used to help identify relevant pathways and interventions that could better support these individuals, both within a community and prison setting.

References:

National Prisoner Healthcare Network. (2014). National Prisoner Healthcare Network - Brain Injury and Offending. NPHN.